



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
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ARLINGTON, TEXAS 76011-4005

October 24, 2007

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
05000313/2007004 AND 05000368/2007004

Dear Mr. Mitchell:

On September 23, 2007, 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 September 27, 2007, 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 four NRC identified findings self-revealing findings of very low safety significance (Green). All four of these findings were determined to involve violations of NRC requirements. 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 noncited violations consistent with Section VI.A.1 of the NRC Enforcement Policy. If you contest any of these noncited violations, 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, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-4005; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington DC 20555-0001; and the NRC Resident Inspector 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

Entergy Operations, Inc.

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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/

Jeff Clark, P.E.
Chief, Branch E
Division of Reactor Projects

Dockets: 50-313
50-368
Licenses: DPR-51
NPF-6

Enclosure:
NRC Inspection Report 05000313/2007004 and 05000368/2007004
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R:\ REACTORS\ ANO2007-004DRP-CHY-wpd.

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**U.S. NUCLEAR REGULATORY COMMISSION
REGION IV**

Dockets: 50-313, 50-368

Licenses: DPR-51, NPF-6

Report: 05000313/2007004 and 05000368/2007004

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

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

Dates: June 24 through September 23, 2007

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SUMMARY OF FINDINGS

IR 05000313/2007004, 05000368/2007004; 06/24/07 - 09/23/07; Arkansas Nuclear One, Units 1 and 2; Maintenance Risk Assessments and Emergent Work Control, Operability Evaluations, and Follow-up of Events and Notices of Enforcement Discretion.

This report covered a 3-month period of inspection by resident inspectors and regional specialist inspectors. The inspection identified five Green findings, all of which were noncited violations. 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 Nuclear Regulatory Commission 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. A self-revealing noncited violation of Technical Specification 6.4.1, "Procedures," was identified associated with the failure to ensure that adequate procedures were available for maintenance conducted on the Unit 2 Emergency Diesel Generator (EDG) 2K-4A. Specifically, the maintenance procedure used for the replacement of the four-barrel inspection plate did not have requirements for flatness checks. As a result, oil leakage from the inspection plate cover resulted in an exhaust manifold fire on the Unit 2 EDG on August 3, 2007. This issue was entered into the licensee's corrective action program as Condition Report ANO-2-2007-1073.

The finding was more than minor because it was associated with the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because the condition constituted a low degradation of a fire prevention and administrative controls feature. The finding had crosscutting aspects in the area of problem identification and resolution associated with operating experience in that the licensee failed to effectively implement changes to station processes and procedures in response to operating experience involving the importance of ensuring flatness of flanges in the diesel exhaust manifold (P.2(b)) (Section 4OA3).

- Green. The inspectors identified a noncited violation (NCV) of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the failure of the licensee to perform a risk assessment prior to mobile crane activities in the vicinity of Startup 2 transformer. This issue was entered into the licensee's corrective action program as Condition Report ANO-1-2007-1657.

The finding was more than minor because it was associated with the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Additionally, if left uncorrected, the practice of not adequately evaluating crane activities in the vicinity of safety-related equipment by appropriately trained individuals would become a more significant safety concern in that it could result in a more than minimal increase in risk associated with other risk important equipment that would not be identified and not result in appropriate actions being taken. The inspectors evaluated this finding using the Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process" worksheets of Manual Chapter 0609 because the finding is a maintenance risk assessment issue. Flowchart 1, "Assessment of Risk Deficit," requires the inspectors to determine the risk deficit associated with this issue. This finding was determined to be of very low safety significance because the incremental core damage probability deficit was less than 1×10^{-6} . The finding had crosscutting aspects in the area of human performance associated with work control in that the licensee failed to appropriately plan and incorporate risk insights in work activities associated with mobile crane operations (H.3(a)) (Section 1R13).

Cornerstone: Mitigating Systems

- Green. A self-revealing noncited violation of Unit 1 Technical Specification 5.4.1.a was identified for the licensee's failure to provide adequate instructions for conducting maintenance on the north emergency switchgear chiller hot gas bypass valve. The failure to specify an appropriate fastener torque requirement in the work procedures resulted in a Freon leak that caused a loss of safety function of the equipment. This issue was entered into the licensee's corrective action program as Condition Report ANO-1-2007-1656.

The finding was greater than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone, and it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance (Green) because it did not represent an actual loss of safety function of a non-Technical Specification train of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee failed to incorporate vendor recommendations through changes to station maintenance procedures (P.2(b)) (Section 1R15.1).

- Green. A self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified involving the licensee's failure to take adequate corrective actions in response to a loss of control power to the Unit 1 turbine-driven emergency feedwater Pump P-7A that occurred on

November 30, 2004. The lack of corrective actions resulted in a condition not being addressed which contributed to a subsequent failure that occurred on June 27, 2007. This issue was entered into the licensee's corrective action program as Condition Report ANO-1-2007-1672.

The finding was greater than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone, and it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance (Green) because it did not represent an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee failed to implement relevant operating experience through changes to station equipment (P.2(b)) (Section 1R15.2).

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 began the inspection period at 100 percent rated thermal power (RTP) and operated there for the entire inspection period.

Unit 2 began the inspection period at 100 percent RTP and operated there until September 13, 2007, when power was reduced to 85 percent RTP for approximately 22 hours in support of repairs to the Main Feedwater Pump B control valve. The unit returned to 100 percent RTP on September 13, 2007, and operated there for the remainder of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

1R01 Adverse Weather Protection (711111.01)

.1 Readiness for Seasonal Susceptibilities

a. Inspection Scope

The inspectors completed a review of the licensee's readiness of seasonal susceptibilities involving extreme high temperatures. The inspectors: (1) reviewed plant procedures, the Updated Final Safety Analysis Report (UFSAR), and Technical Specifications (TSs) to ensure that operator actions defined in adverse weather procedures maintained the readiness of essential systems; (2) walked down portions of the two systems listed below to ensure that adverse weather protection features (weatherized enclosures, temporary chillers, etc.) were sufficient to support operability including the ability to perform safe shutdown functions; (3) evaluated operator staffing levels to ensure the licensee could maintain the readiness of essential systems required by plant procedures; and (4) reviewed the corrective action program (CAP) to determine if the licensee identified and corrected problems related to adverse weather conditions.

- August 20, 2007, Unit 2 Emergency Feedwater System, and Unit 1 Decay Heat Removal System

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 Walkdown

a. Inspection Scope

The inspectors: (1) walked down portions of the two 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 corrective action program (CAP) to ensure problems were being identified and corrected.

- July 17, 2007, Unit 2, Train A Containment Spray System
- August 15, 2007, Unit 1, Train A Low Pressure Injection System

Documents reviewed by the inspectors included:

- Procedure OP-1104.004, "Decay Heat Removal Operating Procedure," Revision 076
- Procedure OP-2104.005, "Containment Spray," Revision 047
- Drawing M-232, "Piping & Instrument Diagram Decay Heat Removal System," Sheet 1, Revision 102
- Drawing M-2236, "Piping & Instrument Diagram Containment Spray System," Sheet 1, Revision 93

The inspectors completed two samples.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Inspection

a. Inspection Scope

The inspectors walked down the six below listed plant areas 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 was 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.

