



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

August 7, 2008

Mr. Timothy G. Mitchell  
Vice President Operations  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 S.R. 333  
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE - NRC INTEGRATED INSPECTION  
REPORT 05000313/2008003 AND 05000368/2008003

Dear Mr. Mitchell:

On June 23, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One, Units 1 and 2, facility. The enclosed integrated report documents the inspection findings, which were discussed on July 10, 2008, with you and other members of your staff.

The inspection examined activities conducted under your licenses as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your licenses. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

This report documents seven NRC-identified findings and two self-revealing findings. All of these findings were evaluated under the significance determination process as having very low safety significance (Green). Seven of these findings were determined to involve violations of NRC requirements. Additionally, two licensee-identified violations, which were determined to be of very low safety significance, are also listed in this report. However, because of the very low safety significance and because they are entered into your corrective action program, the NRC is treating these findings as NCVs consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission Region IV, 612 E. Lamar Ave, Suite 400, Arlington, Texas 76011-4125; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspectors at Arkansas Nuclear One, Units 1 and 2, facility.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Wayne Walker  
Acting Chief, Project Branch E  
Division of Reactor Projects

Dockets: 50-313  
50-368

Licenses: NPF-51  
NPF-6

Enclosure:

NRC Inspection Report 05000313/2008003 and 05000368/2008003  
w/attachment: Supplemental Information, Maintenance Rule Online Risk Monitor - Effect of  
Switchyard Activities

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SUNSI Review Completed: WCW ADAMS:  Yes  No Initials: WCW  
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RI:DRP/E	SRI:DRP/E	C:DRS/OB	C:DRS/PSB1
JEJosey	AASanchez	RELantz	MPShannon
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C:DRS/EB1	C:DRS/EB2	C:DRS/PSB2	C:DRP/E
RLBywater	NFO'Keef	GEWerner	WCWalker
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**U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV**

Dockets: 50-313, 50-368

Licenses: NPF-51, NPF-6

Report: 05000313/2008003 and 05000368/2008003

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: Junction of Hwy. 64W and Hwy. 333 South  
Russellville, Arkansas

Dates: March 24, 2008 through June 23, 2008

Inspectors: A. Sanchez, Senior Resident Inspector  
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J. Josey, Resident Inspector  
C. Young, P.E., Resident Inspector  
W. Sifre, Senior Reactor Inspector  
S. Graves, Reactor Inspector  
L. Ricketson, P.E., Senior Health Physicist  
P. Elkmann, Senior Emergency Preparedness Inspector  
G. Apper, Operations Engineer  
S. Alferink, Reactor Inspector  
G. George, Reactor Inspector  
S. Makor, Reactor Inspector

Approved By: Wayne Walker, Chief, Project Branch E  
Division of Reactor Projects

## SUMMARY OF FINDINGS

IR 05000313/2008003, 05000368/2008003; 03/24/08 - 06/23/08; Arkansas Nuclear One, Units 1 and 2; Integrated Resident Report; Maint. Effectiveness, Maint. Risk Assess. and Emergent Work, Outage Activities, Occup. RP, PI&R, Event Follow Up, Other Activities.

This report covered a 3-month period of inspection by resident inspectors, six regional inspectors, and one Nuclear Professional Development Participant. The inspection identified nine Green findings, seven of which were NCVs. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) using Inspection Manual Chapter 0609, "Significance Determination Process." Findings for which the significance determination process does not apply may be Green or be assigned a severity level after NRC management's review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

### A. NRC-Identified and Self-Revealing Findings

#### Cornerstone: Initiating Events

- Green. The inspectors documented a self-revealing finding for emergent work performed outside of the original work scope that led to the loss of the Pleasant Hills 500 kV power line. Entergy switchyard technicians, while working on a switchyard breaker, stepped outside the bounds of the Arkansas Nuclear One work order and caused another breaker to trip. Consequently, the load dispatcher requested that the plant reduce the output power level and the licensee down-powered both units. The licensee entered the issue into the corrective action program as CR ANO-C-2008-1053, immediately stopped work in the switchyard, performed a stand down to reemphasize work procedures and expectations, and instituted supervisory tours of the work in the switchyard until the work was complete.

The finding was more than minor because it was associated with the human error attribute and affected the Initiating Event Cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. The significance of the finding was assessed using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet. The finding was of very low safety significance (Green) because it did not contribute to the likelihood that mitigation equipment or functions would not be available. The finding had a cross-cutting aspect in the area of Human Performance associated with work practices because the licensee did not ensure supervisory and management oversight of work activities, including Entergy transmission network technicians, in the switchyard such that nuclear safety was supported [H.4.(c)](Section 4OA3).

#### Cornerstone: Mitigating Systems

- Green. The inspectors documented a self-revealing noncited violation of Technical Specification 6.4.1.a, "Procedures," for an inadequate Unit 2 low pressure safety injection discharge check valve assembly procedure. Specifically, during Refueling Outage 2R18 (Fall 2006) the Train A pump

discharge check valve was incorrectly assembled such that it would not fully close. Subsequently, during Refueling Outage 2R19 (Spring 2008), operations swapped decay heat removal from Train A to Train B and noticed reverse flow through the Train A pump, indicating that the discharge check valve was not fully closed. The licensee determined that the safety function of the valve was maintained because the valve still limited sufficient reverse flow through the Train A pump such that Train B pump remained operable. Operability of the Train A pump was not affected. A contributor to the violation included inadequate postmaintenance testing following refueling outage 2R18 work. The licensee entered the issue into the corrective action program as CR ANO-2-2008-0422 and implemented compensatory measures as appropriate. The licensee performed corrective maintenance, successfully completed post maintenance testing, and returned the system to service.

The finding was more than minor because it was similar to nonminor Example 5.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the valve was installed incorrectly during Unit 2 Refueling Outage 2R18 and then the system was subsequently returned to service with the faulty component. The finding was of very low safety significance because the Train B LPSI pump remained operable. The inspectors determined that this particular finding did not have a cross-cutting aspect because the inadequate procedure was in place for eight years, which is not indicative of current plant performance (Section 1R20.1).

- Green. The inspectors identified a noncited violation of 10 CFR 50.65 (a)(2) for the licensee's failure to demonstrate that alternate AC diesel generator performance was being effectively controlled through preventative maintenance. The licensee maintained the diesel generator in a Maintenance Rule a(2) status but the diesel had suffered ten functional failures (for Maintenance Rule scoped functions) between April 2006 through March 2008. Functional failures included 8 failures of the starting air compressor and 2 failures of building ventilation. The licensee maintained separate performance criteria for these components but had failed to properly characterize the malfunctions as Maintenance Rule functional failures. The licensee entered this issue in their corrective action program as CR ANO-2-2008-1265.

The finding was more than minor because it was similar to non-minor Maintenance Rule Example 7.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the problem involved degraded equipment performance. This finding had very low safety significance because the finding did not lead to an actual loss of safety function or cause the diesel to be inoperable, nor did it screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had a cross-cutting aspect in the area of Human Performance associated with decision making [H.1(b)], in that engineers failed to verify the validity of the underlying assumptions for compressor and building ventilation functional failures when evaluating preventative maintenance effectiveness (Section 1R12.1).

- Green. The inspectors identified a noncited violation of 10 CFR 50.65 (a)(2) for the licensee's failure to demonstrate that Unit 2 service water intake structure roof drains performance was being effectively controlled through preventive maintenance. Specifically, the licensee has never tested or checked the drains

for blockages. The failure (or blockage) of the drains could result in channeling water to the service water pump motors during design basis rain events. The licensee entered this issue in their corrective action program as Condition Report ANO-2-2008-1302.

The finding was more than minor because it was similar to nonminor Maintenance Rule Example 7.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the problem could involve degraded equipment performance. This finding had very low safety significance because the failure to properly categorize failures in accordance with the Maintenance Rule Program did not create, in itself, additional operability or functionality concerns. The inspectors determined that the finding did not have a crosscutting aspect because the opportunity to identify that performance monitoring was inadequate had not occurred recently and therefore was not indicative of current licensee performance (Section 1R12.2).

- Green. The inspectors identified a finding because the "Fix-it-Now" team failed to follow site procedures when working on high energy line break barrier Door 62, which protected one train of the Unit 1 emergency switchgear. While performing troubleshooting activities on the door to determine the cause of the previous failure associated with the operating mechanism, the team maintained the door open for approximately 15 minutes and made an on the spot decision to turn this troubleshooting activity into "minor maintenance," which was not permitted in this instance. In addition, the team failed to: (1) obtain an approved work order; and (2) inform the control room of the activity, which would have required entry into an 8.0 hour Technical Specification shutdown action statement. The licensee entered this issue in their corrective action program as Condition Report ANO-1-2008-0603.

The finding was more than minor because, if left uncorrected, it could result in a more significant concern. Specifically, by circumventing site procedural requirements, the "Fix-it-Now" team could render more risk significant equipment inoperable without the knowledge and approval of site management or control room personnel. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, this finding was determined to have very low safety significance because: (1) the finding was a qualification deficiency that resulted in a loss of functionality of Door 62; (2) it did not lead to an actual loss of safety function of the system or train; (3) it did not result in the loss of one or more trains of non-Technical Specification equipment; (4) it did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding was determined to have a crosscutting aspect in the area of Human Performance associated with Work Control [H.3(b)], in that the licensee did not appropriately coordinate work activities associated with Door 62 by incorporating actions to address the impact of changes to the work scope on the plant, and the need to keep personnel apprised of work status and the operational impact of work activities (Section 1R13).

- Green. The inspectors identified a noncited violation involving the licensee's failure to adequately monitor the performance of the emergency switchgear chillers in accordance with 10 CFR 50.65 (a)(2). Specifically, while re-evaluating the systems' performance for 10 CFR 50.65 (a)(1) status as a corrective action in response to a previous noncited violation for failure to adequately monitor the



performance of the system, the licensee inappropriately determined that two independent functional failures should be counted as one based on time between failures. The extra failure would have resulted in exceeding the licensee's performance criteria for these components. The licensee entered this issue in their corrective action program as Condition Report ANO-1-2008-0360.

The finding was more than minor because it was similar to nonminor Maintenance Rule Example 7.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the failure to demonstrate effective control of performance or condition and not putting the affected structure, system or component in (a)(1), necessarily involved degraded system performance. This finding had very low safety significance because the failure to properly categorize failures in accordance with the Maintenance Rule Program did not create, in itself, additional operability or functionality concerns. This finding was determined to have a cross-cutting aspect in the area of Human Performance associated with Decision Making [H.1(b)], in that the licensee did not use conservative assumptions and failed to verify the validity of the underlying assumptions used when evaluating the performance criteria of the emergency switchgear chillers for classification as 10 CFR 50.65 (a)(1) status (Section 4OA2).

- Green. The inspectors identified a noncited violation of 10 CFR Part 50, Appendix R, Section III.J, with two examples for inadequate preventive maintenance activities that resulted in 90 emergency light failures between January 2005 and December 2007. The first example related to inadequate preventive maintenance activities that resulted in the failure of 15 emergency light batteries. The second example related to inadequate preventive maintenance activities that resulted in the failure of 75 emergency light lamps. The licensee has entered these conditions in their corrective action program as CR ANO-C-2007-1646.

The finding was more than minor since it was associated with the Mitigating Systems Cornerstone attribute of protection from external factors and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this finding adversely affected the ability of operators to access and align equipment necessary for safe shutdown in the event of a fire requiring evacuation of the control room. The significance of this finding was assessed using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." The finding was determined to be of very low safety significance (Green) because it was determined to be a low degradation of the post-fire safe shutdown category. In addition, operators were procedurally required to carry flashlights. This finding was determined to have a crosscutting aspect of Human Performance in that the licensee failed to appropriately plan work activities to support long-term equipment reliability. Specifically, the maintenance scheduling was more reactive than preventive [H.3(b)] (Section 4OA5.3)

Cornerstone: Barrier Integrity

- Green. The inspectors identified a Green noncited violation of Unit-2 Technical Specification 6.4.1.a, "Procedures," associated with the licensee's failure to

maintain containment closure capability as required by Station Procedure OP-1015.008, "Unit 2 SDC Control," Revision 23. The licensee was installing a "Hawke seal" at Containment Penetration 2P-53 to support outage work. However, seal installation would take approximately 1 hour and none of the workers had been designated as the responsible individual nor had the required materials been staged to ensure that they could accomplish containment closure in no more than 30 minutes. At the time, the estimated time to reactor coolant system boiling (assuming a loss of mitigating equipment) was 18 minutes. The licensee entered this issue in their corrective action program as Condition Report CR ANO-2-2008-0461.

The finding was greater than minor because it affected the configuration control attribute of the barrier integrity cornerstone, and it directly affected the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process," the inspectors determined that a Phase 2 evaluation was required. The inspectors performed a Phase 2 analysis using Appendix H, Table 6.4, "Phase 2 Risk Significance-Type B Findings at Shutdown," and determined the finding was of very low safety significance (Green) because there was no mitigating equipment out of service and the finding existed for less than 8 hours. The finding had a crosscutting aspect in the area of Human Performance associated with the resources component [H.2(c)], because the licensee failed to provide complete, accurate and up-to-date procedures and work packages for the installation of the Hawke seal which ensured that the ability to maintain containment closure was directed (Section 1R20.2).

Cornerstone: Occupational Radiation Safety

- Green. The inspectors identified a noncited violation of Technical Specification 6.4.1 which resulted from workers failing to follow procedural requirements. On March 25, 2008, two workers entered the radiologically controlled area, dressed in protective clothing, then exited through a door marked "No Exit." There was a previous, similar occurrence on March 23, 2008. The licensee counseled the workers and documented the occurrences in the corrective action program as CR ANO-2-2008-00789.

The finding is greater than minor because it was associated with an Occupational Radiation Safety Cornerstone attribute (exposure control) and it affected the associated cornerstone objective because the failure to use the personnel contamination monitors could result in increased personnel dose and the release of radioactive material. Using the Occupational Radiation Safety Significance Determination Process, the inspectors determined the finding had very low significance because: (1) it was not an ALARA finding, (2) there was no overexposure, (3) there was no substantial potential for an overexposure, and (4) the ability to assess dose was not compromised. Additionally, the finding had a crosscutting aspect in the area of Human Performance, Work Practice Component, because the workers did not use self- or peer-checking as a human error prevention technique [H.4(a)] (Section 2OS1).

B. Licensee-Identified Violations

Violations of very low safety significance which were identified by the licensee have been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. These violations and their corrective actions are listed in Section 4OA7 of this report.

## REPORT DETAILS

### Summary of Plant Status

Arkansas Nuclear One (ANO) Unit 1 began the reporting period at 100 percent power. On April 20, 2008, Unit 1 reduced reactor power to approximately 40 percent due to high temperatures in the Main Feedwater Pump A bearing rapidly increasing. Following repair of the feedwater pump bearing temperature indication, the unit was returned to 100 percent on April 21. On May 2, 2008, the load dispatcher requested ANO to reduce electrical output by 100 We. Unit 1 reduced power to approximately 88 percent power. On May 7, Unit 1 returned to 100 percent power. On May 16, Unit 1 again was requested to rapidly reduce power to approximately 60 percent power due to the loss of the 500 kV Mablevale power line from a ground fault approximately 70 miles away. The fault was cleared, and the unit returned to 100 percent power that evening. On May 24, due to maintenance action in the ANO switchyard that caused the loss of the Pleasant Hills 500 kV line, ANO was asked to rapidly reduce total electrical load to reduce stress on the remaining 500 kV power line. Unit 1 reduced power to approximately 48 percent power. Following correction of the maintenance, the power line was restored and the unit was returned to 100 percent power on that same evening. Unit 1 continued to operate at essentially 100 percent reactor power for the remainder of the inspection period.

