



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

August 19, 2016

EA-15-194

Mr. Clay Warren, Acting Site Vice President  
Arkansas Nuclear One  
Entergy Operations, Inc.  
1448 SR 333  
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE – REVISED NRC INSPECTION  
REPORT 05000313/2015002 and 05000368/2015002

Dear Mr. Warren:

On September 3, 2015, Entergy Operations, Inc. (Entergy), the licensee for Arkansas Nuclear One (ANO), provided a response to the U.S. Nuclear Regulatory Commission's (NRC's) Inspection Report 05000313/2015002 and 05000368/2015002 (ML15218A371) issued on August 5, 2015. In this letter, Entergy disagreed with non-cited violation (NCV) 05000313, 368/2015002-04, Failure to Perform Testing of Diesel Fuel Oil Transfer Piping. The response letter is docketed under ML15246A591. Specifically, Entergy believes that the NCV inappropriately applied the same regulation (i.e. 10 CFR 50.55a(g)(1)) to both ANO units without distinguishing between the different licensing bases for the two units based on construction permit dates.

On October 8, 2015, the NRC acknowledged receipt of your letter (ML15282A338) and informed you that the staff would review your basis for contesting the NCV and provide the results of our evaluation by written response.

The NRC conducted a detailed review of your response and provided our conclusions by Letter, dated August 19, 2016 (ML16232A618). After consideration of the bases for your contention of the NCV, the NRC has concluded that the violation is better characterized under 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," related to the failure to establish and maintain an adequate testing program for the fuel oil transfer piping for ANO, Units 1 and 2 without referring to 10 CFR 50.55a(g)(1) or (g)(4). As a result, the NRC is revising the non-cited violation documented in Section 1R08b.2 of the enclosed Inspection Report 05000313/2015002, 05000368/2015002.

C. Warren

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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; 50-368  
License Nos. DRP-51; NPF-6

Enclosure: Inspection Report 05000313/2015002  
and 05000368/2015002

w/Attachment:

1. Supplemental Information
2. Request for Information

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C. Warren

- 2 -

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Letter to Clay Warren from Neil O'Keefe dated August 19, 2016

SUBJECT: ARKANSAS NUCLEAR ONE – REVISED NRC INSPECTION  
REPORT 05000313/2015002 and 05000368/2015002

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 05000313; 05000368

License: DPR-51; NPF-6

Report: 05000313/2015002; 05000368/2015002

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: April 1 through June 30, 2015

Inspectors: B. Tindell, Senior Resident Inspector  
M. Young, Resident Inspector  
L. Carson, II, Senior Health Physicist  
J. Drake, Senior Reactor Inspector  
Z. Hollcraft, Reactor Operations Engineer  
M. Phalen, Senior Health Physicist  
M. Williams, Reactor Inspector

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

## SUMMARY

IR 05000313/2015002; 05000368/2015002; 04/01/2015 – 06/30/2015; Arkansas Nuclear One, Units 1 and 2, Integrated Inspection Report; Adverse Weather Protection, Flood Protection Measures, Inservice Inspection Activities.

The inspection activities described in this report were performed between April 1, 2015, and June 30, 2015, by the resident inspectors at Arkansas Nuclear One and inspectors from the NRC's Region IV office and other NRC offices. Four findings of very low safety significance (Green) are documented in this report. Three 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 Part 50, Appendix B, Criterion V, "Instructions, Procedures, & Drawings," for the failure to establish appropriate procedures for preparations for severe weather. Specifically, inspectors observed that the licensee failed to ensure that all outside areas were inspected in order to secure material prior to severe weather, to reduce the probability of light material missile damage on plant equipment. The licensee concluded that the assignment of responsibilities was unclear in Procedure EN-FAP-EP-010, "Severe Weather Response," Revision 1, leading to confusion among the two operating crews. This issue was entered into the licensee's corrective action program as Condition Reports CR-ANO-C-2015-00854 and CR-ANO-C-2015-00859.

The failure to have a procedure to ensure that all outside areas would be inspected in order to secure loose material prior to the arrival of severe weather, to reduce the probability of light material missile damage on plant equipment was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, during severe weather, unsecured material could become a missile that impacts equipment and upsets plant stability. Using NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," the inspectors determined that the finding had very low safety significance (Green) because it did not represent an actual reactor trip and the loss of mitigation equipment. This finding has a human performance cross-cutting aspect associated with work management, in that the organization failed to implement a process of planning, controlling, and executing work activities, including coordination with different groups or job activities. Specifically, only one crew performed the required inspections when severe weather had been forecast since the procedure in use did not clearly assign responsibilities to both operating crews [H.5]. (Section 1R01)

- Green. The inspectors reviewed a self-revealing finding involving failure to verify that the proper material was installed in the plant during initial construction of the Unit 2 reactor coolant system (RCS) sample system. Specifically, failure to use the correct material resulted in two through-wall leaks in the supply line to the 2E30 cooler for the RCS sample system. The licensee removed the components with the incorrect material and installed components of the correct material. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2014-01800.

The failure to verify the correct materials were installed in the plant is a performance deficiency. This performance deficiency is more than minor because it is associated with the equipment performance attribute of the Initiating Events Cornerstone and affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as during power operations. Specifically, failure to install the correct material resulted in failure of the RCS sample system and the inability to meet technical specification requirements for determining dose equivalent Xenon-133. Using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 1, "Initiating Event Screening Questions," the inspectors determined the finding is of very low safety significance (Green) because the transient initiator did not cause a reactor trip and the loss of mitigating equipment. This finding has not been assigned a cross-cutting aspect because the incorrect material was installed during initial construction, and is not indicative of current plant performance. (Section 1R08.1)

#### **Cornerstone: Mitigating Systems**

- Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," for the failure to select and review equipment for suitability of application that is essential to the safety-related function of Unit 2 motor control center (MCC) 2B-52. Specifically, the licensee failed to ensure that the safety-related electrical equipment inside the MCC was adequately protected from water spray in the event of a failure of overhead non-seismic category 1 pipes, in accordance with the safety analysis report. Inspectors identified that the installed spray curtain only protected the front of the cabinet, while a cooling water pipe that could break during a seismic event was located directly above the length of the MCC. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-01342.

The failure to protect Unit 2 MCC 2B-52 from possible spray of overhead non-seismic category 1 pipes by installing a spray shield in accordance with the safety analysis report was a performance deficiency. The performance deficiency was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could result in failure of one train of essential safety features during a seismic event, such as exhaust fans for the emergency diesel generators, containment spray isolation valves, and high pressure safety injection isolation valves. Using NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," the inspectors determined to require a detailed risk evaluation because the finding involved degradation of equipment specifically designed to mitigate a seismic event and could degrade one train of a system that supports a risk-significant function. A senior reactor analyst performed the detailed risk evaluation and estimated the change to

the core damage frequency was 3.8E-8/year (Green). The dominant core damage sequences included seismically induced losses of offsite power. This finding did not have a cross-cutting aspect associated with it because the most significant contributing cause was not indicative of present performance. Specifically, the condition had existed since plant construction, with no recent substantial opportunities to identify the issue. (Section 1R06)

- Green. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control". Specifically, the licensee did not establish testing requirements and acceptance limits to detect degradation of the fuel oil piping, which could result in the piping being rendered inoperable and unable to meet its safety-related function due to undetected cracks or other types of degradation. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-2-2015-01092.

