UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD.
ARLINGTON, TX 76011-4511

January 27, 2016

Jeremy Browning, Site Vice President
Arkansas Nuclear One
Entergy Operations, Inc.
1448 SR 333
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 05000313/2015004 and 05000368/2015004

Dear Mr. Browning:

On December 31, 2015, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One facility, Units 1 and 2. On January 11, 2016, the NRC inspectors discussed the results of this inspection with you and other members of your staff. Inspectors documented the results of this inspection in the enclosed inspection report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the NRC Enforcement Policy.

If you contest the violations or significance of 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, Region IV; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC resident inspector at Arkansas Nuclear One.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV; and the NRC resident inspector at Arkansas Nuclear One.

On December 31, 2015, the NRC completed a quarterly performance review of Arkansas Nuclear One. The NRC determined that continued plant operation was acceptable and oversight in the Multiple/Repetitive Degraded Cornerstone of the Reactor Oversight Process Action Matrix remained appropriate.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, “Public Inspections, Exemptions, Requests for Withholding,” a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public

Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management 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/

Neil O'Keefe, Chief
Project Branch E
Division of Reactor Projects

Docket Nos. 50-313 and 50-368
License Nos. DPR-51 and NPF-6

Enclosure:
Inspection Report 05000313/2015004
and 05000368/2015004
w/ Attachments:
1. Supplemental Information
2. Detailed Risk Evaluation

Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

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DISTRIBUTION:
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Letter to Jeremy Browning from Neil O'Keefe dated January 27, 2016

SUBJECT: ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 05000313/2015004 and 05000368/2015004

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000313; 05000368
License:	DPR-51; NPF-6
Report:	05000313/2015004; 05000368/2015004
Licensee:	Entergy Operations Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	Junction of Hwy. 64 West and Hwy. 333 South Russellville, Arkansas
Dates:	October 1 through December 31, 2015
Inspectors:	B. Tindell, Senior Resident Inspector A. Barrett, Resident Inspector M. Tobin, Resident Inspector J. Dixon, Senior Project Engineer G. Guerra, CHP, Emergency Preparedness Inspector M. Kennard, Operations Engineer W. Sifre, Senior Reactor Inspector
Approved By:	Neil O'Keefe Chief, Project Branch E Division of Reactor Projects

SUMMARY

IR 05000313/2015004; 05000368/2015004; 10/01/2015 – 12/31/2015; Arkansas Nuclear One, Units 1 and 2, Integrated Inspection Report; Maintenance Risk Assessments and Emergent Work Control, Plant Modifications, and Other.

The inspection activities described in this report were performed between October 1 and December 31, 2015, by the resident inspectors at Arkansas Nuclear One and inspectors from the NRC's Region IV office. Three findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

Cornerstone: Initiating Events

- Green. The inspectors identified a non-cited violation of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for failure to assess the risk impact of switchyard maintenance. Specifically, the station failed to properly classify some switchyard work and assess risk as specified in Procedure COPD-024, "Risk Assessment Guidelines," Revision 055 during multiple periods of switchyard work between October 2 and 15, 2015. The work involved the repair of damaged conduit on the voltage regulators, transformer refurbishment, relay calibrations, and motor operated disconnect replacement. For immediate corrective actions, each operations shift manager provided training to their crews to ensure they were familiar with required station risk updates. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-04147.

  The failure to assess the increase in risk due to switchyard maintenance is a performance deficiency. The finding is more than minor because it adversely affected the protection against external factors attribute of the Initiating Event cornerstone to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the licensee failed to evaluate the potential impact of maintenance in the switchyard which could result in plant upsets or transients. Because the finding affects the licensee's assessment of risk associated with performing maintenance activities, NRC Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," directs significance determination via the use of NRC Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 19, 2005. A regional senior reactor analyst screened the change in core damage frequency to be <1E-6 for Unit 1 and calculated the change in core damage frequency to be 1.5E-7 for Unit 2. In accordance with Flowchart 1 of Appendix K, the significance of this finding was determined to be of very low safety significance (Green), because the calculated Incremental Core Damage Probability Deficits for both units were not greater than 1.0E-6. The inspectors determined this finding has a cross-cutting aspect in the area of Consistent Process, because the primary cause of the performance deficiency involved the failure to use a consistent, systematic approach to manage work decisions in the switchyard [H.13]. (Section 1R13)

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failure to identify a condition adverse to quality. Specifically, the licensee failed to identify rain water accumulation in the exhaust systems for the Units 1 and 2 emergency diesel generators due to clogged water drains. As a result, rainwater in the exhaust piping may have caused the emergency diesel generators to exceed the seismic rating of the exhaust systems during a seismic event. The inspector identified that when ANO removed the rain shields in 1998, they planned to implement periodic drain line cleaning to avoid clogging, but never created the preventive maintenance item to implement the cleaning. In response, the licensee cleaned the drain lines, drained the exhaust pipes, and implemented preventative maintenance activities to periodically clean the drain lines. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-04570.

  The failure to identify that rainwater was accumulating in all four emergency diesel exhaust systems and could impact the availability of the system is a performance deficiency. The performance deficiency is more than minor because it affected the protection against external factors attribute of the Mitigating Systems Cornerstone objective and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, operators failed to recognize that drain lines were blocked during routine operations to drain the exhaust lines, which allowed rain water to accumulate that exceeded the allowed seismic loading of the piping. Using NRC Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," the inspectors determined that a detailed risk evaluation was required. A senior reactor analyst performed a detailed risk evaluation and determined that the increase in core damage frequency was 1.3E-7/year (Green). The dominant risk was determined to involve seismically induced losses of offsite power. Emergency feedwater and a Unit 2 emergency diesel generator remained available to successfully avoid core damage. The inspectors determined this finding has a cross-cutting aspect in the area of Avoid Complacency because the primary cause of the performance deficiency involved the failure to plan for or recognizing latent conditions involving clogged drain lines [H.12]. (Section 1R18)

Cornerstone: Barrier Integrity

- Green. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to correctly translate the regulatory requirements and design basis into specifications, drawings, procedures, and instructions to ensure the Unit 1 decay heat vault boundary components could perform their safety-related function. Inspectors identified that the Unit 1 decay heat vaults had a safety-related function to limit accident dose consequences to the public and the control room operators, but some boundary components had not been classified as safety-related. In response to this issue, the licensee performed an immediate operability determination and reviewed previous leakage testing on the containment spray and low pressure injection systems. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-1-2015-04195.

  The inspectors determined that the failure to correctly translate the design requirement that the Unit 1 decay heat vaults be sealed to mitigate the dose consequences of an accident

into specifications, drawings, procedures, and instructions was a performance deficiency. This performance deficiency was more than minor because it was associated with the design control and safety-related structures, systems, and components and barrier performance attributes of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events for the auxiliary building. Specifically, the licensee failed to ensure that Unit 1 decay heat vault boundary components were designated as safety-related components and met the applicable requirements needed to assure the reliability and integrity of the barrier function. Using Inspection Manual Chapter 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions," the issue screened as having very low safety significance (Green) under the Control Room, Auxiliary, Reactor, or Spent Fuel Pool Building questions because the finding only represented a degradation of the radiological barrier function provided for the control room and the auxiliary building and it did not represent a degradation of the barrier function of the control room against smoke or a toxic atmosphere. The inspectors determined that this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance since this condition had existed since construction. (Section 4OA5)

PLANT STATUS

Unit 1 began the inspection period at 100 percent power. On December 15, 2015, while reducing power to replace a failed turbine control power supply, operators manually tripped the reactor due to an unexpected main feedwater transient during the transition from the main feedwater block valves to low load valves. Unit 1 remained in hot standby while the licensee repaired the power supply and the main feedwater valve. Unit 1 commenced reactor startup on December 18, 2015, and reached 100 percent power on December 20. Unit 1 remained at 100 percent power for the rest of the inspection period.

Unit 2 began the inspection period in a refueling outage. On November 15, 2015, Unit 2 commenced startup and reached 100 percent power on November 20. Unit 2 remained at 100 percent power for the rest of the inspection period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness to Cope with External Flooding

a. Inspection Scope

On November 12, 2015, the inspectors completed an inspection of the station's readiness to cope with external flooding. After reviewing the licensee's flooding analysis, the inspectors chose two plant areas that were susceptible to flooding:

- Emergency cooling pond and surrounding structures
- Emergency diesel fuel oil vaults

The inspectors reviewed plant design features and licensee procedures for coping with flooding. The inspectors walked down the selected areas to inspect the design features, including the material condition of seals, drains, and flood barriers. The inspectors evaluated whether credited operator actions could be successfully accomplished.