ANO Unit 2 began the inspection period in a planned Refueling Outage 2RF19. Unit 2 commenced reactor startup on April 10, 2008, and closed output breakers at 11:47 p.m. that same evening. Unit 2 achieved full power, 100 percent, on April 13. On May 24, Unit 2 reduced reactor power to approximately 95 percent power due to maintenance action in the ANO switchyard which caused the loss of the Pleasant Hills 500 kV line. The unit returned to 100 percent power later that same day following power line restoration. Unit 2 continued to operate at essentially 100 percent power for the remainder of the inspection period.

#### 1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01)

##### Summer Readiness of Offsite and Alternate AC Power Systems

##### a. Inspection Scope

The inspectors reviewed licensee's procedures regarding communication protocols between the transmission system operator (TSO) and the nuclear power plant to verify that appropriate information is exchanged when issues arise that could impact the offsite power system. The inspectors also verified that these procedures address measures to monitor and maintain availability and reliability of both the onsite AC power system and the onsite alternate AC power system. Specifically, the inspectors ensured that licensee procedures address:

- Actions to be taken when notified by TSO that posttrip voltage will not be acceptable to assure continued operation of safety-related loads without transferring to onsite power supply

- Compensatory actions to be performed if it is not possible to predict the posttrip voltage for the current grid conditions
- Required reassessment of plant risk based on maintenance activities which could affect grid reliability or the transmission system to provide offsite power
- Required communications between the licensee and the TSO when changes at the nuclear power plant could impact the transmission system or when the capability of the transmission system is challenged

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Equipment Walkdown

a. Inspection Scope

The inspectors: (1) walked down portions of the four below listed risk important systems and reviewed plant procedures and documents to verify that critical portions of the selected systems were correctly aligned; and (2) compared deficiencies identified during the walk down to the licensee's Updated Final Safety Analysis Report (UFSAR) and the corrective action program (CAP) to ensure problems were being identified and corrected.

- April 5, 2008, Unit 2, nuclear loop component cooling water following failure of Component Cooling Water Pump B
- April 10, 2008, Unit 2, spent fuel pool cooling
- May 14, 2008, Unit 2, Vacuum Pump B during maintenance on the Pump A
- June 17, 2008, alternate AC diesel, in accordance with Procedure OP-2104.037, "Alternate AC Diesel Generator Operations," Revision 14, while the Unit 2 Train B emergency diesel generator was out-of-service for extended maintenance

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

.2 Complete Equipment Walkdown (71111.04S)

a. Inspection Scope

During the weeks of June 9 and June 16, 2008 the inspectors: (1) reviewed plant procedures, drawings, the UFSAR, Technical Specifications (TSs), and vendor manuals to determine the correct alignment of the Unit 1 station service water system; (2) reviewed outstanding design issues, operator work arounds, and UFSAR documents to determine if open issues affected the functionality of the Unit 1 station service water system; and (3) verified that the licensee was identifying and resolving equipment alignment problems.

Documents reviewed by the inspectors included:

- Procedure OP-1104.029, "Service Water and Auxiliary Cooling System," Revision 69
- UFSAR, Section 9.3, "Cooling Water Systems"
- Drawing M-209, Sheets 1-4, Revision 15
- Drawing M-210, Sheet 1, Revision 146

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

Quarterly Inspection (71111.05Q)

a. Inspection Scope

The inspectors walked down the six plant areas listed below to assess the material condition of active and passive fire protection features and their operational lineup and readiness. The inspectors: (1) verified that transient combustibles and hot work activities were controlled in accordance with plant procedures; (2) observed the condition of fire detection devices to verify they remained functional; (3) observed fire suppression systems to verify they remained functional and that access to manual actuators were unobstructed; (4) verified that fire extinguishers and hose stations were provided at their designated locations and that they were in a satisfactory condition; (5) verified that passive fire protection features (electrical raceway barriers, fire doors, fire dampers steel fire proofing, penetration seals, and oil collection systems were in a satisfactory material condition; (6) verified that adequate compensatory measures were established for degraded or inoperable fire protection features and that the compensatory measures were commensurate with the significance of the deficiency; and (7) reviewed the UFSAR to determine if the licensee identified and corrected fire protection problems.

- April 7, 2008, Unit 2, Fire Zone 2024-JJ, Emergency Feedwater Pump A room
- April 16, 2008, Unit 2, Fire Zone 2007-LL, East pump area and gallery

- April 29, 2008, Unit 1, Fire Zone 100-N, South switchgear room
- May 2, 2008, Unit 2, Fire Zone 2114-I, Emergency diesel generator intake area
- May 2, 2008, Unit 2, Fire Zone 2093-P and 2094-Q, North and South diesel generator room
- June 17, 2008, alternate alternating current (AAC) diesel generator

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R08 Inservice Inspection Activities (71111.08)

.1 Inspection Activities Other Than Steam Generator Tube Inspection, PWR Vessel Upper Head Penetration Inspections, Boric Acid Corrosion Control

a. Inspection Scope

The inspection procedure requires review of two or three types of nondestructive examination (NDE) activities and, if performed, one to three welds on the reactor coolant system (RCS) pressure boundary. Also review one or two examinations with relevant indications that have been accepted by the licensee for continued service.

The inspectors directly observed the following nondestructive examinations:

<u>System</u>	<u>Weld Identification</u>	<u>Exam Type</u>
Essential Service Water	73-SWS-R-12A-33	Ultrasonic Test (UT)
Essential Service Water	73-SWS-R-12A-34	UT

The inspectors reviewed records for the following nondestructive examinations:

<u>System</u>	<u>Identification</u>	<u>Exam Type</u>
Control Element Drive Mechanism	CEDM Nozzle 69	Penetrant Test (PT)
Control Element Drive Mechanism	CEDM Nozzle 80	PT
Control Element Drive Mechanism	CEDM Nozzle 81	PT

During the review and observation of each examination, the inspectors verified that activities were performed in accordance with ASME Boiler and Pressure Vessel Code requirements and applicable procedures. Indications were compared with previous

examinations and dispositioned in accordance with ASME Code and approved procedures. The qualifications of all NDE technicians performing the inspections were verified to be current.

None of the above observed or reviewed NDEs identified any relevant indications and cognizant licensee personnel stated that no relevant indications were accepted by the licensee for continued service.

Three examples of weld overlays on the RCS were examined through direct observation and record review as follows:

<u>System</u>	<u>Component/Weld Identification</u>
Reactor Coolant	Hot Leg Drain 2CCA-32
Reactor Coolant	Pressurizer Surge Nozzle 2BCA-1
Reactor Coolant	Shutdown Cooling Nozzle 2CCA-25

The inspectors verified, by reviewing the welding procedure specifications and the welders had been properly qualified in accordance with ASME Code, Section IX, requirements. The inspectors also verified, through observation and record review, that essential variables for the welding process were identified, recorded in the procedure qualification record, and formed the bases for qualification of the welding procedure specifications.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample under Section 02.01.

b. Findings

No findings of significance were identified.

.2 Vessel Upper Head Penetration (VUHP) Inspection Activities

a. Inspection Scope

The licensee performed the required visual inspection of pressure-retaining components above the reactor pressure vessel head. The results of this inspection confirmed that there was no evidence of leaks or boron deposits on the surface of the reactor pressure vessel head or related insulation. The personnel performing the visual inspection were certified as Level II and Level III Visual Test (VT-2) examiners.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample under Section 02.02.

b. Findings

No findings of significance were identified.



.3 Boric Acid Corrosion Control Inspection Activities

a. Inspection Scope

The inspectors evaluated the implementation of the licensee's boric acid corrosion control program for monitoring degradation of those systems that could be adversely affected by boric acid corrosion.

The inspection procedure required review of a sample of boric acid corrosion control walkdown visual examination activities through either direct observation or record review. The inspectors reviewed the documentation associated with the licensee's boric acid corrosion control walkdown as specified in Procedure EN-DC-319, "Inspection and Evaluation of Boric Acid Leaks," Revision 3. Visual records of the components and equipment were also reviewed by the inspectors. The inspection procedure required verification that visual inspections emphasize locations where boric acid leaks can cause degradation of safety significant components. The inspectors verified through record review that the licensee's boric acid corrosion control inspection efforts are directed towards locations where boric acid leaks can cause degradation of safety-related components. On those components where boric acid was identified, the engineering evaluations gave assurance that the ASME Code wall thickness limits were properly maintained. The evaluations also confirmed that the corrective actions performed for evidence of boric acid leaks were consistent with requirements of the ASME Code.

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed one sample under Section 02.03.

b. Findings

No findings of significance were identified.

.4 Steam Generator Tube Inspection Activities

a. Inspection Scope

The inspection procedure specified performance of an assessment of in situ screening criteria to assure consistency between assumed nondestructive examination flaw sizing accuracy and data from the Electric Power Research Institute examination technique specification sheets. It further specified assessment of appropriateness of tubes selected for in situ pressure testing, observation of in situ pressure testing, and review of in situ pressure test results.

The licensee did not perform steam generator inspection activities during this refueling outage.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program (71111.11)

Resident Inspectors Quarterly Review (71111.11Q)

a. Inspection Scope

On May 13, 2008, the inspectors observed a dynamic exam scenario, in which, the operations crew responded to a loss of both DC and AC power to the integrated control system and a tube rupture in the Once Through Steam Generator A on the Unit 1 simulator. The inspectors' observations included: formality and clarity of communications, group dynamics, conduct of operations, procedure usage, command and control, and activities associated with the emergency plan. The inspectors also verified that evaluators and operators were identifying crew performance problems as applicable.

The inspectors also attended operator requalification training pertaining to the electrical distribution system, specifically the 161 kV and 500 kV switchyards on April 30, 2008.

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the maintenance activity listed below to: (1) verify the appropriate handling of SSC performance or condition problems; (2) verify the appropriate handling of degraded SSC functional performance; (3) evaluate the role of work practices and common cause problems; and (4) evaluate the handling of SSC issues reviewed under the requirements of the Maintenance Rule, 10 CFR Part 50, Appendix B, and TSs.

- May 18, 2008, Unit 2, Structures walls and supports
- June 23, 2008, Unit 2, Alternate AC diesel generator

The inspectors completed two samples.

b. Findings

(1) Failure to Adequately Monitor the Performance of the AAC Diesel Generator

Introduction. The inspectors identified a Green noncited violation (NCV) of 10 CFR 50.65 (a)(2) for the licensee's failure to demonstrate that AAC diesel generator performance was being effectively controlled through preventative maintenance. The licensee maintained the diesel generator in a Maintenance Rule a(2) status but the diesel had suffered ten functional failures (for Maintenance Rule scoped functions) between April 2006 through March 2008. Functional failures included 8 failures of the starting air compressor and 2 failures

of building ventilation. The licensee maintained separate performance criteria for these components but had failed to properly characterize the malfunctions as Maintenance Rule functional failures.

Description. While reviewing the licensee's Maintenance Rule scoping, classification and functional failure history of the AAC diesel generator, which encompasses the diesel starting air system, as well as,, ventilation equipment associated with the AAC diesel generator building, the inspectors identified several instances where apparent functional failures were not being properly categorized as such. Specifically, eight apparent functional failures of the starting air compressor had occurred from June 2006 through March 2008, and two apparent functional failures of ventilation equipment associated with the AAC diesel generator building had occurred in April 2006, and none of these had been classified as Maintenance Rule functional failures by the licensee.

The inspectors reviewed the functional failure determinations performed by the licensee to determine the bases of the decision to not classify these failures as functional failures. For the starting air compressor, the licensee had determined that since there was no loss of Maintenance Rule function for the AAC diesel generator, the failures of the starting air compressor were not Maintenance Rule functional failures. The base of this determination was that the Maintenance Rule function of the AAC diesel generator is to provide an alternate source of vital power. Since the starting air receiver retained adequate pressure to start the AAC diesel generator these failures were not functional failures. The inspectors also noted that for the ventilation equipment associated with the AAC diesel generator building, the licensee had not reviewed these failures to determine if they were functional failures.

The inspectors questioned the licensee's bases for determining that the starting air failures were not Maintenance Rule functional failures based solely on the AAC diesel generator being able to perform its Maintenance Rule function because of the pressure in the starting air receiver. The inspectors noted that the licensee Maintenance Rule database contained specific performance criteria for the starting air system, less than three functional failures for the starting air system (i.e. compressor/air dryer) per rolling 18 months. The inspectors also took note of the fact that this performance criterion had been added in October 2003 specifically to track functional failures against the starting air system.

The inspectors also noted that the licensee had determined that the loss of AAC diesel generator exhaust fan, 2VEF17, was a functional failure because it resulted in the loss of Maintenance Rule function of the AAC diesel generator. Based on this, the inspectors determined that the loss of the AAC diesel generator switchgear room Exhaust Fan 2VEF-19 and Heat Pump 2VSF-32 would constitute functional failures because the loss of both of these appeared to result in a loss of Maintenance Rule function of the AAC diesel. As such, the inspectors concluded that the licensee had two unaccounted for Maintenance Rule functional failures.

The inspectors informed the licensee of their concerns. The licensee entered this into the CAP as CR ANO-2-2008-1265. Subsequently, the licensee determined that the eight failures of the AAC diesel generator starting air system, as well as, the two failures of the ventilation equipment associated with the AAC diesel generator building, were functional failures. This determination resulted in the AAC generator exceeding two separate performance criteria the licensee had established to monitor its performance. Based on this, the inspectors concluded that the numerous failures, that were improperly evaluated or not evaluated, should have resulted in the licensee placing the system into Maintenance Rule (a)(1) status.

Analysis. The inspectors determined that the failure of the licensee to effectively monitor the performance of the AAC diesel generator in accordance with 10 CFR 50.65 (a)(2) was a performance deficiency. The finding was more than minor because it was similar to nonminor Maintenance Rule, Example 7.b, in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the problem involved degraded equipment performance. This finding had very low safety significance because the finding did not lead to an actual loss of safety function or cause the diesel to be inoperable, nor did it screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding had a crosscutting aspect in the area of Human Performance associated with Decision Making [H.1(b)], in that engineers failed to verify the validity of the underlying assumptions for compressor and building ventilation functional failures when evaluating preventative maintenance effectiveness.

Enforcement. Title 10 CFR 50.65 (a)(1) requires, in part, that holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended safety functions. Title 10 CFR 50.65 (a)(2) requires, in part, that monitoring specified in paragraph (a)(1) is not required where it has been demonstrated the performance or condition of an SSC is being effectively controlled through appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, the licensee failed to demonstrate that performance of the AAC diesel generator was being effectively controlled through appropriate preventive maintenance. Specifically, repetitive functional failures associated with the AAC diesel generator from April 2006 through March 2008, demonstrated that the AAC diesel generator performance was not being controlled as required by 10 CFR 50.65 (a)(2). Because the finding is of very low safety significance and has been entered into the licensee's CAP as CR ANO-2-2008-1302, this violation is being treated as an NCV consistent with Section VIA of the Enforcement Policy: NCV 05000368/2008003-01, "Failure to Adequately Monitor the Performance of the Alternate AC Diesel Generator."

(2) Failure to Adequately Monitor the Performance of the Unit 2 Service Water Intake Structure Roof Drains

Introduction. The inspectors identified a Green NCV of 10 CFR 50.65 (a)(2) for the licensee's failure to demonstrate that Unit 2 service water intake structure roof drains performance was being effectively controlled through preventive maintenance. Specifically, the licensee has never tested or checked the drains

for blockages. The failure (or blockage) of the drains could result in channeling water to the service water pump motors during design basis rain events.