- July 17, 2007, Unit 2, Fire Zone 2007-LL, High Pressure Safety Injection B, Low Pressure Safety Injection, and Containment Spray Pump Room
- September 23, 2007, Unit 1, Fire Zone 53-Y, Lower North Piping Penetration Room
- September 23, 2007, Unit 1, Fire Zone 112-I, Lower North Electrical Penetration Room
- September 23, 2007, Unit 1, Fire Zone 77-V, Upper South Piping Penetration Room
- September 23, 2007, Unit 2, Fire Zone 2111-T, Lower South Electrical Penetration Room
- September 23, 2007: Unit 2, Fire Zone 2102-Y, East Battery Room

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed six samples.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Quarterly Inspection

The licensed operator requalification program involves two training cycles that are conducted over a 2-year period. In the first cycle, the annual cycle, the operators are administered an operating test consisting of job performance measures and scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a written examination. The inspectors reviewed the results of the annual requalification program for Unit 2 and the biennial cycle for Unit 1.

a. Inspection Scope

On August 16, 2007, the inspectors observed testing and training of senior reactor operators and reactor operators in the Unit 1 simulator to identify deficiencies and discrepancies in the training, to assess operator performance, and to assess the evaluator's critique. The training scenario involved the crew response to a malfunction of the emergency feedwater initiation and control system.

Documents reviewed by the inspectors included:

- Procedure A1SPG-LOR-080103, "Unannounced Casualties (EFIC)," Revision 0

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

.2 Biennial Inspection (Unit 1)

a. Inspection Scope

To assess the performance effectiveness of the licensed operator requalification program, the inspectors conducted personnel interviews, reviewed samples of both the operating and written examinations, and observed ongoing operating examination activities.

The inspectors interviewed six licensee personnel, consisting of two operators, two instructors, one evaluator, and a training supervisor to determine their understanding of the policies and practices for administering requalification examinations. The inspectors also reviewed operator performance on the written and operating examinations. These reviews included observations of portions of the operating examination by the inspectors. The operating examinations observed included six job performance measures and two scenarios that were used in the current biennial requalification cycle. These observations allowed the inspectors to assess the licensee's effectiveness in conducting the operating test to ensure operator mastery of the training program content.

The results of these examinations were reviewed to determine the effectiveness of the licensee's appraisal of operator performance and to determine if feedback of performance analyses into the requalification training program was being accomplished. The inspectors interviewed members of the training department to assess the responsiveness of the licensed operator requalification program to incorporate the lessons learned from both plant and industry events. Examination results were also assessed to determine if they were consistent with the guidance contained in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, and NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process." All but two of the operators (a reactor operator and a senior reactor operator) passed the written examination. The operators that failed the written examination were remediated and successfully re-examined.

b. Findings

No findings of significance were identified.

.3 Annual Inspection (Unit 2)

a. Inspection Scope

The inspectors conducted an on-site and in-office review of the annual requalification training program to determine the results of this program. Sixty operators (21 reactor operators and 39 senior reactor operators) were examined during this requalification

cycle. In addition, nine operating crews were examined on the facility's simulator. All of the licensed operating crews passed the simulator examinations and all licensed operators passed the operating examinations.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed the one below listed maintenance activity to: (1) verify the appropriate handling of structure, system, and component (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 Technical Specifications.

- August 3, 2007, Unit 1, Safety-Related Batteries

Documents reviewed by the inspectors included:

- CR ANO-1-2007-1574
- Procedure OP-1202.008 "Blackout," Revision 9
- Calculation PRA-A1-01-001 "ANO-1 PSA Level-1 Model 3p0 Summary Report," Revision 0
- Calculation 92-E-0021-01 "Emergency Duty Cycle and Battery Sizing Calculation," Revision 9

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

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

.1 Risk Assessment and Management of Risk

a. Inspection Scope

Risk Assessment and Management of Risk

The inspectors reviewed the five below listed assessment activities 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.

- June 26, 2007, Unit 1, Mobile Crane Use in the Vicinity of Startup 2 Transformer
- July 13, 2007, Unit 1, Maintenance on Train A Reactor Building Spray Valve CV-2401
- August 1, 2007, Unit 1, Emergency Diesel Generator (EDG) Surveillance Requirement 3.0.3 Risk Assessment
- August 27, 2007, Unit 1, Mobile Crane Use in the Vicinity of Startup 2 Transformer
- September 21, 2007, Unit 2, Service Water Intake Forebay Diving and Cleaning

Documents reviewed by the inspectors included:

- Procedure COPD-024, "Risk Assessment Guidelines," Revision 018
- CR ANO-1-2007-1657
- CR ANO-C-2007-0120
- WO 89004

The inspectors completed five samples.

b. Findings

Introduction. The inspectors identified a noncited violation (NCV) of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," involving the failure of the licensee to perform a risk assessment prior to mobile crane activities in the vicinity of Startup 2 transformer.

Description. On June 25, 2007, station maintenance personnel were in the process of setting up a mobile crane for use in lifting activities to the roof of the turbine building in the southeast corner of the Unit 1 turbine building. The crane was being set up to move materials to facilitate turbine building roof work.

The inspectors were informed of the intended activities and performed a walkdown in the area of the crane. During this walkdown, the inspectors noted that the crane was set up in the vicinity of the safety-related station Startup 2 transformer, and the boom had been raised in preparation for use. The inspectors also noted that given the location of the crane, a failure of the boom had the potential to impact the transformer. The inspectors requested a copy of the risk assessment performed to evaluate the work in progress in the area of the transformer. The inspectors were informed by the work supervisor that there had not been a formal risk assessment performed for this activity, though the workers had been provided a load path sketch that prohibited the crane from lifting over Startup 2 transformer.

The inspectors questioned operators in the control room and work control center about the intended work with the crane. During these discussions, the inspectors determined the control room operators were not aware of the intended work, and although

personnel in the work control center knew that a crane was being used to lift materials to the roof, they were not aware that the crane had been moved to the vicinity of the Startup 2 transformer. As such, a risk assessment to determine if there was an increase in risk to the safety-related components in the immediate vicinity of the crane had not been completed. Control room operators subsequently stopped the crane work until a risk assessment was performed. This was accomplished as part of Work Order 00089004-06.

The inspectors also noted during their review that the licensee had previously identified the need to develop a formal approach for performing Maintenance Rule risk assessments for maintenance activities requiring engineering input when the activity is not governed by the site's equipment out-of-service models. Specifically identified was the need to address load movement activities both inside and outside of the power block which could impact safety-related systems that would be in service.

Analysis. The inspectors determined that the licensee's failure to perform a risk assessment and implement appropriate risk management actions was a performance deficiency. The finding was more than minor because it was associated with the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Additionally, if left uncorrected, the practice of not adequately evaluating crane activities in the vicinity of safety-related equipment by appropriately trained individuals would become a more significant safety concern in that it could result in a more than minimal increase in risk associated with other risk important equipment that would not be identified and not result in appropriate actions being taken. The inspectors evaluated this finding using the Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process" worksheets of Manual Chapter 0609 because the finding is a maintenance risk assessment issue. Flowchart 1, "Assessment of Risk Deficit," requires the inspectors to determine the risk deficit associated with this issue. This finding was determined to be of very low safety significance because the incremental core damage probability deficit was less than 1×10^{-6} . The finding had crosscutting aspects in the area of human performance associated with work control in that the licensee failed to appropriately plan and incorporate risk insights in work activities associated with mobile crane operations (H.3(a)).

