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

August 3, 2017

EA-16-143

Mr. Richard L. Anderson, Site Vice President
Entergy Operations, Inc.
Arkansas Nuclear One
1448 S.R. 333
Russellville, AR 72802

SUBJECT: ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 05000312017002 and 05000368/2017002

Dear Mr. Anderson:

On June 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One facility, Units 1 and 2. On July 10, 2017, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented three findings of very low safety significance (Green) in this report. All of these findings involved violations of NRC requirements. Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. 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; 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 U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC resident inspector at Arkansas Nuclear One.

Also, a violation of the licensee's current site-specific licensing basis for tornado-generated missile protection was identified. Because this violation was identified during the discretion period discussed in Enforcement Guidance Memorandum 15–002, "Enforcement Discretion for Tornado Missile Protection Noncompliance," Revision 1, and because the licensee implemented compensatory measures, the NRC is exercising enforcement discretion by not issuing an enforcement action for the violation and is allowing continued reactor operation. (EA-16-143)

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 made available electronically for public inspection in the NRC's Public Document Room or the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response, if any, should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction.

Sincerely,

/RA/

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

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

Enclosures:
Inspection Report 05000313/2017002
and 05000368/2017002
w/ Attachments:
1. Supplemental Information
2. Occupational Radiation Safety Inspection Document Request
3. Inservice Inspection Document Request
4. Additional Information Regarding Tornado-Generated Missile Protection Noncompliances

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ARKANSAS NUCLEAR ONE – NRC INSPECTION REPORT 050003132017002
and 05000368/2017002 – DATED AUGUST 3, 2017

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OFFICE	**SRI:DRP/E**	**RI:DRP/E**	**RI:DRP/E**	**PE:DRP/E**	**DRS/EB1**	**DRS/EB2**
NAME	BTindell	MTobin	TSullivan	JChoate	TFarnholtz	GWerner
SIGNATURE	***/RA/***	***/RA/BWT for***	***/RA/***	***/RA/***	***/RA/RML for***	***/RA/***
DATE	07/28/2017	07/28/2017	07/28/2017	07/31/2017	08/02/2017	08/02/17
OFFICE	**DRS/PSB2**	**DRS/OB**	**DRS/IPAT**	**ACES**	**BC:DRP/E**	
NAME	HGepford	VGaddy	THipschman	MHay	NO'Keefe	
SIGNATURE	***/RA/RWD for***	***/RA/***	***/RA/HAF for***	***/RA/***	***/RA/***	
DATE	08/02/17	08/02/17	08/02/2017	08/02/17	08/03/17	

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	05000313; 05000368
License:	DPR-51; NPF-6
Report:	05000313/2017002; 05000368/2017002
Licensee:	Entergy Operations, Inc.
Facility:	Arkansas Nuclear One, Units 1 and 2
Location:	Junction of Highway 64 West and Highway 333 South Russellville, Arkansas
Dates:	April 1 through June 30, 2017
Inspectors:	B. Tindell, Senior Resident Inspector T. Sullivan, Resident Inspector M. Tobin, Resident Inspector J. Choate, Project Engineer J. Drake, Senior Reactor Inspector N. Greene, PhD, Health Physicist M. Phalen, Senior Health Physicist
Approved By:	Neil O'Keefe Chief, Project Branch E Division of Reactor Projects

SUMMARY

IR 05000313/2017002; 05000368/2017002; 04/01/2017 – 06/30/2017; Arkansas Nuclear One, Units 1 and 2; Integrated Inspection Report; Fire Protection, Operability Determinations and Functionality Assessments, Post-Maintenance Testing.

The inspection activities described in this report were performed between April 1 and June 30, 2017, 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. Additionally, NRC inspectors documented in this report one licensee-identified violation of very low safety significance. The significance of inspection findings is indicated by their color (i.e., Green, greater than Green, White, Yellow, or Red), determined using Inspection Manual Chapter 0609, "Significance Determination Process," dated April 29, 2015. Their cross-cutting aspects are determined using Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. 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," dated July 2016.

Cornerstone: Initiating Events

- Green. The inspectors identified a finding and associated non-cited violation of License Conditions 2.C.(3)(b), "Fire Protection," for Arkansas Nuclear One Unit 2, associated with the failure to adequately implement the fire protection program. Specifically, the licensee failed to follow the requirements for control of flammable liquid lockers and compressed hydrogen gas cylinders. The licensee immediately removed the hydrogen cylinders and stored them in an approved location and began processing the flammable liquid lockers through the design change process. The licensee entered these issues into their corrective action program as Condition Reports CR-ANO-2-2017-01525 and CR-ANO-C-2017-01508.

  The failure to properly control transient combustible material in accordance with the approved fire protection program was a performance deficiency. The finding was considered more than minor because storing unanalyzed flammable material could result in the potential to exceed combustible material limits, and is associated with the protection against external factors 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 power operations. Specifically, the failure to follow procedures resulted in conditions that increased the risk of fire which could upset plant stability and challenge critical safety functions. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process," and assigned the finding to the "Fire Prevention and Administrative Controls" category; because it affected the licensee's combustible materials control. The finding was determined to be Green, or very low safety significance, in accordance with Inspection Manual Chapter 0609, Appendix F, Question 1.3.1, because the reactor would have been able to reach and maintain safe shutdown since the postulated fires would not have affected both trains of safe shutdown equipment. This finding had a cross-cutting aspect associated with teamwork within the human performance area since multiple groups in the licensee staff were involved in the decisions that resulted in the improper introduction of the flammable liquids lockers and the improper storage of the hydrogen cylinders [H.4]. (Section 1R05)

Cornerstone: Mitigating Systems

- Green. The inspectors documented a Green self-revealing finding and associated non-cited violation of Unit 2 Technical Specification 6.4.1.a, for failure to properly pre-plan and perform maintenance on the Unit 2 containment spray pump B breaker in accordance with written procedures. Specifically, the licensee failed to install a cam shaft set screw during the breaker's last overhaul. The cam eventually became displaced on the shaft, and the breaker failed to close. To correct the issue, the licensee replaced the breaker and installed a cam shaft set screw in the failed breaker. The licensee also inspected all other similar breakers to verify the cams were properly secured. The licensee entered the issue into their corrective action program as Condition Report CR-ANO-2-2017-03168.

  The failure to install a cam shaft set screw during the overhaul of the Unit 2 containment spray pump B breaker is a performance deficiency. The performance deficiency is more than minor because it was associated with the equipment performance 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 resulted in the failure of a Unit 2 containment spray pump breaker. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was not a design or qualification deficiency; did not represent a loss of system; did not result in the actual loss of function of a train of technical specification equipment for greater than its allowed outage time; and did not screen as potentially risk significant due to seismic, flooding, or severe weather events. The inspectors determined this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance. Specifically, the error occurred during the breaker's last overhaul, which occurred in 2011. (Section 1R15)

- Green. The inspectors reviewed a Green self-revealing finding and associated non-cited violation of Unit 1 Technical Specification 3.5.2, "Emergency Core Cooling System (ECCS) – Operating," for the licensee's failure to ensure the operability of the P36A high pressure injection pump after reinstalling its feeder breaker during a unit outage. A violation of Unit 1 Technical Specification 3.0.4 was also identified for making a mode change without meeting the requirements to do so. Following unit restart, the pump failed to start during routine equipment rotation, resulting in one train of emergency core cooling system being inoperable for longer than allowed by Unit 1 Technical Specifications. The licensee subsequently identified that the feeder breaker had not been fully racked into position. Inspectors also noted that the breaker had been racked in manually rather than using the normal electric racking tool, and no special precautions had been taken to ensure this infrequently-used method was successful. When the breaker was correctly racked in, the pump was satisfactorily tested. The licensee subsequently verified that all similar breakers were correctly racked into position. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-1-2017-01764.

  The inspectors determined that the failure to verify that the P36A high pressure injection pump was operable after racking its feeder breaker into the switchgear cubicle was a performance deficiency. The performance deficiency was more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors performed the initial significance determination for the performance deficiency using NRC Inspection Manual 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," dated June 19, 2012, and concluded that it required a detailed risk evaluation because it involved the loss of a single train of mitigating equipment for longer than the technical specification allowed outage time. Therefore, a Region IV senior reactor analyst performed a bounding detailed risk evaluation. The estimate in the increase in core damage frequency is 4.4E-8 per year, or of very low safety significance (Green). This finding had a cross-cutting aspect in the area of Human Performance, Avoid Complacency, because the licensee failed to ensure that individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the licensee failed to verify that the pump was operable after its breaker was reinstalled, even though an infrequently-used method was employed [H.12]. (Section 1R19)

Licensee Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by the inspectors. Corrective actions taken or planned by the licensee have been entered into the licensee's corrective action program. This violation and associated corrective action tracking numbers are listed in Section 4OA7 of this report.