Description. While reviewing the licensee's Maintenance Rule scoping and classification of the facilities structural walls and supports, which encompasses the service water intake structures, the inspectors identified a concern with how the intake structure roof drains were being controlled. Specifically, the Maintenance Rule scoping document did not identify the roof drains as serving a Maintenance Rule function and there were no preventative maintenance actions for the licensee to verify that the roof drains were capable of performing their intended function of protecting the service water pumps during a flooding event.

The inspectors questioned this based on the physical construction of the intake structure roof and a review of Calculation 5.8.2, "Intense Precipitation on Roofs," Revision 0. Specifically, the Unit 2 intake structure roof has grating installed above each service water pump which is surrounded by curbing that is 6 inches high, and Calculation 5.8.2 identifies the maximum ponding depth for the roof of 14.7 inches during a flooding event. The inspectors also noted that the licensee had a current operability evaluation documented in Condition Report ANO-2-2008-0028, which established that as long as the roof drains are not clogged, water ponding on the intake structure roof during a flooding event would not reach a level sufficient to affect the operability of the service water pumps.

The inspectors informed the licensee of their concerns. Subsequently, the licensee determined that the Unit 2 intake structure roof drains were not explicitly included within the scope of the Maintenance Rule since a functional basis is used to determine what is within Maintenance Rule Scope. However, since the roof drains are considered to be part of the intake structure, which is a safety-related structure with a Maintenance Rule function to maintain structural integrity to protect safety-related equipment, specifically, those components related to the service water system, the roof drains are considered to be inherently within the scope of the Maintenance Rule. The licensee also determined that the only preventative maintenance actions associated with the drains was a visual inspection of the intake structure on a 5-year periodicity as detailed in Engineering Standard CES-19, "Maintenance Rule Structural Monitoring at Arkansas Nuclear One," Revision 4.

The inspectors reviewed Engineering Standard CES-19, and based on this review, as well as, discussions with personnel who perform the inspections, the inspectors determined that this visual inspection was not sufficient to demonstrate that the roof drains were capable of performing their intended function of protecting safety-related equipment. Specifically, personnel were not aware of the need to inspect the roof drains, and the inspectors determined that there were failure mechanisms that would not be apparent to a cursory visual inspection.

Analysis. The inspectors determined that the failure of the licensee to effectively monitor the performance of the Unit 2 service water intake structure roof drains in accordance with 10 CFR 50.65 (a)(2) was a performance deficiency. The finding was more than minor because it was similar to non-minor Maintenance Rule, Example 7.b, in NRC Manual Chapter 0612, Appendix E, "Examples of Minor

Issues," in that the problem could involve degraded equipment performance. This finding had very low safety significance because the failure to properly categorize failures in accordance with the Maintenance Rule Program did not create, in itself, additional operability or functionality concerns. The inspectors determined that the finding did not have a crosscutting aspect because the opportunity to identify that performance monitoring was inadequate had not occurred recently and therefore was not indicative of current licensee performance.

Enforcement. 10 CFR 50.65 (a)(1) requires, in part, that holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended safety functions. 10 CFR 50.65 (a)(2) requires, in part, that monitoring specified in paragraph (a)(1) is not required where it has been demonstrated the performance or condition of an SSC is being effectively controlled through appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, between November 1997 and March 2008, the licensee failed to demonstrate the performance of the Unit 2 service water intake structure roof drains were being effectively controlled through appropriate preventive maintenance. Specifically, the licensee failed to have appropriate preventative maintenance actions that would demonstrate that the intake structure roof drains were capable of performing their intended function of protecting safety-related equipment. Because the finding is of very low safety significance and has been entered into the licensee's CAP as CR ANO-2-2008-1302, this violation is being treated as an NCV consistent with Section VIA of the Enforcement Policy: NCV 05000368/2008003-02, "Failure to Adequately Monitor the Performance of the Unit 2 Service Water Intake Structure Roof Drains."

## 1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

### .1 Risk Assessment and Management of Risk

#### a. Inspection Scope

The inspectors reviewed the four assessment activities listed below to verify: (1) performance of risk assessments when required by 10 CFR 50.65 (a)(4) and licensee procedures prior to changes in plant configuration for maintenance activities and plant operations; (2) the accuracy, adequacy, and completeness of the information considered in the risk assessment; (3) that the licensee recognizes, and/or enters as applicable, the appropriate licensee-established risk category according to the risk assessment results and licensee procedures; and (4) that the licensee identified and corrected problems related to maintenance risk assessments.

- April 1, 2008, Unit 1, Circulating Water Bay C diving operations
- April, 25, 2008, Unit 2, Main Turbine Control Valve 2CV-0242
- April 30, 2008, Unit 1 Containment Spray Isolation Valve CV-2400 and Containment Spray Pump P-35B maintenance

- June 18, 2008, Unit 2 Train B emergency diesel generator outage concurrent with switchyard activities in the relay house

The documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

.2 Emergent Work Control

a. Inspection Scope

The inspectors: (1) verified that the licensee performed actions to minimize the probability of Initiating Events and maintained the functional capability of Mitigating Systems and Barrier Integrity systems; (2) verified that emergency work-related activities such as troubleshooting, work planning/scheduling, establishing plant conditions, aligning equipment, tagging, temporary modifications, and equipment restoration did not place the plant in an unacceptable configuration; and (3) reviewed the UFSAR to determine if the licensee identified and corrected risk assessment and emergency work control problems.

- April 1, 2008, Unit 2, Main Feedwater Block Valve 2CV-1074-1 motor replacement
- June 11, 2008, Unit 2 Emergency Feedwater Pump 2P-7A speed controller troubleshooting and recalibration activities
- May 13, 2008, Unit 1, emergent repair of Door 62

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings

Introduction. The inspectors identified a Green finding because the "Fix-it-Now" team failed to follow site procedures when working on high energy line break barrier Door 62, which protected one train of the Unit 1 emergency switchgear. While performing troubleshooting activities on the door to determine the cause of the previous failure associated with the operating mechanism, the team maintained the door open for approximately 15 minutes and made an on the spot decision to turn this troubleshooting activity into "minor maintenance," which was not permitted in this instance. In addition, the team failed to: 1) obtain an approved work order; and 2) inform the control room of the activity, which would have required entry into an 8.0 hour TS shutdown action statement.

Description. On May 3, 2008, Door 62, the missile door for the lower south electrical equipment room, was discovered to be in a condition where it could not be dogged shut. Based on the inability of Door 62 to meet its seismic design function, which potentially affected the operability of the Red Train AC electrical power distribution subsystem located in the Lower South Electrical Equipment Room, Unit 1 entered a TS requiring an 8 hour shutdown Limiting Condition for Operation (LCO). Subsequently, the licensee installed an emergency temporary alteration on Door 62 using Engineering Request ER-ANO-2005-0517-000, "DR 62 Emergency Temporary Alteration," Revision 0, which allowed the licensee to exit the 8 hour LCO.

On May 5, 2008, while in the control room following up on the licensee's planned actions for Door 62 with the shift manager, the inspectors observed an operator inform the shift manager that the Fix-It-Now Team had completed work on Door 62 and it had been returned to an operable status. Since the inspectors were not aware of any current LCOs, the inspectors inquired of the shift manager what had been done to the door and if the unit had entered an LCO for this work. The shift manager informed the inspectors that he was not aware that the Fix-It-Now Team had been performing any activities on Door 62, and the unit had not entered an LCO associated with Door 62. He further stated that he was not sure if the unit would have entered a TS LCO just because the door had been opened.

The inspectors questioned this, and followed up with the Fix-It-Now Team to determine what had been done to Door 62, and what was found. During discussions with the Fix-It-Now Team, the inspectors were informed that initially they had been sent to troubleshoot Door 62 to determine the cause of the failure, which would facilitate planning of the required repair. Upon opening the door, the Fix-It-Now Team discovered that the setscrews in the operating mechanism appeared to be loose and decided that this was the cause of the failure. As such they decided that they could correct this as minor maintenance without a work order in accordance with EN-WM-100. This activity resulted in Door 62 being open for 15 minutes.

The inspectors reviewed Station Procedure COPD-003 and noted that section 2.2 requires, in part, "For HELB doors that are required to be open for a period greater than 5 minutes, Safety Analysis Engineering shall be contacted for approval." The inspectors determined that the Fix-It-Now Team had not contacted Safety Analysis Engineering, therefore the fact that Door 62 had been open for longer than 5 minutes had not been appropriately evaluated. Subsequently, engineering determined that Unit 1 should have entered the applicable TS LCO based on Door 62 not being able to fulfill its function of isolating the Red Train AC electrical power distribution subsystem located in the Lower South Electrical Equipment Room from a High Energy Line Break (HELB).

The inspectors determined that the Fix-It-Now Team had not followed the requirements of COPD-003, and this in conjunction with their failure to inform operations of their troubleshooting/work plan for Door 62, directly resulted in the licensee's failure to recognize that Unit 1 should have entered the applicable TS LCO. Furthermore, the inspectors determined that since entry into an LCO was required, Procedure EN-WM-100 did not allow work to be done as minor maintenance.



The inspectors informed the licensee of their concerns. The licensee entered this into their CAP as CR ANO-2-2008-1265. Subsequently, the licensee determined that the unit should have entered the applicable LCO and the maintenance conducted was not allowed by Procedure EN-WM-100 as minor maintenance.

Analysis. The inspectors determined that the failure of station personnel to follow Procedures COPD-003, "Door Breach Checklist," and EN-WM-100, "Work Request Generation, Screening and Classification," was a performance deficiency. The finding was more than minor because, if left uncorrected, it could result in a more significant concern. Specifically, by circumventing site procedural requirements, the "Fix-it-Now" team could render more risk significant equipment inoperable without the knowledge and approval of site management or control room personnel. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet this finding was determined to have very low safety significance because: 1) the finding was a qualification deficiency that resulted in a loss of functionality of Door 62; 2) it did not lead to an actual loss of safety function of the system or train; 3) it did not result in the loss of one or more trains of non-TS equipment; 4) it did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This finding was determined to have a cross-cutting aspect in the area of Human Performance associated with Work Control [H.3(b)], in that the licensee did not appropriately coordinate work activities associated with Door 62 by incorporating actions to address the impact of changes to the work scope on the plant, and the need to keep personnel apprised of work status and the operational impact of work activities.

Enforcement. While a performance deficiency was identified, there were no violations of NRC requirements identified during the review of this issue because Door 62 is not a safety-related system. The licensee entered this issue into the CAP as CR ANO-1-2008-0603: FIN 05000313/2008003-03, "Failure to Follow Station Procedures While Troubleshooting."

#### 1R15 Operability Evaluations (71111.15)

##### a. Inspection Scope

The inspectors: (1) reviewed plants status documents, such as operator shift logs, emergent work documentation, deferred modifications, and standing orders, to determine if an operability evaluation was warranted for degraded components; (2) referred to the UFSAR and design basis documents to review the technical adequacy of licensee operability evaluations; (3) evaluated compensatory measures associated with operability evaluations; (4) determined degraded component impact on any TSs; (5) verified that the degraded SSC or compensatory measures taken to address the degrade SSC does not result in changes to the UFSAR; or if there is a change to the UFSAR that a proper 10 CFR 50.59 review has been performed; (6) used the significance determination process to evaluate the risk significance of degraded or inoperable equipment; and (7) verified that the licensee has identified and implemented appropriate corrective actions associated with degraded components.

- March 28, 2008, Unit 1, low pressure safety injection pump bearing cooler inlet Valve CV-3840
- April 7, 2008, Unit 2, Low Pressure Safety Injection Pumps 2P-60A/B with degraded flow through the bearing coolers

- April 8, 2008, Unit 2, penetration room Damper 2UCD-8853-1
- April 15, 2008, Unit 2, Train B, low pressure safety injection system due to Train A discharge check Valve 2SI-3A not closing as designed
- April 17, 2008, Unit 2, Reactor Building Spray Pumps 2P-35A/B
- May 13, 2008, Unit 2, reactor building spray system following the discovery of non-seismic scaffold in close proximity to the return line to the refueling water storage tank
- May 14, 2008, Unit 1, penetration room ventilation

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples.

b. Findings

No findings of significance were identified.

1R17 Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications (71111.17)

a. Inspection Scope

The inspectors reviewed the effectiveness of the licensee's implementation of evaluations performed in accordance with 10 CFR 50.59, and changes, tests, experiments, or methodology changes that the licensee determined did not require 10 CFR 50.59 evaluations. The inspection procedure requires the review of 6 to 12 licensee evaluations required by 10 CFR 50.59, 12 to 25 changes, tests, or experiments that were screened out by the licensee and 5 to 15 permanent plant modifications.

The inspectors reviewed 13 evaluations required by 10 CFR 50.59, 22 changes tests and experiments that were screened out by the licensee, and 15 permanent plant modifications. Three of the samples inspected included the licensee's activities addressing dissimilar metal butt welds. Additional examples of items inspected include:

- Essential feedwater flow modification
- Qualification of 800 gpm service water design flow to the Unit 2 EDG heat exchangers
- Refueling Outage 2R17 code repair on Valve 2VCC-2D supply header piping
- ANO-2 Diesel Generators 1 (2K4A) and 2 (2K4B) loading calculation revision
- Increase Unit 1 maximum fuel pool heat load to 31 MBtu/Hr

- Subcooling margin monitor low margin to saturation alarm setpoint change during operations
- Emergency diesel generator service water modification
- Station Batteries D -125VDC
- Polar crane uprate

The inspectors verified that, when changes, tests, or experiments were made, evaluations were performed in accordance with 10 CFR 50.59 and that the licensee had appropriately concluded that the change, test, or experiment can be accomplished without obtaining a license amendment. The inspectors also verified that safety issues related to the changes, tests, or experiments were resolved. The inspectors reviewed changes, tests, and experiments that the licensee determined did not require evaluations and verified that the licensee's conclusions were correct and consistent with 10 CFR 50.59. The inspectors also verified that procedures, design, and licensing basis documentation used to support the changes were accurate after the changes had been made.

In the inspection of modifications the inspectors verified that supporting design and license basis documentation had been updated accordingly and was still consistent with the new design. The inspectors verified that procedures, training plans and other design basis features had been adequately accounted for and updated.

Document numbers of the evaluations, changes, and modifications reviewed are listed in the attachment

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the UFSAR, plant drawings, procedure requirements, and TSs to ensure that the temporary modification listed below was properly implemented. The inspectors: (1) verified that the modification did not have an effect on system operability/availability, (2) verified that the installation was consistent with the modification documents, (3) ensured that the post installation test results were satisfactory and that the impact of the temporary modification on permanently installed SSCs were supported by the test, (4) verified that the modifications were identified on control room drawings and that appropriate identification tags were placed on the affected drawings, and (5) verified that appropriate safety evaluations were completed. The inspectors verified that licensee identified and implemented any needed corrective actions associated with temporary modifications.

- May 12, 2008, Unit 1, emergency temporary modification to Door 62
- May 13, 2008, Unit 2, installation of top hat on condenser as a temporary modification

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

.2 Permanent Plant Modifications

a. Inspection Scope

The inspectors reviewed key affected parameters associated with energy needs, materials/replacement components, timing, heat removal, control signals, equipment protection from hazards, operations, flow paths, pressure boundary, ventilation boundary, structural, process medium properties, licensing basis, and failure modes for the modification listed below. The inspectors verified that: (1) modification preparation, staging, and implementation does not impair emergency/abnormal operating procedure actions, key safety functions, or operator response to loss of key safety functions; (2) post modification testing maintained the plant in a safe configuration during testing by verifying that unintended system interactions will not occur, SSC performance characteristics still meet the design basis, the appropriateness of modification design assumptions, and the modification test acceptance criteria has been met; and (3) the licensee has identified and implemented appropriate corrective actions associated with permanent plant modifications.