The licensee's failure to perform adequate testing of the fuel oil piping was a performance deficiency. The performance deficiency was determined to be more than minor because it is associated with the protection against external factors attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to perform examinations required to demonstrate that the piping would perform its intended function during design basis seismic events, and therefore maintain the ability to supply fuel to the emergency diesel generators. The inspectors evaluated the finding using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, Mitigating Systems, the inspectors determined the finding is of very low safety significance (Green) because the finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic initiating event. The finding has a human-performance cross-cutting aspect associated with conservative bias because the licensee did not use decision making-practices that emphasized prudent choices over those that were simply allowable. Specifically, during the buried piping initiative inspections that were completed in August 2013, the licensee failed to identify that the condition of the safety-related piping had never been evaluated and was being treated as a run to failure component [H.14]. (Section 1R08.2)



## PLANT STATUS

Unit 1 operated at 100 percent power for the entire inspection period.

Unit 2 operated at 100 percent power for the entire inspection period.

## REPORT DETAILS

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

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

##### .1 Summer Readiness for Offsite and Alternate AC Power Systems

###### a. Inspection Scope

On May 1, 2015, the inspectors completed an inspection of the station's off-site and alternate-ac power systems. The inspectors inspected the material condition of these systems, including transformers and other switchyard equipment to verify that plant features and procedures were appropriate for operation and continued availability of offsite and alternate-ac power systems. The inspectors reviewed outstanding work orders and open condition reports for these systems. The inspectors walked down the switchyard to observe the material condition of equipment providing off-site power sources.

The inspectors verified that the licensee's procedures included appropriate measures to monitor and maintain availability and reliability of the off-site and alternate-ac power systems.

These activities constituted one sample of summer readiness of off-site and alternate-ac power systems, as defined in Inspection Procedure 71111.01.

###### b. Findings

No findings were identified.

##### .2 Readiness for Impending Adverse Weather Conditions

###### a. Inspection Scope

On March 26, 2015, the inspectors completed an inspection of the station's readiness for impending adverse weather conditions. The inspectors reviewed plant design features, the licensee's procedures to respond to tornadoes and high winds, and the licensee's

implementation of these procedures. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant.

These activities constituted one sample of readiness for impending adverse weather conditions, as defined in Inspection Procedure 71111.01.

b. Findings

Introduction. The inspectors identified a Green non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to establish appropriate procedures for severe weather preparations. Specifically, the licensee failed to ensure that all outside areas were toured in order to secure material prior to severe weather, to reduce the probability of light material missile damage on plant equipment.

Description. The inspectors reviewed Procedures OP-1203.025, "Natural Emergencies," Revision 053, OP-2203.008, "Natural Emergencies," Revision 036, and Entergy Procedure EN-FAP-EP-010, "Severe Weather Response," Revision 001. Unit 1 Procedure OP-1203.025, Section 2, "Predicted Severe Weather," states, "Notify Unit 2 and dispatch Unit 1 personnel to perform walkdowns in the protected area identifying potential missile hazards using 'Severe Weather Missile Hazard Reduction Standard', Attachment 7.15 of Procedure EN-FAP-EP-010 as a guide to determine whether materials outside the plant require resolution." Procedure EN-FAP-EP-010, Attachment 7.15, "Severe Weather Missile Hazard Reduction Standard," stated, in part, that the purpose was to reduce the chances of "light material" missile damage on plant facilities.

On March 25, 2015, the National Weather Service issued a severe thunderstorm watch for Pope County. The inspectors reported to the control room to observe the operators' severe weather preparations. The inspectors observed that the Unit 1 operator did not tour Unit 2 areas, and that no Unit 2 operator had been dispatched. The inspectors notified the licensee and operators subsequently walked down Unit 2 areas.

The inspectors also performed a walkdown of the turbine building roof because the procedure did not explicitly require a walkdown of the area, and it is physically above high voltage lines and transformers in the yard. The inspectors discovered debris that could be potential missile hazards. The licensee subsequently secured the loose items and documented the concern in Condition Report CR-ANO-C-2015-00859.

The inspectors noted that the procedures failed to provide clear guidance for either the Unit 1 operator to walk down all areas, or to dispatch a Unit 2 operator. Therefore, the inspectors concluded that the procedure was inadequate to ensure that all outside areas were toured in order to secure material prior to severe weather, and in this case did not meet the purpose statement of Procedure EN-FAP-EP-010, Attachment 7.15, referenced above. The licensee documented the concern in Condition Report CR-ANO-C-2015-00854 and initiated a standing order to clarify adequate preparations between both units until a procedure change could be completed.

Analysis. The failure to have an adequate procedure to ensure that all outside areas were inspected in order to secure material prior to severe weather to reduce the probability of light material missile damage on plant equipment, in accordance with Procedure EN-FAP-EP-010, "Severe Weather Response," Revision 1, was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedure quality attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, during severe weather, unsecured material could become a missile that impacts equipment and upsets plant stability. Using NRC Inspection Manual Chapter 0609.04, "Initial Characterization of Findings," effective July 1, 2012, and NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," effective July 1, 2012, the inspectors determined that the finding had very low safety significance (Green) because it did not represent an actual reactor trip or loss of mitigation equipment. This finding has a human performance cross-cutting aspect associated with work management, in that the organization failed to implement a process of planning, controlling, and executing work activities, including coordination with different groups or job activities. Specifically, only one crew performed the required inspections when severe weather had been forecast since the procedure in use did not clearly assign responsibilities to both operating crews [H.5].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," states, in part, that activities affecting quality shall be prescribed by procedures of a type appropriate to the circumstance. Contrary to the above, as of March 25, 2015, the procedure for severe weather preparations, an activity affecting quality, was not appropriate to the circumstance. Specifically, Procedure EN-FAP-EP010, "Severe Weather Response," Revision 1, was unclear in assigning responsibility for inspecting the entire site for potential missile hazards. The licensee initiated a standing order to establish adequate preparations for both units until a procedure change could be completed. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy because it was of very low safety significance (Green) and it was entered into the licensee's corrective action program as Condition Reports CR-ANO-C-2015-00854 and CR-ANO-C-2015-00859. (NCV 05000313, 368/2015002-01; Inadequate Procedure for Severe Weather Preparation)

## **1R04 Equipment Alignment (71111.04)**

### **.1 Partial Walkdown**

#### **a. Inspection Scope**

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

- May 5, 2015, Unit 2, turbine driven emergency feedwater train while the motor driven emergency feedwater train was out of service for maintenance

- May 27, 2015, Unit 1, electric driven fire water pump while the diesel driven fire water pump was out of service for maintenance
- June 18, 2015, Unit 2, high pressure safety injection train A while train B was out of service for testing

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 walk-down samples 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:

- April 15, 2015, Unit 2, Fire Zone 2091-BB, north electrical equipment room
- April 15, 2015, Unit 2, Fire Zone 2099-W, west dc equipment room
- May 1, 2015, Unit 2, Fire Zone Intake, intake structure
- June 10, 2015, Unit 1, Fire Zones 86-G and 87-H, emergency diesel generators

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.

## 1R06 Flood Protection Measures (71111.06)

### a. Inspection Scope

On April 9, 2015, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis, the inspectors chose two plant areas containing risk-significant structures, systems, and components that were susceptible to flooding:

- Unit 1 decay heat watertight vaults
- Unit 2 upper and lower electrical penetration rooms and elevation 335 ft. corridor

The inspectors reviewed plant design features and licensee procedures for coping with internal 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 operator actions credited for flood mitigation could be successfully accomplished.