PLANT STATUS

Unit 1 began the inspection period at full power. On April 26, 2017, high winds damaged offsite power transmission lines approximately 16 miles from the plant, which caused a main generator trip and reactor trip. See Section 40A3.1 of this report for details. During the unplanned outage, operators cooled down the reactor coolant system (RCS) in order to replace a reactor coolant pump seal. After the transmission lines and pump seal were repaired, operators restarted the reactor on May 17, 2017. On May 18, 2017, while the plant was at 25 percent power, operators noted turbine oscillations and tripped the turbine, while the reactor remained in service. See Section 4OA3.1 of this report for details. After the cause of the oscillations was repaired, operators placed the turbine generator in service and raised reactor power. The unit reached full power on May 22, 2017, and remained there for the remainder of the inspection period.

Unit 2 remained in refueling outage 2R25 for the entire inspection period. On April 26, 2017, while the reactor fuel was fully offloaded to the spent fuel pool, high winds damaged offsite power transmission lines and power was momentarily lost and restored. See Section 4OA3.1 of this report for details.

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 April 20, 2017, 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 off-site 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 assessed corrective actions for identified degraded conditions and verified that the licensee had considered the degraded conditions in its risk evaluations and had established appropriate compensatory measures. 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 April 11, 2017, 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

No findings were identified.

1R04 Equipment Alignment (71111.04)

Partial Walk-Down

a. Inspection Scope

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

- April 2, 2017, Unit 2, reactor coolant system vent for emergency makeup capability while in lowered inventory
- April 2, 2017, Unit 2, reactor coolant system level instruments while draining to lowered inventory
- April 20, 2017, Unit 2, spent fuel pool cooling system during full core offload
- May 5, 2017, Unit 1, reactor coolant system level instruments during lowered inventory

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 four partial system walk-down samples as defined in Inspection Procedure 71111.04.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

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 six plant areas important to safety:

- April 14, 2017, Units 1 and 2, storage of transient combustibles in various areas of the plant
- April 18, 2017, Unit 1, Fire Zone 159-B, spent fuel pool area
- April 18, 2017, Unit 2, Fire Zone 2151-A, spent fuel pool area
- April 18, 2017, Unit 2, Fire Zone 4-EE,317 elevation general access area
- April 19, 2017, Unit 2, Fire Zones 2032-K, 2033-K, containment building
- June 30, 2017, Unit 1, Fire Zone 160-B, Turbine Building Computer Room

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 six quarterly inspection samples, as defined in Inspection Procedure 71111.05.

b. Findings

Introduction. The inspectors identified two examples of a Green finding and associated non-cited violation of License Condition 2.C.(3)(b), "Fire Protection," for Unit 2 for the failure to follow approved fire protection program procedures for the control of flammable liquid lockers and combustible gas cylinders.

Description.

Example 1: Control of Flammable Liquid Lockers

During plant walkdowns between April 10, 2017, and April 16, 2017, the inspectors identified 11 permanent flammable liquid lockers that had been installed using the wrong process. The inspectors determined that the licensee was required to install and maintain flammable storage lockers using Procedure EN-DC-115, "Engineering Change Process," but these lockers were installed using Procedure 1000.034, "Control of Temporary Services and Equipment," Revision 8.

Procedure EN-DC-330, “Fire Protection Program,” Revision 4, Section 2, “Fire Prevention and Protection,” Item (a) stated that, “Control of transient combustibles shall be implemented by administrative controls to govern the handling, storage, and limitations for use of ordinary combustible materials, combustible and flammable gases and liquids, and other combustible supplies in accordance with EN-DC-161.” Procedure EN-DC-161, “Control of Combustibles,” Revision 16, required that “Installation or long-term storage of combustible material is controlled through the design change process via EN-DC-115 and is not controlled by this procedure.” Section 5.1, Item 2 of EN-DC-161 stated, “Where it is desired to permanently store combustible materials in any plant area, request a new designated storage area, or when a revision or an extension is required to a previously approved storage area, an engineering change should be initiated in accordance with Procedure EN-DC-115.” The inspectors determined that the licensee had installed 11 flammable liquid lockers, starting in 2000, in various locations in the plant using Procedure 1000.034, “Control of Temporary Services and Equipment,” Revision 8. Some of these lockers were found with the doors open, doors that did not self-close as required by the manufacturer, or contained both solid and liquid combustibles, contrary to procedures and manufacturer’s guidance. The combustible loading in these lockers was not accounted for in the calculations for the affected fire areas.

Example 2: Control of Combustible Gas Cylinders

The inspectors noted 15 hydrogen gas bottles that were not stored in accordance with Procedure EN-IS-109, “Compressed Gas Cylinder Handling and Storage,” Revision 7. Procedure EN-IS-109 required, in part, that the cylinders be stored such that they are protected from environmental and physical damage and that there are no combustibles within 20 feet of the storage area. During a Unit 2 plant tour on April 13, 2017, the inspectors identified that the hydrogen gas bottles were stored in direct sunlight and exposed to potential physical damage. The cylinders had been placed inside a scaffolding frame adjacent to the entrance to the Unit 1 Auxiliary Building that was being used to access cable raceways above the cylinders. The scaffold did not have toe boards installed and the workers were not using restraints on their tools, so the hydrogen bottles were not adequately protected from damage from falling objects. In addition, there were combustible materials within 20 feet of the compressed gas cylinders.

Analysis. The failure to properly control transient combustible material in accordance with the approved fire protection program was a performance deficiency. The finding was considered more than minor because storing unanalyzed material could result in the potential to exceed combustible limits. It is associated with the protection against external factors 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 power operations. Specifically, the failure to follow procedures resulted in conditions that increased the risk of fire which could upset plant stability and challenge critical safety functions. The inspectors evaluated the finding using Inspection Manual Chapter 0609, Appendix F, “Fire Protection Significance Determination Process,” and assigned the finding to the “Fire Prevention and Administrative Controls” category; in that, it affected the licensee’s combustible materials control. The finding was determined to be Green, or very low safety significance, in accordance with Inspection Manual Chapter 0609, Appendix F, Question 1.3.1, because

the reactor would be able to reach and maintain safe shutdown since the fire would not have affected both trains of safe shutdown equipment. This finding had a cross-cutting aspect associated with teamwork within the human performance area since multiple groups in the licensee staff were involved in the decisions that resulted in the improper introduction of the flammable liquids lockers and the improper storage of the hydrogen cylinders [H.4].

Enforcement. Unit 2 License Condition 2.C (3)(b), "Fire Protection," requires that written procedures be established, implemented, and maintained covering fire protection program implementation.

Procedure EN-DC-330, "Fire Protection Program," Revision 4, Section 2, "Fire Prevention and Protection," requires that control of transient combustibles shall be implemented by administrative controls to govern the handling, storage, and limitations for use of ordinary combustible materials, combustible and flammable gases and liquids, and other combustible supplies in accordance with Procedure EN-DC-161, "Control of Combustibles." Procedure EN-DC-161, Revision 16, requires that the installation or long-term storage of combustible material be controlled through the design change process in accordance with Procedure EN-DC-115.

Procedure EN-DC-161, Revision 16, Step 5.5[1](c), requires, in part, that flammable gases be stored in accordance with Procedure EN-IS-109. Procedure EN-IS-109, "Compressed Gas Cylinder Handling and Storage," Revision 7, Steps 5.2 and 5.3 require, in part, that the cylinders be stored such that they are protected from environmental and physical damage, including protecting gas cylinders from any object that could produce a harmful cut, and that there are no combustibles within 20 feet of storage area.

Contrary to the above requirements, the license failed to implement written procedures covering the fire protection program as evidenced by the following two examples:

1. From approximately March 2000 until April 2017, the licensee failed to follow the requirements of Procedure EN-DC-161, "Control of Combustibles," Revision 16, that required flammable liquid storage lockers to be installed in the plant in accordance with the design change process Procedure EN-DC-115. Instead, the flammable liquid storage lockers were installed in the plant using Procedure 1000.034, "Control of Temporary Services and Equipment," Revision 8. As a result of using the wrong process, storage lockers were observed to be in disrepair and transient combustibles contained in the lockers were not accounted for in the fire area loading calculations.

2. On April 13, 2017, the licensee failed to follow the requirements of Procedure EN-IS-109, "Compressed Gas Cylinder Handling and Storage," Revision 7, for temporary storage of 15 cylinders of compressed hydrogen located adjacent to the entrance to the Unit 1 Auxiliary Building. Specifically, the hydrogen cylinders were not protected from environmental and physical damage because a scaffold platform immediately above the cylinders, used by workers, did not have toe boards installed and the workers were not using restraints on their tools. In addition, there were combustible materials within 20 feet of the gas cylinders.

The licensee immediately removed the hydrogen cylinders and stored them in an approved location and began processing the flammable liquid lockers through the design change process. Because this finding is of very low safety significance and has been entered into the corrective action program as Condition Reports CR-ANO-2-2017-01525 and CR-ANO-C-2017-01508, this violation is being treated as a non-cited violation consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000368/2017002-01, "Failure to Follow Fire Protection Program Procedures."