- June 9, 2008, Unit 1, permanent plant modification to Door 62

Document reviewed by the inspectors are listed in the attachment

The inspectors completed one sample.

b. Findings

No findings of significance identified.

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the four post maintenance test activities of risk significant systems or components listed below. For each item, the inspectors: (1) reviewed the

applicable licensing basis and/or design-basis documents to determine the safety functions, (2) evaluated the safety functions that may have been affected by the maintenance activity, and (3) reviewed the test procedure to ensure it adequately tested the safety function that may have been affected. The inspectors either witnessed or reviewed test data to verify that acceptance criteria were met, plant impacts were evaluated, test equipment was calibrated, procedures were followed, jumpers were properly controlled, the test data results were complete and accurate, the test equipment was removed, the system was properly realigned, and deficiencies during testing were documented. The inspectors also reviewed the UFSAR to determine if the licensee identified and corrected problems related to post maintenance testing.

- March 29, 2008, Unit 2, Visual Inspection VT-2 inspection of Loop 2 service water pipe following replacement
- March 31, 2008, Unit 2, low pressure safety injection pump discharge check Valve 2SI-3A following repair of the valve
- April 10, 2008, Unit 2, Visual Inspection VT-2 inspection following repair of the reactor vessel head vent flange
- May 1, 2008, Unit 1, Reactor Building Spray Pump 1P-35B following bearing oil sample and change out
- May 13, 2008, Unit 1, Emergency Switchgear Chiller VCH-4A following fitting replacement

Documents reviewed by the inspectors are listed in the attachment

The inspectors completed five samples.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage Activities (71111.20)

a. Inspection Scope

The inspectors evaluated the licensee's Refueling Outage 2R19 activities to ensure that risk was considered when deviating from the outage schedule, the plant configuration was controlled in consideration of facility risk, mitigation strategies were properly implemented, and TSs were implemented to maintain the appropriate defense-in-depth. Inspectors also evaluated licensee activities during reduced inventory condition to ensure appropriate risk management techniques was in accordance with commitments communicated in response to Generic Letter 88-17, "Loss of Decay Heat Removal." The inspectors performed plant walkdowns of normally inaccessible areas of the plant during power operations. Specific activities observed and/or reviewed by the inspectors include:

- Containment walkdowns to identify safety and quality issues related to work activities, evaluate material conditions, observe radiation protection postings and barriers, observe foreign material exclusion program
- Reduced inventory activities to perform vacuum fill of the RCS
- Containment closure capability
- Verification of decay heat removal capability
- Spent fuel pool cooling capability
- Refueling activities that included fuel transfer and core reloading
- Electrical power source arrangement
- Containment cleanup and closeout
- Unit 2 heat-up and start-up activities
- Licensee identification and resolution of problems related to refueling activities

Document reviewed by the inspectors are listed in the attachment

The inspectors completed one sample.

b. Findings

.1 Low Pressure Safety Injection Check Valve Failure Due to Inadequate Maintenance Procedures

Introduction. The inspectors documented a Green self-revealing NCV of TS 6.4.1.a, "Procedures," for an inadequate Unit 2 low pressure safety injection (LPSI) discharge check valve assembly procedure. Specifically, during Refueling Outage 2R18 Fall 2006) the Train A pump discharge check valve was incorrectly assembled such that it would not fully close. Subsequently, during Refueling Outage 2R19 (Spring 2008), operations swapped decay heat removal from Train A to Train B and noticed reverse flow through the Train A pump, indicating that the discharge check valve was not fully closed. The licensee determined that the safety function of the valve was maintained because the valve still limited sufficient reverse flow through the Train A pump such that Train B pump remained operable. Operability of the Train A pump was not affected. A contributor to the violation included inadequate post maintenance testing following refueling outage 2R18 work. The licensee performed corrective maintenance, successfully completed post maintenance testing, and returned the system to service.

Description. On March 16, 2008, Unit 2 entered Mode 4 and Operations placed LPSI Pump 2P-60A (Train A), into service following reactor shutdown for Refueling Outage 2RF19. At approximately 3 p.m., Unit 2 entered Mode 5. At 3:44 p.m., operations started LPSI Pump 2P-60B (Train B) and stopped the Train A LPSI pump. At 3:45 p.m. the Train A LPSI pump was secured. At 3:48 p.m. the Train A LPSI pump was rotating backwards. Operators unlocked the Train A LPSI Discharge Check

Valve 2SI-3A and partially closed the valve when the valve seated and the Train A LPSI pump stopped rotating backwards.

The licensee disassembled the valve and found evidence that the valve had been installed incorrectly during Refueling Outage 2RF18 outage. Reviewing engineers determined that the Anchor-Darling valve was initially designed to be installed in a vertical position, but because of space constraints, was installed horizontally. Due, in part, to the weight of the valve internals and the horizontal installation, it is very difficult to maintain alignment between the valve stem and the valve disk. The work orders and procedures guiding and directing this activity did not prescribe any special precautions or directions to install the valve, given that it was installed in a manner not specifically prescribe by the vendor. As a result, mechanics were not aware of the steps necessary to ensure proper installation of valve internals. It was obvious that the valve was misaligned which allowed the valve disk to unevenly rest on two or the three valve guides. The result was that there were excessive frictional loads introduced that the closing spring could not overcome.

Quarterly surveillance tests were incapable of detecting the type of valve degradation because the train is tested using a recirculating line to and from the refueling water storage tank, so flow is about 10 percent of actual flow (320 gpm as opposed to 3900 gpm) and does not force the disk to the full open position where it would come into contact with the valve guides. The inspectors reviewed the operability evaluation of both trains of LSPI and agreed with the operability evaluation in that, although the discharge check valve did not fully seat, it was sufficiently closed to allow adequate RCS injection at designed.

The valve components were repaired and the valve was reassembled with extra measures, such as boroscope verification of alignment and assembly of the valve internals, without incident. The postmaintenance testing consisted of swapping pumps in full flow operation and acoustic monitoring to ensure that the check valve was fully seated. The LPSI system operated the remainder of the outage without incident.

The licensee has not completed all the corrective actions stemming from the CR, but actions taken include: modifying two maintenance procedures with cautions and more detailed instruction to ensure proper alignment, the development and distribution of the operating experience, and rework and test the valve. Inspectors have questioned the post-maintenance testing from the Refueling Outage 2RF18 refueling outage, as compared to the extensive testing performed this last Refueling Outage 2RF19, and whether or not the postmaintenance testing performed after the most recent valve work will be incorporated into future postmaintenance testing requirements for similar valve work.

Analysis. The failure to properly install the Train A LPSI discharge check valve was the performance deficiency and therefore a finding. The finding was more than minor because it was similar to nonminor Example 5.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the valve was installed incorrectly during Unit 2 Refueling Outage 2R18 and then the system was subsequently returned to service with the faulty component. The finding was of very low safety significance because the Train B LPSI pump remained operable. The inspectors determined that this particular finding did not have a crosscutting aspect because the inadequate procedure was in place for 8 years, which is not indicative of current plant performance.

Enforcement. ANO Unit 2 TS 6.4.1.a states, in part, "Written procedures shall be established, implemented, and maintained covering . . . the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." Contrary to the above, during the Unit 2 Refueling Outage 2RF18, Fall 2006, the licensee failed to provide adequate maintenance procedures to ensure proper installation of the LPSI Discharge Check Valve 2SI-4A. Because the violation is of very low safety significance and it has been entered into the CAP as CR ANO-2-2008-0422, this violation is being treated as an NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy: NCV 05000368/2008003-04, "Low Pressure Safety Injection Check Valve Failure Due to Inadequate Maintenance Procedures."

## .2 Failure to Maintain Containment Closure Capability

Introduction. The inspectors identified a Green NCV of Unit-2 TS 6.4.1.a, "Procedures," associated with the licensee's failure to maintain containment closure capability as required by Station Procedure OP-1015.008, "Unit 2 SDC Control," Revision 23. The licensee was installing a "Hawke seal" at Containment Penetration 2P-53 to support outage work. However, seal installation would take approximately 1 hour and none of the workers had been designated as the responsible individual nor had the required materials been staged to ensure that they could accomplish containment closure in no more than 30 minutes. At the time, the estimated time to RCS boiling (assuming a loss of mitigating equipment) was 18 minutes.

Description. While performing a tour of the Unit 2 containment building, following its being open for general entry during Refueling Outage 2R19, the inspectors noticed maintenance personnel working in the area of containment penetration 2P-53, installing the Hawke seal in accordance with Procedure OP-2504.038, "Hawke Seal Maintenance," Revision 4. This seal is where auxiliaries, used during the outage, are run into containment at one place.

The inspectors observed that maintenance personnel had removed both the inside and outside containment blind flanges for this penetration, and the installation of the Hawke seal flanges required the use of chain falls due to their weight and size. The inspectors noticed that there did not appear to be any material staged in the area for maintenance personnel to use to close the penetration if necessary. The inspectors questioned this based on the fact that the licensee was conducting RCS draining and the estimated time to boil was 19 minutes. It was not clear to the inspectors that the workers inside of containment could establish containment closure using the Hawke seal flange within the estimated time to boil.

The inspectors asked the personnel if there was material staged outside of containment to close the penetration if necessary and who was the designated individual if it were required. The maintenance personnel responded that they had not briefed that anyone was to be designated to close the penetration nor had they briefed any requirements to stage material to close the penetration while work was in progress. The inspectors further inquired of the workers as to how long they estimated it would take them to establish containment closure if it were directed using the Hawke seal flange. The workers responded that it would take them about one hour to get the flange in place and fitted up. The inspectors noted that this exceeded the containment closure time requirements of Station Procedure OP-1015.008, which directed that all containment breaches will have the capability of being closed within 30 minutes and where possible within the estimated time to boil.



The inspectors informed the licensee of their concerns. The licensee entered this into their CAP as CR ANO-2-2008-1265. Subsequently, the licensee closed this CR to CR ANO-C-2008-0559, as corrective action 5, and performed an apparent cause evaluation (ACE). The licensee determined that the procedures used by operations and maintenance to ensure compliance with containment closure requirements did not give explicit enough guidance to ensure that all personnel involved were fully aware of their responsibilities related to setting and maintaining closure.

Analysis. The inspectors determined that the failure of station personnel to follow Procedure OP-1015.008, "Unit 2 SDC Control," was a performance deficiency. The finding was greater than minor because it affected the configuration control attribute of the Barrier Integrity cornerstone, and it directly affected the cornerstone objective to provide reasonable assurance that the physical design barriers protect the public from radionuclide releases caused by accidents or events. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet, for the containment barrier cornerstone, it was determined that the finding represented an actual open pathway in the physical integrity of reactor containment, and required evaluation using Manual Chapter 0609, Appendix H, "Containment Integrity Significance Determination Process." The finding was determined to be a Type B finding because it affected only Large Early Release Frequency, not Core Damage Frequency, at shutdown. Using Manual Chapter 0609, Appendix H, Table 6.3, "Phase 1 Screening—Type B Findings at Shutdown," it was determined that: (1) the ANO Unit 2 containment was a pressurized water reactor (PWR), large, dry containment; (2) the containment status was intact, because the licensee planned to maintain an intact containment; (3) the SSC specifically affected by this finding was Containment Penetration 2P-53, which was determined to fit the category of containment penetration seals, isolation valves, vent and purge system; and (4) the finding involved the failure to maintain the ability to close containment. Based on this assessment, the inspectors determined that a Phase 2 evaluation was required.

The inspectors performed a Phase 2 analysis using Manual Chapter 0609, Appendix H, Table 6.4, "Phase 2 Risk Significance-Type B Findings at Shutdown." The inspectors made the following assumptions:

- The plant was determined to be in POS 2E which represents cold shutdown with the RCS vented, steam generators not available, and within 8 days of shutdown (decay heat high)
- The finding occurred within the first 24 hours of shutdown
- The finding existed for less than eight hours
- There was no mitigation equipment out of service. This results in the classification as a PWR with in-depth shutdown mitigation capability in accordance with Manual Chapter 0609, Appendix H, table 6.8

Given these assumptions, the significance of this finding was determined to have very low safety significance, Green.

This finding was determined to have a crosscutting aspect in the area of Human Performance associated with resources [H.2(c)], because the licensee failed to provide

complete, accurate and up-to-date procedures and work packages for the installation of the Hawke seal which ensured that the ability to maintain containment closure was directed.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions, procedures or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Procedure OP-1015.008 required, in part, "All containment breaches will have the capability of being closed within 30 minutes and where possible within the estimated time to boil." Contrary to the above, on March 17, 2008, maintenance personnel removed both the inside and outside blind flanges for Containment Penetration 2P-53 without the capability to close the opening within 30 minutes or time to boil. Because the finding was of very low safety significance and had been entered into the licensee's CAP as CR ANO-2-2008-0461, this violation is being treated as an NCV consistent with Section VIA of the Enforcement Policy: NCV 05000368/2008003-05, "Failure to Maintain Containment Closure Capability."

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the UFSAR, procedure requirements, and TSs to ensure that the five surveillance activities listed below demonstrated that the SSCs tested were capable of performing their intended safety functions. The inspectors either witnessed or reviewed test data to verify that the following significant surveillance test attributes were adequate: (1) preconditioning; (2) evaluation of testing impact on the plant; (3) acceptance criteria; (4) test equipment; (5) procedures; (6) jumper/lifted lead controls; (7) test data; (8) testing frequency and method demonstrated TS operability; (9) test equipment removal; (10) restoration of plant systems; (11) fulfillment of ASME Code requirements; (12) updating of performance indicator data; (13) engineering evaluations, root causes, and bases for returning tested SSCs not meeting the test acceptance criteria were correct; (14) reference setting data; and (15) annunciators and alarms set points. The inspectors also verified that the licensee identified and implemented any needed corrective actions associated with the surveillance testing.

- March 19, 2008, Unit 2, local leak rate test of Containment Penetration 2P52, component cooling water to reactor coolant pump seals
- March 22, 2008, Unit 2, local leak rate test of Containment Penetration 2P68, reactor building sump
- March 25, 2008, Unit 2, local leak rate test of Containment Penetration 2P39, quench tank makeup water supply
- April 15, 2008, Unit 2, containment airlock leak late test
- April, 16, 2008, Unit 2, hot leg injection check Valve 2SI-26A
- May 1, 2008, Unit 2, integrated engineering safeguards test

- June 5, 2008, Unit 2, service water Pump 2P-4A quarterly test
- June 5, 2008, Unit 2, high pressure injection Pump 2P-36C quarterly test

The inspectors completed eight samples.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP1 Exercise Evaluation (71114.01)

a. Inspection Scope

The inspectors reviewed the objectives and scenario for the 2008 biennial emergency plan exercise to determine if the exercise would acceptably test major elements of the emergency plan. The scenario simulated an onsite fire, the onset of failed fuel, failure of the reactor protection system to trip the reactor, a feedwater system leak, a steam generator tube rupture, several pump failures, fission product barrier failures, core damage and a radiological release to the environment through the ruptured steam generator, to demonstrate the licensee's capability to implement their emergency plan.