The inspectors reviewed the circumstances surrounding the licensee's discovery that a flood protection seal had been installed in the incorrect location to provide flood protection for the Unit 2 decay heat removal vaults. The seal was installed as part of corrective actions to address Yellow finding 2014009-01. This issue was documented in Condition Report CR-ANO-2-2015-00716 and was dispositioned as an NCV in Inspection Report 2015008.

These activities constitute completion of two flood protection measures samples, as defined in Inspection Procedure 71111.06.

### 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 select and review equipment for suitability of application that is essential to the safety-related function of Unit 2 motor control center (MCC) 2B-52. Specifically, the licensee failed to ensure that the safety-related electrical equipment inside the MCC was adequately protected from water spray in the event of a failure of overhead non-seismic category 1 pipes in accordance with the safety analysis report.

Description. During internal flooding walkdown sample selection, the inspectors reviewed the Unit 2 safety analysis report, Amendment 23. Section 3.6.4.3.3.4, stated, in part, that one engineered safety features MCC is located in the passageway near the spent resin storage tank. Several low-energy non-seismic Category 1 piping systems pass above this MCC. To protect the MCC from possible spray from these pipes, a spray shield has been constructed over the MCC.

On April 15, 2015, the inspectors performed a walkdown of the above-described MCC 2B-52 and spray shield. The inspectors noted that the MCC powered red train mitigating equipment needed to mitigate seismic events, including emergency diesel generator exhaust fans, containment spray isolation valves, and high pressure safety

injection isolation valves. The inspectors also noted that the spray shield was installed vertically in front of the cabinet, and determined that the configuration would not protect the internal equipment from postulated overhead water spray from failed piping. Therefore, the inspectors concluded that the licensee failed to install the spray shield in accordance with the safety analysis report, and the mitigation equipment powered by 2B-52 may fail during a seismic event due to the lack of a spray shield. The licensee initiated Condition Report CR-ANO-C-2015-01342 to document the inspectors' concerns. The licensee also evaluated the condition to ensure that the overhead pipes, while not fully qualified for seismic conditions, were sufficiently rugged and therefore unlikely to break during a seismic event.

The inspectors determined that the condition had existed since plant construction, with no recent substantial opportunities to identify the issue.

Analysis. The failure to protect Unit 2 MCC 2B-52 from possible spray of overhead non-seismic category 1 pipes by installing a spray shield in accordance with the safety analysis report was a performance deficiency. The performance deficiency was more than minor because it was associated with the design control attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the reliability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency could result in failure of one train of essential safety features during a seismic event, such as exhaust fans for the emergency diesel generators, containment spray isolation valves, and high pressure safety injection isolation valves. Using NRC Inspection Manual Chapter 0609.04, "Initial Characterization of Findings," effective July 1, 2012, and NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," effective July 1, 2012, the inspectors determined the finding required a detailed risk evaluation because the finding involved degradation of equipment specifically designed to mitigate a seismic event and could degrade one train of a system that supports a risk-significant function. A senior reactor analyst performed the detailed risk evaluation and estimated the change to the core damage frequency was  $3.8E-8$ /year (Green). The dominant core damage sequences included seismically induced losses of offsite power. See Attachment 2 for the detailed risk evaluation.

This finding did not have a cross-cutting aspect associated with it because the most significant contributing cause was not indicative of present performance. Specifically, the condition had existed since plant construction, with no recent substantial opportunities to identify the issue.

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion III, "Design Control," states, in part, that for those structures, systems, and components (SSCs) to which this appendix applies, measures shall be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related functions of the SSCs. Contrary to the above, from construction until April 15, 2015, for quality-related components associated with Unit 2 MCC 2B-52, to which 10 CFR Part 50, Appendix B applies, the licensee failed to select and review for suitability of application of materials, parts, equipment, and processes that are essential to the safety-related function of the component. Specifically, the licensee failed to ensure that the safety-related electrical equipment inside the MCC was adequately

protected from water spray in the event of a failure of overhead non-seismic category 1 pipes. The licensee evaluated the condition to ensure that the overhead pipes, while not fully qualified for seismic conditions, were sufficiently rugged and therefore unlikely to break during a seismic event. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy because it was of very low safety significance (Green) and it was entered into the licensee's corrective action program as Condition Report CR-ANO-C-2015-01342. (NCV 05000368/2015002-02; Failure to Protect Motor Control Center from Potential Pipe Spray)

## **1R08 Inservice Inspection Activities (71111.08)**

### a. Inspection Scope

This inspection was focused on resolving two Unresolved Items (URIs) opened during the performance of inspection IP 71111.08, "Inservice Inspection Activities," documented in NRC Inspection Report 05000313; 368/2014003. The inspectors reviewed additional licensing basis information provided by the licensee, as well as industry standards and regulatory guidance. The information below documents the resolution of these two URIs.

### b. Findings

#### .1 Failure to Verify Material Properties Prior to Installation

Introduction. The inspectors reviewed a self-revealing Green finding involving failure to verify that the proper material was installed in the plant during construction of the Unit 2 reactor coolant system (RCS) sample system.

Description. On February 3, 2014, two through-wall leaks in the supply line to the reactor coolant sample cooler, 2E30, were identified. The 2E30 heat exchanger is used to cool samples obtained from the reactor coolant system. These samples are used to verify the reactor coolant system dose equivalent Xenon-133 specific activity meets Technical Specification 4.4.8.1, Surveillance for Dose Equivalent Xenon (DEX), which is required once per 7 days to ensure the acceptability of the system for continued operation. Follow-up review by the licensee determined that the RCS sample system had not been built as designed. Design Drawing M-2014-2 specified that ASME SA-479, Type 304, stainless steel be used in the components. The components were actually made of carbon steel. Use of the wrong material resulted in through-wall corrosion of the piping and the reactor coolant system sample system being declared inoperable.

Analysis. The failure to use the correct materials in the Unit 2 reactor coolant sampling system as specified by design drawings is a performance deficiency. The finding is more than minor because it is associated with the equipment performance attribute of the initiating events cornerstone and adversely affects the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, failure to verify the correct material prior to installation resulted in the failure of the RCS sample system; the inability

to sample the reactor coolant for activity could upset plant stability by necessitating an unplanned shutdown as required by technical specifications. Using Inspection Manual Chapter 0609, Attachment 4, "Initial Characterization of Findings," dated June 19, 2012, and Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 1, "Initiating Events Screening Questions," the inspectors determined that the finding is of very low safety significance (Green) because the finding did not result in a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of a trip to a stable shutdown condition. This finding has not been assigned a cross-cutting aspect because the incorrect material was used during initial construction, and thus not indicative of current plant performance.

Enforcement. This finding did not involve enforcement action because no regulatory requirements were violated. This issue was entered into licensee's corrective action program as Condition Report CR-ANO-C-2015-01091. The faulted component was replaced with a component of the correct material. (FIN 05000368/2015002-03; Failure to Verify Material Properties Prior to Installation)

## .2 Failure to Perform Adequate Testing of Diesel Fuel Oil Transfer Piping

Introduction. The inspectors identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," for the licensee's failure to establish and maintain an adequate testing program for the fuel oil transfer piping for Units 1 and 2. Specifically, the licensee did not establish testing requirements to detect degradation of the fuel oil piping between the fuel oil storage tanks and the emergency diesel generator day tanks.