Enforcement. 10 CFR 50.65 (a)(4) requires, in part, that before performing maintenance activities the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, on June 25, 2007, the licensee did not assess and manage the increase in risk that may result from the use of a mobile crane in the vicinity of Startup 2 transformer prior to placing the crane in the vicinity of the transformer. Because this finding is of very low safety significance and has been entered into the CAP as Condition Report (CR) ANO-1-2007-1657 this violation is being treated as a NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000313/2007004-01, "Failure to Perform a Risk Assessment When Required by 10 CFR 50.65(a)(4) for Mobile Crane Use in the Vicinity of Safety-Related Equipment."

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 Technical Specifications; (5) used the significance determination process to evaluate the risk significance of degraded or inoperable equipment; and (6) verified that the licensee has identified and implemented appropriate corrective actions associated with degraded components.

- June 26, 2007, Unit 1, North Emergency Switchgear Room Chiller VCH-4A
- June 28, 2007, Unit 1, Steam Driven Emergency Feedwater Pump P-7A
- July 10, 2007, Unit 2, Safety-Related Battery 2D-11
- July 11, 2007, Unit 2, Motor-Driven Emergency Feedwater Pump 2P-7B
- July 25, 2007, Unit 2, Service Water Loop 1 Supply Header Drain Valve 2SW-1550
- July 27, 2007, Unit 1, Leakage Past Flood Barrier Door DR-40
- September 4, 2007, Unit 1, Train B Low Pressure Injection Pump P-34B

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed seven samples.

b. Findings

.1 Loss of Function of Emergency Switchgear Chiller Due To Inadequate Maintenance Procedure

Introduction. A Green, self-revealing NCV of Unit 1 Technical Specification 5.4.1.a was identified for the licensee's failure to provide adequate instructions for conducting maintenance on the north emergency switchgear chiller hot gas bypass valve. The failure to specify an appropriate fastener torque requirement in the work procedures resulted in a Freon leak that caused a loss of safety function of the equipment.

Description. On June 26, 2006, VCH-4A (Unit 1 north emergency switchgear room chiller) was declared nonfunctional when the unit failed to maintain the required chill water outlet temperature during a regularly scheduled monthly surveillance run. This condition was entered into the licensee's CAP as CR ANO-1-2007-1656. The cause of the failure was determined to be a Freon leak on the valve body of the hot gas bypass Valve TCV-6052. The leak was determined to be the result of maintenance on the valve that occurred in January 2005 under WO 52949. A review of this work order (WO)

revealed that the valve fasteners were torqued to 24 in-lbs. It was also noted that a March 2002 technical bulletin for this component indicated that the fasteners should have been tightened to 72 in-lbs.

Analysis. The failure to include the appropriate torque requirements in the WO package was a performance deficiency. The finding was greater than minor because it was associated with the procedure quality attribute of the mitigating systems cornerstone, and it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using the Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance (Green) because it did not represent an actual loss of safety function of a non-Technical Specification train of equipment designated as risk significant per 10 CFR 50.65 for greater than 24 hours, and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee failed to incorporate vendor recommendations through changes to station maintenance procedures (P.2(b)).

Enforcement. Unit 1 Technical Specification 5.4.1.a requires that written procedures be established, implemented, and maintained covering the activities specified in Regulatory Guide 1.33, "Quality Assurance Program Requirements (Operation) Reactors," Appendix A, "Typical Procedures for Pressurized Water Reactors and Boiling Water," dated February 1978. Regulatory Guide 1.33, Appendix A, Section 9.a., requires, in part, that maintenance that can affect the performance of safety-related equipment should be performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above, in January 2005, the licensee failed to implement written procedures, documented instructions, or drawings appropriate to the circumstances for maintenance that can affect the performance of safety-related equipment. Specifically, the maintenance instructions in WO 52949 failed to include an appropriate fastener torque value. Because the finding is of very low safety significance and has been entered into the licensee's CAP as CR ANO-1-2007-1656, this violation is being treated as an NCV consistent with Section VI.A of the Enforcement Policy: NCV 05000313/2007004-02, "Loss of Function of Emergency Switchgear Chiller Due to Inadequate Maintenance Procedure."

.2 Indicating Lamp Fault Results in Loss of Control Power to Steam Driven Emergency Feedwater Pump

Introduction. A Green self-revealing noncited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," was identified for the licensee's failure to take adequate corrective actions in response to a loss of control power to the Unit 1 turbine-driven emergency feedwater Pump P-7A that occurred on November 30, 2004. The lack of corrective actions resulted in a condition not being addressed which contributed to a subsequent failure that occurred on June 27, 2007.

Description. On June 27, 2007, a loss of control power to Pump P-7A turbine speed control panel occurred which resulted in a period of 5 ½ hours of inoperability. This issue was entered into the licensee's CAP as CR ANO-1-2007-1672. The cause of this failure was determined to be a fault associated with the "Power On" indicating lamp on the control panel. The lamp filament failed in such a way that a short circuit was created which was propagated directly to the control power circuit, causing the control power

fuses to open and interrupt control power. A similar sequence of events occurred on November 30, 2004, when a fault that was believed to originate in the "Power On" indicating lamp socket caused the same result; i.e., a loss control power and a period of inoperability of Pump P-7A. That condition was entered into the licensee's CAP as CR ANO-1-2004-2435.

Because the indicating lamp is a full-voltage incandescent type indicating lamp in the DC control power circuit, a lamp related fault that causes a short circuit will propagate directly to the control power circuit and cause an overcurrent condition that will cause a loss of control power when the control power fuses open. The potential for failures associated with indicating lamps of this type causing a loss of control power in their associated safety-related control power circuit applications was the subject of NRC Information Notice (IN) 94-68, "Safety-Related Equipment Failures Caused by Faulted Indicating Lamps," which was issued on September 27, 1994. The purpose of this IN was to illustrate the design deficiency of not electrically isolating indicating lamps from the associated control power circuitry. The IN also suggested corrective actions proven to be effective in addressing this issue, such as the replacement of full-voltage incandescent lamps with light-emitting diode style lamps, the addition of a separate fuse to the lamp power supply circuit, or the replacement of lamp assemblies with those having current-limiting features or resistors.

Numerous instances of industry operating experience, both internal and external to ANO, have since supported the issue and corrective actions that were illustrated with IN 94-68. The licensee's response to the November 2004 loss of control power event did not result in corrective actions to modify the indicating lamps in the Pump P-7A control power circuit to address this problem, despite a suggested corrective action that was issued for CR ANO-1-2004-2435 to implement measures to prevent recurrence. Consequently, the uncorrected condition contributed to the subsequent failure which occurred on June 27, 2007. On August 22, 2007, the licensee replaced the subject indicating lamps with light-emitting diode style lamps.

Analysis. The performance deficiency associated with this finding involved the licensee's failure to implement measures to correct the use of full-voltage incandescent type indicating lamps in the Pump P-7A control power circuit in light of site-specific and industry operating experience that illustrated the susceptibility of such an arrangement to the loss of operability due to a fault associated with such indicating lamps. The finding was greater than minor because it was associated with the equipment performance attribute of the mitigating systems cornerstone, and it affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Using Manual Chapter 0609, "Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance (Green) because it did not represent an actual loss of safety function of a single train for greater than its Technical Specification allowed outage time and did not screen as potentially risk significant due to a seismic, flooding, or severe weather initiating event. The cause of this finding was determined to have a crosscutting aspect in the area of problem identification and resolution associated with operating experience in that the licensee failed to implement relevant operating experience through changes to station equipment (P.2(b)).