The inspectors evaluated exercise performance by focusing on the risk-significant activities of event classification, offsite notification, recognition of offsite dose consequences, and development of protective action recommendations, in the Simulator Control Room and the following dedicated emergency response facilities:

- Technical Support Center
- Operations Support Center
- Emergency Operations Facility

The inspectors also assessed recognition of and response to abnormal and emergency plant conditions, the transfer of decision making authority and emergency function responsibilities between facilities, onsite and offsite communications, protection of emergency workers, emergency repair evaluation and capability, and the overall implementation of the emergency plan to protect public health and safety and the environment. The inspectors reviewed the current revision of the facility Emergency Plan, emergency plan implementing procedures associated with operation of the licensee's emergency response facilities, procedures for the performance of associated emergency functions, and other documents as listed in the Attachment to this report.

The inspectors compared the observed exercise performance with the requirements in the facility Emergency Plan, 10 CFR 50.47(b), 10 CFR Part 50, Appendix E, and with the guidance in the emergency plan implementing procedures and other federal guidance.

The inspectors attended the postexercise critiques in each emergency response facility to evaluate the initial licensee self-assessment of exercise performance. The inspectors also attended a subsequent formal presentation of critique items to plant management.

The inspectors completed one sample during the inspection.

b. Findings

No findings of significance were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspectors performed an on-site review of Revision 34 to the Arkansas Nuclear One Emergency Plan, effective May 19, 2008. This revision revised which shift manager takes the lead for plant emergencies that are not specific to an operating unit, restored the station's commitment to detect gaseous radioactivity at a sensitivity of  $1.0E-7$   $\mu\text{Ci/cc}$ , updated senior reactor operator titles, and made minor administrative corrections.

The revision was compared to its previous revision, to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans, and Preparedness in Support of Nuclear Power Plants," Revision 1, and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q). This review was not documented in a safety evaluation report and did not constitute an approval of the licensee's changes; therefore, the revisions are subject to future inspection.

Document reviewed by the inspectors are listed in the attachment

The inspectors completed one sample during the inspection.

b. Findings

No findings of significance were identified.

**2. RADIATION SAFETY**

Cornerstone: Occupational Radiation Safety [OS]

2OS1 Access Control to Radiologically Significant Areas (71121.01)

a. Inspection Scope

This area was inspected to assess the licensee's performance in implementing physical and administrative controls for airborne radioactivity areas, radiation areas, high radiation areas, and worker adherence to these controls. The inspectors used the requirements in 10 CFR Part 20, the TSs, and the licensee's procedures required by TSs as criteria for determining compliance. During the inspection, the inspectors interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspectors performed independent radiation dose rate measurements and reviewed the following items:

- Performance indicator events and associated documentation packages reported by the licensee in the Occupational Radiation Safety Cornerstone

- Controls (surveys, posting, and barricades) of radiation, high radiation, or airborne radioactivity areas
- Radiation work permits, procedures, engineering controls, and air sampler locations
- Conformity of electronic personal dosimeter alarm set points with survey indications and plant policy; workers' knowledge of required actions when their electronic personnel dosimeter noticeably malfunctions or alarms
- Barrier integrity and performance of engineering controls in airborne radioactivity areas
- Physical and programmatic controls for highly activated or contaminated materials (non-fuel) stored within spent fuel and other storage pools
- Self-assessments, audits, licensee event reports, and special reports related to the access control program since the last inspection
- Corrective action documents related to access controls
- Radiation work permit briefings and worker instructions
- Adequacy of radiological controls, such as required surveys, radiation protection job coverage, and contamination control during job performance
- Dosimetry placement in high radiation work areas with significant dose rate gradients
- Changes in licensee procedural controls of high dose rate - high radiation areas and very high radiation areas
- Controls for special areas that have the potential to become very high radiation areas during certain plant operations
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas
- Radiation worker and radiation protection technician performance with respect to radiation protection work requirements

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed 19 of the required 21 samples.

b. Findings

Introduction. The inspectors identified an NCV of TS 6.4.1 which resulted from workers failing to follow procedural requirements.

Description. On March 25, 2008, two workers entered the radiologically controlled area, dressed in protective clothing, then exited through a door marked "No exit." The workers returned to exchange their standard electronic alarming dosimeters for telemetric electronic alarming dosimeters, but by returning through this route, the workers failed to pass through the contamination monitors at the radiologically controlled area exit. The inspectors found there was a previously documented occurrence on March 23, 2008.

Analysis. The failure to follow procedural requirements for exiting the radiologically controlled area is a performance deficiency. The finding is greater than minor because the failure to use the personnel contamination monitors could result in increased personnel dose and the release of radioactive material. Using the Occupational Radiation Safety Significance Determination Process, the inspectors determined the finding had very low significance because: (1) it was not as low as is reasonably achievable (ALARA) finding, (2) there was no overexposure, (3) there was no substantial potential for an overexposure because no one entered the area in which high doses were possible, and (4) the ability to assess dose was not compromised. Additionally, the finding had a crosscutting aspect in the area of Human Performance, Work Practice component, because the workers did not use self- or peer-checking as a human error prevention technique.

Enforcement. TS 6.4.1 requires the procedures in Regulatory Guide 1.33, Appendix A. Procedure EN-RP-100, "Radworker Expectations," Revision 1, states, "Upon exit of an RCA, whole body monitoring is required utilizing a whole body contamination monitor. A whole body gamma monitor must also be cleared." The workers violated this requirement when they exited the radiologically controlled area through an incorrect door. After prompting by the inspectors, the latest occurrence was documented in CR ANO-2-2008-00789. Because this violation was of very low safety significance and was entered into the licensee's CAP as CR ANO-2-2008-00789, it is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000368/2008003-06, Failure to Follow Procedure When Exiting the RCA.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining individual and collective radiation exposures ALARA. The inspectors used the requirements in 10 CFR Part 20 and the licensee's procedures required by TSs as criteria for determining compliance. The inspectors interviewed licensee personnel and reviewed:

- Use of engineering controls to achieve dose reductions and dose reduction benefits afforded by shielding

- Workers' use of the low dose waiting areas
- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or high radiation areas

Documents reviewed by the inspectors are listed in the attachments.

The inspectors completed two of the required 15 samples and one of the optional samples.

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

Cornerstone: Occupational Radiation Safety

4OA1 Performance Indicator Verification (71151)

.1 Radiation Protection

a. Inspection Scope

Occupational Exposure Control Effectiveness

The inspectors reviewed licensee documents from July 1 through December 31, 2007. The review included corrective action documentation that identified occurrences in locked high radiation areas (as defined in the licensee's TSs), very high radiation areas (as defined in 10 CFR 20.1003), and unplanned personnel exposures (as defined in Nuclear Energy Institute (NEI) 99-02, "Regulatory Assessment Indicator Guideline," Revision 5). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. In addition, the inspectors toured plant areas to verify that high radiation, locked high radiation, and very high radiation areas were properly controlled. Performance indicator definitions and guidance contained in NEI 99-02, Revision 5, were used to verify the basis in reporting for each data element.

Documents reviewed by the inspectors are listed in the attachments.

The inspectors completed the required sample (one) in this cornerstone.

Cornerstone: Public Radiation Safety

Radiological Effluent TS/Offsite Dose Calculation Manual Radiological Effluent Occurrences

The inspectors reviewed licensee documents from July 1 through December 31, 2007. Licensee records reviewed included corrective action documentation that identified occurrences for liquid or gaseous effluent releases that exceeded performance indicator thresholds and those reported to the NRC. The inspectors interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. Performance indicator definitions and guidance contained in NEI 99-02, Revision 5, were used to verify the basis in reporting for each data element.

The inspectors completed the required sample (one) in this cornerstone.

b. Findings

No findings of significance were identified.

.2 Emergency Preparedness

a. Inspection Scope

The inspectors reviewed licensee evaluations for the three emergency preparedness cornerstone performance indicators of Drill and Exercise Performance, Emergency Response Organization Participation, and Alert and Notification System Reliability, for the period April 2007 through March 2008. The definitions and guidance of Nuclear Energy Institute Report 99-02, "Regulatory Assessment Indicator Guideline," Revisions 3 and 4, and the licensee's Performance Indicator Procedure EN-EP-201 "Performance Indicators," were used to verify the accuracy of the licensee's evaluations for each performance indicator reported during the assessment period.

The inspectors reviewed a sample of drill and exercise scenarios and licensed operator simulator training sessions, notification forms, and attendance and critique records associated with training sessions, drills, and exercises conducted during the verification period. The inspectors reviewed twenty selected emergency responder qualification, training, and drill participation records. The inspectors reviewed alert and notification system testing procedures, maintenance records, and a 100 percent sample of siren test records. The inspectors also reviewed other documents as listed in the attachment to this report.

Documents reviewed by the inspectors are listed in the attachments.

The inspectors completed three samples during the inspection.

b. Findings

No findings of significance were identified.



## 4OA2 Identification and Resolution of Problems (71152)

### .1 Routine Review of Identification and Resolution of Problems

#### a. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's CAP. This assessment was accomplished by reviewing corrective maintenance, condition report documents, and attending corrective action review and work control meetings. The inspectors: (1) verified that equipment, Human Performance and program issues were being identified by the licensee at an appropriate threshold and that the issues were entered into the CAP, (2) verified that corrective actions were commensurate with the significance of the issue, and (3) identified conditions that might warrant additional follow up through other baseline inspection procedures.

Documents reviewed by the inspectors are listed in the attachments.

#### b. Findings and Observations

No findings of significance were identified.

### .2 Semi-Annual Review to Identify Trends

#### a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues. The review also included issues documented outside the normal CAP in system health reports, corrective maintenance work orders, quality assurance audit/surveillance reports, component status reports, and Maintenance Rule assessments.

#### b. Findings

The inspectors determined the licensee missed an opportunity to identify and correct the inadequate preventive maintenance activities associated with the Appendix R emergency lights before the batteries and lamps exceeded their design life. In December 2006, the licensee initiated CR ANO-1-2006-01159 to document that additional batteries would be needed during the next battery test because many of the emergency light batteries would need to be replaced due to their end of life or they would likely fail the test. This provided the licensee an opportunity to review the maintenance activities associated with the batteries to ensure they had adequate lighting to meet the requirements of 10 CFR Part 50, Appendix R, Section III.J.

The inspectors determined that the licensee would likely not have identified the adverse trend during their own trend reviews or with their Maintenance Rule program. The licensee identifies adverse trends from quarterly rollups of CR data. Specifically, the licensee coded the emergency light failures to the Unit 2 Maintenance Department. Since the Unit 2 Maintenance Department had a large number of other equipment failure CRs coded against it, a quarterly rollup would likely not have identified this specific adverse trend.

The Maintenance Rule Program states, in part, that a functional failure of emergency lighting is "a component failure that results in a loss of all essential, emergency, and alternate shutdown lighting in any Emergency Operating Procedure area defined above . . . . Failures of a single illumination element will not be considered a functional failure." Based on this definition, the licensee's program had incorrectly concluded that the failures of the individual emergency lighting units did not constitute a functional failure of the emergency lighting system. As such, the Maintenance Rule Program would likely not have identified the adverse trend.

.3 Selected Issue Follow-Up Inspection

a. Inspection Scope

In addition to the routine review, the inspectors selected the issue listed below for a more in-depth review. The inspectors considered the following during the review of the licensee's actions: (1) complete and accurate identification of the problem in a timely manner; (2) evaluation and disposition of operability/reportability issues; (3) consideration of extent of condition, generic implications, common cause, and previous occurrences; (4) classification and prioritization of the resolution of the problem; (5) identification of root and contributing causes of the problem; (6) identification of corrective actions; and (7) completion of corrective actions in a timely manner.

- June 23, 2008, Unit 1, Follow-up of emergency switchgear chillers Maintenance Rule classification

b. Findings

Introduction. The inspectors identified a Green NCV involving the licensee's failure to adequately monitor the performance of the emergency switchgear chillers in accordance with 10 CFR 50.65 (a)(2). Specifically, while reevaluating the systems' performance for 10 CFR 50.65 (a)(1) status as a corrective action in response to a previous NCV for failure to adequately monitor the performance of the system, the licensee inappropriately determined that two independent functional failures should be counted as one based on time between failures. The extra failure would have resulted in exceeding the licensee's performance criteria for these components.

Description. The inspectors reviewed CR ANO-C-2007-1621, which contained the licensee's reevaluation of the performance of the emergency switchgear chillers in accordance with 10 CFR 50.65 (a)(2), for potential (a)(1) status. The licensee performed this review in response to a previous NCV for failure to adequately monitor the performance of the system. During their review the inspectors noted that the licensee had determined that two functional failures for Chiller VCH-4A were to be counted as one functional. The bases of this determination was that the time between the two failures was only 8 days and the corrective action plan for the first failure was not issued prior to the second failure.

The inspectors reviewed the CRs associated with these failures and noted the following:

- CR ANO-1-2007-1764 was initiated on July 16, 2007, and identified that Emergency Switchgear Chiller VCH-4A failed to meet its Maintenance Rule function because the compressor would not run due to low suction pressure.

The licensee subsequently performed an ACE for this issue and determined that the cause of the failure was due to O-ring degradation associated with Solenoid Valve SV-6050 which resulted in a refrigerant leak.

- CR ANO-1-2007-1793 was initiated on July 24, 2007, and identified that Emergency Switchgear Chiller VCH-4A failed to meet its Maintenance Rule function because condenser pressure and chill water outlet temperature were found out of tolerance. Subsequently, condition report ANO-1-2007-1793 was closed to condition report ANO-1-2007-1764, as corrective action 2, for resolution. The inspectors noted that corrective action 2 was closed based on the adequacy of the corrective action plan of CR ANO-1-2007-1764 because both conditions involved refrigerant leaks.

The inspectors also noted during their review that CR ANO-1-2007-1796 had been initiated on July 25, 2007, and closed to CR ANO-1-2007-1764 as Corrective Action 3. CR ANO-1-2007-1796 identified that, while performing troubleshooting on Emergency Switchgear Chiller VCH-4A for the failure that occurred on July 24, body to bonnet bolts for four valves on the compressor were found to be loose which resulted in refrigerant leaks. The identified corrective action for this issue was to replace the gaskets for the valves and to tighten the body to bonnet bolts on all of the valves.

Based on their review, the inspectors questioned the licensee's logic for classifying these two failures as one. The inspectors were able to determine that, though both failures coincidentally involved refrigerant leaks, they were in fact caused by two independent failure conditions. Specifically, the failure identified in CR ANO-1-2007-1764 was determined to be due to a degraded O-ring on Valve SV-6050, and the failure identified in CR ANO-1-2007-1793 appeared to be a result of loose valve bonnets that resulted in refrigerant leaks. The inspectors also determined that the apparent cause violation performed in response to CR ANO-1-2007-1764 was narrowly focused on the failure associated Valve SV-6050, and did not identify the cause of the failure associated with CR ANO-1-2007-1793.

The inspectors informed the licensee of their concerns. The licensee entered this into their CAP as CR ANO-1-2008-0360. Upon initial review of the issue the licensee was unable to determine the cause of the failure described in CR ANO-1-2007-1793, but subsequently was able to determine that the failure was in fact due to refrigerant leakage caused by loose bolts on the compressor valves. As such, the licensee determined that these two failures were independent failures and should have been counted as separate functional failures. Based on this, the licensee determined that the emergency switchgear chillers had in fact exceeded their performance criteria and placed the system in (a)(1) status.