Description. During performance of TI 2515/182, "Review of the Implementation of the Industry Initiative to Control Degradation of Underground Piping and Tanks," the inspectors determined that the fuel oil transfer piping was not included in the licensee's inservice inspection program. During performance of IP 71111.08, "Inservice Inspection Activities," in May 2014, the inspectors further determined that the licensee was not performing inspections/testing to ensure the fuel oil piping would perform satisfactorily in service.

Through document review, the inspectors determined that the fuel oil transfer piping for Units 1 and 2 was safety-related, seismic Class 1 piping that provided the ability to transfer fuel oil from the fuel oil storage tanks to the emergency diesel generator day tanks. The fuel oil transfer systems for both units were designed and built to ASME Code B31.1.0 requirements. It was noted by the inspectors that the requirements of 10 CFR Part 50, Appendix B, were applicable to the fuel oil transfer piping because the requirements apply to all activities affecting the safety-related functions of structures, systems, and components. The inspectors also identified that the NRC has issued a number of guidance documents describing fuel oil storage and transfer systems and acceptable testing programs, including NUREG-75/087, "Standard Review Plan," and Regulatory Guide 1.137, "Fuel-Oil Systems for Standby Diesel Generators."

The licensee stated that Arkansas Nuclear One's technical specifications required surveillance testing of the diesel generators and analysis of the fuel oil. The licensee



further stated that, together with the aging management program, these surveillances provided adequate assurance that the fuel oil piping can perform its safety function. The NRC agrees that these measures ensure that fuel oil is flowing to the emergency diesel generators. However, they do not verify the structural integrity of the piping or whether the piping still meets the design requirements of B31.1 and Seismic Class 1.

Analysis. The inspectors determined that the failure to perform adequate testing of the fuel oil piping is a performance deficiency. In accordance with Inspection Manual Chapter 0612, Appendix B, "Issue Screening," the issue is more than minor because it is associated with the protection against external factors attribute of the Mitigating Systems Cornerstone, and affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the licensee failed to perform examinations required to demonstrate that the piping can perform its intended function during design basis seismic events, and therefore maintain the ability to supply fuel to the emergency diesel generators. The inspectors evaluated the finding using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, Mitigating Systems. The inspectors determined the finding is of very low safety significance (Green) because the finding did not involve the loss or degradation of equipment or function specifically designed to mitigate a seismic initiating event. The finding has a cross-cutting aspect in the area of human performance, associated with conservative bias, because the licensee did not use decision making-practices that emphasized prudent choices over those that were simply allowable. Specifically, during the buried piping initiative inspections that were completed in August 2013, the licensee failed to identify that the condition of the safety-related piping had never been evaluated and was being treated as a run to failure component [H.14].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion XI, "Test Control," requires, in part, that a test program shall be established to assure that all testing required to demonstrate that SSCs will perform satisfactorily in service is identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Contrary to the above, from initial commercial operations to the present, the licensee failed to establish an adequate test program to assure that all testing required to demonstrate that the fuel oil transfer piping will perform satisfactorily in service was identified and performed in accordance with written test procedures which incorporate the requirements and acceptance limits contained in applicable design documents. Specifically, the licensee did not establish testing requirements and acceptance limits to detect degradation of the fuel oil piping, which could result in the piping being rendered inoperable and unable to meet its safety-related function due to undetected cracks or other types of degradation. Since the violation is of very low safety significance and is documented in the licensee's corrective action program as Condition Report CR-ANO-2-2015-01092, it is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy. (NCV 05000313, 368/2015002-04; Failure to Perform Testing of Diesel Fuel Oil Transfer Piping)

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

### **.1 Review of Licensed Operator Requalification**

#### **a. Inspection Scope**

On May 20, 2015, the inspectors observed Unit 2 simulator training for an operating crew. On June 17, 2015, the inspectors observed a Unit 1 simulator examination for an operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance.

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:

- April 15, 2015, Unit 1, control rod exercises
- May 29, 2015, Unit 2, emergency diesel generator A surveillance

In addition, the inspectors assessed the operators' adherence to plant procedures, including 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.

## **1R12 Maintenance Effectiveness (71111.12)**

#### **a. Inspection Scope**

The inspectors reviewed two instances of degraded performance or condition of SSCs that were important to safety:

- March 13, 2015, Unit 1, instrument air dryer supply line rupture
- March 13, 2015, Unit 1, reactor building tendon grease leaks

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 two 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:

- May 6, 2015, Unit 1, loop 2 service water to intermediate cooling water cooler isolation valve, CV-3811, out of service
- June 10, 2015, Unit 1, emergency diesel generator B out of service

The inspectors verified that these risk assessments were 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.

The inspectors also observed portions of an emergent work activity that had the potential to cause an initiating event. On May 5, 2015, the inspectors observed Unit 2 motor control center 2B-53 maintenance due to high resistance connections that had the potential to cause a fault and/or fire.

The inspectors verified that the licensee appropriately developed and followed a work plan for these activities. The inspectors verified that the licensee took precautions to minimize the impact of the work activities on unaffected SSCs.

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

b. Findings

No findings were identified.

**1R15 Operability Determinations and Functionality Assessments (71111.15)**

a. Inspection Scope

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

- April 16, 2015, Unit 2, operability determination for the turbine driven emergency feedwater pump with a steam trap drain inadvertently left partially open
- April 7, 2015, Unit 1, operability determination for CV-1000 and CV-1009, electromatic relief valve block valve and pressurizer spray block valve environmental qualification configuration
- April 23, 2015, Unit 1, operability determination for the penetration room ventilation system with damper CV-2100 failed to fully close
- May 4, 2015, Unit 1, operability determination for loop 2 service water when CV-3811 failed to close
- May 7, 2015, Unit 2, operability determination for abnormal noise inside inverter 2Y22
- May 19, 2015, Unit 1, operability determination for turbine-driven emergency feedwater pump increased speed setting
- May 27, 2015, Unit 2, operability determination for startup transformer 3 voltage regulator following damage to cabling from debris during high winds

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.

These activities constitute completion of seven operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

## **1R18 Plant Modifications (71111.18)**

### a. Inspection Scope

On April 15, 2015, the inspectors reviewed a temporary modification to disable a degraded Unit 2 upper gripper coil for control element assembly 18.

The inspectors verified that the licensee had installed this temporary modification in accordance with technically adequate design documents. The inspectors verified that this modification did not adversely impact the operability or availability of affected SSCs. The inspectors reviewed design documentation and plant procedures affected by the modification to verify the licensee maintained configuration control.

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

### b. Findings

No findings were identified.

## **1R19 Post-Maintenance Testing (71111.19)**

### a. Inspection Scope

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

- April 24, 2015, Unit 2, motor control center 2B-35, following repair activities due to a fault
- May 3, 2015, Unit 1, motor control center B-33, following preventative maintenance
- May 5, 2015, Unit 2, motor driven emergency feedwater discharge to steam generator B valve 2CV-1036-2, following preventative maintenance
- May 6, 2015, Unit 1, loop 2 service water to intermediate cooling water cooler isolation valve CV-3811, following emergent maintenance

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 four post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

No findings were identified.