1R08 Inservice Inspection Activities (71111.08)

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

.1 Non-destructive Examination Activities and Welding Activities

a. Inspection Scope

The inspectors directly observed the following nondestructive examinations:

SYSTEM	COMPONENT IDENTIFICATION	EXAMINATION TYPE
Low Pressure Safety Injection	2GCB-7-H18	Visual Test 3
Low Pressure Safety Injection	2PSV-5089 FW-6	Dye Penetrant
Emergency Diesel Generator	2JBD-202-30	Ultrasonic
Reactor Vessel Head	Penetration 49	Eddy Current
Main Steam Reheat	FW-44C1	Radiograph
Main Steam Reheat	FW-27C1	Radiograph

The inspectors reviewed records for the following nondestructive examinations:

SYSTEM	COMPONENT IDENTIFICATION	EXAMINATION TYPE
Reactor Vessel Head	Penetration 49	Ultrasonic
Reactor Vessel Head	Penetration 29	Ultrasonic
Main Feedwater	FW-1024	Ultrasonic
Safety Injection*	Part 2724A Weld ID 320*	Ultrasonic
Safety Injection*	Part 2724A Weld ID 320*	Ultrasonic
Safety Injection	2GCB-5-H10	Visual Test 3
Containment	2P-66	Visual Test 3

SYSTEM	COMPONENT IDENTIFICATION	EXAMINATION TYPE
Common Feedwater	FW-6C1	Magnetic Particle
Common Feedwater	FW-8C1	Magnetic Particle

*This is inservice designation and part number, not plant system and component identification number. The heat exchangers have not been installed in the plant and actual location (2E-35 A or 2E-35 B) has not been determined.

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 reviewed seven indications that were previously examined, and observed that the licensee evaluated and accepted the indications in accordance with the ASME Code and/or an NRC approved alternative. 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
Common Feedwater	FW-6C1	Gas Tungsten Arc
Common Feedwater	FW-8C1	Gas Tungsten Arc

The inspectors reviewed records for the following welding activities:

SYSTEM	WELD IDENTIFICATION	WELD TYPE
Main Feedwater	FW-100	Gas Tungsten Arc
Emergency Feedwater	FW-14	Gas Tungsten Arc
Emergency Feedwater	FW-16	Gas Tungsten Arc
Main Feedwater	FW-82	Shielded Metal Arc
Main Feedwater	FW-83	Shielded Metal Arc
Main Feedwater	FW-152	Shielded Metal Arc

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 that the required inspection coverage was achieved and whether limitations were properly recorded. The inspectors reviewed the certifications for the personnel performing the inspection to verify that the examiners were certified to their respective nondestructive examination method.

b. Findings

No findings were identified.

.3 Boric Acid Corrosion Control 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 walk-down as specified in Procedure CEP-BAC-001, Boric Acid Corrosion Control (BACC) Program Plan, Revision 1. 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, 10 CFR 50, and Appendix B requirements.

b. Findings

No findings were identified.

.4 Steam Generator Tube Inspection Activities

Inspection Scope

There were no steam generator tube inspections performed during this outage.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed 15 condition reports which dealt with inservice inspection activities and found the corrective actions for inservice inspection issues were appropriate. From this review, the inspectors concluded that the licensee has an appropriate threshold for entering inservice inspection 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 inservice inspection operating experience. Specific documents reviewed during this inspection are listed in the attachment.

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 May 8, 2017, the inspectors observed simulator training for a Unit 2 operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

On May 23, 2017, the inspectors observed simulator training for a Unit 1 operating crew. The inspectors assessed the performance of the operators and the evaluators' critique of their performance. The inspectors also assessed the modeling and performance of the simulator during the requalification activities.

These activities constituted 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 main control room. At the time of the observations, the plant was in a period of heightened activity and risk. The inspectors observed the operators' performance of the following activities:

- April 3, 2017, Unit 2, lowering reactor coolant system inventory to remove the vessel head

- May 4, 2017, Unit 1, lowering reactor coolant system inventory to replace reactor coolant pump seal

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

These activities constituted 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)

Routine Maintenance Effectiveness

a. Inspection Scope

The inspectors reviewed two instances of degraded performance or condition of safety-significant SSCs:

- June 28, 2017, Unit 2, shutdown cooling heat exchanger replacement due to corrosion

- June 28, 2017, Units 1 and 2, common feedwater system installation and startup

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 six 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:

- April 2, 2017, Unit 2, recirculation actuation signal defeated for trip of low pressure safety injection pumps, protected train signs posted, and fire watches on station prior to entering lowered inventory

- April 14, 2017, Units 1 and 2, alternate ac diesel generator fuel makeup isolated while Unit 1 turbine driven emergency feedwater pump was out of service

- April 20, 2017, Units 1 and 2, switchyard work while Midcontinent Independent System Operator had issued Conservative Operations Notification, a notification of potential generation shortage

- April 27, 2017, Unit 2, removal and lifting of old shutdown cooling heat exchanger

- April 27, 2017, Unit 1, lifting of the old shutdown cooling heat exchanger potential cross-unit interactions

- May 7, 2017, Unit 1, procedurally required postings to prevent hot work during lowered inventory

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.

Additionally, on April 13, 2017, the inspectors observed portions of emergent work to correct an incorrect torque switch setting that had rendered the Unit 1 turbine driven emergency feedwater pump steam admission valve inoperable. The emergent work activity had the potential to affect the functional capability of a mitigating system.

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 structures, systems, and components (SSCs).

These activities constituted completion of seven 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)

.1 Operability Determinations

a. Inspection Scope

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

- April 11, 2017, operability determination of the Unit 1 reactor protection system with one nuclear instrument failed, causing a half-trip of the system

- April 13, 2017, operability determination of the Unit 1 turbine driven emergency feedwater pump steam admission valve for an incorrectly set torque switch settings

- May 11, 2017, operability determination of the Unit 1 control rods following ratcheting during a reactor trip

- May 11, 2017, operability determination of the Unit 1 emergency feedwater initiation and control system after emergency feedwater did not immediately feed steam generators following reactor trip

- May 31, 2017, operability determination of Units 1 and 2 Magne-blast breakers after licensee discovered loose closing cam set screws

- June 28, 2017, operability determination of Units 1 and 2 tornado missile vulnerabilities

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 constituted completion of six operability and functionality review samples, as defined in Inspection Procedure 71111.15.

b. Findings

Introduction. The inspectors documented a Green self-revealing finding and associated non-cited violation of Unit 2 Technical Specification 6.4.1.a, for failure to properly pre-plan and perform maintenance on the Unit 2 containment spray pump B breaker in accordance with written procedures. Specifically, the licensee failed to install a cam shaft set screw during the breaker's last overhaul. The cam eventually became displaced on the shaft, and the breaker failed to close.

Description. On May 26, 2017, operators attempted to start the Unit 2 containment spray pump B but the breaker failed to close. During troubleshooting on the Magne-Blast breaker, the licensee discovered that the closing cam had moved down the cam shaft and jammed, preventing the breaker from closing. The cam had displaced because the closing cam set screw intended to secure the cam axially to the shaft was missing. The licensee documented the issue in Condition Report CR-ANO-2-2017-03168, replaced the breaker, and repaired the failed breaker.

The licensee promptly performed an extent of condition review of all other important-to-safety Magne-Blast breakers and discovered that 11 breakers had loose set screws. All of the additional loose set screws still maintained engagement with the shaft, so that the

closing cams remained secure. The licensee also performed a cause evaluation and concluded that the set screw had loosened and backed out over time. However, the inspectors noted that the missing set screw and the locking screw that fit on top were not found in the breaker cubicle and all of the set screws identified as loose during the extent of condition review still staked the cam to the shaft, so the evidence did not support the licensee's conclusion. Therefore, the inspectors concluded that it was more likely that maintenance personnel had failed to reinstall the set screw during the last breaker overhaul.

Licensee maintenance personnel had last overhauled the failed breaker on October 7, 2011, in accordance with Procedure OP-1416.041, "Magne-Blast Circuit Breaker Overhaul," Revision 9. The procedure contained instructions to assemble the breaker operating mechanism. The procedure did not provide detailed assembly instructions for the closing cam and shaft set screw, which are parts in the operating mechanism. The inspectors concluded that the maintenance personnel had but failed to install the set screw for unknown reasons. As corrective actions for the failure, the licensee added detailed steps to ensure that the set screws are inspected and tightened during future overhauls, and to add adhesive to the screw threads to prevent the screws from backing out. The inspectors concluded that the corrective actions would provide reasonable assurance that the screw would be installed during future breaker overhauls.

The inspectors noted that the breaker had been cycled to start the pump earlier the same day as the breaker failed, while the reactor fuel had been offloaded. Therefore, the inspectors concluded that the exposure period for the breaker was less than one day while the reactor fuel had been offloaded to the spent fuel pool. The inspectors also concluded that the reliability of the breaker had been adversely affected since the overhaul in 2011.