Analysis. The inspectors determined that the failure of the licensee to effectively monitor the performance of the emergency switchgear chillers in accordance with 10 CFR 50.65 (a)(2) was a performance deficiency. The finding was more than minor because it was similar to nonminor Maintenance Rule Example 7.b in NRC Manual Chapter 0612, Appendix E, "Examples of Minor Issues," in that the failure to demonstrate effective control of performance or condition and not putting the affected SSC in (a)(1), necessarily involved degraded system performance. This finding had very low safety significance because the failure to properly categorize failures in accordance with the Maintenance Rule Program did not create, in itself, additional operability or functionality concerns. This finding was determined to have a crosscutting aspect in the area of

Human Performance associated with Decision Making [H.1(b)], in that the licensee did not use conservative assumptions and failed to verify the validity of the underlying assumptions used when evaluating the performance criteria of the emergency switchgear chillers for classification as 10 CFR 50.65 (a)(1) status.

Enforcement. 10 CFR 50.65 (a)(1) requires, in part, that holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended safety functions. 10 CFR 50.65 (a)(2) requires, in part, that monitoring specified in paragraph (a)(1) is not required where it has been demonstrated, the performance or condition of an SSC is being effectively controlled through appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, from July 2007 through February 2008, the licensee failed to demonstrate that performance of the emergency switchgear chillers was being effectively controlled through appropriate preventive maintenance. Because the finding is of very low safety significance and has been entered into the licensee's CAP as CR ANO-2-2008-1302, this violation is being treated as an NCV consistent with Section VIA of the Enforcement Policy: NCV 05000313/2008003-07, "Failure to Adequately Monitor the Performance of the Unit 1 Emergency Switchgear Chillers."

.3 Inservice Inspection Activities (71111.08)

a. Inspection Scope

The inspection procedure requires review of a sample of problems associated with inservice inspections documented by the licensee in the CAP for appropriateness of the corrective actions.

The inspectors reviewed 60 CRs which dealt with inservice inspection activities and found the corrective actions were appropriate. The specific CRs reviewed are listed in the documents reviewed section. From this review, the inspectors concluded that the licensee has an appropriate threshold for entering issues into the CAP and has procedures that direct a root cause evaluation when necessary. The licensee also has an effective program for applying industry operating experience.

b. Findings

No findings of significance were identified.

.4 Access Control to Radiologically Significant Areas (71121.01), ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspectors evaluated the effectiveness of the licensee's problem identification and resolution process with respect to the following inspection areas:

- Access Control to Radiologically Significant Areas (Section 2OS1)
- ALARA Planning and Controls (Section 2OS2)

b. Findings

Section 2OS1 describes a violation for which the license did not initiate a corrective action document until prompted by inspectors 48 hours after the occurrence.

.5 Emergency Response-Annual Sample Review

a. Inspection Scope

The inspectors reviewed a summary of corrective action reports associated with emergency response organization performance generated between April 2006 and April 2008, and reviewed 13 drill and exercise evaluation reports. The corrective action and drill evaluation reports were reviewed to understand current emergency response organization performance. The inspectors compared emergency response organization performance observed during the May 21, 2008, biennial exercise with previously identified performance issues to verify the effectiveness of correction actions.

b. Findings

No findings of significance were identified.

4OA3 Event Follow Up

Loss of 500 kV Pleasant Hills Power Line

a. Inspection Scope

Inspectors reviewed an ANO switchyard event in which planned work performed by Entergy Transmission and Distribution (T&D) on Breaker B5148 caused the inadvertent trip and lockout of Breaker B5122. This isolated the Pleasant Hills 500 kV power line from the ANO switchyard ring bus. The inspectors discussed the event with Unit 1 shift manager and other plant management as to the specific details, event timeline, and effect of the event on plant operations, and plant performance. The inspectors also acquired supplemental information and reviewed reporting requirement in accordance with NUREG-1022, "Event Reporting Guidelines," Revision 2. The inspectors also reviewed the licensee's ACE and proposed corrective actions.

b. Findings

Introduction. The inspectors documented a Green self-revealing finding for emergent work performed outside of the original work scope that led to the loss of the Pleasant Hills 500 kV power line. Entergy switchyard technicians, while working on a switchyard breaker, stepped outside the bounds of the Arkansas Nuclear One work order and caused another breaker to trip. Consequently, the load dispatcher requested that the plant reduce the output power level and the licensee down-powered both units. The licensee immediately stopped work in the switchyard, performed a stand down to reemphasize work procedures and expectations, and instituted supervisory tours of the work in the switchyard until the work was complete.

Description. On May 24, 2008, Entergy T&D was working on the planned replacement of Breaker B5148, one of two breakers from the 500kV Pleasant Hills power line, when

Breaker B5122 tripped open and became locked out. This isolated the Pleasant Hills power line. Due to this condition, the System Operation Center (SOC) requested that ANO reduce total combined electrical output to 1150 MWe as quickly and safely as possible. Unit 1 reduced reactor power to approximately 48 percent reactor power, while Unit 2 reduced reactor power to approximately 95 percent reactor power.

Entergy T&D had been working on Breaker B5148 replacement for a several weeks and was nearing the end of their work window, but were behind schedule and working over the Memorial Day weekend to complete the work. Unit 2 also had scheduled an extended EDG-1 maintenance window beginning on June 2, 2008 but maintenance would not begin until the switchyard was complete. Operations staff for both units were aware of the ongoing work activities on May 24, 2008, as the switchyard work had been going on for the better part of a couple of months. The Entergy T&D group in the switchyard was comprised of one senior transmission specialist, two relay technicians, and three relay technician apprentices.

A lead relay technician identified a sliding link current transformer (CT) terminal block in the Breaker B5148 control panel (old style terminal block) and instructed one of the relay apprentices to replace the terminal block with the correct style. The relay technician did not perceive the importance of this activity being outside the originally planned work scope, did not have the emergent work activity reviewed by the licensee staff, and requested the work to be performed without written guidance. The relay apprentice began to replace the terminal board when a short to the current transformers feeding protection circuitry was initiated and Breaker B5122 tripped on overcurrent. Three subsequent attempts to reclose the breaker failed.

Due to the loss of the Pleasant Hills line, the SOC requested that ANO reduce total station output to 1150 MWe as quickly and safely as possible. At 11:38 a.m., Unit 1 proceeded to reduce reactor power to 48 percent power and Unit 2 reduced power to 95 percent power. The lead technician recognized that the terminal board replacement occurred out of sequence and that two phases of the control circuit were shorted together resulting in a simulated overcurrent condition that caused the protective relay to trip Breaker B5122. The lugs and cables were properly insulated to remove the short and Breaker B5122 was reclosed approximately 90 minutes after the initial breaker trip. At 2:03 p.m. Unit 2 began power ascension to 100 percent power, and at 3:19 p.m. Unit 1 began power ascension to 100 percent. Both units achieved 100 percent power and all plant equipment operated as designed with no anomalies noted.

Following an immediate work stand down, work on Breaker B5148 resumed three days later, on May 27, 2008. The licensee's immediate corrective actions were to: (1) relieve the individual that made the error, (2) have ANO system engineers to perform two to three walkdowns on the switchyard per day, (3) a daily afternoon phone call with ANO management to discussion progress, work items remaining and any new issues discovered, and (4) assign more Entergy T&D supervision.

Analysis. The inspectors determined that the failure of Entergy T&D to follow licensee approved work order instructions and procedures in the ANO electrical switchyard was a performance deficiency, and therefore a finding. The finding was more than minor because it was associated with the Human Error attribute and affected the Initiating Event Cornerstone objective to limit the likelihood of those events that upset plant stability during power operations. The significance of the finding was assessed using Manual Chapter 0609, "Significance Determination Process," Phase 1 Worksheet. The

finding was determined to be of very low safety significance (Green) because it did not contribute to the likelihood that mitigation equipment or functions would not be available. The finding had a cross-cutting aspect in the area of Human Performance associated with Work Practices because the licensee did not ensure supervisory and management oversight of work activities, including Entergy transmission network technicians, in the switchyard such that nuclear safety is supported [H.4.(c)].

Enforcement. Although the inspectors identified a performance deficiency during maintenance performed in the ANO switchyard on May 24, 2008, no violation of NRC requirements occurred. The licensee has entered the issue into their CAP as CR ANO-C-2008-1053: FIN 05000368/2008003-08, "Loss of 500 kV Power Line Due to Switchyard Maintenance."

#### 4OA5 Other Activities

##### .1 Quarterly Resident Inspectors Observations of Security Personnel and Activities

###### a. Inspection Scope

During the inspection period, the inspectors performed observations of security force personnel and activities to ensure that the activities were consistent with Arkansas Nuclear One security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

Documents reviewed by the inspectors are listed in the attachments.

###### b. Findings

No findings of significance were identified.

##### .2 Temporary Instruction 2515-172, "Reactor Coolant System Dissimilar Metal Butt Welds"

Portions of Temporary Instruction TI2515/172, "Reactor Coolant System Dissimilar Metal Butt Welds" were performed at Arkansas Nuclear One, Unit 2 during Refueling Outage 19 in March 2008.

###### Licensee's Implementation of the Material Reliability Program (MRP)-139 Baseline Inspections

MRP - 139 baseline inspections:

The MRP-139 guidelines require inspection of dissimilar metal butt welds based on their susceptibility to primary water stress-corrosion cracking (PWSCC). The welds most susceptible to PWSCC are located in systems with temperatures at or above those of the hot leg, which includes the pressurizer nozzles and hot leg nozzles. The pressurizer at ANO, Unit 2 was replaced during the Fall 2006 refueling outage. During the

installation of the replacement pressurizer, dissimilar metal welds (DMWs) requiring Inconel filler metal were welded with Alloy 52 or 52M filler metal. Therefore, none of the DMWs associated with the Unit 2 pressurizer require preemptive full structural weld overlays. Currently, dissimilar metal butt welds (DMBW) on piping less than or equal to 14 inches exposed to temperatures equivalent to hot leg temperatures are being inspected and mitigated by full structural weld overlays this refueling outage and will be complete before the December 31, 2008, deadline. DMBWs on piping greater than 14 inches exposed to temperatures equivalent to hot leg temperatures are scheduled for volumetric examination before December 31, 2009. Volumetric examinations of cold leg DMBWs are scheduled to be completed before December 31, 2010.

The inspectors observed performance and reviewed records of structural weld overlays and nondestructive examination activities associated with the licensee's hot leg DMBW structural weld overlay mitigation effort.

At the present time, the licensee is not planning to take any deviations from the baseline inspection requirements of MRP-139, and all other applicable DMBWs are scheduled in accordance with MRP-139 guidelines.

#### Volumetric Examinations

The inspectors reviewed the ultrasonic and eddy current examination records of the unmitigated DMBW 2CCA-25 shutdown cooling nozzle performed in Refueling Outage 2R18.

No relevant conditions were identified during the examinations of the hot and cold leg unmitigated DMBW.

Inspectors also reviewed the volumetric examinations of the full structural weld overlays for the following DMBWs performed during the current refueling outage:

<u>Weld Number</u>	<u>Description</u>
2CCA-32	Hot Leg Drain
2BCA-1	Pressurizer Surge Nozzle
2CCA-25	Shutdown Cooling Nozzle

The inspection coverage met the requirements of MPR-139. No relevant conditions were identified. The inspectors reviewed the qualification records for the examiners who performed the examinations. The inspectors also reviewed the qualification/calibration records for the instruments used to perform the examinations.

No deficiencies were identified during the examinations.

#### Weld Overlays

The inspectors observed welding of the overlays on Welds 2CCA-32 and 2CCA-25. The inspectors verified that these activities were performed consistent with the requirements of the ASME code as modified by NRC staff relief request authorizations.



The licensee submitted Relief Request ANO2-R&R-005 and received NRC authorization by letter dated March 17, 2008, to install full structural weld overlays for repairing/mitigating RCS nozzle-to-safe end dissimilar metal welds and adjacent safe end-to-piping stainless steel welds.

The inspectors reviewed and verified the qualifications for the welders who performed the full structural weld overlays.

The inspectors verified that deficiencies identified during the performance of the weld overlays were appropriately dispositioned and resolved. Specifically, voids were identified during dye penetrant examination of the buffer layers for Welds 2CCA-25 and 2BCA-1. The licensee correctly identified the indications and performed the appropriate corrective actions in accordance with the relief request and the ASME code.

#### Mechanical Stress Improvement

This item is not applicable because the licensee did not employ a mechanical stress improvement process.

#### Inservice inspection program

The licensee's MRP-139 Inservice Inspection Program will receive in-office review at a later date.

### .3 (Closed) Unresolved Item 05000313; 368/2007006-02: Inadequate Preventive Maintenance Activities Result in Excessive Emergency Light Failures

Introduction. The inspectors identified a Green NCV of 10 CFR Part 50, Appendix R, Section III.J with two examples for inadequate preventive maintenance activities that resulted in 90 emergency light failures between January 2005 and December 2007.

Description. During a triennial fire protection inspection (NRC Inspection Report 05000313/2007006; 05000368/2007006), the inspectors identified an apparent excessive failure rate for the Appendix R emergency lights. Specifically, the inspectors noted that approximately 50 Appendix R emergency lights in Unit 2 required new batteries, lights, or charging cards during the performance of the annual emergency light tests in December 2006. The licensee corrected these problems immediately and entered them into their CAP as CRs ANO-2-2006-2657 and ANO-2-2006-2683.

Upon questioning by the inspectors, the licensee entered the adverse trend in their CAP as CR ANO-C-2007-1646. As part of this CR, the licensee performed an ACE for the increasing emergency light failures. The licensee categorized the failure data by the type of failure (battery, lamps, charging card, or other) and examined each category separately.

The ACE noted that the emergency light batteries failed because the batteries exceeded their life expectancy based on battery design and ambient temperature. The emergency light battery vendor specifically noted that temperature has an adverse effect on the life of the battery and provided data relating the life expectancy to the average ambient temperature. The licensee concluded the life expectancy was exceeded because of inadequate replacement frequencies specified in the preventive maintenance

procedures. The preventive maintenance procedures specified the battery replacement frequency based on ambient temperature at the time of the inspection, as opposed to average annual ambient temperature, and the vendor's life-temperature relationship, which was not conservative.

The ACE noted that the emergency light lamps failed because the lights exceeded their life expectancy based on number of operating hours. The preventive maintenance procedures did not contain a replacement frequency for the lights, although the expected life span was approximately 50 operating hours. The inspectors reviewed the data contained in the ACE and determined that 75 emergency light lamps failed between January 2005 and December 2007. The licensee concluded that maintenance issues related to cost and manpower were allowed to influence engineering direction for lamp replacement.

During this inspection, the inspectors reviewed the ACE and performed an independent analysis of the emergency light battery failure data. Based on the evaluation and data provided, the inspectors agreed with the licensee's apparent cause conclusion. However, the inspectors also determined that the preventive maintenance procedures were inadequate because they allowed the licensee to maintain the emergency light batteries in-service past the expected end of life before being replaced.

The inspectors determined that 15 battery failures occurred after the licensee's replacement frequency and the vendor's replacement frequency.

The inspectors concluded that these issues constituted two examples where inadequate preventive maintenance activities resulted in emergency light failures. The failure of the 15 emergency light batteries is a performance deficiency since the batteries should have been replaced, at a minimum, before the vendor's replacement frequency. Similarly, the failure of 75 emergency light lamps is a performance deficiency since the lamps should have been replaced on a fixed replacement schedule prior to their expected end of life.

Analysis. The inspectors determined a performance deficiency existed since inadequate preventive maintenance activities resulted in emergency light failures. The finding was more than minor since it was associated with the Mitigating Systems Cornerstone attribute of protection from external factors and affected the associated cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, this finding adversely impacted the ability of operators to access and align equipment necessary for safe shutdown in the event of a fire requiring evacuation of the control room.