**1R22 Surveillance Testing (71111.22)**

a. Inspection Scope

The inspectors observed seven risk-significant surveillance tests and reviewed test results to verify that these tests adequately demonstrated that the SSCs were capable of performing their safety functions:

Inservice tests:

- June 19, 2015, Unit 2, high pressure safety injection train B pump inservice test

Reactor coolant system leak detection tests:

- May 29, 2015, Unit 1, reactor coolant system leak detection surveillance
- May 29, 2015, Unit 2, reactor coolant system leak detection surveillance

Other surveillance tests:

- April 23, 2015, Unit 1, penetration room ventilation system surveillance test
- May 28, 2015, Unit 1, reactor coolant system chemistry sampling
- May 28, 2015, Unit 2, reactor coolant system chemistry sampling
- May 29, 2015, Unit 2, emergency diesel generator A monthly surveillance

The inspectors verified that these tests met technical specification requirements, that the licensee performed the tests in accordance with their procedures, 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 seven surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

**Cornerstone: Emergency Preparedness**

**1EP6 Drill Evaluation (71114.06)**

a. Inspection Scope

On June 17, 2015, the inspectors observed simulator-based licensed operator requalification training that included implementation of the licensee's emergency plan. The inspectors verified that the licensee's emergency classifications, off-site

notifications, and protective action recommendations were appropriate and timely. The inspectors verified that any emergency preparedness weaknesses were appropriately identified by the evaluators and entered into the corrective action program for resolution.

These activities constitute completion of one training observation sample, as defined in Inspection Procedure 71114.06.

b. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstones: Public Radiation Safety and Occupational Radiation Safety**

**2RS2 Occupational ALARA Planning and Controls (71124.02)**

a. Inspection Scope

The inspectors assessed licensee performance with respect to maintaining occupational individual and collective radiation exposures as low as is reasonably achievable (ALARA). During the inspection, the inspectors interviewed licensee personnel and reviewed licensee performance in the following areas:

- Site-specific ALARA procedures and collective exposure history, including the current 3-year rolling average, site-specific trends in collective exposures, and source-term measurements
- ALARA work activity evaluations/post-job reviews, exposure estimates, and exposure mitigation requirements
- The methodology for estimating work activity exposures, the intended dose outcome, the accuracy of dose rate and man-hour estimates, and intended versus actual work activity doses and the reasons for any inconsistencies
- Records detailing the historical trends and current status of tracked plant source terms and contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry
- Radiation worker and radiation protection technician performance during work activities in radiation areas, airborne radioactivity areas, or high radiation areas
- Audits, self-assessments, and corrective action documents related to ALARA planning and controls since the last inspection

These activities constitute completion of one sample of occupational ALARA planning and controls as defined in Inspection Procedure 71124.02.

b. Findings

No findings were identified.

**2RS4 Occupational Dose Assessment (71124.04)**

a. Inspection Scope

The inspectors evaluated the accuracy and operability of the licensee's personnel monitoring equipment, verified the accuracy and effectiveness of the licensee's methods for determining total effective dose equivalent, and verified that the licensee was appropriately monitoring occupational dose. The inspectors interviewed licensee personnel, walked down various portions of the plant, and reviewed licensee performance in the following areas:

- External dosimetry accreditation, storage, issue, use, and processing of active and passive dosimeters
- The technical competency and adequacy of the licensee's internal dosimetry program
- Adequacy of the dosimetry program for special dosimetry situations such as declared pregnant workers, multiple dosimetry placement, and neutron dose assessment
- Audits, self-assessments, and corrective action documents related to dose assessment since the last inspection

These activities constitute completion of one sample of occupational dose assessment as defined in Inspection Procedure 71124.04.

b. Findings

No findings were identified.

**2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation (71124.08)**

Shipment Preparation (02.05)

a. Inspection Scope

The inspectors observed shipment packaging, surveying, labeling, marking, placarding, vehicle checks, emergency instructions, disposal manifest, shipping papers provided to the driver, and licensee verification of shipment readiness. The inspectors assessed whether the requirements of applicable transport cask certificate of compliance had been met. The inspectors evaluated whether the receiving licensee was authorized to receive the shipment packages. The inspectors evaluated whether the licensee's procedures for



cask loading and closure procedures were consistent with the vendor's current approved procedures.

These inspection activities supplement those documented in Inspection Report 05000313/2015002 and constitute sample as defined in IP 71124.08-05.

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**

**40A1 Performance Indicator Verification (71151)**

.1 Safety System Functional Failures (MS05)

a. Inspection Scope

For the period of April 1, 2014, through March 31, 2015, the inspectors reviewed licensee event reports (LERs), maintenance rule evaluations, and other records that could indicate whether safety system functional failures had occurred. The inspectors used definitions and guidance contained in Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, and NUREG-1022, "Event Reporting Guidelines: 10 CFR 50.72 and 50.73," Revision 3, to determine the accuracy of the data reported.

These activities constituted verification of the safety system functional failures performance indicator for Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Reactor Coolant System Specific Activity (BI01)

a. Inspection Scope

The inspectors reviewed the licensee's Unit 1 and Unit 2 reactor coolant system chemistry sample analyses for the period of April 1, 2014, through March 31, 2015, to verify the accuracy and completeness of the reported data. The inspectors observed a chemistry technician obtain and analyze a Unit 1 and Unit 2 reactor coolant system sample on May 28, 2015. 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 reactor coolant system specific activity performance indicator for Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Reactor Coolant System Total Leakage (BI02)

a. Inspection Scope

The inspectors reviewed the licensee's records of Unit 1 and Unit 2 reactor coolant system total leakage for the period of April 1, 2014, through March 31, 2015, to verify the accuracy and completeness of the reported data. The inspectors observed the performance of Unit 1 RCS leak detection surveillance procedure on May 29, 2015, and Unit 2 RCS leak detection surveillance procedure on May 28, 2015. 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 reactor coolant system leakage performance indicator for Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

**40A2 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, 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

#### **Roof Leaks**

On April 1, 2015, Unit 2 MCC 2B-35 electrically shorted. The licensee evaluated the fault in Condition Report CR-ANO-2-2015-00902 and determined that a contributor to the fault was past water intrusion due to an overhead roof leak.

On May 4, 2015, the licensee identified that there was an adverse trend regarding roof leaks at the facility, including two auxiliary building leaks, nine turbine building leaks, a leak at the alternate ac diesel generator building, and radioactive waste building leaks. Some of the roof leaks have been long term and now require large sections of the roof to be replaced to correct the leakage. The licensee documented the observation in Condition Report CR-ANO-C-2015-01390, and plans to fix the leaks.

The inspectors observed that the licensee has taken action to protect plant equipment from wetting, such as tarps. However, as evidenced by the MCC 2B-35 fault, the inspectors concluded that plant equipment was more susceptible to wetting and damage due to the number and duration of the roof leaks.

#### **Alternate Ac Diesel Generator Ventilation**

The inspectors observed a negative trend related to ventilation equipment for the alternate ac diesel generator, a safety significant electrical supply for Units 1 and 2.

The inspectors observed that 2VSF-32, the electrical room cooler had tripped multiple times within the past year. The inspectors also observed that, as documented in Condition Report CR-ANO-C-2015-01729, it was very difficult for operators to diagnose that the cooler's breaker had tripped, due to the breaker design. The electrical room exhaust fan, 2VEF-19, had been available each time that 2VSF-32 was out of service, so the diesel generator remained available. However, due to the increased unreliability and the difficulty of diagnosis, the inspectors concluded that there was an increased probability of concurrent out of service time for fans 2VSF-32 and 2VEF-19, which would cause diesel generator unavailability. The licensee documented the inspectors' concern in Condition Report CR-ANO-C-2015-01935.