Enforcement. 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures be established to assure that conditions adverse to quality are promptly identified and corrected. Contrary to this, between November 30, 2004, and

August 22, 2007, the licensee's measures failed to assure that a condition adverse to quality was promptly corrected. Specifically, the licensee failed to take actions to mitigate the susceptibility of the Pump P-7A control power circuit due to an indicating lamp related fault or failure. Because the finding is of very low safety significance and has been entered into the licensee's CAP as CR ANO-1-2007-1672, this violation is being treated as an NCV consistent with Section VI.A of the Enforcement Policy: NCV 05000313/2007004-03, "Indicating Lamp Fault Results in Loss of Control Power to Steam-Driven Emergency Feedwater Pump."

1R19 Postmaintenance Testing (71111.19)

a. Inspection Scope

The inspectors selected the four below listed postmaintenance test activities of risk significant systems or components. 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 postmaintenance testing.

- June 23, 2007, Unit 2, Train A Plant Protection System
- July 25, 2007, Unit 1, North Emergency Switchgear Room Chiller VCH-4A
- June 28, 2007, Unit 1, Steam-Driven Emergency Feedwater Pump P-7A
- August 15, 2007, Unit 1, Train B Low Pressure Injection Pump P-34B

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed four samples.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors reviewed the UFSAR, procedure requirements, and Technical Specifications to ensure that the five below listed surveillance activities demonstrated that the SSC's 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 Technical Specification 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 setpoints. The inspectors also verified that the licensee identified and implemented any needed corrective actions associated with the surveillance testing.

- June 28, 2007, Unit 1, Train B Low Pressure Injection Pump P-34B Inservice Test
- August 13, 2007, Unit 1, Channel B Emergency Feedwater Initiation and Control
- August 17, 2007, Unit 2, EDG 2
- August 23, 2007, Unit 1, Train B Reactor Building Spray Pump P-35B Inservice Test
- August 24, 2007, Unit 2, Train B High Pressure Safety Injection Pump 2P-89B Inservice Test

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed five samples.

b. Findings

No Findings of significance were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert Notification System Testing (71114.02)

a. Inspection Scope

The inspector discussed with licensee and Arkansas Department of Health and Human Services staff the status of offsite siren and tone alert radio systems to determine the adequacy of licensee methods for testing the alert and notification system in accordance with 10 CFR Part 50, Appendix E. The licensee's alert and notification system testing program was compared with criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1; Federal Emergency Management Agency (FEMA) Report REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants"; and the licensee's current FEMA-approved alert and notification system design report. The inspector also reviewed "Procedures for Testing, Verification, and Maintenance of the Emergency Warning System," Revisions 2 and 3.

The inspector completed one sample.

b. Findings

No findings of significance were identified.

1EP3 Emergency Response Organization Augmentation Testing (71114.03)

a. Inspection Scope

The inspector discussed with licensee staff the status of primary and backup systems for augmenting the on-shift emergency response staff to determine the adequacy of licensee methods for staffing emergency response facilities in accordance with the licensee emergency plan and the requirements of 10 CFR Part 50, Appendix E. The inspector reviewed licensee Procedure 1903.011, "Emergency Response/Notifications," Revision 28-03-0, and Form 1903.062C, "Emergency Response Staffing Drill," Revision 18-06, completed for drive-in staffing drills conducted in September 2005 and November 2006.

The inspector completed one sample.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspector performed an in-office review of Revision 39 to Emergency Plan Implementing Procedure 1903.010, "Emergency Action Level Classification," submitted May 30, 2007. This revision added definitions, made administrative and formatting changes, and revised Emergency Action Level 2.1 to its previous description in accordance with the guidance of Regulatory Information Summary 2007-001, "Clarification of NRC Guidance for Maintaining a Standard Emergency Action Level Scheme."

The revision was compared to the 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 was adequately conducted following the requirements of 10 CFR 50.54(q). This review was not documented in a safety evaluation report and did not constitute approval of licensee changes; therefore, these revisions are subject to future inspection.

The inspector completed one sample.

b. Findings

No findings of significance were identified.

1EP5 Correction of Emergency Preparedness Weaknesses and Deficiencies (71114.05)

a. Inspection Scope

The inspector reviewed the licensee's corrective action program requirements in Procedure EN-LI-102, "Corrective Action Process," Revisions 9 and 10. The inspector reviewed summaries of 76 condition reports assigned to the emergency preparedness

department between June 2005 and June 2007, and selected 9 for detailed review against the program requirements. The inspector evaluated the response to the corrective action requests to determine the licensee's ability to identify, evaluate, and correct problems in accordance with the licensee program requirements and 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E. The inspector also reviewed other documents as listed in the attachment to this report.

The inspector completed one sample.

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

a. Inspection Scope

For the below listed drill contributing to the Drill/Exercise Performance (DEP) and Emergency Response Organization (ERO) Performance Indicators, the inspectors: (1) observed the training evolution to identify any weaknesses and deficiencies in classification, notification, and Protective Action Requirements (PAR) development activities; (2) reviewed the identified weaknesses and deficiencies against licensee identified findings to determine whether the licensee is properly identifying failures; and (3) determined whether licensee performance is in accordance with the guidance of the NEI 99-02, "Voluntary Submission of Performance Indicator Data," acceptance criteria.

- July 18, 2007, Unit 2, Full Scale ERO Drill Involving the Declaration of a General Emergency Due to a Loss of or Challenge to All Three Fission Product Barriers

Documents reviewed by the inspectors included:

- Procedure 1903.010, "Emergency Action Level Classification," Change 039
- Procedure 1903.011, "Emergency Response/Notification," Change 030

The inspectors completed one sample.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

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 inspector used the

requirements in 10 CFR Part 20, the Technical Specifications, and the licensee's procedures required by technical specifications as criteria for determining compliance. During the inspection, the inspector interviewed the radiation protection manager, radiation protection supervisors, and radiation workers. The inspector 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, and airborne radioactivity areas
- 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.
- Adequacy of the licensee's internal dose assessment for any actual internal exposure greater than 50 millirem Committed Effective Dose Equivalent
- Self-assessments, audits, and special reports related to the access control program since the last inspection
- Licensee actions in cases of repetitive deficiencies or significant individual deficiencies
- Posting and locking of entrances to all accessible high dose rate - high radiation areas and very high radiation areas

The inspector completed 8 of the required 21 samples.

b. Findings

No findings of significance were identified.

2OS2 ALARA Planning and Controls (71121.02)

a. Inspection Scope

The inspector assessed licensee performance with respect to maintaining individual and collective radiation exposures as low as is reasonably achievable (ALARA). The inspector used the requirements in 10 CFR Part 20 and the licensee's procedures required by technical specifications as criteria for determining compliance. The inspector interviewed licensee personnel and reviewed:

- ALARA work activity evaluations, exposure estimates, and exposure mitigation requirements
- Intended versus actual work activity doses and the reasons for any inconsistencies
- Person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements

- Method for adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered
- Exposure tracking system
- Use of engineering controls to achieve dose reductions and dose reduction benefits afforded by shielding
- Exposures of individuals from selected work groups
- Source-term control strategy or justifications for not pursuing such exposure reduction initiatives
- Self-assessments, audits, and special reports related to the ALARA program since the last inspection
- Effectiveness of self-assessment activities with respect to identifying and addressing repetitive deficiencies or significant individual deficiencies

The inspector completed 10 of the required 29 samples.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

.1 Cornerstone: Mitigating Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the three performance indicators listed below for the period from January 1 through June 30, 2007, for Units 1 and 2. The definitions and guidance of Nuclear Energy Institute 99-2 "Regulatory Assessment Indicator Guideline," Revision 5, were used to verify the licensee's basis for reporting each data element in order to verify the accuracy of PI data reported during the assessment period. The inspectors reviewed licensee event reports, out-of-service logs, operating logs, and the maintenance rule database as part of the assessment. Licensee performance indicator data were also reviewed against the requirements of Procedure EN-LI-114, "Performance Indicator Process," Revision 2.