Analysis. The failure to install a cam shaft set screw during the overhaul of the Unit 2 containment spray pump B breaker is a performance deficiency. The performance deficiency is more than minor because it was associated with the equipment performance 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 resulted in the failure of a Unit 2 containment spray pump breaker. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, Exhibit 2, "Mitigating Systems Screening Questions," the issue screened as having very low safety significance (Green) because it was not a design or qualification deficiency; did not represent a loss of system; did not result in the actual loss of function of a train of technical specification equipment for greater than its allowed outage time; and did not screen as potentially risk significant due to seismic, flooding, or severe weather. The inspectors determined this finding did not have a cross-cutting aspect because the most significant contributor did not reflect current licensee performance. Specifically, the failed breaker was last overhauled in 2011.

Enforcement. Unit 2 Technical Specification 6.4.1.a requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, Section 9.a, states, in part, that maintenance that can affect the performance of safety-related equipment should be properly pre-planned and performed

in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. The licensee established Procedure OP-1416.041, "Magne-Blast Circuit Breaker Overhaul," Revision 9, to meet the Regulatory Guide 1.33 requirement related to maintenance on safety-related Magne-Blast breakers. Step 8.26 of Procedure OP-1416.041 required that the breaker operating mechanism be assembled after disassembly and inspection. Contrary to the above, on October 7, 2011, the licensee did not ensure that the operating mechanism for the Unit 2 containment spray pump B was assembled after disassembly and inspection. Specifically, the licensee failed to install the cam shaft set screw, which allowed the cam shaft to become displaced over time and caused the breaker to fail. To correct the issue, the licensee replaced the breaker and installed the cam shaft set screw on the breaker and improved the level of detail in the maintenance procedure. Because this finding is of very low safety significance and was entered into the corrective action program as Condition Report CR-ANO-2-2017-03168, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000368/2017002-02, "Failure to Install Set Screw Leads to Breaker Failure."

.2 EA-16-143, Enforcement Discretion for Tornado-Generated Missile Protection Noncompliances

Description

Appendix A to 10 CFR 50, "General Design Criteria for Nuclear Power Plants," Criterion 2, "Design Bases for Protection Against Natural Phenomena," states, in part, that SSCs important to safety shall be designed to withstand the effects of natural phenomena, such as tornadoes. Criterion 4, "Environmental and Dynamic Effects Design Basis," states, in part, that SSCs important to safety shall be appropriately protected against dynamic effects including missiles which may result from events and conditions outside the nuclear power unit.

As part of their response to external flood boundary degradation, the licensee performed a review of external hazard protection at the site, which included protection against tornado-generated missiles required by the current licensing basis for each unit. During the review in 2016, the licensee identified four different plant areas containing safety-related SSCs that could be susceptible to tornado missiles. See NRC Inspection Report 2016003 and Enforcement Discretion EA-16-143 for more details. During a recent review of the tornado missile protection walkdowns, the licensee discovered additional tornado missile vulnerabilities:

- Unit 1 cable trays in electrical equipment room
- Unit 1 conduits in turbine building
- Unit 2 conduit in controlled access area

In each case, the licensee identified low-probability scenarios where one or more tornado-generated missiles could penetrate doors, walls, and other building features that were not fully qualified and damage equipment that was important to safety inside the affected rooms. Details about the date of discovery, affected SSCs, condition report numbers, compensatory actions taken by the licensee, notifications made to the NRC, and affected technical specification actions for each susceptible area are listed in Attachment 4 of this report.

Relevant Enforcement Discretion Policy

On June 10, 2015, the NRC issued Enforcement Guidance Memorandum (EGM) 15-002, "Enforcement Discretion for Tornado-Generated Missile Protection Noncompliance." (ML15111A269) On February 7, 2017, the NRC issued EGM 15-002, Revision 1 that incorporated lessons learned during the implementation of Revision 0 and allows licensees, on a case-by-case basis, to request an extension to the applicable enforcement discretion timeframe (ML16355A286). The EGM referenced a bounding generic risk analysis performed by the NRC staff that concluded that tornado missile vulnerabilities pose a low risk significance to operating nuclear plants. Because of this, the EGM described the conditions under which the NRC staff may exercise enforcement discretion for noncompliances with the current licensing basis for tornado-generated missile protection. Specifically, if the licensee could not meet the technical specification required actions within the required completion time, the EGM allows the staff to exercise enforcement discretion provided the licensee implements initial compensatory measures prior to the expiration of the time allowed by the limiting condition for operation. The compensatory actions should provide additional protection such that the likelihood of tornado missile effects are lessened. The EGM then requires the licensee to implement more comprehensive compensatory measures within approximately 60 days of issue discovery. The compensatory measures must remain in place until permanent repairs are completed, or until the NRC dispositions the non-compliance in accordance with a method acceptable to the NRC such that discretion is no longer needed. In addition, the issue must be entered into the licensee's corrective action program. Because EGM 15-002 listed Arkansas Nuclear One as a Group A plant, enforcement discretion will expire on June 10, 2018. However, the EGM did not provide for enforcement discretion for any related underlying technical violations; the EGM specifically requires that any associated underlying technical violations be assessed through the enforcement process.

Licensee Actions

For each of the examples listed above, the licensee declared the affected systems inoperable and complied with the applicable technical specification action statement(s), initiated a condition report, invoked the enforcement discretion guidance, implemented prompt compensatory measures, and returned the SSCs to an operable status. The licensee instituted compensatory measures intended to reduce the likelihood of tornado missile effects that included developing actions to be taken: if a tornado watch is predicted or issued for the area to ensure the operability or restore redundant equipment during severe weather; if a tornado warning is issued, including pre-staging operators in safe, strategic locations to promptly implement mitigative actions, and verifying the readiness of equipment and procedures dedicated to the Diverse and Flexible Coping Strategy (FLEX). Other specific compensatory actions for the individual areas are listed in Attachment 4.

NRC Actions

The inspectors' review addressed the material issues in the plant, and whether the compensatory measures were implemented in accordance with the guidance in EGM 15-002. The inspectors also evaluated whether the measures would function as intended and were properly controlled. The inspectors verified through inspection that the EGM 15-002 criteria were met in each case. Therefore, the staff determined that it

was appropriate to exercise enforcement discretion and not take enforcement action for the technical specification requirements listed in Attachment 4 of this report, provided the noncompliances are resolved prior to expiration of the enforcement discretion (EA-16-143).

The inspectors did not fully review the underlying circumstances that resulted in the technical specification violations. As stated in EGM 15-002, violations of other requirements which may have contributed to the technical specification violations will be evaluated independently of EGM implementation. The inspectors will verify restoration of compliance and assess the underlying circumstances in a follow-up inspection tracked under Licensee Event Reports 05000313/2016-002-00 (ML16224A767), 05000313/2016-003-00 (ML16293A66), 05000313/2016-003-01 (ML17163A27), 05000368/2017-001-00 (ML17150A48), and any updates or additional licensee event reports that the licensee issues.

1R18 Plant Modifications (71111.18)

.1 Temporary Modifications

a. Inspection Scope

On April 10, 2017, the inspectors reviewed a temporary plant modification for the inoperable Unit 1 reactor protection system D power range excore nuclear instrument intended to bypass the power range input to the reactor protection system channel while keeping all other functions of the channel in-service, which is a SSC. This was necessary because the instrument was experiencing excessive noise.

The inspectors verified that the licensee had installed these temporary modifications 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 constituted completion of one sample of temporary modifications, as defined in Inspection Procedure 71111.18.

b. Findings

No findings were identified.

.2 Permanent Modifications

a. Inspection Scope

The inspectors reviewed two permanent plant modifications that affected risk-significant SSCs:

- April 27, 2017, Unit 2, replacement of both shutdown cooling heat exchangers due to shell corrosion
- May 21-22, 2016, Unit 2, common feedwater system installation

The inspectors reviewed the design and implementation of the modifications. The inspectors verified that work activities involved in implementing the modifications did not adversely impact operator actions that may be required in response to an emergency or other unplanned event. The inspectors verified that post-modification testing was adequate to establish the operability or functionality of the SSCs as modified.

These activities constituted completion of two samples of permanent 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 eight post-maintenance testing activities that affected risk-significant SSCs:

- April 6, 2017, Unit 2, circuit checks after control circuit modification to prevent spurious operation of reactor coolant system high point vent valves
- May 5, 2017, Unit 2, energized tests of non-vital 4160 Volt bus B
- May 12, 2017, Unit 2, circuit checks after control circuit modification to prevent spurious operation for shutdown cooling suction isolation valve 2CV-5038-1
- May 31, 2017, Unit 1, high pressure injection pump A breaker racking
- June 19, 2017, Unit 2, service water system full flow test after service water pipe replacements
- June 21, 2017, Unit 2, high pressure safety injection full flow test after multiple valve and piping replacements
- June 21, 2017, Unit 2, common feedwater pump P-805-A discharge pressure and flow test
- June 27, 2017, Unit 2, common feedwater system flow to the steam generator test

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 constituted completion of eight post-maintenance testing inspection samples, as defined in Inspection Procedure 71111.19.

b. Findings

Introduction. The inspectors reviewed a Green self-revealing finding and associated non-cited violation of Unit 1 Technical Specification 3.5.2, "Emergency Core Cooling System (ECCS) – Operating", for the failure to ensure the operability of the P36A High Pressure Injection (HPI) pump after reinstalling its feeder breaker during a unit outage. A violation of Unit 1 Technical Specification 3.0.4 was also identified for making a mode change without meeting the requirements to do so. Following unit restart, the pump failed to start during a routine test, resulting in inoperability of one train of ECCS for a period of time greater than allowed by Unit 1 Technical Specifications.