These activities constituted one sample of readiness to cope with external flooding, as defined in Inspection Procedure 71111.01.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdown

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- October 28, 2015, Unit 2, containment spray train A following an extended system outage
- November 12, 2015, Unit 2, shutdown cooling system during reduced reactor coolant system inventory
- December 15, 2015, Units 1 and 2, alternate ac diesel generator during planned switchyard maintenance

The inspectors reviewed the licensee's procedures and system design information to determine the correct lineup for the systems. They visually verified that critical portions of the systems were correctly aligned for the existing plant configuration.

These activities constituted three partial system walkdown samples as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

.2 Complete Walkdown

a. Inspection Scope

On November 19, 2015, the inspectors performed a complete system walkdown inspection of the high pressure safety injection system for Unit 2. The inspectors reviewed the licensee's procedures and system design information to determine the correct high pressure safety injection system lineup for the existing plant configuration. The inspectors also reviewed condition reports, temporary modifications, and other open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

These activities constituted one complete system walkdown sample, as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Quarterly Inspection

a. Inspection Scope

The inspectors evaluated the licensee's fire protection program for operational status and material condition. The inspectors focused their inspection on four plant areas important to safety:

- September 30, 2015, Unit 2, Fire Zone 2200-MM, turbine building
- October 5, 2015, Unit 2, Fire Zone 2098-C, computer room
- November 17, 2015, Unit 2, Fire Zone 2136-I, health physics area
- December 15, 2015, Fire Zone SBOD, alternate ac diesel generator

For each area, the inspectors evaluated the fire plan against defined hazards and defense-in-depth features in the licensee's fire protection program. The inspectors evaluated control of transient combustibles and ignition sources, fire detection and suppression systems, manual firefighting equipment and capability, passive fire protection features, and compensatory measures for degraded conditions.

These activities constituted four quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

.2 Annual Inspection

a. Inspection Scope

On November 27, 2015, the inspectors completed an annual evaluation of the licensee's fire brigade performance. This evaluation included observation of an unannounced fire drill for a simulated fire caused by a fault in a 4160V switchgear in the Unit 1 north switchgear room on November 20, 2015.

During this drill, the inspectors evaluated the capability of the fire brigade members, the leadership ability of the brigade leader, the brigade's use of turnout gear and fire-fighting equipment, and the effectiveness of the fire brigade's team operation. The inspectors also reviewed whether the licensee's fire brigade met NRC requirements for training, dedicated size and membership, and equipment.

These activities constituted one annual inspection sample, as defined in Inspection Procedure 71111.05.

b. Findings

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

On December 30, 2015, the inspectors completed an inspection of underground bunkers susceptible to flooding. The inspectors selected two underground vaults that contained risk-significant cables whose failure could disable risk-significant equipment:

- Unit 2, service water manhole 3 west
- Unit 2, service water manhole 3 east

The inspectors observed the material condition of the cables and splices contained in the vaults and looked for evidence of cable degradation due to water intrusion. The inspectors verified that the cables and vaults met design requirements.

These activities constitute completion of one bunker/manhole sample, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

On December 22, 2015, the inspectors completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspectors reviewed the data from a performance test for the Unit 2 shutdown cooling heat exchanger A. Additionally, the inspectors walked down the heat exchanger to observe its performance and material condition.

These activities constitute completion of one heat sink performance annual review sample, as defined in Inspection Procedure 71111.07.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

The activities described in subsections 1 through 5 below constitute completion of one inservice inspection sample for Unit 2, as defined in Inspection Procedure 71111.08.

.1 Non-destructive Examination (NDE) Activities and Welding Activities

a. Inspection Scope

The inspectors directly observed the following nondestructive examinations:

SYSTEM	WELD IDENTIFICATION	EXAMINATION TYPE
Feedwater	Feedwater Nozzle to Steam Generator 2E24B Shell	Magnetic Particle
Reactor Coolant System	Steam Generator 2E24B Support Pedestal/Channel Head Joint	Magnetic Particle
Reactor Coolant System	Steam Generator 2E24B Primary Outlet Nozzle Inner Radius	Ultrasonic
Reactor Coolant System	Steam Generator 2E24A Primary Outlet Nozzle Inner Radius	Ultrasonic
Reactor Coolant System	Reactor Vessel Head Instrumentation Nozzles and Vent Line	Ultrasonic
Reactor Coolant System	2R-1 Reactor Vessel Head Bolting	Visual (VT-2)

The inspectors reviewed records for the following nondestructive examinations:

SYSTEM	WELD IDENTIFICATION	EXAMINATION TYPE
Reactor Coolant System	Field Weld FW-26C1	Radiography
Reactor Coolant System	Field Weld FW-27C2	Radiography
Reactor Coolant System	Reactor Vessel Head Bare Metal Visual	Visual (VT-1)
Service Water	Field Weld FW-105	Dye Penetrant
Service Water	Field Weld FW-102	Dye Penetrant
Service Water	Field Weld FW-103	Dye Penetrant
Service Water	Field Weld FW-125	Dye Penetrant
Service Water	Field Weld FW-138	Dye Penetrant
Service Water	Field Weld FW-139	Dye Penetrant
Service Water	Field Weld FW-145	Dye Penetrant

During the review and observation of each examination, the inspectors observed whether activities were performed in accordance with the ASME Code requirements and applicable procedures The inspectors also reviewed the qualifications of all nondestructive examination technicians performing the inspections to determine whether they were current.

The inspectors directly observed a portion of the following welding activities:

SYSTEM	WELD IDENTIFICATION	WELD TYPE
Service Water	Field Weld FW-105	Gas-Tungsten Arc Weld (GTAW)

The inspectors reviewed records for the following welding activities:

SYSTEM	WELD IDENTIFICATION	WELD TYPE
Service Water	Field Weld FW-102	GTAW
Service Water	Field Weld FW-103	GTAW
Service Water	Field Weld FW-125	GTAW
Service Water	Field Weld FW-138	GTAW
Service Water	Field Weld FW-139	GTAW
Service Water	Field Weld FW-145	GTAW

The inspectors reviewed whether the welding procedure specifications and the welders had been properly qualified in accordance with ASME Code Section IX requirements. The inspectors also determined whether that essential variables were identified, recorded in the procedure qualification record, and formed the bases for qualification of the welding procedure specifications.

b. Findings

No findings were identified.

.2 Vessel Upper Head Penetration Inspection Activities

a. Inspection Scope

The inspectors reviewed the results of the licensee's bare metal visual inspection of the Reactor Vessel Upper Head Penetrations to determine whether the licensee identified any evidence of boric acid challenging the structural integrity of the reactor head components and attachments. The inspectors also verified that the required inspection coverage was achieved and limitations were properly recorded. The inspectors reviewed the results of the licensee's volumetric inspection of the reactor vessel head to determine whether the inspection met Code Case N-729-1. The inspectors also reviewed whether the required inspection coverage was achieved and whether limitations were properly recorded. The inspectors reviewed whether the personnel performing the inspection were certified examiners to their respective non-destructive examination method.

b. Findings

No findings were identified.

.3 Boric Acid Corrosion Control (BACC) Inspection Activities

a. Inspection Scope

The inspectors reviewed the licensee's implementation of its boric acid corrosion control program for monitoring degradation of those systems that could be adversely affected by boric acid corrosion. The inspectors reviewed the documentation associated with the licensee's boric acid corrosion control walkdown as specified in Procedure EN-DC-319, "Boric Acid Corrosion Control Program," Revision 11. The inspectors reviewed whether the visual inspections emphasized locations where boric acid leaks could cause degradation of safety significant components, and whether engineering evaluation used corrosion rates applicable to the affected components and properly assessed the effects of corrosion induced wastage on structural or pressure boundary integrity. The inspectors observed whether corrective actions taken were consistent with the ASME Code, and 10 CFR Part 50, Appendix B requirements.

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities

a. Inspection Scope

The licensee did not perform inspections of the steam generator tubes. No inspections were required during this outage. Additionally, no primary side inspections were performed. Therefore, the inspectors determined this section of Inspection Procedure 71111.08 was not applicable.

b. Findings

No findings were identified.

.5 Identification and Resolution of Problems

a. Inspection scope

The inspectors reviewed eight condition reports which dealt with inservice inspection activities and found the corrective actions were appropriate. From this review the inspectors concluded that the licensee has an appropriate threshold for entering issues into the corrective action program and has procedures that direct a root cause evaluation when necessary. The licensee also has an effective program for applying industry operating experience. Specific documents reviewed during this inspection are listed in the attachment.