- Mitigating System Performance Index (MSPI) - Emergency AC Power System
- MSPI - High Pressure Injection System
- MSPI - Heat Removal System

Documents reviewed by the inspectors are listed in the attachment.

The inspectors completed three samples.

b. Findings

No findings of significance were identified.

.2 Occupational Radiation Safety Cornerstone

Occupational Exposure Control Effectiveness

a. Inspection Scope

The inspector reviewed licensee documents from April 2007 through June 2007. The review included corrective action documentation that identified occurrences in locked high radiation areas (as defined in the licensee's Technical Specifications), 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 4). Additional records reviewed included ALARA records and whole body counts of selected individual exposures. The inspector interviewed licensee personnel that were accountable for collecting and evaluating the performance indicator data. In addition, the inspector 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 4, were used to verify the basis in reporting for each data element.

The inspector completed one sample.

Public Radiation Safety Cornerstone

Radiological Effluent Technical Specification/Offsite Dose Calculation Manual
Radiological Effluent Occurrences

The inspector reviewed licensee documents from April 2007 through June 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 inspector 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 4, were used to verify the basis in reporting for each data element.

The inspector completed one sample.

b. Findings

No findings of significance were identified.

.3 Emergency Preparedness Cornerstone

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 2006 through March 2007. The definitions and guidance of NEI 99-02, "Regulatory Assessment Indicator Guideline," Revisions 2 through 4, and licensee

Procedures EN-LI-114, "Performance Indicator Process," Revisions 1 and 2, and EN-EP-201, "Emergency Planning Performance Indicators," Revisions 4 and 5, were used to verify the accuracy of the licensee's evaluations for each performance indicator reported during the assessment period.

The inspector 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 inspector reviewed selected emergency responder drill participation records. The inspector reviewed alert and notification system testing procedures, maintenance records, and a one hundred percent sample of siren test records. The inspector also reviewed other documents as listed in the attachment to this report.

The inspector completed one sample 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

The inspectors performed a daily screening of items entered into the licensee's corrective action program. This assessment was accomplished by reviewing CRs 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 corrective action program; (2) verified that corrective actions were commensurate with the significance of the issue; and (3) identified conditions that might warrant additional followup through other baseline inspection procedures.

.2 Selected Issue Followup Inspection

a. Inspection Scope

In addition to the routine review, the inspectors selected the below listed issue 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.

- September 19, 2007, Unit 2, Error with Respect to Battery Overcharge Voltage Specified in Technical Specification SR 4.8.2.3.b

Documents reviewed by the inspectors are listed in the attachment.

b. Findings and Observations

No findings of significance were identified.

.3 Semiannual Trend Review

a. Inspection Scope

The inspectors completed a semi-annual trend review of repetitive or closely related issues that were documented in corrective action documents to identify trends that might indicate the existence of more safety significant issues. The inspectors' review consisted of the 6-month period of March 25 through September 23, 2007. When warranted, some of the samples expanded beyond those dates to fully assess the issue. The inspectors also reviewed corrective action program items associated with fires, smoke, and oil leaks associated with the Unit 2 EDGs. The inspectors compared and contrasted their results with the results contained in the licensee's quarterly trend reports. Corrective actions associated with a sample of the issues identified in the licensee's trend report were reviewed for adequacy.

When evaluating the effectiveness of the licensee's corrective actions for these issues, the following attributes were considered:

- Complete and accurate identification of the problem in a timely manner commensurate with its significance and ease of discovery
- Evaluation and disposition of operability and reportability issues
- Consideration of extent of condition, generic implications, common cause, and previous occurrences
- Classification and prioritization of the resolution of the problem commensurate with its safety significance
- Identification of root and contributing causes of the problem for significant conditions adverse to quality
- Identification of corrective actions which are appropriately focused to correct the problem
- Completion of corrective actions in a timely manner commensurate with the safety significance of the issue

Documents reviewed by the inspectors are listed in the attachment.

b. Findings and Observations

During the time of March through August 2007, 14 CRs were generated to document lube oil leakage, smoke generated during engine operation, and three exhaust manifold fires associated with the Unit 2 EDGs. Several small lube oil leaks on both EDGs have been identified on seven occasions, with the majority being associated with the gasketed junction of the exhaust manifold header/collector with the turbocharger. During six surveillance tests, smoke was observed to be generated at these same locations. On three occasions, small fires were observed at the location of the four-barrel collector,

which connects the exhaust header to the turbocharger. One fire was due to the use of an incorrect insulation cover material that ignited when in contact with the hot exhaust header. Another fire was attributed to a lube oil leak which resulted in the saturation of exhaust manifold insulation material. Another fire was the result of hot exhaust gas and lube oil leaking from an inadequately sealed four-barrel collector inspection cover plate flange.

Each of these conditions has been entered into the licensee's CAP.

.4 Review of Identification and Resolution of Problems for Occupational Radiation Safety

a. Inspection Scope

The inspector 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 and Observations

No findings of significance were identified.

.5 Review of Identification and Resolution of Problems for Emergency Preparedness

a. Inspection Scope

The inspector selected 36 condition reports for detailed review. The reports were reviewed to ensure that the full extent of the issues were identified, an appropriate evaluation was performed, and appropriate corrective actions were specified and prioritized. The inspector evaluated the condition reports against the requirements of Procedure EN-LI-102, "Corrective Action Process," Revisions 9 and 10, and the Emergency Preparedness Condition Report Threshold Criteria, November 2004 Revision.

b. Findings and Observations

No findings of significance were identified.

4OA3 Event Follow-up (71153)

.1 Exhaust Manifold Fire in Unit 2 EDG 1

a. Inspection Scope

The inspectors: (1) reviewed operator logs, plant computer data, and/or strip charts for the below listed evolutions to evaluate operator performance in coping with nonroutine events and transients; (2) verified that operator actions were in accordance with the response required by plant procedures and training; and (3) verified that the licensee has identified and implemented appropriate corrective actions associated with personnel performance problems that occurred during the nonroutine evolutions sampled.

- August 3, 2007, Unit 2, EDG 2K-4A Exhaust Manifold Fire

b. Findings

Introduction. A self-revealing Green noncited violation of Technical Specification 6.4.1, "Procedures," was identified associated with the failure to ensure that adequate procedures were available for maintenance conducted on the Unit 2 Emergency Diesel Generator (EDG) 2K-4A. Specifically, the maintenance procedure used for the replacement of the four-barrel inspection plate did not have requirements for flatness checks. As a result, oil leakage from the inspection plate cover resulted in an exhaust manifold fire on the Unit 2 EDG on August 3, 2007.