Description. On May 11, 2017, the licensee racked in the four Siemens 4160 Volt breakers associated with the HPI pumps in accordance with their breaker racking procedure in preparation for Unit 1 startup and return to full power. These breakers had been racked out to comply with station procedures to prevent cold over-pressure conditions for reactor coolant system components during the Unit 1 outage. There are four breakers associated with the three HPI pumps (P36A, P36B, and P36C), because the swing pump (P36B) can be aligned to either 4160 Volt engineered safeguards electrical bus (A3 or A4) through motor-operated disconnects. Operators did not test any of the breakers at the time they were racked in, and later started only one HPI pump (P36C) prior to reactor startup. Licensee Procedure COPD-001, "Operations Expectations and Standards," Revision 074, provided the shift manager with latitude to waive the requirement to operate the P36A pump subsequent to the breaker rack in evolution.

On May 27, 2017, following Unit 1 restart, the P36A HPI pump failed to start. The licensee declared the P36A HPI pump and one ECCS train inoperable, documented the issue in Condition Report CR-ANO-1-2017-01764, and performed troubleshooting on the breaker. Licensee personnel determined that the breaker was not fully racked into the switchboard because the trip pedal was in a tripped condition and the roller nut was not free to roll. The licensee fully racked in the breaker, successfully started the P36A HPI pump, and declared the associated ECCS train operable. Subsequent to the P36A HPI pump failure to start, the remaining three HPI pump breakers were inspected to ensure they were properly racked in. Additionally, the licensee performed an extent of condition investigation on all other safety bus A3 Siemens breakers (no Siemens breakers are installed on safety bus A4) and found no issues.

Licensee Procedure OP-1107.001, "Electrical System Operations," Exhibit C, Revision 113, provided options to either electrically or manually rack in 4160 Volt breakers. Due to the electric racking tools not being available or in disrepair, the licensee used the manual racking option in lieu of the electrical option in OP-1107.001 to rack in the four HPI pump Siemens 4160 Volt breakers on May 11, 2017. Inspectors noted that no special precautions had been taken to ensure this infrequently-used method was successful. Using the electric racking tool automatically stops when the breaker is fully racked in, while manually racking required a manual determination that it is correctly racked in.

When operators racked the breakers in, the plant was outside the mode of applicability for HPI pump operability as specified by technical specifications. But the inspectors determined that operators did not declare or track the HPI pumps as being inoperable when their feeder breakers were racked out. As a result, there was no tracking

mechanism to ensure that operators would subsequently consider what actions were needed to declare the pumps operable after the breakers were racked in prior to entering the mode of applicability. The inspectors noted that the licensee routinely waived pump starts following breaker racking and concluded that the licensee failed to ensure that the associated mitigating equipment was operable prior to declaring the equipment operable.

Unit 1 Technical Specification 3.5.2, "ECCS – Operating," states that two ECCS trains shall be operable in MODES 1 and 2, and MODE 3 with reactor coolant system (RCS) temperature >350°F. Unit 1 exceeded 350°F on May 14, 2017. Since the P36A HPI pump was inoperable because its breaker was not fully racked in at this time, one train of ECCS became inoperable. This technical specification required restoring the train to operable status within 72 hours, or exiting the mode of applicability. However, the licensee failed to meet the technical specification until May 19, 2017, when operators realign both HPI trains for equipment rotation and P36A was no longer required. As a result, one train of ECCS was inoperable from May 14, 2017, to May 19, 2017, which exceeded the operability requirements of Technical Specification 3.5.2, "ECCS – Operating." A violation of Unit 1 Technical Specification 3.0.4 was also identified for making a mode change without meeting the requirements to do so.

For corrective actions, the licensee revised Procedure OP-1107.001, "Electrical System Operation," Revision 113, to include a requirement that the licensee electrical relay maintenance group verify the breaker is properly racked in when racking breakers manually. The licensee also revised COPD-001, "Operations Expectations and Standards," Step 5.13.1C, to require obtaining approval from the operations manager or an assistant operations manager approval prior to waiving the requirement to start a load after racking in a breaker. The licensee has also taken steps to ensure availability of functioning breaker racking equipment such that the preferred method to rack breakers (electrically) is once again available.

Analysis. The inspectors determined that the failure to verify that the P36A HPI pump was operable after racking its feeder breaker into the switchgear cubicle was a performance deficiency. The performance deficiency is more than minor because it was associated with the human performance attribute of the Mitigating Systems Cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors performed the initial significance determination for the performance deficiency using NRC Inspection Manual Chapter 0609, Appendix A, Exhibit 2, "Mitigating Systems Screening Questions," dated June 19, 2012, and concluded that the finding required a detailed risk evaluation because it involved the loss of a single train of mitigating equipment for longer than the technical specification allowed outage time.

In the detailed risk evaluation, the analyst considered the exposure time of the performance deficiency to be from May 11 to May 27, 2017, since that was the time pump P36A would have failed to start. The analyst referred to NRC Inspection Manual Chapter 0609, Appendix G, "Shutdown Operations Significance Determination Process," dated May 9, 2014, to qualitatively screen the time in which the plant was shut down with decay heat being removed by the shutdown cooling system. The analyst estimated all of the remaining exposure time of 307 hours using NRC Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power,"

dated June 19, 2012, considering all of that time to be at-power risk. In this exposure time, 5 days were assumed with P-36A as the only pump in the train. The analyst modeled the degradation to be a failure to start basic event in the Arkansas Nuclear One, Unit 1 SPAR model, Version 8.50, and ran on SAPHIRE, Version 8.1.5. These assumptions yielded an estimate in the increase in core damage frequency of 4.4E-8 per year or of very low safety significance (Green). The dominant core damage sequences were losses of switchgear and small loss of coolant accidents which were mitigated by the feedwater systems and the ability to feed and bleed.

This finding has a cross-cutting aspect in the area of human performance, avoid complacency, because the licensee failed to ensure that individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Specifically, the licensee failed to verify that the pump was operable after its breaker was reinstalled, even though an infrequent method was employed. [H.12]

Enforcement. Two violations were identified with this finding:

The Unit 1 Technical Specification 3.5.2, "ECCS – Operating," requires that two ECCS trains shall be operable in Modes 1 and 2, and Mode 3 with RCS temperature >350°F. Technical Specification 3.5.2, Condition A, requires that if one ECCS train is inoperable, then restore the ECCS train to operable status within 72 hours. Technical Specification 3.5.2, Condition B, states that if the required action and associated completion time of Condition A is not met, then the plant shall be placed in Mode 3 in six hours and reduce RCS temperature less than 350°F within 12 hours. Contrary to the above, from May 14 to May 19, 2017, one train of ECCS was inoperable but the licensee failed to place Unit 1 in Mode 3 within 6 hours and reduce RCS temperature below 350°F within 12 hours as required by Technical Specification 3.5.2, Condition B.

The Unit 1 Technical Specification 3.0.4 states, in part, that when a limiting condition for operation is not met, entry into a mode of applicability shall only be made when the associated actions to be entered permit continued operation in the mode for an unlimited period of time, after performance of a risk assessment and establishment of risk management actions, or when an allowance is stated in the individual specification. Contrary to the above, for a Mode 3 entry on May 14, 2017, for a Mode 2 entry on May 17, 2017, and for a Mode 1 entry on May 17, 2017, Unit 1 entered into a mode of applicability when the associated actions to be entered did not permit continued operation in the mode for an unlimited period of time; without performance of a risk assessment and establishment of risk management actions; and without an allowance stated in the individual specification. Specifically, Unit 1 Technical Specification 3.5.2, "ECCS – Operating" did not permit continued operation in the mode for an unlimited period of time, the licensee did not perform a risk assessment or establish risk management actions prior to entering the modes of applicability, and there was no allowance stated in the individual specification. The licensee did identify in their apparent cause assessment that an opportunity was missed to discover this issue during a mode of non-applicability.

Because this finding was of very low safety significance (Green), and was entered into the licensee's corrective action program as CR-ANO-1-2017-01764, this violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy: NCV 05000313/2017002-03, "Failure to Comply with ECCS Technical Specifications."