These actions constitute completion of the requirements of Inspection Procedure 71111.08, Section 02.05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program and Licensed Operator Performance (71111.11)

.1 Review of Licensed Operator Requalification

a. Inspection Scope

On November 18, 2015, the inspectors observed an evaluated simulator scenario performed by a Unit 1 operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed and the modeling and performance of the simulator during the evaluated scenario.

On December 17, 2015, the inspectors observed an evaluated simulator scenario performed by a Unit 2 operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed and the modeling and performance of the simulator during the evaluated scenario.

These activities constitute completion of two quarterly licensed operator requalification program samples, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.2 Review of Licensed Operator Performance

a. Inspection Scope

The inspectors observed the performance of on-shift licensed operators in the plant's Unit 1 and Unit 2 main control rooms. The inspectors observed the operators' performance of the following activities:

- November 23, 2015, Unit 1, heightened activity due to core flood system surveillance and makeup and purification operations
- November 7, 2015, Unit 2, heightened activity due to integrated engineered safeguards testing

In addition, the inspectors assessed the operators' adherence to plant procedures, including the conduct of operations procedure and other operations department policies.

These activities constitute completion of two quarterly licensed operator performance samples, as defined in Inspection Procedure 71111.11.

b. Findings

No findings were identified.

.3 Annual Review

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 simulator scenarios. In the second part of the training cycle, the biennial cycle, operators are administered an operating test and a comprehensive written examination. For this annual inspection requirement, Arkansas Nuclear One, Unit 2, was in the first part of the training cycle while Arkansas Nuclear One, Unit 1, was in the second part of the training cycle.

a. Inspection Scope

The inspectors conducted an in-office review of the annual requalification training program to determine the results of this program.

On September 11, 2015, the licensee informed the inspector of the following Unit 1 results:

- 10 of 10 crews passed the simulator portion of the operating test
- 59 of 59 licensed operators passed the simulator portion of the operating test
- 58 of 59 licensed operators passed the job performance measure portion of the operating test
- 56 of 59 licensed operators passed the written examination

The one individual that failed the job performance measure portion of the operating test was remediated, retested, and passed the retake test. The three individuals that failed the written examination were remediated, retested, and passed their retake written examination prior to returning to shift.

One licensed operator was not examined due to medical issues.

On September 11, 2015, the licensee informed the inspector of the following Unit 2 results:

- 9 of 9 crews passed the simulator portion of the operating test
- 44 of 44 licensed operators passed the simulator portion of the operating test
- 43 of 44 licensed operators passed the job performance measure portion of the operating test

The one individual that failed the job performance measure portion of the operating test was remediated, retested, and passed the retake job performance test.

Six licensed operators were not examined due to change in responsibilities or retirement.

These activities constitute completion of one inspection sample of the annual licensed operator requalification program.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

a. Inspection Scope

The inspectors reviewed four instances of degraded performance or condition of safety-related structures, systems, and components (SSCs):

- December 17, 2015, Unit 1, emergency feedwater system
- December 23, 2015, Unit 2, containment spray pump A motor breaker failure to close
- December 31, 2015, Unit 2, emergency and auxiliary feedwater system
- December 31, 2015, Unit 1, integrated control system power supplies

The inspectors reviewed the extent of condition of possible common cause SSC failures and evaluated the adequacy of the licensee's corrective actions. The inspectors reviewed the licensee's work practices to evaluate whether these may have played a role in the degradation of the SSCs. The inspectors assessed the licensee's characterization of the degradation in accordance with 10 CFR 50.65 (the Maintenance Rule), and verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule.

These activities constituted completion of four maintenance effectiveness samples, as defined in Inspection Procedure 71111.12.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors reviewed two risk assessments performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk:

- October 10, 2105, switchyard maintenance
- November 2, 2015, hydrogen recombiner maintenance

The inspectors verified that these risk assessment were performed timely and in accordance with the requirements of 10 CFR 50.65 (the Maintenance Rule) and plant

procedures. The inspectors reviewed the accuracy and completeness of the licensee's risk assessments and verified that the licensee implemented appropriate risk management actions based on the result of the assessments.

These activities constitute completion of two maintenance risk assessments and emergent work control inspection samples, as defined in Inspection Procedure 71111.13.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," for failure to assess the risk impact of switchyard maintenance. Specifically, the station failed to properly classify some switchyard work and assess risk as specified in Procedure COPD-024, "Risk Assessment Guidelines," Revision 055.

Description. Between October 2 and 15, 2015, during the Unit 2 refueling outage, the licensee performed planned switchyard maintenance. The switchyard contains switching equipment for 22 kV, 161 kV, and 500 kV offsite power circuits which supply power to both units' safety-related electrical busses and safety systems. The work in the switchyard involved many different components during the planned maintenance window.

On October 5, 2015, the inspectors walked down the switchyard to understand the scope of ongoing work. Using Procedure COPD-024, the inspectors determined that the work scope at that time met the description of minor work, but the licensee had failed to assess the classification of the switchyard work.

Procedure COPD-024, "Risk Assessment Guidelines," Revision 055, provided instructions to operators and scheduling personnel for implementing risk assessments in order to satisfy 10 CFR 50.65(a)(4) requirements to assess and manage the increase in risk from maintenance activities. Attachment 11, "Switchyard Maintenance Guidelines," required that switchyard work be classified into one of three categories – major work, minor work, or an item listed as an exception that had previously been analyzed to not impact risk. Work that met the descriptions of major or minor switchyard maintenance was required to be entered into the risk assessment calculator (EOOS) for each unit to assess the increase in risk.

The inspector concluded that work that required the use of heavy equipment was being classified as major switchyard work, and the risk was being properly assessed. However, during multiple periods between October 2 and 15, 2015, ANO exited the major switchyard work category but failed to recognize and assess the risk of work that should have been categorized as minor switchyard work. The inspector determined that work that involved the repair of damaged conduit on the voltage regulators, transformer refurbishment, relay calibrations, and motor operated disconnect replacement met the description of minor switchyard maintenance.

Analysis. The failure to assess the increase in risk due to switchyard maintenance is a performance deficiency. The finding is more than minor because it adversely affected the protection against external factors attribute of the Initiating Event cornerstone to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the licensee failed to

evaluate the potential impact of maintenance in the switchyard which could result in plant upsets or transients. Because the finding affects the licensee's assessment of risk associated with performing maintenance activities, NRC Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012 directs significance determination via the use of NRC Manual Chapter 0609, Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," dated May 19, 2005. A regional senior reactor analyst screened the change in core damage frequency to be <1E-6 for Unit 1 and calculated the change in core damage frequency to be 1.5E-7 for Unit 2. In accordance with Flowchart 1 of Appendix K, the significance of this finding was determined to be of very low safety significance (Green), because the calculated Incremental Core Damage Probability Deficits for both units were not greater than 1.0E-6. The inspectors determined this finding has a cross-cutting aspect in the area of H.13, Consistent Process, because the primary cause of the performance deficiency involved the failure to use a consistent, systematic approach to manage work decisions in the switchyard.

Enforcement. Title 10 CFR 50.65(a)(4), states in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. Contrary to the above, before performing maintenance activities between October 2, 2015, and October 15, 2015, the licensee failed to assess the increase in risk associated with maintenance activities in the switchyard. Specifically, during multiple periods of switchyard maintenance work, the licensee failed to assess the increase in risk that should have been classified as minor switchyard maintenance. This work involved a system that a risk-informed evaluation process has shown to be significant to public health and safety. For immediate corrective actions, each operations shift manager provided training to their crews to ensure they were familiar with required station risk updates. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-04147. Because the finding was of very low safety significance and has been entered into the corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000313; 05000368/2015004-001 "Failure to Assess Risk Assessment for Switchyard Work."

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

The inspectors reviewed six operability determinations that the licensee performed for degraded or nonconforming SSCs:

- October 1, 2015, Unit 2, operability determination for broken hold-down bolts on polar crane rail
- October 2, 2015, Unit 2, operability determination for shutdown cooling heat exchanger A and B shell corrosion
- October 6, 2015, Unit 1, operability determination for absolute position indication of control rods

- October 13, 2015, Unit 1, operability determination for the turbine drivenemergency feedwater pump exceeding expected speed during surveillance testing

- November 12, 2015, Unit 2, operability determination for shutdown cooling heat exchangers A and B following shell repair

- November 18, 2015, Unit 2, operability determination for unexpected trip of containment coolers during containment integrated leak rate testing

The inspectors reviewed the timeliness and technical adequacy of the licensee's evaluations. Where the licensee determined the degraded SSC to be operable, the inspectors verified that the licensee's compensatory measures were appropriate to provide reasonable assurance of operability. The inspectors verified that the licensee had considered the effect of other degraded conditions on the operability of the degraded SSC.