The significance of this finding was assessed using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." The finding was determined to be of very low safety significance (Green) because it was determined to be a low degradation of the postfire safe shutdown category. In addition, operators are procedurally required to carry flashlights.

The inspectors determined that this finding had a crosscutting aspect of Human Performance in that the licensee failed to appropriately plan work activities to support long-term equipment reliability. Specifically, the maintenance scheduling was more reactive than preventive. [H.3(b)]

Enforcement. Title 10 CFR Part 50, Appendix R, Section III.J states, in part, that emergency lighting units with at least 8 hour battery power shall be provided in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. Contrary to the above, prior to May 16, 2008, the licensee failed to provide emergency lighting units in all areas needed for operation of safe shutdown equipment and in access and egress routes thereto. Specifically, the licensee failed to maintain the emergency lighting units in working condition by allowing 90 emergency lighting units to operate with batteries and lamps that exceeded their design life.

This issue does not qualify for enforcement discretion during the transition to NFPA 805 since it was unlikely that the licensee would have identified the violation in light of the defined scope, thoroughness, and schedule of the licensee's transition to 10 CFR 50.48(c) and the violation could have been identified by previous licensee efforts such as normal surveillance or quality assurance activities. Because this finding is of very low safety significance and has been entered into their CAP as CR ANO-C-2007-1646, this violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000313(368)/2008003-09, "Inadequate Preventive Maintenance Activities Result in Emergency Light Failures."

#### 40A6 Meetings, Including Exit

On March 28, 2008, the inspectors presented the occupational radiation safety inspection results to Mr. T. Mitchell, Vice President, Operations, and other members of his staff who acknowledged the findings. The inspectors confirmed that proprietary information was not provided or examined during the inspection.

On April 8, 2008, the inspectors presented the results of this inservice inspection to Mr. D. Bauman, Senior Project Manager, and other members of licensee management. Licensee management acknowledged the inspection findings. The inspectors also acknowledged review of proprietary material during the inspection which had been or will be returned to the licensee.

On May 16, 2008, the inspectors presented the results of the open item review and closeout to Mr. E. Blackard, Acting Engineering Programs and Component Manager, and other members of the licensee's staff. The licensee acknowledged the information presented. The inspectors noted no proprietary information was reviewed.

On May 23, 2008, the inspectors presented the results of the Emergency Preparedness Biennial Exercise inspection to Mr. C. Reasoner, Engineering Director, and other members of his staff, who acknowledged the findings. The inspectors confirmed that proprietary, sensitive, or personal information examined during the inspection had been returned to the identified information custodians.

On June 12, 2008, the inspectors presented the results of this inspection to Mr. B. Berryman, Plant Manager, and other members of licensee management. The inspectors also acknowledged review of proprietary material during the inspection which had been or will be returned to the licensee.

On July 10, 2008, the resident inspectors presented the inspection results to Mr. T. Mitchell, Vice President, Operations, and other members of the licensee's management

staff. The licensee acknowledged the findings presented. The inspectors confirmed that no proprietary information was provided or reviewed during this inspection.

#### 4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meet the criteria of Section VI of the NRC Enforcement Policy, for being dispositioned as an NCV.

- Title 10 CFR 50.65(a)(1) requires, in part, that holders of an operating license shall monitor the performance or condition of SSCs within the scope of the rule against licensee-established goals in a manner sufficient to provide reasonable assurance that such SSCs are capable of fulfilling their intended safety functions. 10 CFR 50.65(a)(2) requires, in part, that monitoring specified in paragraph (a)(1) is not required where it has been demonstrated the performance or condition of an SSC is being effectively controlled through appropriate preventive maintenance, such that the SSC remains capable of performing its intended function. Contrary to the above, the licensee failed to demonstrate that performance of emergency switchgear chillers was being effectively controlled through appropriate preventive maintenance. Specifically, while reevaluating the systems performance for 10 CFR 50.65(a)(1) status as a corrective action in response to a previous NCV for failure to adequately monitor the performance of the system, the licensee determined that Emergency Switchgear Chiller VCH-4B had exceeded its performance criteria and should have been classified as being in (a)(1) status. This finding was determined to have very low safety significance because the Maintenance Rule aspect of the finding did not lead to an actual loss of safety function of the system or cause a component to be inoperable, nor did it screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. This issue was entered into the licensee's CAP as CRs ANO-1-2008-0204 and ANO-1-2008-0156.
- TS 6.4.1.a, requires, in part, that procedures be established, implemented, and maintained covering maintenance activities that can affect safety-related equipment. Contrary to the above, the licensee failed to provide adequate and detailed procedures for reassembly of the reactor head vent flange. Specifically, one of the two head vent flanges was not assembled correctly and began to leak during plant heat up following Refueling Outage 2RF19. The licensee identified the RCS leak during walkdowns to specifically look for reactor coolant leaks. The licensee conservatively decided to cool the plant back down to rework and repair the leak. The finding was determined to have of very low safety significance because it did not affect core heat removal, power availability, containment control, or reactivity guidelines, and did not challenge inventory control guidelines in that available equipment was sufficient to keep the core covered. This issue was placed into the CAP as CR-2-2008- 0117.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee Personnel

J. Bacquet, RCS Supervisor  
D. Bauman, Senior Project Manager  
D. Bentley, Acting Design Manager  
B. Berryman, General Manager, Plant Operations  
M. Bratten, Senior Lead Nondestructive Examination  
C. Bregar, Nuclear Safety Assurance Director  
B. Byford, Supervisor, Simulator Training  
K. Canitz, Simulator Instructor  
A. Clinkingbeard, Operations, Unit 1  
J. Cork, Evaluator, Operations Training, Unit 1  
S. Cotton, Manager, Training & Development  
S. Cupp, Supervisor, Simulator Support  
G. Doran, Quality Assurance Auditor  
D. Eichenberger, Licensing Specialist  
J. Eichenberger, Acting Director, Nuclear Safety  
M. Fields, Senior Reactor Operator  
D. Fowler, Supervisor, Quality Assurance  
W. Greeson, Supervisor, Engineering  
J. GoBell, Project Manager, Alloy 600 Project  
M. Harris, Design Engineer  
R. Hendrix, Fire Protection Engineer  
R. Holeyfield, Manager, Emergency Planning  
D. James, Licensing Manager  
R. Jones, Coordinator, Boric Acid Program  
R. Martin, Supervisor, Operations Training, Unit 1  
D. Marvel, Acting, Radiation Protection Manager  
J. McCoy, Programs and Components Manager  
D. Merhar, Manager, Emergency Preparedness, Columbia Generating Station  
T. Mitchell, Vice President, Operations  
D. Moore, Manager, Radiation Protection  
N. Mosher, Licensing Engineer  
C. Murray, Reactor Operator  
R. Pace, Manager, Planning, Scheduling, and Outages  
K. Panther, Senior Lead Nondestructive Examination  
S. Pyle, Licensing Specialist  
C. Reasoner, Engineering Director  
R. Scheide, Licensing Specialist  
R. Schwartz, Radiation Protection Specialist  
C. Shively, System Engineering  
D. Slusher, Instructor, Operations Training Unit 1  
J. Smith, Quality Assurance Manager  
R. Soukup, Instructor, Operations Training, Unit 1  
B. Starkey, Radiation Protection Supervisor  
D. Stoltz, RCS Coordinator  
C. Tyrone, Manager, Quality Assurance

F. Van Buskirk, Licensing Specialist  
 R. Walters, Operations Manager  
 P. Weaver, Team Leader, Auditor  
 G. Woerner, Design Engineering Supervisor

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**

Opened and Closed

05000368/2008003-01	NCV	Failure to Adequately Monitor the Performance of the Alternate AC diesel generator (Section 1R12.1)
05000368/2008003-02	NCV	Failure to Adequately Monitor the Performance of the Unit 2 Service Water Intake Structure Roof Drains (Section 1R12.2)
05000313/2008003-03	FIN	Failure to Follow Station Procedures While Troubleshooting (Section 1R13)
05000368/2008003-04	NCV	Low Pressure Safety Injection Check Valve Failure Due to Inadequate Maintenance Procedures (Section 1R20.1)
05000368/2008003-05	NCV	Failure to Maintain Containment Closure Capability (Section 1R20.2)
05000368/2008003-06	NCV	Failure to Follow Procedure When Exiting the RCA (Section 2OS1)
05000313/2008003-07	NCV	Failure to Adequately Monitor the Performance of the Unit 1 Emergency Switchgear Chillers (Section 4OA2)
05000313;368/2008003-08	FIN	Loss of 500 kV Power Line Due to Switchyard Maintenance (Section 4OA3)
05000313;368/2008003-09	NCV	Inadequate Preventive Maintenance Activities Result in Emergency Light Failures (Section 4OA5)

Closed

05000313;368/2007006-02	URI	Inadequate Preventive Maintenance Activities Result in Excessive Emergency Light Failures
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Discussed

None

## LIST OF DOCUMENTS REVIEWED

In addition to the documents referred to in the inspection report, the following documents were selected and reviewed by the inspectors to accomplish the objectives and scope of the inspection and to support any findings:

### **Section 1R01: Adverse Weather Protection**

#### Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
ENS-DC-201	ENS Transmission Grid Monitoring	2
OP-2107.001	Electrical System Operations	62
OP-1203.037	Abnormal ES Bus Voltage and Degraded Offsite Power	6
OP-2104.037	Alternate AC Diesel Generator Operations	14
OP-1107.001	Electrical System Operations	67
ENS-DC-199	Off Site Power Supply Design Requirements	2

### **Section 1R04: Equipment Alignment**

#### Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
OP-2104.037	Alternate AC Diesel Generator Operations	14
OP-2305.018		

## **Section 1R05: Fire Protection**

### Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
FHA	Arkansas Nuclear One Fire Hazards Analysis	11
PFP-U1	ANO Prefire Plan (Unit 1)	9
PFP-U2	ANO Prefire Plan (Unit 2)	9
OP-1000.152	Unit 1 & 2 Fire Protection System Specifications	7
EN-DC-127	Control of Hot Work and Ignition Sources	4
EN-DC-161	Control of Combustibles	1

### Drawings

FZ-2038, Sheet 1, Revision 2	FZ-1041, Sheet 1, Revision 1
FZ-2018, Sheet 1, Revision 2	FZ-2020, Sheet 1, Revision 2
FZ-2021, Sheet 1, Revision 2	FZ-2029, Sheet 1, Revision 2
FZ-2022, Sheet 1, Revision 2	FZ-1045, Sheet 1, Revision 3
FZ-2032, Sheet 1, Revision 2	FZ-2040, Sheet 1, Revision 2
FZ-2047, Sheet 1, Revision 2	

### Calculations

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-85-E-0053-15	Fire Area B Combustible Loading Calculation	47
CALC-85-E-0053-34	Fire Area HH Combustible Loading Calculation	0

## **1R08: Inservice Inspection Activities**

### Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CEP-NDE-0424	Manual Ultrasonic Examination of the Reactor Vessel Flange Ligament Areas	1
EN-DC-319	Inspection and Evaluation of Boric Acid Leaks	2
OP-1032.037	Inspection and Identification of Boric Acid Leaks for ANO-1 and ANO-2	4



OP-2311.009	ANO Unit 1 and Unit 2 Alloy 600 Inspections	10
WDI-CAL-002	Pulser/Receiver Linearity Procedure	7
WDI-SSP-1002	Reactor Vessel Head Penetration Inspection Tool Operation for ANO-2 and Waterford 3 - ROSA	2
WDI-STD-001	IntraSpect Eddy Current Imaging Procedure for Inspection of Reactor Vessel Head Penetrations	11
WDI- STD- 041	IntraSpect Eddy Current Analysis Guidelines	12
WDI- STD- 055	IntraSpect Ultrasonic Procedure for Inspection of Reactor Vessel Head Penetrations, Time of Flight, Ultrasonic, Longitudinal Wave and Shear Wave	14
WDI- STD- 070	IntraSpect UT Analysis Guidelines	12
WDI- STD- 101	RVHI Vent Tube J-Weld Eddy Current Examination	6
WDI- STD- 114	RVHI Vent Tube ID & CS Wastage Eddy Current Examination	6
WDI-STD-120	RPV head CRDM Penetrations EC Examination for Wastage Detection Procedure	7
WDI-STD-122	RVHI CEDM Bottom OD Inspection	5
WDI-STD-138	RVHI ICI Bottom Surface EC Array Probe Inspection	5
WDI-STD-144	RVHI ICI Bottom OD Surface EC Manual Probe Inspection	4
WDI- STD- 148	IntraSpect Ultrasonic Procedure for Inspection of CE ICI Reactor Vessel Head Penetrations	5

Corrective Action Documents

2-2006-01428	2-2006-01534	2-2006-02604	2-2007-00350
2-2006-01430	2-2006-01546	2-2006-02686	2-2007-00351
2-2006-01436	2-2006-01584	2-2006-02716	2-2007-00443
2-2006-01447	2-2006-01721	2-2007-00012	2-2007-00596
2-2006-01453	2-2006-01770	2-2007-00019	2-2007-00605
2-2006-01456	2-2006-01827	2-2007-00105	2-2007-00615
2-2006-01473	2-2006-01951	2-2007-00183	2-2007-00785
2-2006-01476	2-2006-02054	2-2007-00186	2-2007-00786
2-2006-01489	2-2006-02183	2-2007-00190	2-2007-00967
2-2006-01490	2-2006-02215	2-2007-00192	2-2007-00991
2-2006-01491	2-2006-02392	2-2007-00240	2-2007-01055

2-2006-01492	2-2006-02407	2-2007-00253	2-2007-01421
2-2006-01499	2-2006-02413	2-2007-00281	2-2007-01425
2-2006-01503	2-2006-02452	2-2007-00286	2-2008-00027
2-2006-01505	2-2006-02502	2-2007-00303	2-2008-00066

Miscellaneous

Engineering Request ER-ANO-2003-0245-049, 2R18 Reactor Head Examination Plan, Revision 0

CNRO-2005-00048, ANO-2 Relaxation Request #5 to NRC First Revised Order EA-03-009 for the Control Element Drive Mechanism Nozzles

CEP-ISI-004, Arkansas Nuclear One Unit 2 Inservice Inspection Plan, Revision 302

**Section 1R12: Maintenance Effectiveness**

Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
EN-LI-102	Corrective Action Process	12
EN-DC-203	Maintenance Rule Program	1
EN-DC-204	Maintenance Rule Scope and Basis	1
EN-DC-205	Maintenance Rule Monitoring	1
EN-DC-206	Maintenance Rule (a)(1) Process	1
EN-DC-207	Maintenance Rule Periodic Assessment	1
CES-19	Maintenance Rule Structural Monitoring at Arkansas Nuclear One	4

Drawing

M-2260, Sheet 4, Revision 1

Calculations

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-96-R-0003-11	2004 Maintenance Rule Structural Monitoring Walkdown of High Risk Structures	0
CALC-94-E-0079-02	Evaluation of Unit 2 Safety-related Structures for the Effects of Local Intense Precipitation to Generic Letters 88-20 and 89-22	0

CALC-5.8.2	Effect of Local Intense Precipitation on Safety-Related Roofs	0
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Condition Reports

ANO-2-2008-0028	ANO-2-2008-0009	ANO-C-2008-0450
ANO-2-2008-1265	ANO-2-2008-0290	ANO-2-2006-0547
ANO-2-2008-1266	ANO-2-2008-0299	ANO-C-2006-0682
ANO-C-2006-0962	ANO-C-2008-0313	ANO-C-2006-1859
ANO-2-2007-0736	ANO-2-2008-0330	ANO-C-2006-0638
ANO-C-2006-1402	ANO-2-2006-1238	ANO-2-2008-0221
ANO-2-2008-1302		