The inspectors observed that 2VEF-18, the diesel generator room exhaust fan, had also tripped multiple times within the past year. A second room exhaust fan, 2VEF-17, had

been available each time that 2VEF-18 was out of service. If outside air temperature exceeds 92 degrees Fahrenheit with 2VEF-18 out of service and 2VEF-17 available, then the diesel generator would be unavailable. However, the inspectors observed that when 2VEF-18 was out of service, operators were not tracking outside air temperature to ensure that the diesel generator remained available. The inspectors reviewed actual temperature data for those periods and determined that the diesel generator remained available. The licensee documented the inspectors' concern in Condition Report CR-ANO-C-2015-01770.

The licensee has addressed the equipment failures through the corrective action program and the maintenance rule program trends the ventilation equipment failures. However, the inspectors concluded that the licensee had failed to identify and correct the human factors that contributed to reliability of the alternate ac diesel generator; namely, operator walkdowns to ensure standby equipment is available, and tracking degraded conditions to ensure the standby equipment remained available.

c. Findings

No findings were identified.

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

.1 (Closed) Licensee Event Report 05000368/2014-004-00, Technical Specification 3.0.4 Violation due to a Mode Change with an Inoperable Emergency Feedwater Pump

a. Inspection Scope

Revision 01 of this licensee event report was reviewed and closed in NRC Inspection Report 05000368/2015001, Section 4OA3.3. No additional deficiencies were identified during review of Revision 00 of this licensee event report. This licensee event report is closed.

b. Findings

No findings were identified.

.2 Event Follow-up for Unirradiated Nuclear Fuel Damage

a. Inspection Scope

On April 13, 2015, as Unit 2 new fuel assemblies were being transferred from the new fuel storage rack to the spent fuel pool in preparations for refueling outage 2R24, a fuel assembly was damaged. One operator initiated raising the new fuel elevator before another operator had moved the assembly clear of the elevator travel path. The fuel assembly was impacted by the top of the new fuel elevator resulting in the fuel assembly being determined unacceptable for use in the core. The inspectors verified the status of safety equipment and barriers, assessed radiological impacts, and observed command and control functions. The inspectors also performed a walkdown to verify that the damaged assembly was stabilized and that spent fuel assemblies were not affected.

b. Findings

No findings were identified.

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

**4OA5 Other Activities**

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 April 9, 2015, a quarterly review of performance is required for a plant whose performance is in Column 4 of the Action Matrix.

On July 1, 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.

**4OA6 Meetings, Including Exit**

Exit Meeting Summary

On April 29, 2015, the inspectors presented the inservice inspection activities results to Mrs. S. Pyle, Regulatory Assurance Manager and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed none of the information reviewed was proprietary.

On May 12, 2015, the inspectors held a public meeting at the Lakepoint Conference Center in London, Arkansas, to present the results of the 2014 end-of-cycle performance review of Arkansas Nuclear One, Units 1 and 2. The inspectors presented inspection results and enforcement actions from January 1, 2014, through December 31, 2014.

On May 21, 2015, the NRC held a public Commission Meeting to discuss the results of the Agency Action Review Meeting in Rockville, Maryland. The NRC staff and licensee discussed, in part, performance at Arkansas Nuclear One and performance improvement plans with the Commission.

On June 25, 2015, the inspectors presented the radiation safety inspection results to Mr. D. James, Director, Regulatory Affairs, 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 July 9, 2015, the inspectors presented the inspection results to Mr. J. Browning 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 July 27, 2016, the NRC discussed the results of the review of contested violation, NCV 05000313, 368/2015002-04, with Ms. S. Pyle, Regulatory Assurance Manager, and other members of the licensee staff. The revised NCV is documented in this report.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

D. Barborek, Engineer  
R. Barnes, Director, Regulatory Affair & Performance Indicators  
L. Blocker, Nuclear Oversight Manager  
J. Browning, Site Vice President  
P. Butler, Design and Program Engineering Manager  
B. Daiber, Recovery Manager  
B. Davis, Engineering Director  
G. Doran, Specialist, Radiation Protection  
T. Evans, General Manager of Plant Operations  
K. Gaston, Engineer  
M. Gibson, Supervisor, ALARA  
D. James, Director, Regulatory Affairs & Recovery  
D. Marvel, Radiation Protection Manager  
N. Mosher, Licensing Specialist  
D. Pehrson, Unit 1 Assistant Operations Manager  
S. Pyle, Regulatory Assurance Manager  
B. Short, Senior Licensing Specialist  
M. Smith, Coordinator, ALARA  
J. Toben, Security Manager  
D. Varvil, Engineer

#### **NRC**

D. Alley, Chief, Component Integrity Branch  
T. Lupold, Chief, Mechanical and Civil Engineering Branch  
S. Cumbridge, Component Integrity Branch  
J. Tsao, Component Integrity Branch  
K. Hoffman, Component Integrity Branch

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

#### **Opened and Closed**

05000313/2015002-01	NCV	Inadequate Procedure for Severe Weather Preparation (Section 1R01.2)
05000368/2015002-01		
05000368/2015002-02	NCV	Failure to Protect Motor Control Center from Potential Pipe Spray (Section 1R06)

Opened and Closed

05000368/2015002-03	FIN	Failure to Verify Material Properties Prior to Installation (Section 1R08.1)
05000313/2015002-04 05000368/2015002-04	NCV	Failure to Perform Testing of Diesel Fuel Oil Transfer Piping (Section 1R08.2)

Closed

05000368/2014003-05	URI	Proper ASME Code Classification of RCS Sample System (Section 1R08)
05000368/2014003-06	URI	Inservice Testing of the Diesel Fuel Oil Transfer Piping (Section 1R08)
05000368/2014004-00	LER	Technical Specification 3.0.4 Violation due to a Mode Change with an Inoperable Emergency Feedwater Pump (Section 4OA3)



## LIST OF DOCUMENTS REVIEWED

### Section 1R01: Adverse Weather Protection

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-1203.025	Natural Emergencies	053
EN-FAP-EP-010	Severe Weather Response	001
OP-1015.044	Summer Reliability Operations	009
ENS-DC-201	ENS Transmission Grid Monitoring	006
ENS-DC-199	Off Site Power Supply Design Requirements Nuclear Plant Interface Requirements	009
ENS-PL-159	Summer Reliability Plan	000
ENS-PL-158	Switchyard and Transmission Interface Requirements	036

### Section 1R04: Equipment Alignment

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2106.006	Emergency Feedwater System Operations	089
OP-1104.032	Fire Protection Systems	083
OP-2104.039	HPSI System Operation	077

#### Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
M-2232	Piping & Instrument Diagram Safety Injection System	120
M-2236	Piping & Instrument Diagram Containment Spray System	095

**Section 1R05: Fire Protection**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FHA	Fire Hazards Analysis	016
2A-372-2099-W	West DC Equipment Room	002
FHA	Fire Hazards Analysis	016
2A-372-2091-BB	North Electrical Equipment (2Y22/2Y24) Room	003
2b-add-unit2 intake	Unit 2 Intake Structure	002