Description. On August 3, 2007, local operators were performing a monthly surveillance run of EDG 2K-4A. The EDG had been running fully loaded for approximately one minute when the operators observed a fire on the opposite control side exhaust manifold that appeared to originate from the inspection cover plate on the bottom side of the four-barrel collector assembly. Control room operators unloaded and secured the EDG, and at this time, it was noted that the intensity of the fire diminished significantly. After the EDG was secured, two small flames were observed coming from the inspection cover plate, and these were extinguished by an operator using a fire extinguisher.

The licensee performed a root cause evaluation of this event as documented in CR-ANO-2-2007-1073. During this evaluation, the licensee performed as found flatness checks on the four-barrel collector inspection cover plate and determined that the cover plate was warped in the area adjacent to where the fire was noted. The licensee further investigated this issue and determined that this cover plate had been removed from the previous four-barrel collector assembly and reused on the existing collector as part of the followup actions from a previous EDG fire. This prompted the licensee to perform a physical examination of the gasket, cover plate, and an old four-barrel collector assembly. During this examination, the licensee noted that when the inspection cover plate was bolted to the four-barrel assembly with no torque applied, there was a gap of approximately 2 mils across most of the seating area on the side where the fire had occurred. The physical examination of the gasket also determined that there was measurably less crush on the corners adjacent to where the fire was observed as compared to the rest of the gasket. The licensee's investigation of the gasket design also revealed that the vendor literature was very specific in stating that mating surfaces should be flat. The licensee determined the root cause of this event was that Maintenance Procedure OP-2306.005, "Maintenance Surveillance on Unit 2 Emergency Diesel Generator 2K-4," did not require flatness checks on the four-barrel inspection plate as it does for other flanged surfaces on the EDG exhaust system.

The inspectors reviewed the licensee's root cause evaluation of this event. During their review, the inspectors noted that there was industry operating experience available to the licensee that identified the importance of performing flatness checks on the exhaust manifold flanges. The inspectors also noted that the licensee's evaluation determined that there were no requirements for flatness checks on the four-barrel inspection cover plate as there was for the other flanged joints on the exhaust manifold, because this joint had never been disassembled.

Analysis. The inspectors determined that the licensee's failure to ensure that adequate procedures were available for maintenance conducted on EDG 2K-4A was a performance deficiency. The finding was more than minor because it was associated with the protection against external factors attribute of the initiating events cornerstone, and it directly affected the cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as

power operations. Using Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," Phase 1 worksheet, the finding was determined to have very low safety significance because the condition constituted a low degradation of a fire prevention and administrative controls feature. The finding had crosscutting aspects in the area of problem identification and resolution associated with operating experience in that the licensee failed to effectively implement changes to station processes and procedures in response to operating experience involving the importance of ensuring flatness of flanges in the diesel exhaust manifold (P.2(b)).

Enforcement. Unit 2 Technical Specifications, Section 6.4.1.a, "Procedures," requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, Section 9.a, requires, in part, that maintenance that can affect the performance of safety-related equipment should be performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Contrary to the above, on May 11, 2007, the licensee failed to implement written procedures, documented instructions, or drawings appropriate to the circumstances for maintenance that can affect the performance of safety-related equipment. Specifically, the licensee did not ensure that adequate procedures were available for maintenance conducted on EDG 2K-4A. Because this finding is of very low safety significance and has been entered into the CAP as CR ANO-2-2007-1073, this violation is being treated as an NCV consistent with Section VI.A of the NRC Enforcement Policy: NCV 05000368/2007004-04, "Inadequate Work Procedures for EDG 2K-4A Results in a Fire."

.2 (Closed) Licensee Event Report (LER) 05000368/2007-001-00, "Completion of a Plant Shutdown Required by Technical Specifications Because a Control Element Assembly Dropped Into the Core as a Result of a Failed Upper Gripper Coil"

a. Inspection Scope

On January 25, 2007, Unit 2 completed a plant shutdown as required by Technical Specification in response to one control element assembly (CEA) having dropped into the reactor core. The preliminary root cause of this event was determined to be a failure of the CEA upper gripper coil caused by thermal degradation of the coil insulation which led to internal shorting. A final root cause determination is pending the inspection of additional coils to be removed during the next refueling outage. The inspectors reviewed the LER, corrective action documents, Unit 2 station operating logs, and plant procedures. This review verified that the cause of the dropped CEA was identified and corrective actions were appropriate.

b. Findings

No findings of significance were identified.

40A6 Meetings, Including Exit

On June 29, 2007, the emergency preparedness inspector briefed Mr. C. Bregar, Director, Nuclear Safety Assurance (Acting Vice President, Nuclear Operations), and other members of his staff who acknowledged the findings. The inspector confirmed that proprietary information was not provided or examined during the inspection.

On July 13, 2007, the operations inspectors briefed Ms. S. Cotton, Training Manager, and other members of the licensee's staff of the results of the inspection. The licensee acknowledged the findings presented. After final review of the overall biennial requalification exams on Unit 1 and the annual requalification exams on Unit 2, the inspectors conducted a teleconference exit with Mr. R. Walters, Operations Manager, and other member's of the licensee's staff on August 23, 2007. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

On August 16, 2007, the health physics inspector presented the occupational radiation safety inspection results to C. Bregar, Director, Nuclear Safety Assurance and other members of his staff who acknowledged the findings. The inspector confirmed that proprietary information was not provided or examined during the inspection.

On September 27, 2006, the resident inspectors presented the inspection results of the resident inspections to Mr. T. Mitchell, Vice President, Operations, and other members of the licensee's management staff. The licensee acknowledged the findings presented. Proprietary information was reviewed by the inspectors and was returned to the licensee at the end of the inspection.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

J. Bacquet, ALARA Supervisor
B. Berryman, General Manager, Plant Operations
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
J. Eichenberger, Acting Director, Nuclear Safety
M. Fields, Senior Reactor Operator
D. Fowler, Supervisor, Quality Assurance
R. Holeyfield, Manager, Emergency Planning
D. James, Licensing Manager
R. Martin, Supervisor, Operations Training, Unit 1
D. Marvel, Acting, Radiation Protection Manager
T. Mitchell, Vice President, Operations
C. Murray, Reactor Operator
R. Pace, Manager, Planning, Scheduling, and Outages
C. Reasoner, Engineering Director
R. Scheide, Licensing Specialist
R. Schwartz, Radiation Protection Specialist
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, ALARA Coordinator
C. Tyrone, Manager, Quality Assurance
F. Van Buskirk, Licensing Specialist
R. Walters, Operations Manager

Other Personnel

D. Baldwin, Section Chief, Emergency Planning, Arkansas Department of Health
C. Meyer, Program Manager, Nuclear Planning and Response, Arkansas Department of Health

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000313/2007004-01	NCV	Failure to perform a Risk Assessment When Required by 10 CFR 50.65(a)(4) for Mobile Crane Use in the Vicinity of Safety-Related Equipment (Section 1R13)
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05000313/2007004-02	NCV	Loss of Function of Emergency Switchgear Chiller Due To Inadequate Maintenance Procedure (Section 1R15.1)
05000313/2007004-03	NCV	Indicating Lamp Fault Results in Loss of Control Power to Steam Driven Emergency Feedwater Pump (Section 1R15.2)
05000313/2007004-04	NCV	Inadequate Work Procedures for EDG 2K-4A Results in a Fire (Section 4OA3.1)

Closed

05000368/2007-001-00	LER	Completion of a Plant Shutdown Required by Technical Specifications Because a CEA Dropped Into the Core as a Result of a Failed Upper Gripper Coil (Section 4OA3.2)
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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