Miscellaneous Document

ULD-0-SYS-19, "ANO Unit 1 and Unit 2 Alternate AC Generator System," Revision 1

**Section 1R13: Maintenance Risk Assessments and Emergent Work Control**

Procedures

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
COPD-024	Risk Assessment Guidelines	23
EN-WM-100	Work Request Generation, Screening and Classification	3
COPD-003	Door Breach Checklist	12

Calculations

<u>NUMBER</u>	<u>TITLE</u>	<u>REVISION</u>
CALC-ANO-ER-05-027	ANO-1 HELB Door Sensitivity Analysis	0

Condition Reports

ANO-2-2008-1214	ANO-1-2008-0571	ANO-1-2005-1580
ANO-2-2008-0674	ANO-1-2007-1732	ANO-1-2005-1025
ANO-2-2008-0859	ANO-1-2007-0862	ANO-1-2005-1022
ANO-2-2008-0933	ANO-1-2006-0179	ANO-1-2008-0560
ANO-1-2008-0593	ANO-1-2006-0178	ANO-1-2005-0800

Work Orders

00064178

00150784

00151135

Miscellaneous Documents

ULD-2-SYS-13, ANO-2 Feedwater and Steam Generator Blowdown Systems, Revision 11

ER-ANO-2006-0192-000, "DR-62 Safety Classification Evaluation," Revision 0

TD 0105.0010, "Maintenance Instruction and Parts Catalog for Overly Manufacturing Company Impingement Door #62," Revision 0

**Section 1R15: Operability Evaluations**

Procedures

NUMBER	TITLE	REVISION
EN-OP-104	Operability Determinations	2
OP-1015.035	Valve Operations	12
OP-1015.001	Conduct of Operations	65

Condition Reports

ANO-1-2001-1065	ANO-2-2008-1275	ANO-1-2008-0468
ANO-1-2008-0415	ANO-2-2008-1366	ANO-1-2008-0229
ANO-1-2008-0198	ANO-2-2008-0978	ANO-1-2008-0549
ANO-2-2008-0978	ANO-2-2008-1066	ANO-1-2008-0511
ANO-2-2008-1066	ANO-1-2008-0592	ANO-1-2001-1065
ANO-1-2008-0415	ANO-1-2008-0198	ANO-2-2008-0895
ANO-2-2008-0524		

Calculation

NUMBER	TITLE	REVISION
CALC-91-E-0116-01	NPSH Calculation for HPSI and RB Spray	5

Work Order

00133058

Miscellaneous Documents

ULD-1-SYS-23, "ANO-1 Penetration Room Ventilation System, Revision 4  
Engineering Report 98-R-1022-01, Unit 1 AOV Program Valves, Revision 1

**1R17: Evaluations of Changes, Tests, or Experiments and Permanent Plant Modifications**

Procedures

NUMBER	TITLE	REVISION
EN-DC-105	Configuration Management	2
EN-DC-112	Engineering Change Request and Project Initiation Process,	1
EN-DC-115	Engineering Change Development	5
EN-DC-116	Engineering Change Installation	1
EN-DC-117	Post Modification Testing and Special Instructions	1
EN-DC-118	Engineering Change Closure	2
EN-LI-100	Process Applicability Determination	6
EN-LI-101	CFR 50.59 Review Program	4

Screens

05-001	05-009	05-012	05-052	06-004	06-008
06-046	06-046	06-051	07-014	07-026	07-028
07-028	07-035	07-039	08-009	08-012	

Evaluations

05-022	05-029	05-009	06-001	06-012	06-017
06-018	06-019	06-026	06-045	06-046	06-049
07-011	07-036				

Modifications

EC 0423	EC 0446	EC 0592	EC 0608	EC 0704	EC 0897
EC 1565	EC 1830	EC 1889	EC 2325	EC 6097	
ER-ANO-2002-0630-001		ER-ANO-2002-1401		ER-ANO-2003-0245-032	
ER-ANO-2005-0149-004		ER-ANO-2005-0149-005		ER-ANO-2005-0871	

Calculations

85-S-00002  
85-S-00002-01  
05-E-0014-01

**Section 1R18: Plant Modifications**

Procedure

NUMBER	TITLE	REVISION
EN-DC-136		

Miscellaneous Documents

ER-ANO-2005-0517-000, "DR 62 Emergency Temporary Alteration," Revision 0

ER-ANO-2006-0192-000, "DR-62 Safety Classification Evaluation," Revision 0

TD 0105.0010, "Maintenance Instruction and Parts Catalog for Overly Manufacturing Company Impingement Door #62," Revision 0

**Section 1R19 Post maintenance Testing**

Procedures

NUMBER	TITLE	REVISION
EN-WM-100	Work Request Generation, Screening and Classification	3
OP-1104.027	Battery and Switchgear Emergency Cooling System	31

Condition Report

ANO-1-2008-0547

Work Orders

00143408                      51214364

**Section 1R20: Refueling and Other Outage Activities**

Procedures

NUMBER	TITLE	REVISION
EN-MA-119	Material Handling Program	5
OP-1000.024	Control of Maintenance	53

### Calculations

NUMBER	TITLE	REVISION
91-D2016-07	Evaluation of Transco Fiberglass Insulation in Relation to REG Guide 1.82	2
CALC-ANO-ER-06-023	Head Loss Calculation for ANO2 Suction Strainer	0

### Condition Reports

ANO-2-2008-0988	ANO-2-2008-1204	ANO-2-2008-0995
ANO-2-2008-0989	ANO-C-2008-0767	ANO-2-2008-0998
ANO-2-2008-1192	ANO-2-2008-1134	ANO-2-2008-1038
ANO-2-2008-1170	ANO-2-2008-1188	ANO-2-2008-1116
ANO-2-2008-0934	ANO-2-2008-1054	ANO-2-2008-0921
ANO-2-2008-0919	ANO-2-2008-0802	ANO-2-2008-0921
ANO-2-2008-0499	ANO-2-2008-0576	ANO-2-2008-0630
ANO-2-2008-0615	ANO-2-2008-0980	ANO-C-2008-0673
ANO-2-2008-0612	ANO-2-2008-0710	ANO-2-2008-0732
ANO-2-2008-0407	ANO-2-2008-0856	ANO-2-2008-0810
ANO-2-2008-0829	ANO-2-2008-0763	ANO-2-2008-0420
ANO-2-2008-1486	ANO-C-2008-0667	ANO-2-2008-0614
ANO-2-2008-0863	ANO-2-2008-0761	ANO-2-2008-0471
ANO-2-2008-0857	ANO-2-2008-0746	ANO-2-2006-1521

### **Section 1EP1: Exercise Evaluation (71114.01)**

#### Procedures

NUMBER	TITLE	REVISION
OP-1903.010	Emergency Action Levels Classification	39
OP-1903.011	Notifications	30
OP-1903.064	Emergency Response Facility - Control Room	9
OP-1903.065	Emergency Response Facility - Technical Support Center	19
OP-1903.066	Emergency Response Facility - Operations Support Center	16
OP-1903.067	Emergency Response Facility – Emergency Operations Facility	24

OP-1904.002                      Dose Assessment  
OP-1905.001                      Emergency Radiological Controls

1

Condition Reports

ANO-2-2008-1287	ANO-C-2006-0477	ANO-C-2006-0712
ANO-2-2008-1202	ANO-C-2004-1930	ANO-C-2008-0377
ANO-2-2008-1124	ANO-C-2004-1926	ANO-C-2005-1108
ANO-2-2008-1172	ANO-C-2004-1778	

Work Orders

51088326	00102801	00141137
51211196	51088568	

Miscellaneous

REX04 Exercise Summary  
REX06 Exercise Summary  
REX08 Exercise Manual  
EP-2006-0039 Alert Emergency Class Declaration of October 30, 2006  
EP-2006-0040 Annual Post Accident Sampling Drill  
EP-2006-0041 Annual Environmental Monitoring Drill on November 9, 2006  
EP-2006-0049 2006 Emergency Medical Team Drill  
EP-2007-0006 Severe Accident Management Drill  
EP-2007-0014 Emergency Response Organization Full Scale Drill  
EP-2008-0006 Alert Declaration October 23, 2007  
EP-2007-0031 Environmental Monitor / Field Monitoring Drill  
EP-2008-0005 2007 Post Accident Sampling Drill  
EP-2007-0029 TSC Drill

**Section 2OS1: Access Controls to Radiologically Significant Areas (71121.01)**

Corrective Action Documents

ANO-C-2008-00665	ANO-2-2008-00640	ANO-2-2008-00747
ANO-2-2007-01584	ANO-2-2008-00706	ANO-2-2008-00753
ANO-2-2008-00547		

Radiation Work Permits

2008-2430, "Refueling Activities"  
2008-2471, "Perform Inspection of Reactor Head"



Procedures

NUMBER	TITLE	REVISION
EN-RP-101	Access Control for Radiologically Controlled Areas	3
EN-RP-102	Radiological Control	2
EN-RP-106	Radiological Survey Documentation	1
EN-RP-131	Air Sampling	4

**Section 20S2: RCS Planning and Controls**

NUMBER	TITLE	REVISION
EN-RP-105	Radiation Work Permits	2

**Section 40A1: Performance Indicator Verification**

Drill and Exercise Schedule, 2007  
Drill and Exercise Schedule, 2008

NUMBER	TITLE	REVISION
OP-1903.10	Emergency Action Levels Classification	39
OP-1903.11	Notifications	30

Miscellaneous Documents

Arkansas Nuclear One Emergency Plan, Revision 33  
Arkansas Nuclear One Emergency Plan, Revision 34

**Section 40A2: Identification and Resolution of Problems**

Procedure

NUMBER	TITLE	REVISION
EN-DC-205	Maintenance Rule Monitoring	0

Condition Reports

ANO-1-2007-1764	ANO-1-2007-1656	ANO-1-2008-0360
ANO-C-2007-1621	ANO-1-2007-1483	ANO-1-2008-0387
ANO-1-2007-1793	ANO-1-2008-0156	
ANO-1-2007-1796	ANO-1-2008-0204	

Miscellaneous Documents

NUMBER	TITLE	REVISION
ULD-1-SYS-30	Auxiliary Building HVAC System	4

**Section 4OA5: Other Activities**

Condition Reports

ANO-C-2005-02280	ANO-2-2006-02657	ANO-1-2007-01777
ANO-C-2007-01646	ANO-2-2006-02683	ANO-2-2007-01042
ANO-1-2006-01159		

Repetitive Maintenance Tasks

50238696  
50238697

Engineering Requests

ER 010699E301, "Equivalency Evaluation Model B200 Emergency Light Batteries," Revision 0

Miscellaneous Documents

Maintenance Rule Information for Emergency Lighting System

**LIST OF ACRONYMS**

AAC	alternate alternating current
ACE	apparent cause evaluation
ALARA	as low as reasonably achievable
ANO	Arkansas Nuclear One
ASME	American Society of Mechanical Engineers
CAP	corrective action program
CFR	<i>Code of Federal Regulations</i>
CR	condition report
DMBW	dissimilar metal butt welds
EDG	emergency diesel generator
LPSI	low pressure safety injection
MRP	material reliability program
NDE	nondestructive examination
PWR	pressurized water reactor\
RCS	reactor coolant system
SSC	system, structure, and component
TS	Technical Specification
TSO	transmission system operator
UFSAR	Updated Safety Analysis Report
UT	ultrasonic test
VT	visual test

**Maintenance Rule Online Risk Monitor - effect of switchyard activities**

1. How is the reactor trip frequency changed in the online risk monitor for:
  - a. general presence of workers/vehicles in the switchyard
  - b. Breaker maintenance/manipulation
  - c. Transformer maintenance
  - d. Other (please elaborate as necessary)

ANO 1	ANO 2
handled with increased LOOP frequency	

2. How is the LOOP frequency changed in the online risk monitor for:
  - a. general presence of workers/vehicles in the switchyard
  - b. Breaker maintenance/manipulation
  - c. Transformer maintenance
  - d. Other (please elaborate as necessary)

ANO 1	
<p>Per COPD-024 titled Risk Assessment Guidelines 6.6.2 Switchyard Work/Grid Instability: This bar will normally be in the Normal position. When it is moved into the High Risk position, it increases the value for the likelihood of a loss of offsite electrical power (LOOP) by a factor of 10. For grid instability, the bar should be moved to the High Risk position if the Control Room is notified by the System Operations Center that offsite power design requirements are not maintained within specified limits IAW ENS-DC-201. Action may also be directed from OP-1203.037 Section 3, Offsite Voltage Abnormal, and Section 4, Offsite Frequency Low. For switchyard work, this bar should be moved to the High Risk position during switchyard work that could cause a reactor/turbine trip, LOOP, or significantly affect offsite power availability to Unit 1 IAW OP-1015.033 ANO Switchyard and Transformer Yard Controls, Maintenance Determination Process.</p>	

ANO 2	
<p>Per COPD-024 titled Risk Assessment Guidelines 6.7.1 Switchyard Work/Grid Instability: This bar will normally be in the Normal position. When it is moved into the High Risk position, it increases the value for the likelihood of a loss of offsite electrical power (LOOP) by a factor of 10. For grid instability, the bar should be moved to the High Risk position if the Control Room is notified by the System Operations Center that offsite power design requirements are not maintained within specified limits IAW ENS-DC-201. Action may also be directed from OP-2107.001, Section 15, Operations With Degraded or Elevated Offsite Power. For switchyard work, this bar should be moved to the High Risk position during switchyard work that could cause a reactor/turbine trip, LOOP, or significantly affect offsite power availability to Unit 2 IAW OP-1015.033 ANO Switchyard and Transformer Yard Controls, Maintenance Determination Process.</p>	

3. Are the above changes in event frequency based on data evaluation or engineering judgment?

ANO 1	ANO 2
Engineering Judgment	

4. Have there been any incidents in your switchyard in the past 10 years where human error caused a plant trip, LOOP, partial LOOP, or that can be characterized as a near miss of the same?

ANO 1	ANO 2
In 2002 there was an event that resulted in one phase breaker for the Auto Transformer failing to close. The Root Cause determined several Human Performance issues with authorization and reviews of relay setting changes. These events were addressed in a Condition Report and Corrective Action Plan which implemented several administrative controls for switchyard work and restoration. (CR ANO-C-2002-00661)	

5. Have you made any improvements in training/procedures/design in the past 10 years that would tend to make plant trips or LOOPS less likely to occur as a result of activities in the switchyard? If yes, please explain.

ANO 1	ANO 2
We log and perform switch yard inspections, we constantly revise and improve 1015.033 Switch yard controls, we routinely have training on Switch yard upgrades and it is part of the SAT base training for Ops. We've also trip hardened the Switchyard and main transformers	

6. Do you have procedural guidance to restrict access to the switchyard when a diesel generator or station blackout power source is unavailable, when offsite power sources are out of service, when dc-powered injection trains are unavailable, or when threatening weather is approaching?

ANO 1	
There is a specific attachment in 1104.036 for Unit 1 when removing an EDG from service. For most issues we do not restrict access but we restrict maintenance activities	

ANO 2	
There is a specific attachment in 2104.036 for Unit 2 when removing an EDG from service similar to Unit 1.	

7. Do you consider the Maintenance Rule treatment of the risk implications of switchyard activity to be something that should be standardized through an industry-wide effort?

ANO 1	ANO 2
Unsure of the effectiveness of such an approach based on two issues 1- design differences and 2- managing switch yard activities does nothing to control the grid inputs to the switch yard.	