The inspectors reviewed operator actions taken or planned to compensate for degraded or nonconforming conditions. The inspectors verified that the licensee effectively managed these operator workarounds to prevent adverse effects on the function of mitigating systems and to minimize their impact on the operators' ability to implement abnormal and emergency operating procedures.

- December 2, 2015, Unit 1, operator work-arounds

- December 2, 2015, Unit 2, operator work-arounds

These activities constitute completion of eight operability and functionality review samples, which included two operator work-around samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

On November 16, 2015, the inspectors reviewed a permanent modification to the exhaust stacks for the emergency diesel generators for Units 1 and 2 that removed the stack covers and added drain lines. The inspectors reviewed the design and implementation of the modifications. The inspectors verified that post-modification testing was adequate to establish the operability of the SSC as modified.

These activities constitute completion of one sample of permanent modifications, as defined in Inspection Procedure 71111.18.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for failure to identify a condition adverse to quality. Specifically, the licensee failed to identify rain water accumulation in the exhaust systems for the Units 1 and 2 emergency diesel generators due to clogged drains. As a result, significant precipitation could cause the exhaust piping for the emergency diesel generators in both units to exceed the seismic rating. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-04570.

Description. During routine inspections on the turbine building and auxiliary building roofs, the inspectors identified rainwater accumulating at the bottom of the emergency diesel generator exhaust pipes for Units 1 and 2. Water accumulation in the exhaust of diesel engines can impact the safety function in two ways. First, water can flow back through the exhaust and hydraulically lock the engine cylinders. Second, the accumulated water can increase the weight of the exhaust piping beyond the seismic design capability. If overloaded during a seismic event, an exhaust line break can cause the rooms to overheat and shutdown the diesel generators. The emergency diesel generators provide redundant safety-related emergency electrical power sources for required engineered safeguards loads to maintain the plants in a safe shutdown condition following a seismic event, among other events.

The inspectors reviewed the plant design, and determined that the licensee completed the modifications to the Unit 1 exhaust stacks on June 18, 1998, and the Unit 2 exhaust stacks on November 16, 1998. The design changes removed the diesel exhaust hoods that prevented rain water from entering, installed stiffener rings around the top section of each exhaust stack, and installed drain lines for the removal of any water that accumulates in the exhaust piping.

The design change required operators to drain any rainwater that accumulated, and also required that the drains be periodically cleaned to prevent clogging. Operations procedures for Unit 1 required draining once per week, whereas Unit 2 procedures required a monthly draining frequency. The inspectors identified that the station had not implemented the periodic actions to clean the drain lines. Further investigation by the licensee determined that the drain lines had clogged with corrosion products, which rendered the periodic draining ineffective, but operators failed to recognize that attempts to drain the pipes following rain events did not drain water as expected. Following the inspector's identification of the deficiency, the licensee implemented and completed immediate corrective actions to clean the drain lines.

The licensee performed an analysis to determine the amount of rainfall that could hydraulically lock the cylinders and the amount of rainfall that would cause the piping to exceed its seismic design capability. For Units 1 and 2, the licensee determined that the diesels were operable for all licensing basis events except for additional seismic loading following a probable maximum precipitation event. For Unit 1, this was 19.5 inches of rainfall in a 2 hour period, and 42 inches of rainfall in a 48 hour period for Unit 2. Because of this, the licensee determined that the emergency diesel generators were degraded and non-conforming. The licensee implemented compensatory measures to drain the exhaust lines on a more frequent basis, and to drain the lines during extreme rainfall events.

The inspectors reviewed monthly rainfall totals back to 1999 and found instances where monthly totals exceeded the Unit 1 emergency diesel generator exhaust seismic design limit. However, no example was identified where actual rainfall would have caused Unit 2 to exceed its seismic rating.

The inspectors determined that the licensee had previous opportunities to identify the condition. Condition Report CR-ANO-1-2005-01370 documented through wall corrosion in the base of the exhaust piping of Unit 1 emergency diesel generator B. The operability evaluation stated that the drain lines were known to be clogged, but the inspectors found that the licensee took no action to repair the clogged drains. Condition Report CR-ANO-C-2012-01591 documented a large volume of rust scale debris on the roof of the auxiliary building near the diesel exhausts. The condition report remained open and addressed degraded exhaust piping, but the licensee had failed to address the potential for the drain lines to be clogged from the debris.

Analysis. The failure to identify that rainwater was accumulating in all four emergency diesel exhaust systems and could impact the availability of systems is a performance deficiency. The performance deficiency is more than minor because it affected the protection against external factors attribute of the Mitigating Systems Cornerstone objective and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. NRC Manual Chapter 0609, Appendix A, "Determining the Significance of Reactor Inspection Findings for At-Power Situations," dated June 19, 2012, required a detailed risk evaluation because the finding involved the degradation of equipment designed to mitigate a seismic event. A senior reactor analyst performed a detailed risk evaluation and determined that the increase in Unit 1 core damage frequency was 1.3E-7/year (Green). Dominant initiators were seismically induced losses of offsite power. Emergency feedwater and a Unit 2 emergency diesel generator remained available to successfully avoid core damage. The detailed risk evaluation is included as Attachment 2 of this report. The inspectors determined this finding has a cross-cutting aspect in the area of H.12, Avoid Complacency, because the primary cause of the performance deficiency involved the failure to plan for or recogognize latent conditions involving clogged drain lines.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," states, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformance are promptly identified and corrected. Contrary to the above, between June 18, 1998, and October 19, 2015, measures did not assure that conditions adverse to quality were promptly identified and corrected. Specifically, the licensee failed to identify and correct accumulated rain water in the quality-related exhaust systems for both the Units 1 and 2 emergency diesel generator systems due to clogged drains. In response, the licensee cleaned the drain lines, drained the exhaust pipes, and implemented preventative maintenance activities to periodically clean the drain lines. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-04570. Because this finding was of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000313; 05000368/2015004-002 "Failure to Identify

and Correct Rain Water Accumulation in the Emergency Diesel Generator System Exhausts."

1R19 Post-Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed six post-maintenance testing activities that affected risk-significant SSCs:

- October 1, 2015, Unit 2, emergency diesel generator A breaker test following control cable modifications
- November 3, 2015, Unit 2, offsite power transfer test following control cable modifications
- November 6, 2015, Unit 2, integrated engineered safeguards testing following various outage maintenance activities
- November 9, 2015, Unit 2, local leak rate test on containment equipment hatch following hatch opening for refueling outage
- November 10, 2015, Unit 2, emergency feedwater overspeed trip test following overspeed trip mechanism inspection and adjustment
- November 16, 2015, Unit 2, low power physics testing during startup following reactor core refueling

The inspectors reviewed licensing- and design-basis documents for the SSCs and the maintenance and post-maintenance test procedures. The inspectors observed the performance of the post-maintenance tests to verify that the licensee performed the tests in accordance with approved procedures, satisfied the established acceptance criteria, and restored the operability of the affected SSCs.

These activities constitute completion of six post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

For the portion of the Unit 2 refueling outage that started in the previous quarter on September 20, 2015, and concluded on November 14, 2015, the inspectors evaluated the licensee's outage activities. The inspectors verified that the licensee considered risk in developing and implementing the outage plan, appropriately managed personnel fatigue, and developed mitigation strategies for losses of key safety functions. The verification for this quarterly inspection included the following:

- Verification that the licensee maintained defense-in-depth during outage activities
- Observation and review of reduced-inventory and mid-loop activities
- Observation and review of fuel handling activities
- Monitoring of heat-up and startup activities

These activities constitute completion of one refueling outage sample, as defined in Inspection Procedure 71111.20.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

On October 28, 2015, the inspectors observed the Unit 1 service water flow test and reviewed the test results to verify that this test adequately demonstrated that the SSCs were capable of performing their safety functions. The inspectors verified that the test met technical specification requirements, that the licensee performed the test in accordance with their procedure, and that the results of the test satisfied appropriate acceptance criteria. The inspectors verified that the licensee restored the operability of the affected SSCs following testing.