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

During the Unit 1 unplanned outage between April 26 and May 22, 2017, and the Unit 2 refueling outage that continued throughout the inspection period, 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. During this inspection period, this verification included the following:

- Review and verification of the licensee's fatigue management activities
- Monitoring of cool-down activities
- Verification that the licensee maintained defense-in-depth during outage activities
- Observation and review of reduced-inventory activities
- Observation and review of fuel handling activities
- Monitoring of heat-up and startup activities

The inspectors observed the licensee's projects to replace the Unit 2 shutdown cooling heat exchangers and common feedwater system for Unit 2. The inspectors observed methods of controlling hot work, risk assessment and mitigation, lifting activities, testing, inspections, alignment, problem identification and resolution, and restoration. The other inspection samples for these activities are documented in this inspection report.

These activities constituted completion of two refueling and other outage samples (one refueling and one other), as defined in Inspection Procedure 71111.20.

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 structures, systems, and components (SSCs) were capable of performing their safety functions:

In-service tests:

- May 8, 2017, Unit 1, motor driven emergency feedwater pump flow to steam generators during shutdown

- June 2, 2017, Unit 2, steam generator snubber testing

Containment isolation valve surveillance tests:

- June 26, 2017, Unit 2, local leak rate test on the containment equipment hatch, including the containment test isolation valve 2-IA-200

Reactor coolant system leak detection tests:

- June 27, 2017, Unit 1, reactor coolant system mass balance calculation, containment sump level trending, and containment radiation monitoring following increase in reactor coolant system pump seal leakage

Other surveillance tests:

- May 24, 2017, Unit 2, emergency diesel generator B operational test
- June 1, 2017, Unit 2, 2A1 bus offsite power transfer test
- June 19, 2017, Unit 2, battery 2D-11 discharge test

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 constituted completion of seven surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

2. RADIATION SAFETY

Cornerstones: Public Radiation Safety and Occupational Radiation Safety

2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

a. Inspection Scope

The inspectors evaluated the licensee's performance in assessing the radiological hazards in the workplace associated with licensed activities. The inspectors assessed the licensee's implementation of appropriate radiation monitoring and exposure control measures for both individual and collective exposures. During the inspection, the inspectors interviewed licensee personnel, walked down various areas in the plant, performed independent radiation dose rate measurements, and observed postings and physical controls. The inspectors reviewed licensee performance in the following areas:

- Radiological hazard assessment, including a review of the plant's radiological source terms and associated radiological hazards. The inspectors also reviewed the licensee's radiological survey program to determine whether radiological hazards were properly identified for routine and non-routine activities and assessed for changes in plant operations.

- Instructions to workers including radiation work permit requirements and restrictions, actions for electronic dosimeter alarms, changing radiological condition, and radioactive material container labeling.

- Contamination and radioactive material control, including release of potentially contaminated material from the radiologically controlled area, radiological survey performance, radiation instrument sensitivities, material control and release criteria, and control and accountability of sealed radioactive sources.

- Radiological hazards control and work coverage. During walk downs of the facility and job performance observations, the inspectors evaluated ambient radiological conditions, radiological postings, adequacy of radiological controls, radiation protection job coverage, and contamination controls. The inspectors also evaluated dosimetry selection and placement as well as the use of dosimetry in areas with significant dose rate gradients. The inspectors examined the licensee's controls for items stored in the spent fuel pool and evaluated airborne radioactivity controls and monitoring.

- High radiation area and very high radiation area controls. During plant walk downs, the inspectors verified the adequacy of posting and physical controls, including areas of the plant with the potential to become risk-significant high radiation areas.

- Radiation worker performance and radiation protection technician proficiency with respect to radiation protection work requirements. The inspectors determined if workers were aware of significant radiological conditions in their workplace, radiation work permit controls/limits in place, and electronic dosimeter dose and dose rate set points. The inspectors observed radiation protection technician job performance, including the performance of radiation surveys.

- Problem identification and resolution for radiological hazard assessment and exposure controls. The inspectors reviewed audits, self-assessments, and corrective action program documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the seven required samples of radiological hazard assessment and exposure control program, as defined in Inspection Procedure 71124.01.

b. Findings

No findings were identified.

2RS3 In-plant Airborne Radioactivity Control and Mitigation (71124.03)

a. Inspection Scope

The inspectors evaluated whether the licensee controlled in-plant airborne radioactivity concentrations consistent with ALARA principles and that the use of respiratory protection devices did not pose an undue risk to the wearer. During the inspection, the inspectors interviewed licensee personnel, walked down various areas in the plant, and reviewed licensee performance in the following areas:

- Engineering controls, including the use of permanent and temporary ventilation systems to control airborne radioactivity. The inspectors evaluated installed ventilation systems, including review of procedural guidance, verification the systems were used during high-risk activities, and verification of airflow capacity, flow path, and filter/charcoal unit efficiencies. The inspectors also reviewed the

use of temporary ventilation systems used to support work in contaminated areas such as high efficiency particulate air (HEPA)/charcoal negative pressure units. Additionally, the inspectors evaluated the licensee's airborne monitoring protocols, including verification that alarms and set points were appropriate.

- Use of respiratory protection devices, including an evaluation of the licensee's respiratory protection program for use, storage, maintenance, and quality assurance of National Institute for Occupational Safety and Health (NIOSH) certified equipment, air quality and quantity for supplied-air devices and self-contained breathing apparatus (SCBA) bottles, qualification and training of personnel, and user performance.

- Self-contained breathing apparatus for emergency use, including the licensee's capability for refilling and transporting SCBA bottles to and from the control room and operations support center during emergency conditions, hydrostatic testing of SCBA bottles, status of SCBA staged and ready for use in the plant including vision correction, mask sizes, etc., SCBA surveillance and maintenance records, and personnel qualification, training, and readiness.

- Problem identification and resolution for airborne radioactivity control and mitigation. The inspectors reviewed audits, self-assessments, and corrective action documents to verify problems were being identified and properly addressed for resolution.

These activities constituted completion of the four required samples of in-plant airborne radioactivity control and mitigation program, as defined in Inspection Procedure 71124.03.

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 Safety System Functional Failures (MS05)

a. Inspection Scope

For the period of April 1, 2016, through March 31, 2017, 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 Units 1 and 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 reactor coolant system chemistry sample analyses for the period of April 1, 2016, through March 31, 2017, 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 reactor coolant system specific activity performance indicator for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Reactor Coolant System Identified Leakage (BI02)

a. Inspection Scope

The inspectors reviewed the licensee's records of reactor coolant system identified leakage for the period of April 1, 2016 through March 31, 2017 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 reactor coolant system leakage performance indicator for Units 1 and 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

Cornerstone: Occupational Radiation Safety

.4 Occupational Exposure Control Effectiveness (OR01)

a. Inspection Scope

The inspectors reviewed corrective action program records documenting unplanned exposures and losses of radiological control over locked high radiation areas and very

high radiation areas during the period of October 1, 2016, to March 30, 2017. The inspectors reviewed a sample of radiologically controlled area exit transactions showing exposures greater than 100 millirem. 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 occupational exposure control effectiveness performance indicator as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.5 Radiological Effluent Technical Specifications (RETS)/Offsite Dose Calculation Manual (ODCM) Radiological Effluent Occurrences (PR01)

a. Inspection Scope

The inspectors reviewed corrective action program records for liquid and/or gaseous effluent releases, leaks, and spills that occurred between October 1, 2016, and March 30, 2017, including those reported to the NRC to verify the performance indicator 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 radiological effluent technical specifications (RETS)/offsite dose calculation manual (ODCM) radiological effluent occurrences 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 Annual Follow-up of Selected Issues

a. Inspection Scope

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

- On May 31, 2017, Units 1 and 2, licensee response to operating experience regarding valve stem to disk separation for Anchor Darling double disc gate valves

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 taken and planned corrective actions and that these actions were adequate to correct the condition.

These activities constituted 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)

.1 High Winds Damage Offsite Power Transmission Lines Causing Unit 1 Reactor Trip

On April 26, 2017, high winds damaged offsite power transmission lines, which caused a Unit 1 main generator trip and reactor trip. After the generator trip and reactor trip, the site autotransformer locked out, which caused a loss of power to the connected startup 1 transformer. The autotransformer is located in the switchyard, and it receives power from both 500 KV and 161 KV ring buses and provides power to startup transformer 1 (Unit 1) and startup transformer 3 (Unit 2). By design, loss of power to Unit 1 non-vital buses caused a fast bus transfer to startup transformer 1, which was unsuccessful due to loss of feed from the autotransformer, so a slow transfer to startup transformer 2 occurred. This transformer powers one train of plant loads in each unit. For Unit 1, the other train was powered by its emergency diesel generator. The operators cooled the unit down on natural circulation using emergency feedwater because the reactor coolant pumps had lost power. All onsite equipment important to safety functioned as designed, although one reactor coolant pump seal developed unexpected leakage and was subsequently replaced prior to unit restart.

At the time of the event, Unit 2 was shut down for refueling and being powered from startup transformer 2. The startup transformer 2 momentarily lost power long enough for both emergency diesel generators to automatically start on low bus voltage. Power from startup transformer 2 was restored before the diesels powered the buses, so the startup transformer continued to supply power as designed. The core was fully offloaded into the spent fuel pool at the time of the event. Although the spent fuel pool cooling pumps

tripped due to the momentary loss of power, operators restarted the pumps within ten minutes.