Drawings

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FZ-2056	Fire Zone Detail - West Battery Room and West DC Equipment Room	002
FZ-2027	Fire Zone Detail - Electrical Equipment Room	003
FZ-2010	Fire Zone Detail - Intake Structure	002
FZ-2035	Fire Zone Detail - Intake Structure	002

**Section 1R06: Flood Protection Measures**

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
ULD-0-TOP-17	Design Configuration Documentation Project ANO Flooding Topical	000

**Section 1R08: Inservice Inspection Activities**

Miscellaneous

<u>Number</u>	<u>Description or Title</u>	<u>Revision</u>
ANSI N195-1976	Fuel Oil Systems for Standby Diesel-Generators	
EC-49008	2TCD-19-1 sheet 1	006

Miscellaneous

<u>Number</u>	<u>Description or Title</u>	<u>Revision</u>
6600-M-2084	Drawing of RCS Sample System Sheet 73	023
2305-017	Local Leak Rate Testing	031
M2014-2	Reactor Sample System Piping Diagram	002
6600-2	Field Change Notice to reroute piping of Reactor Sample System	
6600-M-2084	Reactor Sample System Piping Diagram Sheet 73	003
ANO-M-2514	Technical Specification for the Design of Piping for ANO Units 1 and 2	002

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1105.009	CRD System Operating Procedure	049
1015.001	Conduct of Operations	109

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SES-1-039	Unit 1 Dynamic Exam Scenario	002

**Section 1R12: Maintenance Effectiveness**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2106.006	Emergency Feedwater System Operations	084
EN-MA-125	Troubleshooting Control of Maintenance Activities	017

Condition Reports (CRs)

CR-ANO-1-2015-00370	CR-ANO-1-2015-01829	CR-ANO-1-2015-01594
CR-ANO-2-2015-00497	CR-ANO-C-2015-00756	CR-ANO-1-2015-00054
CR-ANO-1-2013-01988		

Title

Maintenance Rule A(1) Plan for 1IA

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-WM-104	On Line Risk Assessment	011
OP-2107.002	ESF Electrical System Operation	031
OP-2412.074	Unit 2 AC Motor Control Centers	018

Work Order (WO)

412506-01

Condition Reports (CRs)

CR-ANO-1-2015-02032	CR-ANO-1-2015-02016	CR-ANO-2-2015-01057
CR-ANO-1-2015-02017		

**Section 1R15: Operability Determinations and Functionality Assessments**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-LI-102	Corrective Action Program	024
EN-OP-104	Operability Determination Process	008
EN-OP-103	Reactivity Management Program	005
EN-HU-101	Human Performance Program	015
EN-LI-118	Cause Evaluation Process	021
OP-2106.006	Emergency Feedwater System Operations	089

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-FAP-OP-010	Component Misposition Performance Indicator	001
STM 1-11	AB, Spent Fuel, Penetration Room Ventilation Systems	009
OP-2107.003	Inverter and 120 VAC Electrical System Operation	032

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Date</u>
1104.002 Sup 4	Quarterly HPI Pump (P-36B) Test	October 27, 2014

Condition Reports (CRs)

CR-ANO-2-2014-03572	CR-ANO-2-2014-03115	CR-ANO-1-2015-01914
CR-ANO-2-2014-02546	CR-ANO-2-2015-01026	CR-ANO-1-2015-01917
CR-ANO-2-2015-00976	CR-ANO-2-2015-00353	CR-ANO-2-2015-00343
CR-ANO-2-2015-00344	CR-ANO-1-2015-02205	CR-ANO-2-2015-01342

**Section 1R18: Plant Modifications**

Procedure

<u>Number</u>	<u>Title</u>	<u>Revision</u>
STM 2-02	Control Element Drive Mechanism Control System	018

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
TMOD 54932	Removal of CEA-18 Upper Gripper Coil	001

Work Order (WO)

00402629-01

## **Section 1R19: Post-Maintenance Testing**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2106.006	Emergency Feedwater System Operations, Supplement 3A	089
OP-1104.029	Service Water and Auxiliary Cooling System	110
OP-1412.054	Unit 1 AC Motor Control Centers	030

### Drawing

<u>Number</u>	<u>Title</u>	<u>Revision</u>
E-2025	480 Volt Motor Control Center B33 & 2B72 Post Accident Sampling Facility	003

### Work Orders (WOs)

412512-01      412507-01      412507-04      412507-05

## **Section 1R22: Surveillance Testing**

### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-1104.043	Penetration Room Ventilation System	028
OP-1607.001	Reactor Coolant System Sampling	021
OP-2607.001	Unit 2 Reactor Coolant System Sampling	021
OP-1103.013	RCS Leak Detection	040
OP-2305.002	Reactor Coolant System Leak Detection	025
OP-2104.036	Emergency Diesel Generator Operations	087
OP-2104.039	HPSI System Operation	077

### Work Order (WO)

52561841

Condition Report (CR)

CR-ANO-2-2015-01638

**Section 1EP6: Drill Evaluation**

Miscellaneous

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SES-1-039	Unit 1 Dynamic Exam Scenario	002

**Section 2RS2: Occupational ALARA Planning and Controls**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1000.031	Radiation Protection Manual	020-00-0
EN-RP-105	Radiological Work Permits	14
EN-RP-110	ALARA Program	12
EN-RP-110-01	ALARA Initiative Deferrals	01
EN-RP-110-02	Elemental Cobalt Sampling	00
EN-RP-110-03	Collective Radiation Exposure (CRE) Reduction Guidelines	04
EN-RP-110-04	Radiation Protection Risk Assessment Process	05
EN-RP-110-05	Personnel Monitoring	02
EN-RP-110-06	Outage Dose Estimating and Tracking	01
EN-RP-204	Special Monitoring Requirements	06 & 08

Audits, Self-Assessments, and Surveillances

<u>Number</u>	<u>Title</u>	<u>Date</u>
1R25	ALARA Report	Undated
2R23	ALARA Report	Undated
LO- ALO-LO-2013-00110	Radiation Protection Triennial Assessment	August 5, 2014

Condition Reports (CRs)

HQN-2014-00645	C-2014-00916	C-2015-0007	C-2015-00552
HQN-2015-00321	C-20015-01891		

Miscellaneous Documents

<u>Title</u>	<u>Revision\Date</u>
Arkansas Nuclear One Annual Radiation Protection Report	2015-0026
Arkansas Nuclear One 5-Year Exposure Reduction Plan	2015-2019
RWP 2014-2450; ISI and Alloy 600 Inspections (Excluding RVCH)	Revision 00
RWP 2015-1407; Decontamination Activities 1R15	Revision 00
RWP 2015-1420; Scaffold Installation and Removal	Revision 00
RWP 2015-1450; ISI and Alloy 600 Inspections (Excluding RVCH)	Revision 02
Selected Radiation Surveys; Unit 1 and Unit 2	Various Dates 2014 & 2015

**Section 2RS4: Occupational Dose Assessment**

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-RP-131	Air Sampling	13
EN-RP-201	Dosimetry Administration	4
EN-RP-202	Personnel Monitoring	9
EN-RP-203	Dose Assessment	6
EN-RP-204	Special Monitoring Requirements	6
EN-RP-205	Prenatal Monitoring	3
EN-RP-206	Dosimeter of Legal Record QA	5
EN-RP-208	Whole Body Counting/In-Vitro Bioassay	6

Audits, Self-Assessments, and Surveillances

<u>Number</u>	<u>Title</u>	<u>Date</u>
LO- ALO-LO-2013-00110	Radiation Protection Triennial Assessment	August 5, 2014