CRs

ANO-1-2007-1934	ANO-C-2007-1261	ANO-2-2007-1143
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Procedures

NUMBER	TITLE	REVISION
OP-2203.012G	Annunciator 2K07 Corrective Action	028

Calculations

NUMBER	TITLE	REVISION
91-E-0139-01	Heatup Rate of Room 2024 (2P7A) With No Room Cooling	2
94-E-0095-13	Room 2025 Heat Load Evaluation	0
94-E-0095-12	Room 2024 Heat Load Evaluation	0

Section 1R05: Fire Protection

Procedures

NUMBER	TITLE	REVISION
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-1000.120	ANO Fire Watch Program	015

Drawings

FZ-1032, Sheet 1, Revision 2	FZ-2040, Sheet 1, Revision 2
FZ-1042, Sheet 1, Revision 2	FZ-2046, Sheet 1, Revision 2
FZ-1049, Sheet 1, Revision 2	FZ-2055, Sheet 1, Revision 2

CRs

ANO-1-2007-0495	ANO-1-2007-0967	ANO-1-2007-1225
ANO-1-2007-0962	ANO-1-2007-1047	ANO-2-2007-1014

Section 1R15: Operability Evaluations

Procedures

NUMBER	TITLE	REVISION
EN-OP-104	Operability Determinations	2
COPD-001	Operations Expectations and Standards	029

CRs

ANO-1-1994-0092	ANO-1-2007-1658	ANO-1-2007-1814
ANO-1-1996-0484	ANO-1-2007-1672	ANO-1-2007-1825
ANO-1-2004-2435	ANO-1-2007-1733	ANO-1-2007-1827
ANO-1-2007-0164	ANO-1-2007-1764	ANO-1-2007-1853
ANO-1-2007-0595	ANO-1-2007-1792	ANO-1-2007-1989
ANO-1-2007-1012	ANO-1-2007-1793	ANO-1-2007-2050
ANO-1-2007-1483	ANO-1-2007-1796	ANO-2-2007-0926
ANO-1-2007-1487	ANO-1-2007-1800	ANO-2-2007-0932
ANO-1-2007-1656	ANO-1-2007-1802	ANO-2-2007-0994

WOs

52949
56194

Miscellaneous

Industry Events Analysis Screening Form SCR-94-0313 "Safety-Related Equipment Failures Caused by Faulted Indicating Lamps"

Section 1R11: Licensed Operator Requalification

Procedures

NUMBER	TITLE	REVISION
Training Desk Guide 4.4	Operations Continuing Training Guide	9
DG-TRNA-032-SEMIVOWELS	Simulator Performance Evaluation	13
EN-TQ-201 1063.008	Systematic Approach to Training Procedure, Operations Training Sequence	2 Change 036
DG-TRNA-4.5-SIMTRNG 1064.032	Conducting Simulator Training Simulator Training	10 Change 019-01-0

Unit 1 Scenarios

SES-1-003, Revision 13 SES-1-006, Revision 6 SES-1-008, Revision 6	SES-1-017, Revision 7 SES-1-018, Revision 9	SES-1-020, Revision 11 SES-1-026, Revision 9
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Unit 2 Scenarios

SES-2-004, Revision 7 SES-2-012, Revision 3 SES-2-013, Revision 5	SES-2-016, Revision 6 SES-2-020, Revision 6	SES-2-023, Revision 4 SES-2-034, Revision 4
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Unit 1 Job Performance Measures (JPMs)

NUMBER	TITLE	REVISION
A1JPM-RO-AOP13	Perform RO#2 Alternate Shutdown Actions for a Delayed Control Room Evacuation	4
A1JPM-RO-ED010	Place Battery Charger D-03A in Service	11
A1JPM-RO-CRD03	Transfer a Group of Rods to the Auxiliary Power Supply	8
A1JPM-RO-RCP04	Shutdown RCP P-32A at Power	3
A1JPM-RO-AOP19	Loss of Decay Heat Removal: Makeup Using LPI Pump from BWST	2

A1JPM-SRO-EAL07	Classify an Emergency Event	1
ANO-1-JPM-RO-AOP17	Perform Alternate Shutdown Section 1 – Immediate Control Room Evacuation	7
A1JPM-RO-AOP26	Respond to Loss of Load Center B6	2
ANO-1-JPM-RO-CF001	Perform Bleeding and Draining CFTs During Plant Operations	5
A1JPM-RO-CRD06	Perform Exhibit ‘A’ – Operation of APSR Group	0
A1JPM-RO-DHR01	Establish Decay Heat Removal with Low Pressure Injection (Decay Heat) Pump P-34A	9
A1JPM-RO-ED008	Transfer Buses (A1, A2, H1, H2) from SU 1 Transformer to Unit Aux Transformer	6
A1JPM-RO-EDG05	Place an Emergency Diesel Generator in a no DC Override Condition	6
ANO-1-JPM-RO-EDG07	Reset EDG #1 Positive Crankcase Pressure Trip	5
A1JJPM-RO-EFW02	Manual Control of Emergency Feedwater Pump P-7A at the Turbine	8
ANO-1-JPM-RO-EOP06	Perform Reactor Trip Immediate Actions	3
A1JPM-RO-EOP21	Respond to Reactor Trip	1
A1JPM-RO-EOP22	Respond to Degraded Power	0
A1JPM-RO-ESAS1	Verify Proper ESAS Actuation (and Perform ESAS Operation After Actuation)	5
A1JPM-RO-GEN01	Purging Hydrogen with CO ₂ During Emergency Conditions (Station Blackout)	7
A1JPM-RO-ICS04	Perform ICS Startup	0
A1JPM-RO-PZR02	Respond to Pressurizer Spray Valve Failure	4
A1JPM-RO-RPS04	Perform Removing Power from a Portion of the CRD System due to a RPS Channel or RPS Trip Device Failure	0
1JPM-RO-SW003	Transfer of Service Water Suction from the Lake to the Emergency Cooling Pond	4
A1JPM-SRO-EAL01	Classify an Emergency Event	4
A1JPM-SRO-EAL04	Classify an Emergency Event	3

Unit 2 Job Performance Measures

NUMBER	TITLE	REVISION
A2JPM-RO-2Y1	Perform a dead bus Cross-connect of 2Y1 and 2Y2	1
A2JPM-RO-AACFO	Control AAC diesel engine fuel oil day tank level manually	6
A2JPM-RO-S2DGD	Startup a diesel generator without DC control power	4
A2JPM-RO-SIT09	Isolate SITs following SIAS Actuation	2
A2JPM-RO-H2002	Startup a Hydrogen Analyzer	9
A2JPM-RO-SWPDC	Operate the service water pump disconnects manually	5
A2JPM-RO-SFPAW	Line up to fill the spent fuel pool from the RWT	15

Written Examinations

1-07-05 RO Week 2	1-07-05 SRO Week 2
1-07-05 RO Week 4	1-07-05 SRO Week 4
1-07-05 RO Week 5	1-07-05 SRO Week 5
1-07-05 RO Week 6	1-07-05 SRO Week 6

Miscellaneous

1R20 Modification Cycle 1-70-04, ASLP-OPS-OUTG

TQF-201-IM05, Remedial Training Plan, Revision 3 (for one operator dated 6/22/07)

Form 1063.008A, Operator License Reactivation Watch Standing Record, Change 035 (for five operators)