These activities constitute completion of one surveillance testing inspection sample, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation (71114.02)

a. Inspection Scope

The inspectors verified the adequacy of the licensee's methods for testing the primary and backup alert and notification system (ANS). The inspectors interviewed licensee personnel responsible for the maintenance of the primary ANS and reviewed a sample of corrective action system reports written for ANS problems. The inspectors compared the licensee's alert and notification system testing program 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, and the "Design Report Update: Upgraded Public Alert and Notification System (ANS) Arkansas Nuclear One (ANO)," dated May 2009. Other documents reviewed are listed in the attachment to this report.

These activities constitute completion of one alert and notification system evaluation sample as defined in Inspection Procedure 71114.02.

b. Findings

No findings were identified.

1EP3 Emergency Response Organization Staffing and Augmentation System (71114.03)

a. Inspection Scope

The inspectors verified the licensee's emergency response organization on-shift and augmentation staffing levels were in accordance with the licensee's emergency plan commitments. The inspectors reviewed documentation and discussed with licensee staff the operability of primary and backup systems for augmenting the on-shift emergency response staff to verify the adequacy of the licensee's methods for staffing emergency response facilities, including the licensee's ability to staff pre-planned alternate facilities. The inspectors also reviewed records of emergency response organization augmentation tests and events to determine whether the licensee had maintained a capability to staff emergency response facilities within emergency plan timeliness commitments.

These activities constitute completion of one emergency response organization staffing and augmentation testing sample as defined in Inspection Procedure 71114.03.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspectors performed a review of changes to the Arkansas Nuclear One Emergency Plan, Revisions 37, 38, and 39. Of the many administrative and editorial changes performed, The inspectors noted the licensee implemented a change to Table B-1, "Minimum Staffing Requirements," of the Emergency Plan. The change was necessary to implement an all-facilities staffing at the ALERT emergency classification level and changes to the command and control succession structure during an emergency. The inspectors also reviewed Procedure 1903.010, "Emergency Action Level Classification," Revision 52, and Procedure 1903.011, "Emergency Response/Notifications," Revision 49.

These revisions were compared to previous revisions, 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)(3) and 50.54(q)(4). The inspectors verified that the revisions did not reduce the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, the revisions are subject to future inspection.

These activities constitute completion of five emergency action level and emergency plan changes sample as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness (71114.05)

a. Inspection Scope

The inspectors reviewed samples of the following documents for the period of February 2013 to October 2015:

- After-action reports for emergency classifications and events
- After-action evaluation reports for licensee drills and exercises
- Independent audits and surveillances of the licensee's emergency preparedness program
- Licensee evaluations of changes made to the emergency plan and emergency plan implementing procedures
- Drill and exercise performance issues entered into the licensee's corrective action program
- Emergency preparedness program issues entered into the licensee's corrective action program
- Emergency response organization and emergency planner training records

The inspectors reviewed summaries of corrective action program reports associated with emergency preparedness and selected 33 to review against program requirements to determine the licensee's ability to identify, evaluate, and correct problems in accordance with planning standard 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E, IV.F.

These activities constitute completion of one sample of the maintenance of the licensee's emergency preparedness program as defined in Inspection Procedure 71114.05.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index: Residual Heat Removal Systems (MS09)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of October 1, 2014, through September 30, 2015, to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the mitigating system performance index for residual heat removal systems for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index: Cooling Water Support Systems (MS10)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of October 1, 2014, through September 30, 2015, to verify the accuracy and completeness of the reported data. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data.

These activities constituted verification of the mitigating system performance index for cooling water support systems for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspector reviewed the licensee's evaluated exercises and selected drill and training evolutions that occurred between July 1, 2014, and September 30, 2015, to verify the

accuracy of the licensee's data for classification, notification, and protective action recommendation (PAR) opportunities. The inspector reviewed a sample of the licensee's completed classifications, notifications, and PARs to verify their timeliness and accuracy. The inspector used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constitute verification of the drill/exercise performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.4 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspector reviewed the licensee's records for participation in drill and training evolutions between July 1, 2014, and September 30, 2015, to verify the accuracy of the licensee's data for drill participation opportunities. The inspector verified that all members of the licensee's emergency response organization (ERO) in the identified key positions had been counted in the reported performance indicator data. The inspector reviewed the licensee's basis for reporting the percentage of ERO members who participated in a drill. The inspector reviewed drill attendance records and verified a sample of those reported as participating. The inspector used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constitute verification of the emergency response organization drill participation performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.5 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspector reviewed the licensee's records of alert and notification system tests conducted between July 1, 2014, and September 30, 2015, to verify the accuracy of the licensee's data for siren system testing opportunities. The inspector reviewed procedural guidance on assessing alert and notification system opportunities and the results of periodic alert and notification system operability tests. The inspector used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the data reported.

These activities constitute verification of the alert and notification system reliability performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

4OA2 Problem Identification and Resolution (71152)

.1 Routine Review

a. Inspection Scope

Throughout the inspection period, the inspectors performed daily reviews of items entered into the licensee's corrective action program and periodically attended the licensee's condition report screening meetings. The inspectors verified that licensee personnel were identifying problems at an appropriate threshold and entering these problems into the corrective action program for resolution. The inspectors verified that the licensee developed and implemented corrective actions commensurate with the significance of the problems identified. The inspectors also reviewed the licensee's problem identification and resolution activities during the performance of the other inspection activities documented in this report.

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, work orders, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors verified that the licensee was taking corrective actions to address identified adverse trends.

These activities constitute completion of one semiannual trend review sample, as defined in Inspection Procedure 71152.

b. Observations and Assessments

Operability and Functionality Evaluations

The inspectors identified an adverse trend in operability determination quality. Although not designated as an adverse trend per the corrective action program, the licensee had previously identified concerns regarding operability quality, specifically in these three areas;

1) Failure to address extent of condition,

2) Inadequate description of SSC function, and

3) Failure to properly reference current licensing basis documents.

Condition Report CR-ANO-C-2015-01284 documented these concerns and stated that operability determinations do not always address all of the specified elements required by the station procedures. In addition, it states that some operability determinations do not present sufficient technical details to support assumptions. The inspectors identified similar concerns regarding the quality of operability evaluations in the following examples:

- Condition Report CR-ANO-1-2015-2408 documented a degrading trend for Unit 1 decay heat pump A discharge pressure. The inspectors determined that the operability determination failed to demonstrate ongoing acceptable pump performance given the trend and small remaining margin. The licensee performed a second operability determination, but failed to evaluate potential pump degradation over the pump's 30 day mission time. The licensee gathered and analyzed more pump performance data from the previous outage to justify pump operability in a third operability determination.

- Condition Report CR-ANO-2-2015-2879 documented an issue with a shell leak on Unit 2 shutdown cooling heat exchanger B. The inspectors determined that the licensee declared the heat exchanger operable without reviewing a draft ASME Code evaluation of the structural integrity required for operability that was performed by an offsite contractor. The licensee subsequently completed an evaluation that demonstrated operability for the heat exchanger.

- Condition Report CR-ANO-2-2015-2950 documented sheared and missing rail bolts associated with the Unit 2 containment polar crane. The licensee failed to include enough information in the initial functionality to document how the missing bolts could impact the operation of the crane. In addition, the inspectors identified that the licensee performed a lift of refueling equipment in containment even though the crane had been declared non-functional. On the second revision of the operability evaluation, the inspectors challenged the functionality evaluation because the inspector noted that ANO had used a Waterford 3 polar crane drawing versus the ANO Unit 2 polar crane design drawing to evaluate the bolt layout. The licensee corrected the error in a third revision to the functionality evaluation.

Although the licensee did not identify this specifically as an adverse trend, the inspectors determined that the licensee had appropriately identified the programmatic issues. The inspectors will continue to follow the licensee's corrective actions to improve operability and functionality evaluations. The licensee documented the inspectors' observation in Condition Report CR-ANO-C-2015-04097.

c. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues

a. Inspection Scope

The inspectors selected one issue for an in-depth follow-up:

- On December 16, 2015, the inspectors reviewed the licensee's efforts to identify and correct equipment and operator performance issues associated with the December 15, 2015, Unit 1 reactor trip.

The inspectors assessed the licensee's problem identification threshold, cause analyses, extent of condition reviews, and compensatory actions. The inspectors verified that the licensee appropriately prioritized the planned corrective actions and that these actions were adequate to correct the conditions.

These activities constitute completion of one annual follow-up sample as defined in Inspection Procedure 71152.

b. Findings

No findings were identified.