Inspectors responded to the control room, observed implementation of emergency and abnormal operating procedures, verified emergency action levels, verified the status of safety equipment and barriers, and observed command and control functions. Inspectors also observed portions of the plant cooldown on natural circulation. Prior to startup, inspectors reviewed equipment and plant response after the trip, and verified that the licensee had appropriately resolved plant issues prior to restart.

.2 Turbine Governor Valve Oscillations Cause Turbine Trip on Unit 1

On May 18, 2017, operators observed the Unit 1 turbine governor valve number 2 oscillating. The operators manually tripped the turbine from approximately 25 percent nuclear power due to the oscillations. The reactor, as designed, did not trip as steam was automatically redirected directly to the main condenser via the steam dump system. The inspectors responded to the control room shortly after the turbine trip and observed operator actions. After the turbine trip, operators placed the turbine bypass control valves in service and reduced reactor power to approximately 14 percent. The licensee discovered that the Linear Voltage Differential Transmitter (LVDT) for governor valve number 2, used to provide position indication for the valve to the control circuit, was loose, and caused the oscillations. The licensee secured LVDT and placed the turbine back into service.

.3 (Closed) Licensee Event Report 05000313/2016-001-00, Non-Functional External Penetration Flood Seals

On March 19, 2016, the licensee discovered two flood seals that separated the Unit 1 turbine building from the auxiliary building had been constructed with seal material not qualified for flood protection. The licensee had constructed the seal with lath and plaster, but the flooding design basis document required the seal materials to be grout and cellular concrete. In response, the licensee submitted Licensee Event Report 05000313/2016-001-00 on May 18, 2016 (ML16139A795). The licensee entered the issue into their corrective action program as Condition Report CR-ANO-1-2016-0985. As part of their compensatory actions, on March 23, 2016, the licensee anchored carbon steel forms to the floor around the penetration seals and staged sealing materials nearby as a contingency for potential external flooding. The licensee restored compliance on December 23, 2016, when they replaced the two flood seals with grout and high density silicone elastomer. To determine the potential safety significance of the past nonconformance, the licensee tested the original seal materials and found that the seals would allow less than one gallon per minute of leakage into the auxiliary building during a design basis flood. The Unit 1 auxiliary building sump pumps were capable of removing 150 gallons per minute, which significantly exceeds potential leakage from the nonconforming seals.

Inspectors concluded that the failure to install qualified flood seals is a performance deficiency. This performance deficiency is minor because, although the original material used was not qualified for flood protection, the auxiliary building sump pumps could have mitigated the leakage with significant margin, and therefore the performance deficiency would not have affected safety-related equipment. This failure to comply with flood protection design basis requirements constitutes a minor violation that is not subject to

enforcement action in accordance with the NRC's Enforcement Policy. This licensee event report is closed.

These activities constituted completion of three event follow-up samples, as defined in Inspection Procedure 71153.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On April 14, 2017, the inspectors presented the radiation safety inspection results to Mr. R. Anderson, 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.

On April 17, 2017, the inspectors presented the inservice inspection results to Mr. R. Anderson, Site Vice President, and other members of the licensee staff. On May 11, 2017, the inspectors presented updated inspection results based on additional information provided by the licensee to Mr. B. Daiber, Engineering Programs and Components Manager, 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 10, 2017, the inspectors presented the resident inspector inspection results to Mr. R. Anderson, 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.

4OA7 Licensee-Identified Violations

The following violation of very low safety significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as a non-cited violation.

Title 10 CFR 50.55a(g)4, "Inservice Inspection Standards Requirement for Operating Plants," states in part, "Throughout the service life of a pressurized water-cooled nuclear power facility, components that are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements set forth in Section XI of the ASME Code." The ASME Section XI, Article IWA-2610, requires that all welds and components subject to a surface or volumetric examination be included in the licensee's inservice inspection program. This includes identifying system supports in the inservice inspection plan, per ASME Section XI, Article IWA-1310. Contrary to the above, prior to March 9, 2017, the licensee did not ensure that all welds and components subject to a surface or volumetric examination were included in the licensee's inservice inspection. Specifically, the licensee did not apply the applicable inservice inspection requirements for surface or volumetric examination to all portions of the Unit 2 emergency feedwater system within the system ASME Code Class 3 boundary. The licensee identified that they failed to include the emergency feed pump supports in their inservice inspection program. The licensee entered this issue into their corrective action program as Condition Report CR-ANO-2-2016-01023 and reasonably determined the emergency feedwater system remained operable. The licensee restored compliance by inspecting the supports, with no degradation identified, and entering the emergency feedwater pump supports into the ASME Section XI program. The finding was of very low safety significance (Green) because the finding did not

represent an actual loss of safety function of a system or train and did not result in the loss of a single train for greater than technical specification allowed outage time. This issue was entered into the licensee's corrective action program as Condition Report CR-ANO-2-2016-01023.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

R. Anderson, Site Vice President
J. Beldin, Engineer
L. Blocker, Nuclear Independent Oversight Manager
P. Butler, Design and Program Engineering Manager
P. Crosby, Engineering Programs and Components Supervisor
B. Daiber, Engineering Programs and Components Manager
J. DeVault, Welding Engineer
G. Doran, Specialist, Radiation Protection
P. Ellison, Superintendent, Radiation Protection
T. Evans, General Manager, Plant Operations
M. Fields, Assistant Operations Manager
M. Gibson, ALARA Supervisor, Radiation Protection
G. Hudnall, Corrective Action Program Manager
G. Kilpatrick, Training Manager
R. Lona, Specialist, Radiation Protection
B. Lynch, Manager, Radiation Protection
P. McCray, Site Projects Senior Manager
R. McGaha, NDE Level III Specialist IV
S. Morris, Chemistry Manager
N. Mosher, Licensing Specialist, Regulatory Assurance
R. Penfield, Regulatory Assurance Director
S. Pyle, Regulatory Assurance Manager
M. Skartvedt, System Engineering Manager
S. Taylor, Engineer
D. Varvil, Welding Engineer
D. Vogt, Senior Operations Manager
L. Webb, Dosimetry and RP Support, Radiation Protection

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000368/2017002-01	NCV	Failure to Follow Fire Protection Program Procedures (Section 1R05)
05000368/2017002-02	NCV	Failure to Install Set Screw Leads to Breaker Failure (Section 1R15)
05000313/2017002-03	NCV	Failure to Comply with ECCS Technical Specifications (Section 1R19)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Procedures

Number	Title	Revision
OP-1015.033	ANO Switchyard and Transformer Yard Controls	028
COPD-024	Risk Assessment Guidelines	063

Miscellaneous

Number	Title	Date
0CAN030601	Response to Generic Letter 2006-02 for ANO-1 and ANO-2	March 29, 2006

Section 1R04: Equipment Alignment

Procedures

Number	Title	Revision
OP-1105.008	Unit 2 SDC Control	055
OP-2104.004	Shutdown Cooling System	059
OP-2103.011	Draining the Reactor Coolant System	056

Section 1R05: Fire Protection

Procedures

Number	Title	Revision
EN-DC-161	Control of Combustibles	016
EN-DC-330	Fire Protection Program	004
EN-EV-112	Chemical Control Program	017
EN-DC-136	Temporary Modifications	013
SEP-FP-ANO-001	Arkansas Nuclear One Fire Protection Program	002
OP-1003.014	ANO Fire Protection Program	009
OP-1000.120	ANO Fire Impairment Program	025
PFP-U1	Unit 1 Prefire Plans	019
PFP-U2	Unit 2 Prefire Plans	016

Procedures

Number	Title	Revision
OP-1203.049	Fires in Areas Affecting Safe Shutdown	012
OP-2203.049	Fire in Areas Affecting Safe Shutdown	017
1A-404-160-A	Fire Zone 160-B/167-B Computer and CRD Equipment Room	005
FZ-1057	Fire Zone Detail Computer Room and Computer Transformer	004
1003.005	Fire Prevention Inspection	016
FP-101	ANO Unit-1 Fire Zones – Fuel Handling Floor Plan EL 404' and 422'	004
1003.014	ANO Fire Protection Program	009

Condition Reports (CRs)

CR-ANO-2-2017-01508 CR-ANO-2-2017-01525

Section 1R08: Inservice Inspection Activities

Procedures

Number	Title	Revision
CEP-BAC-001	Boric Acid Corrosion Control (BACC) Program Plan	001
EN-DC-319	Boric Acid Corrosion Control Program (BACCP)	011
SEP-BAC-ANO-001	Boric Acid Corrosion Control Program Inspection and Identification of Boric Acid Leaks for ANO-1 and ANO-2	002
CEP-NDE-0505	Ultrasonic Thickness Examination	004
CEP-NDE-0641	Liquid Penetrant Examination (PT) for ASME Section XI	007
CEP-NDE-0901	VT-1 Examination	004
CEP-NDE-0902	VT-2 Examination	007
CEP-NDE-0903	VT-3 Examination	005
CEP-NDE-0955	Visual Examination (VE) of Bare-Metal Surfaces	303
CEP-WP-003	Qualification and Control of Welders	002