Training Evaluation Action Request (TEAR) ANO 2007 167, Tracking of Unit 1 Ops training missed training or other actions that need tracking for makeup or follow-up as necessary. (07/09/2007)

Unit 1 Licensed Operator 2007 Biennial Requalification Cycle Curriculum

Section 1R19: Postmaintenance Tests

Procedures

NUMBER	TITLE	REVISION
OP-1106.006	Emergency Feedwater Pump Operation	070
OP-2304.037	Unit 2 Plant Protection System Channel A Test	040-00-0
OP-1104.004	Decay Heat Removal Operating Procedure	076
OP-1104.027	Battery and Switchgear Emergency Cooling System	027

CRs

ANO-1-2007-1277

ANO-2-2007-0863

WOs

112657

115231

114943

51038954

Section 1R22: Surveillance Testing

Procedures

NUMBER	TITLE	REVISION
OP-1104.005	Reactor Building Spray System Operation	047
OP-1104.004	Decay Heat Removal Operating Procedure	076
OP-2104.036	Emergency Diesel Generator Operations	055
OP-1304.206	Unit 1 EFIC Channel B Monthly Test, SG Pressure Greater Than 750 PSIG	019
OP-2104.039	HPSI System Operation	047

CRs

ANO-1-2007-1645

ANO-1-2007-1675

WOs

112657

51097867

51201939

115238

51098276

51202719

51043482

51099168

70979

Section 1EP5

EN-LI-104, "Self Assessment and Benchmark Process," Revision

EN-LI-118, "Root Cause Analysis Process," Revision

EN-LI-119, "Apparent Cause Evaluation Process," Revision

1015.040, "Operations Response to Potential Tampering, Vandalism, or Malicious Mischief," Revision 1

1903.004, "Administration and Maintenance of the Emergency Plan and Implementing Procedures," Revision 24

Drills: 2005011, 20050019, 20050020, 20050024, 20050030, 20050927, 20060011, 20060020, 20060040, 20060041, 20060049, 20070023, 20070417

November 28, 2006 Staffing Drill

April 25-26, 2006, Offsite Medical Drills

Semi-Annual Radiological Field Monitoring Drills: June 1, 2005, June 22, 2006, and April 26, 2007

Quality Assurance Audit Report QA-7-2006-ANO-001, "Emergency Preparedness"

Quality Assurance Surveillance Reports: LO-ALO-2006-0090, O2C-ANO-2005-0152, O2C-

ANO-2005-0191, O2C-ANO-2005-0192, O2C-ANO-2006-0068, O2C-ANO-2006-0412, O2C-ANO-2006-0431, O2C-ANO-2007-0020, O2C-ANO-2007-0024, QS-2007-ANO-001, "Evaluation of ANO Emergency Preparedness Performance and Emergency Plan Changes"

Emergency Preparedness Condition Report Threshold Criteria, November 2004 Revision

Emergency Preparedness Corporate Assessment, April 3, 2007

Condition Reports:

CR-ANO-C-2005: 01281, 01286, 01534, 01646, 01647

CR-ANO-C-2006: 00355, 00375, 00418, 00419, 00421, 00432, 00714, 00888, 01002, 01005, 01130, 01240, 01280, 01333, 01335, 01355, 01361, 01362, 01364, 01389, 01421, 01444

CR-ANO-C-2007: 00129, 00528, 00666, 00703, 00789, 00996, 00999, 01000

CR-ANO-2-2007: 00435

CR-WPO-2007-00110

WT-ANO-2007-00000, CA 1284, 1285

EP-2006-0039, "Alert Emergency Class Declaration of October, 30, 2006, Event EAL-2006-2-001"

Section 2OS2: Access Controls to Radiologically Significant Areas (71121.01) and ALARA Planning and Controls (71121.02)

CRs

ANO-1-2007-01824

ANO-2-2007-01029

ANO-C-2007-00330

ANO-2-2006-01120

ANO-2-2007-01148

Audits and Self-Assessments

Quality Assurance Audit Report QA-14-2007-ANO-1, ANO Radiation Protection, February 7 - March 23, 2007

Self-Assessment Report, ALO-2007-98, Dosimetry Report, June 11-15, 2007

Oversight Observation Checklist, April 1 - July 23, 2007

Oversight Observation Checklist, July 23, 2007 - August 13, 2007

Radiation Work Permits

NUMBER	TITLE
RWP 2007-1442	1R20 Steam Generator Primary Side Inspections
RWP 2007-1461	Pressurizer Nozzle Alloy 6000 Mitigation

Procedures

NUMBER	TITLE	REVISION
1012.032	ALARA Work Control and Planning	Change 0
EN-LI-121	Entergy Trending Process	
EN-RP-100	Radworker Expectations	0
EN-RP-104	Personnel Contamination Events	1
EN-RP-105	Radiation Work Permits	1
EN-RP-104	Personnel Contamination Events	3
EN-RP-108	Radiation Protection Posting	3
EN-RP-110	ALARA Program	2
EN-RP-112	Radiation Protection PI	0
EN-RP-203	Dose Assessment	0

Miscellaneous Documents

ANO Radiation Protection Quarterly Trend Report 2007-01
ANO Radiation Protection Quarterly Trend Report 2007-01

Section 40A1: Performance Indicator Verification

Procedures

NUMBER	TITLE	REVISION
EN-LI-114	Performance Indicator Process	2

Miscellaneous

NUMBER	TITLE	REVISION
EN-LI-114 Attachment 9.2	NRC Performance Indicator Technique/Data Sheets	
	INPO MSPI Derivation Reports	
NEI 99-02	Regulatory Assessment Indicator Guideline	5

Section 4OA2: Identification and Resolution of Problems

CRs:

ANO-2-2007-0451	ANO-2-2007-1076	ANO-2-2007-0718
ANO-2-2007-0452	ANO-2-2007-1138	ANO-2-2007-0775
ANO-2-2007-0574	ANO-2-2007-1151	ANO-2-2007-1021
ANO-2-2007-0575	ANO-2-2007-1214	ANO-2-2007-1024
ANO-2-2007-0628	ANO-C-2007-1234	ANO-2-2007-1073
ANO-2-2007-0629	ANO-2-2007-0630	

Section 4OA3: Event Follow-up

LER 05000368/2007-001-00

CRs

ANO-2-2001-1115	ANO-2-2007-0108	ANO-2-2007-0770
ANO-2-2005-2191	ANO-2-2007-0127	ANO-2-2007-0954
ANO-2-2005-2192	ANO-2-2007-0128	ANO-2-2007-0993
ANO-2-2005-2195	ANO-2-2007-0129	ANO-2-2007-1073
ANO-2-2005-2200	ANO-2-2007-0131	ANO-2-2007-1076
ANO-2-2006-2463		

WOs

51050258
102389

Procedures

NUMBER	TITLE	REVISION
OP-2203.034	Fire or Explosion	9

LIST OF ACRONYMS

ALARA	as low as reasonably achievable
ANO	Arkansas Nuclear One
CAP	corrective action program
CEA	control element assembly
CFR	<i>Code of Federal Regulations</i>
CR	condition report
EDG	emergency diesel generator
MSPI	mitigating system performance index
NCV	noncited violation
RTP	rated thermal power
SSC	structure, system, and component
SSC	structure, system, and component
TS	Technical Specifications
UFSAR	Updated Final Safety Analysis Report
WO	work order