4OA3 Follow-up of Events and Notices of Enforcement Discretion (71153)

On December 15, 2015, operators manually tripped the Unit 1 reactor due to a main feedwater transient. During a planned power reduction to replace a failed turbine electro-hydraulic control power supply, Unit 1 transitioned from the full power main feedwater flow controls to the low load feedwater flow control at approximately 45 percent power. The B low load valve failed to respond as expected. Subsequently, operators manually tripped the reactor due to oscillations in main feedwater flow. Emergency feedwater automatically initiated after the trip as expected and fed the steam generators. Operators controlled steam generator levels using the main feedwater startup control valves, and secured emergency feedwater. There were no safety related equipment failures.

Inspectors observed implementation of emergency and abnormal operating procedures, verified emergency action levels, verified the status of safety equipment and barriers, assessed radiological impacts, and observed command and control functions.

These activities constitute completion of one event follow-up sample, as defined in Inspection Procedure 71153.

4OA5 Other Activities

.1 Quarterly Performance Assessment

In the NRC's annual assessment letter (ML15063A499), dated March 4, 2015, the NRC documented that the performance of Arkansas Nuclear One, Units 1 and 2, was within the Multiple/Repetitive Degraded Cornerstone Column (Column 4) of the NRC's Reactor Oversight Process Action Matrix.

In accordance with NRC Inspection Manual Chapter 0305, "Operating Reactor Assessment Program," Issued December 23, 2015, a quarterly review of performance is required for a plant whose performance is in Column 4 of the Action Matrix.

On December 31, 2015, NRC management reviewed inspection and performance indicator results for Units 1 and 2. The NRC determined that continued plant operation

was acceptable in the Multiple/Repetitive Degraded Cornerstone of the Reactor Oversight Process Action Matrix. In addition, no additional regulatory actions beyond those described in the annual assessment letter were identified.

.2 Failure to Properly Translate the Design Requirements for the Unit 1 Decay Heat Vault Rooms Being Sealed

a. Inspection Scope

On February 23, 2015, Entergy, ANO, responded to the NRC's Final Significance Determination of Yellow Finding and Notice of Violation report (ML15023A076), issued on January 22, 2015. Entergy's letter (ML15054A607) stated agreement that a performance deficiency existed and concurred with both violations, with the exception of one example in the Notice of Violation involving the safety classification of the Unit 1 decay heat vault drain valves. The inspectors reviewed of Entergy's comments to the violation, which stated that the licensee had failed to design, implement and maintain the features needed to implement the approved flood protection for the units. The inspector also reviewed the current licensing basis to determine the required functions for the valves in question.

b. Findings

Introduction. The inspectors identified a Green, non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to correctly translate the regulatory requirements and design basis into specifications, drawings, procedures, and instructions to ensure the Unit 1 decay heat vault boundary components could perform their safety-related function to limit dose consequences during an accident.

Description. The original example in the Yellow violation addressed the decay heat vault drain valves and the fact that one had leaked during the stator drop event on March 31, 2013. This leakage demonstrated that the design requirement to protect the safety-related equipment inside the decay heat vault from a source of flooding was not met.

The inspectors determined that, in addition to providing flood protection for the low pressure injection pumps, shutdown cooling heat exchangers, and the containment spray pumps, the Unit 1 decay heat vault boundary components were required provide a radiological barrier to mitigate the consequences of an accident. The NRC-approved design credited the decay heat vault rooms as sealed radiological barriers in Unit 1 safety analysis report Section 14.2.2.5.7. Consequently, during a design basis accident, any leakage from the components within the vault was required to be contained within the vaults in order to mitigate the consequences of accidents that could result in significant offsite dose. This function meets the NRC's definition of a safety-related function. The inspectors determined that the licensee failed to recognize and include this in the design and licensing basis documents.

By specifying the decay heat vaults as sealed, the licensee did not include any radiological leakage from the components in the decay heat vault rooms as inputs into their offsite accident dose calculations or control room habitability calculations. Even though the licensee monitors the low pressure injection and containment spray systems for leakage, they do not include this leakage into the leakage monitoring program or

establish allowable leakage criteria that implements the offsite and control room dose calculation limits under accident conditions.

The inspectors determined that due to differences in the design and licensing basis this concern did not appear to impact Unit 2.

The inspectors considered other potential pathways which could impact the ability of the vault rooms to be sealed, and therefore could increase the consequences of an accident that could result in offsite exposures that meets the NRC's criteria for those components to be classified as safety-related. The inspectors noted that the following Unit 1 components met this criteria for being required to be classified as safety-related:

- decay heat vault drain valves (ABS-13 and ABS-14)
- the decay heat vault watertight doors (Door 5 and Door 6)
- the decay heat vaults' ventilation supply and exhaust damper valves (CV-7621, CV-7622, CV-7637, and CV-7638)

The inspectors noted that the ventilation supply and exhaust dampers were appropriately classified as safety-related, but the watertight doors and the drain valves were inappropriately classified as non-safety.

Analysis. The inspectors determined that the failure to correctly translate the design requirement that the Unit 1 decay heat vault rooms be sealed to mitigate the dose consequences of an accident into specifications, drawings, procedures, and instructions is a performance deficiency. This performance deficiency is more than minor because it was associated with the design control and SSC and barrier performance attributes of the Barrier Integrity cornerstone, and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the licensee failed to ensure that Unit 1 decay heat vault boundary components were designated as safety-related components and met the applicable requirements needed to assure the reliability and integrity of the barrier function.

Using Inspection Manual Chapter 0609, Appendix A, Exhibit 3, "Barrier Integrity Screening Questions," dated June 19, 2012, the inspectors screened the finding as having very low safety significance (Green) under the Control Room, Auxiliary, Reactor, or Spent Fuel Pool Building questions because the finding only represented a degradation of the radiological barrier function provided for the control room and the auxiliary building and it did not represent a degradation of the barrier function of the control room against smoke or a toxic atmosphere. The inspectors determined that this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance since this condition had existed since construction.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," requires, in part, that measures shall be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions. Contrary to the above, from construction until December 15, 2015, the licensee failed to assure that applicable regulatory requirements and the

design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to classified the decay heat vault doors and drain valves as safety-related, translate the associated requirements into specifications, drawings, procedures, and instructions, and assure they were fabricated from material of the appropriate quality classification. In response to this issue, the licensee performed an immediate operability determination and reviewed previous leakage testing on the containment spray and low pressure injection systems. This finding was entered into the licensee's corrective action program as Condition Report CR-ANO-1-2015-04195. Because this finding is of very low safety significance and has been entered into the licensee's corrective action program, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy:
NCV 05000313/2015004-03, "Failure to Properly Translate the Design Requirements for the Unit 1 Decay Heat Vault Rooms Being Sealed."

4OA6 Meetings, Including Exit

Exit Meeting Summary

On October 8, 2015, the inspectors presented the inspection results for the inservice inspection to Mr. B. Davis, Engineering Director, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On October 14, 2015, the inspectors presented the operator requalification inspection results to Mr. R. Martin, Training Superintendent, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On November 6, 2015, the inspector presented the results of the on-site inspection of the emergency preparedness program to Mr. T. Evans, General Manager Plant Operation, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On January 11, 2016, the inspectors presented the resident inspection results to Mr. J. Browning, Site Vice President, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

D. Barborke, Engineer
R. Barnes, Director, Regulatory Assurance and Problem Identification
L. Blocker, Manager, Nuclear Independent Oversight
B. Davis, Director, Engineering
T. Evans, General Manager Plant Operations
K. Gaston, Supervisor, Systems and Components Engineering
T. Hatfield, Supervisor, Systems and Components Engineering
D. James, Director, Recovery
R. McGaha, Engineer, NDE Level III
N. Mosher, Licensing Specialist, Regulatory Assurance
K. Panther, Engineer, Senior NDE Level III
D. Pehrson, Unit 1 Assitant Operations Manager
N. Pope, Planner, Emergency Preparedness
S. Pyle, Manager, Regulatory Assurance
T. Renfroe, Planner, Emergency Preparedness
J. Standridge, Corporate, Emergency Planning
J. Toben, Manager, Security
D. Varvil, Engineer, Welding and Repair/Replacement
D. White, Acting Manager, Emergency Preparedness

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000313/2015004-01 05000368/2015004-01	NCV	Failure to Assess Risk for Switchyard Work (Section 1R13)
05000313/2015004-02 05000368/2015004-02	NCV	Failure to Identify and Correct Rain Water Accumulation in the Emergency Diesel Generator System Exhausts (Section 1R18)
05000313/2015004-03	NCV	Failure to Properly Translate the Design Requirements for the Unit 1 Decay Heat Vault Rooms Being Sealed (Section 4OA5)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