Condition Reports (CRs)

C-2014-00897	C-2014-02730	C-2015-00343	C-2015-00690	C-2015-01333
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### Miscellaneous Documents

<u>Title</u>	<u>Date</u>
ANO Part 61 Scaling Analyses	April 17, 2015
Whole Body Counting Report 1 <sup>st</sup> Qtr. 2015	
Whole Body Counting Report 4 <sup>th</sup> Qtr. 2014	
Whole Body Counting Report 3 <sup>rd</sup> Qtr. 2014	
Whole Body Counting Report 2 <sup>nd</sup> Qtr. 2014	

### **Section 2RS8: Radioactive Solid Waste Processing, and Radioactive Material Handling, Storage, and Transportation**

#### Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EN-RW-101	Radioactive Waste Management	3
EN-RW-102	Radioactive Shipping Procedure	12
EN-RW-103	Radioactive Waste Tracking Procedure	4
EN-RW-104	Scaling Factors	11
EN-RW-105	Process Control Program	4
EN-RW-106	Integrated Transportation Security Plan	4

#### Radioactive Materials/Waste Shipments

<u>Number</u>	<u>Title</u>	<u>Date</u>
RSR-15-075	Low Activity Spent Resin Type B LSA-II	June 24, 2015
RSR-15-077	Low Activity DAW Metal Oxides Type A LSA-I	June 23, 2015

### **Section 4OA1: Performance Indicator Verification**

<u>Title</u>	<u>Date</u>
ANO-1 Tech Spec and TRM Surveillance Report	May 25, 2015
ANO-1 Tech Spec and TRM Surveillance Report	May 27, 2015
ANO-2 Tech Spec and TRM Surveillance Report	May 25, 2015
ANO-2 Tech Spec and TRM Surveillance Report	May 27, 2015

Condition Report (CR)

CR-ANO-C-2013-01304

**Section 4OA2: Problem Identification and Resolution**

Procedure

<u>Number</u>	<u>Title</u>	<u>Revision</u>
OP-2104.037	Alternate AC Diesel Generator Operations	29

Condition Reports (CRs)

CR-ANO-C-2015-01770	CR-ANO-2-2015-00902	CR-ANO-2-2015-01387
CR-ANO-C-2014-01809	CR-ANO-C-2015-02123	CR-ANO-2-2015-01754
CR-ANO-C-2015-01729	CR-ANO-C-2015-01935	CR-ANO-C-2015-01390

**Section 4OA3: Follow-up of Events and Notices of Enforcement Discretion**

Condition Report (CR)

CR-ANO-2-2015-00805

## PAPERWORK REDUCTION ACT STATEMENT

This letter does not contain new or amended information collection requirements subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing information collection requirements were approved by the Office of Management and Budget, control number 3150-0011.

**The following items are requested for the Occupational Radiation Safety: ALARA & Access Control and Occupational Dose Assessment Inspection at ANO from**

**June 22 - 25, 2015, Inspection Report Number 05000-313 & 368/2015-002.**

**Please provide the requested information to Louis C. Carson II and Marty Phalen in the Region IV Arlington Office by June 15, 2015.** *In an effort to keep the requested information organized please submit the information to us **using the same numbering/lettering system below.** Thank you for your support.*

Inspection areas are listed in the attachments below.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.02 should be in a file/folder titled "1- A," applicable organization charts in file/folder "1- B," etc.

If information is placed on ***ims.certrec.com***, please ensure the inspection exit date entered is at least 30 days later than the onsite inspection dates, so the inspectors will have access to the information while writing the report.

In addition to the corrective action document lists provided for each inspection procedure listed below, please provide updated lists of corrective action documents at the entrance meeting. The dates for these lists should range from the end dates of the original lists to the day of the entrance meeting.

If more than one inspection procedure is to be conducted and the information requests appear to be redundant, there is no need to provide duplicate copies. Enter a note explaining in which file the information can be found.

If you have any questions or comments, please call me at 817-200-1221 or Email [Louis.Carson@nrc.gov](mailto:Louis.Carson@nrc.gov) or [Martin.Phalen@nrc.gov](mailto:Martin.Phalen@nrc.gov); 817-200-1158.

1. **Items needed to support the ALARA Planning & Controls (71124.02) Inspection to be conducted by Louis C. Carson II are as follows:** Date of Last Inspection: March 20, 2014
  - A. List of contacts and telephone numbers for ALARA program personnel
  - B. Applicable organization charts
  - C. Copies of audits, self-assessments, and LERs, written since date of last inspection, focusing on ALARA
  - D. Procedure index for ALARA Program
  - E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures may be requested by number after the inspector reviews the procedure indexes.
    - ALARA Program
    - ALARA Committee
    - Radiation Work Permit Preparation
  - F. A summary list of corrective action documents (including corporate and subtiered systems) written since date of last inspection March 20, 2014, related to the ALARA program. In addition to ALARA, the summary should also address Radiation Work Permit violations, Electronic Dosimeter Alarms, and RWP Dose Estimates

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide documents which are "searchable."

- G. List of work activities greater than 1 rem, since date of last inspection.
    - Include original dose estimate and actual dose.
  - H. Site dose totals and 3-year rolling averages for the past 3 years (based on dose of record)
  - I. Outline of source term reduction strategy
  - J. A major focus of this inspection will be the results of the power upgrade outage, please provide the following:
    - Annual ANO ALARA Report for 2014
    - Last post Refueling-Outage Reports (Units 1&2)
    - List of ALARA Package that Exceeded the Original Dose Projections
    - Provide Written Justifications if Dose were Exceeded by 50 percent & 5 PersonRem
2. **Occupational Dose Assessment (Inspection Procedure 71124.04) to be reviewed:** Date of Last Inspection: March 20, 2014. **This part of the inspection will be conducted by John O'Donnell, and items needed are as follows**
    - A. List of contacts and telephone numbers for the following areas:
      - Dose Assessment personnel
    - B. Applicable organization charts

- C. Audits, self assessments, vendor or NUPIC audits of contractor support, and LERs written since date of last inspection March 20, 2014, related to:
  - Occupational Dose Assessment
- D. Procedure indexes for the following areas:
  - Occupational Dose Assessment
- E. Please provide specific procedures related to the following areas noted below. Additional Specific Procedures will be requested by number after the inspector reviews the procedure indexes.
  - Radiation Protection Program
  - Radiation Protection Conduct of Operations
  - Personnel Dosimetry Program
  - Radiological Posting and Warning Devices
  - Air Sample Analysis
  - Performance of High Exposure Work
  - Declared Pregnant Worker
  - Bioassay Program
- F. List of corrective action documents (including corporate and subtiered systems) written since date of last inspection March 20, 2014, associated with:
  - NVLAP accreditation
  - Dosimetry (TLD/OSL, etc.) problems
  - Electronic alarming dosimeters
  - Bioassays or internally deposited radionuclides or internal dose
  - Neutron dose

NOTE: The lists should indicate the significance level of each issue and the search criteria used.

- G. List of positive whole body counts since date of last inspection March 20, 2014, names redacted if desired
- H. Part 61 analyses/scaling factors
- I. The most recent National Voluntary Laboratory Accreditation Program (NVLAP) accreditation report on the licensee or dosimetry vendor, as appropriate

Please provide this information to me by **June 15, 2015**; thank you in advance.