Number	Title	Revision
1306.019	Annual Emergency Cooling Pond Sounding	015
2203.008	Natural Emergencies	036

Condition Reports (CRs)

CR-ANO-2-2011-01409	CR-ANO-2-2015-00716	CR-ANO-2-2015-02872
CR-ANO-C-2014-00583	CR-ANO-C-2015-04514	CR-ANO-C-2015-02833
CR-ANO-C-2013-01097	CR-ANO-1-2013-01026	CR-ANO-2-2013-00892
CR-ANO-C-2013-01129	CR-ANO-2-2013-00904	CR-ANO-C-2013-01156
CR-ANO-2-2013-01628	CR-ANO-C-2013-01304	CR-HQN-2013-00854
CR-ANO-2-2013-01821	CR-ANO-2-2013-01822	CR-ANO-2-2013-02093
CR-ANO-1-2013-03023	CR-ANO-C-2013-02846	CR-ANO-C-2014-00202
CR-ANO-2-2014-00225	CR-ANO-2-2014-00232	CR-ANO-C-2014-00259

Section 1R04: Equipment Alignment

Procedures

Number	Title	Revision
1015.008	Unit 2 Shutdown Cooling Control	052
2104.004	Shutdown Cooling System	057
2104.039	HPSI System Operation	077
1107.001	Electrical System Operations	109
2104.005	Containment Spray	074
2104.037	Alternate AC Diesel Generator Operations	030
1015.008	UNIT 2 SDC Control	052

Condition Reports (CRs)

CR-ANO-2-2013-01012	CR-ANO-2-2015-01484	CR-ANO-2-2013-01729
CR-ANO-2-2013-02216	CR-ANO-C-2012-02878	CR-ANO-2-2015-04264

Drawings

Number	Title	Revision
M-2232, Sh. 1	Safety Injection System	121
M-2230, Sh. 1	Reactor Coolant System	079
M-2236, Sh. 1	Containment Spray System	095
M-2232, Sh. 2	High Pressure Safety Injection	002

Section 1R05: Fire Protection

Procedures

Number	Title	Revision
PFP-U2-R11	Unit 2 Pre Fire Plan	011
2203.014	Alternate Shutdown	031
PFP-UC-R013	Alternate AC Generator El. 354'	002
1015.007	Fire Brigade Organization And Responsibilities	032

Condition Reports (CRs)

CR-ANO-2-2009-03657 CR-ANO-2-2015-02231

Section 1R06: Flood Protection Measures

Procedures

Number	Title	Revision
EN-DC-346	Cable Reliability Program	006

Drawings

Number	Title	Revision
E-2871	Conduit & Tray Layout Auxiliary Building Sections & Details Area 24 & 26	017
A-2813	Architectural Concrete Wall Penetrations Elevs. 24-S-1 thru 10 & 24-S-65	014

Condition Reports (CRs)

CR-ANO-2-2009-00227 CR-ANO-2-2011-01540 CR-ANO-2-2015-00550

Section 1R07: Heat Sink Performance

Procedures

Number	Title	Revision
2311.001	Shutdown Cooling Heat Exchanger Performance Test	006

Section 1R08: Inservice Inspection Activities

Procedures

Number	Title	Revision
CEP-NDE-0903	VT-3 Examination	005
CEP-CII-003	Visual Examinations of Class MC Components	305
CEP-NDE-0485	Manual Ultrasonic Examination of Vessel Nozzle Inside Radius	011
CEP-NDE-0902	VT-2 Examination	007
CEP-NDE-0731	Magnetic Particle Examination (MT) for ASME Section XI	005
EN-DC-319	Boric Acid Corrosion Control Program (BACCP)	011
WDP-2.10	Qualification and Certification of Personnel in Nondestructive Examination	005
WDI-CAL-002	Pulser/Reciever Linearity Procedure	011
WDI-STD-1040	Procedure for Ultrasonic Examination of Reactor Head Penetration	012
WDI-STD-1041	Reactor Vessel Head Penetration Ultrasonic Examination Analysis	010
WDI-STD-1042	Procedure for Eddy Current Examination of Reactor Head Penetrations	005
WDI-STD-1140	Procedure for Intra Spect Eddy Current Examination of Reactor Vessel Head Vent Line Penetrations Using Array Probes	002
WDI-STD-041	Intra Spect Eddy Current Analysis Guidelines	019

Miscellaneous

Number	Title	Revision/Date
	Project Plan for 2R24 Reactor Vessel Closure Head Inspection and Repair	October 20, 2014
EN-LI-104 – Attachment 9.5	Inservice Inspection (ISI) and Pressure Test Program Focused Self Assessment	November 15, 2012

Miscellaneous

Number	Title	Revision/Date
LO-ALO-2010-00056	Welding Program Assessment Report	August, 2011
2CAN020901	Request for Alternative to 10 CFR 50.55a(g)(6)(ii)(D) Examination Requirements Arkansas Nuclear One, Unit 2	February 9, 2009
2CAN060902	Request for Alternative to Use 2001 Edition Through 2003 Addenda In Lieu of the 2004 Edition Arkansas Nuclear One, Unit 2	June 8, 2009
2CAN081007	Request for Additional Information Implementation of a Risk-Informed Inservice Inspection Program Based on ASME Code Case N-716 Arkansas Nuclear One, Unit 2	August 24, 2010
2CAN020801	Supplemental to Request for Alternative ANO2-R&R-005. Proposed Alternative to ASME Code Requirements for Weld Overlay Repairs Arkansas Nuclear One, Unit 2	February 18, 2008

Condition Reports (CRs)

CR-ANO-2-2014-01481	CR-ANO-2-2014-01496	CR-ANO-2-2015-03184
CR-ANO-2-2015-03258	CR-ANO-2-2015-03281	CR-ANO-2-2015-03605
CR-ANO-2-2015-03606	CR-ANO-C-2015-03997	

Section 1R11: Licensed Operator Requalification Program and Licensed Operator Performance

Procedures

Number	Title	Revision
1104.001	Core Flood System Operating Procedure	061
1104.002	Makeup and Purification System Operation	085
TQF-210-CRITGRADE	Critique Grading Sheet	
SES-1-041	Unit 1 Dynamic Exam Scenario	002
SES-2-020	Unit 2 Dynamic Exam Scenario	008

Section 1R12: Maintenance Effectiveness

Procedures

Number	Title	Revision
EN-DC-205	Maintenance Rule Monitoring	5

Condition Reports (CRs)

CR-ANO-2-2015-03955	CR-ANO-2-2015-04732	CR-ANO-C-2015-04873
CR-ANO-2-2015-05124	CR-ANO-2-2015-05127	CR-ANO-2-2015-05144

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

Number	Title	Revision
PRA-A1-01-001S12	Large Early Release Frequency (LERF) Model Revision: 1	001
PRA-A1-01-003S12	ANO-2 Large Early Release Frequency (LERF) Model Revision: 2	002
1015.033	ANO Switchyard and Transformer Yard Ccontrols	026
STM 1-32	Electrical Distribution	044

Condition Reports (CRs)

CR-ANO-2-2015-04147	CR-ANO-C-2015-04061

Section 1R15: Operability Determinations and Functionality Assessments

Procedures

Number	Title	Revision
EN-FAP-OP-006	Operator Aggregate Impact Index Performance Indicator	002
COPD-020	ANO Operations Concerns Program	014
1202.012	Repetitive Tasks	015
1203.012I	Annunciator K10 Corrective Action	054
1000.006	Procedure Control	068
1105.009	CRD System Operating Procedure	050
1103.019	Power Peaking Check	000

Procedures

Number	Title	Revision
1105.009	CRD System Operating Procedure	049

Calculations

Number	Title	Revision
93-SQ-0002-243	Seismic Qualification Review Summary for Shutdown Heat Exchangers	001
CALC-86-E-0036-40	Analysis for the EFCO SD Heat Exchanger	000
CALC-86-E-0036-41	Analysis for the EFCO SD Heat Exchanger	000
CALC-86-E-0036-70	SD Heat Exchanger Nozzle Load Eval	000
CALC-86-E-0036-261	Design Report, ASME Section III, Subsection NC (Class 2), Vessel Appurtenance (PMCap), and ASME Section VIII, Div. 1, Fitness for Service Evaluation for Heat Exchanger 2E-35B	000
CALC-86-E-0036-262	Shutdown Cooling Heat Exchanger 2E-35A and 2E-35B Evaluation of Tube Bundle Associated with Degradation of Shell Barrel Wall Thickness	000
CALC-ANO2-15-00002	Shutdown Cooling Heat Exchangers 2E35A and 2E35B Minimum Wall Requirement of Shell Barrel	000
93-SQ-0002-243	Seismic Qualification Review Summary for Shutdown Heat Exchangers	001

Condition Reports (CRs)

CR-ANO-1-2014-00530	CR-ANO-1-2015-03025	CR-ANO-2-2015-01706
CR-ANO-2-2015-02879	CR-ANO-2-2015-02909	CR-ANO-2-2015-02992
CR-ANO-2-2015-03040	CR-ANO-2-2015-03430	CR-ANO-2-2015-03525
CR-ANO-2-2015-03042	CR-ANO-2-2015-02850	

Work Orders

426255	303122	425770	425718

Section 1R18: Plant Modifications

Procedures/Miscellaneous

Number	Title	Revision
ANO-97-01218	ANO-1 EDG Exhaust Hood Removal	001
LCP-963205L201	Removal of U-2 EDG Exhaust Rain Hoods and Installation of Drains on Silencers 2M-67A&B	

Condition Reports (CRs)

CR-ANO-1-2005-01370	CR-ANO-1-2015-03952	CR-ANO-1-2015-03973
CR-ANO-C-2015-04514	CR-ANO-C-2015-04570	

Section 1R19: Post-Maintenance Testing

Procedures

Number	Title	Revision
2305.054	Offsite Power Transfer Test	011
2305.001	Integrated Engineering Safeguards Test	030
2305.017	Local Leak Rate Testing	032
2106.006	Emergency Feedwater System Operations	090
2402.124	UNIT 2 EFW Overspeed Trip Mechanism Inspection/Repair	011

Condition Reports (CRs)

CR-ANO-2-2007-01617	CR-ANO-2-2009-01769	CR-ANO-2-2015-4703

Section 1R20: Refueling and Other Outage Activities

Procedures

Number	Title	Revision
1015.048	Shutdown Operations Protection Plan	018
EN-FAP-OU-002	Post Outage Critique Process	003

Procedures

Number	Title	Revision
EN-OM-123	Fatigue Management Program	012
EN-PL-202	Personnel Expectations Related to Fatigue Management	000

Condition Reports (CRs)

CR-ANO-2-2015-04181	CR-ANO-C-2015-03793	CR-ANO-C-2015-03795
CR-ANO-C-2015-03952	CR-ANO-C-2015-04225	

Section 1R22: Surveillance Testing

Procedures

Number	Title	Revision
1305.006	Integrated ES System Test	043
1309.013	Unit 1 Service Water Flow Test	029

Condition Reports (CRs)

CR-ANO-1-2013-00760	CR-ANO-1-2015-00889	CR-ANO-1-2015-00936
CR-ANO-2-2011-00679	CR-ANO-2-2011-01340	

Section 1EP2: Alert and Notification System Testing

Procedures

Number	Title	Date
FEMA	Upgraded Public Alert and Notification System (ANS) Arkansas Nuclear One (ANO)	May 2009
EP-2011-0023	Arkansas Nuclear One ANS Design Report Update Corrections	June 14, 2011
FEMA	Backup Alert and Notification System Confirmation	November 27, 2012
	Procedures for Testing, Verification and Maintenance of the Emergency Warning System	May 19, 2015

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

Procedures

Number	Title	Date
TP-1903.062-C 20150915	Emergency Response Staffing Drill	September 10, 2015
	Record of Quarterly Call-In Drills for 2013, 2014 and 2015	

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Procedures

Number	Title	Revision
	Arkansas Nuclear One Emergency Plan	039
	Arkansas Nuclear One Emergency Plan	038
	Arkansas Nuclear One Emergency Plan	037
1903.010	Emergency Action Level Classification	052
1903.011	Emergency Response/Notifications	049

Section 1EP5: Maintenance of Emergency Preparedness

Procedures

Number	Title	Revision/Date
1903.069	Equipment Important to Emergency Preparedness	002
spreadsheet	Emergency Planning Monthly Surveillances	
spreadsheet	Emergency Planning Quarterly Surveillances	
spreadsheet	Emergency Planning Annual Surveillances	
TP-1903.004-M 20141215	ETE Update	September 1, 2014
TP-1903.004-M 20150922	ETE Update	September 22, 2015
TP-1903.004-M 20150831	Communication Systems Surveillance	August 31, 2015
TP-1903.004-M 20150930	Communication Systems Surveillance	September 30, 2015

Audits/Surveillance

Number	Title	Date
	Nuclear Independent Oversight Monthly Functional Area Summary Report	October 12, 2015
QA-7-2013-ANO-1	QA Audit Report, Emergency Planning	July 11, 2013
QA-7-2014-ANO-1	QA Audit Report, Emergency Plan	July 15, 2014
QA-7-2015-ANO-1	QA Audit Report, Emergency Planning	June 10, 2015

Condition Reports (CRs)

2013-00373	2013-01610	2013-01926	2014-00039	2014-00072
2014-00344	2014-00736	2014-00762	2014-01148	2014-01149
2014-01222	2014-01230	2014-01271	2014-01603	2014-02428
2014-02465	2014-02478	2014-02596	2014-02743	2014-03191
2015-00306	2015-01130	2015-01276	2015-01493	2015-01957
2015-02259	2015-02522	2015-02524	2015-02954	2015-02982
2015-03145	2015-03402	2015-03663		

Section 4OA1: Performance Indicator Verification

Procedures

Number	Title	Revision
ECH-NE-09-00041	ANO1 Mitigation System Performance Index Basis Document	002

Condition Reports (CRs)

CR-ANO-1-2015-00048

Section 4OA2: Problem Identification and Resolution

Procedures

Number	Title	Revision
EN-OP-104	Operability Determination Process	009

Condition Reports (CRs)

CR-ANO-C-2015-01284	CR-ANO-2-2015-00435	CR-ANO-2-2013-02502
CR-ANO-1-2013-00515	CR-ANO-1-2015-01193	CR-ANO-2-2015-00435

CR-ANO-1-2013-00495	CR-ANO-1-2013-00701	CR-ANO-1-2013-02090
CR-ANO-1-2013-02231	CR-ANO-1-2013-02417	CR-ANO-1-2015-00902
CR-ANO-1-2015-01193	CR-ANO-2-2013-01913	CR-ANO-1-2013-01286

Attachment 2

Arkansas Nuclear One
Rain Water Collection in the Emergency Diesel Generator Exhaust Manifold
Detailed Risk Evaluation

Overall Conclusion

The change in core damage frequency (CDF) from this performance deficiency is estimated to be 1.3E-7/year (Green).

Assumptions

1. The only initiating event that would produce an appreciable increase in core damage frequency from the performance deficiency would be a switchyard centered loss of offsite power. A seismically induced loss of offsite power frequency of 8.4E-5/year derived from Volume 2, "External Events," of the Risk Assessment of Operational Events Handbook was used.
2. Offsite power was assumed to be unrecoverable after the seismically induced loss of offsite power.
3. Both emergency diesel generators (EDG) in Unit 1 were assumed to fail during a seismic event. The mechanism was assumed to be cracking of the exhaust manifold due to excessive weight from the collection of rain water. EDG exhaust was assumed to heat up the respective EDG room until each EDG failed.
4. The EDGs were assumed to be unrecoverable after failure.
5. The exposure time used was 15 days. Historic rainfall exceeded the amount to cause the Unit 1 EDG manifolds to exceed their seismic ratings in one month of the worst case year since the modification introduced the deficiency. The analyst assumed the rain could have occurred at any time in that month and therefore applied a "T/2" correction.
6. The EDG failures were limited to Unit 1. Due to the different manifold configuration, the Unit 2 EDG's never experienced a condition which would have exceeded their seismic ratings. This also led to a Unit 2 EDG being available for cross-tying power to Unit 1.
7. The alternate AC diesel generator (AAC) was assumed to fail during a seismic event.

ANO, Unit 1 SPAR Model, Version 8.26, was run on SAPHIRE Version 8.1.2. Default truncation of 1E-11 was used. Using the above assumptions the analyst obtained an internal events risk result of 1.3E-7/yr. Dominant initiators were seismically induced losses of offsite power. Emergency feedwater and a Unit 2 EDG were the remaining mitigating equipment used to successfully avoid core damage.

Large early release frequency was not appreciably increased for this case and screened as having very low safety significance (Green) using Manual Chapter 0609, Appendix H, Containment Integrity Significance Determination Process."