Procedures

Number	Title	Revision
CEP-WP-004	Control and Documentation of Welding Activities	004
CEP-WP-GWS-1	General Welding Standard ASME/ANSI	002
CEP-WP-GWS-2	General Welding Standard Structural Steel AWS D1.1	002
CEP-WP-PHT-1	Preheat and Postweld Heat Treatment Requirements	002
CEP-WP-WIIR-1	Weld in process Inspection General Brazing Standard on Requirements	001
CEP-WP-002	Qualification, Development, and Control of Welding Procedure Specifications	001
CEP-WP-005	Control and Issuance of Welding Material	001
CEP-WP-006	Review and Approval of Vendor Welding Programs	001
CEP-WP-GBS-1	General Brazing Standard	001
CEP-WP-GWS-3	General Welding Standard Structural Stainless Steel AWS D1.6	001
CEP-WP-GWS-4	General Welding Standard Sheet Metal AWS D9.1	001
CEP-WP-GWS-5	General Welding Standard Stud Welding	002
CEP-WP-IGP-1	Internal Gas Purging	001
CEP-WP-RBMD-1	Repair of Base Material Defects	001
CEP-WP-TCG-1	Thermal Cutting and Gouging	001
WPS-BM-8/1-B-1	Welding Procedure Specification	000
WPS-BM-8/1-B-2	Welding Procedure Specification	000
WPS-BM-8/1-B-CI	Welding Procedure Specification	000
WPS-BM-8/1-8	Welding Procedure Specification	000
WPS-BM-8/1-C	Welding Procedure Specification	000
WPS-CS-1/1-A-1	Welding Procedure Specification	000
WPS-CS-1/1-A-CVN-1	Welding Procedure Specification	000

Procedures

Number	Title	Revision
WPS-CS-1/1-A	Welding Procedure Specification	000
WPS-CS-1/1-B-1	Welding Procedure Specification	000
WPS-CS-1/1-B-CI	Welding Procedure Specification	000
WPS-CS-1/1-B	Welding Procedure Specification	000
WPS-CS-1 /1-C-1	Welding Procedure Specification	000
WPS-CS-1 /1-C-2	Welding Procedure Specification	000
WPS-CS-1/1-C-3	Welding Procedure Specification	000
WPS-CS-1/1-C-5	Welding Procedure Specification	000
WPS-CS-1/1-C	Welding Procedure Specification	000
WPS-LA-5N1-A-1	Welding Procedure Specification	000
WPS-LA-5A/1-A-2	Welding Procedure Specification	000
WPS-LA-SA/1-A	Welding Procedure Specification	000
WPS-LA-5A/1-B	Welding Procedure Specification	000
WPS-LA-5A/1-C-1	Welding Procedure Specification	000
WPS-LA-SA/1-C	Welding Procedure Specification	000
WPS-BM-8/1-C-2	Welding Procedure Specification	000
EN-DC-328	Entergy Nuclear Welding Program	004
1000.034	Control Of Temporary Services and Equipment	008
SI-GWT-103	Ultrasonic Thickness in Support of Guided Wave Testing	002
2305.009	Containment Spray System Integrity Test and Leak Rate Determination	008
EN-IS-109	Compressed Gas Cylinder Handling And Storage	007
EN-DC-161	Control of Combustibles	016

Procedures

Number	Title	Revision
EN-DC-330	Fire Protection Program	004
EN-EV-112	Chemical Control Program	017
EN-DC-136	Temporary Modifications	013
SEP-FP-ANO-001	Arkansas Nuclear One Fire Protection Program	002
1003.014	ANO Fire Protection Program	009
1000.120	ANO Fire Impairment Program	025

Miscellaneous

Number	Title	Revision
97-R-2002-01	ECCS Leakage Quantities To The Auxiliary Building	004

Condition Reports

CR-ANO-C-2015-04014	CR-ANO-2-2015-03142	CR-ANO-2-2015-03148
CR-ANO-2-2015-04350	CR-ANO-2-2015-04374	CR-ANO-2-2015-04375
CR-ANO-2-2016-00361	CR-ANO-2-2016-01548	CR-ANO-2-2016-02151
CR-ANO-2-2016-03502	CR-ANO-2-2016-03504	CR-ANO-2-2016-03507
CR-ANO-2-2016-04594	CR-ANO-2-2017-00402	CR-ANO-2-2012-03214
CR-ANO-2-2016-01503	CR-ANO-2-2015-00918	CR-ANO-2-2015-01569
CR-ANO-2-2017-01694	CR-ANO-2-2017-01804	CR-ANO-2-2017-01805
CR-ANO-2-2017-01809	CR-ANO-2-2017-01883	CR-ANO-2-2017-1914
CR-ANO-2-2015-03153	CR-ANO-2-2017-00436	CR-ANO-2-2015-04348
CR-ANO-2-2015-04609	CR-ANO-2-2015-02970	CR-ANO-2-2015-04714
CR-ANO-2-2015-01354	CR-ANO-2-2017-01806	CR-ANO-2-2016-03480
CR-ANO-2-2016-03518	CR-ANO-C-2017-01508	CR-ANO-2-2016-03963
CR-ANO-2-2017-00520	CR-ANO-2-2015-04668	CR-ANO-2-2017-01807

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

Procedures

Number	Title	Revision
OP-1015.048	Shutdown Operations Protection Plan	024
OP-1015.002	Decay Heat Removal and LTOP System Control	061
OP-1103.011	Draining and N2 Blanketing the RCS	048
EN-OP-115	Conduct of Operations	019
OP-2104.004	Shutdown Cooling System	059
OP-2103.011	Draining the Reactor Coolant System	056

Miscellaneous

Number	Title	Revision
A1SPGLOR170501	Overcooling (EOP)	000
A2SPGLOR170503	Loss of IA and RCP Emergencies	000

Section 1R12: Maintenance Effectiveness

Miscellaneous

Number	Title	Revision
SIPD-7648	ANO2 2E-35A/B Shutdown Cooling Heat Exchanger Replacements	
ECT-58169-01	CFW System Recirculation Flow Path Testing	000

Condition Reports

CR-ANO-2-2017-01346	CR-ANO-2-2017-01454	CR-ANO-2-2017-01492
CR-ANO-2-2017-02316	CR-ANO-2-2017-02539	CR-ANO-2-2017-02636
CR-ANO-2-2017-02854	CR-ANO-2-2017-02910	CR-ANO-2-2017-02945

CR-ANO-2-2017-02959	CR-ANO-2-2017-02988	CR-ANO-2-2017-03280
CR-ANO-2-2017-03289	CR-ANO-2-2017-03545	CR-ANO-2-2017-02092
CR-ANO-2-2017-03312	CR-ANO-2-2017-04009	CR-ANO-C-2017-01325
CR-ANO-C-2017-01601	CR-ANO-C-2017-01721	CR-ANO-C-2017-01800
CR-ANO-C-2017-02448	CR-ANO-C-2017-02512	

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

Number	Title	Revision
OP-1105.001	Conduct of Operations	113
OP-2104.037	Alternate AC Diesel Generator Operations	032
OP-2305.018	Underground EDG F.O. Tank 2T-57A/B Recirculation and Cleanup	014
OP-2104.004	Shutdown Cooling System	059
OP-1015.033	ANO Switchyard and Transformer Yard Controls	028
COPD-024	Risk Assessment Guidelines	063
OP-1015.002	Decay Heat Removal and LTOP System Control	061

Drawings

Number	Title	Revision
M-2241	Piping & Instrument Diagram AAC Generator System Fuel Oil Subsystem	003
M-217	Piping & Instrument Diagram Emergency Diesel Generators Fuel Oil Storage	089

Section 1R15: Operability Determinations and Functionality Assessments

Miscellaneous

Number	Title
WO-00472543	Restore Full Open Function to CV-2615 P-7A Steam Admission

Miscellaneous

Number	Title	
EC 70914	Temp Mod – Force Degraded NI-8 Signal to Zero and Defeat the Alarm Circuit to Allow NI-8 Power Supply to be Powered Down	000
EC 70917	Temp Mod – Disable NI-8 RPS Output to EFIC Channel D	000
CALC-ANO1-NE-06-00006	Arkansas Nuclear One Unit 1, Cycle 21 Reload Report	000
EC 61243	Tornado Missile Protection Features and Licensing Basis	001

Condition Reports (CRs)

CR-ANO-1-2017-01236	CR-ANO-1-2017-01371	CR-ANO-1-2016-04306
CR-ANO-1-2017-01140	CR-ANO-1-2016-05271	CR-ANO-1-2017-01265
CR-ANO-1-2017-01171	CR-ANO-2-2017-01555	

Section 1R18: Plant Modifications

Procedures

Number	Title	Revision
OP-1106.007	Common Feedwater System	000

Drawings

Number	Title	Revision
E-17, Sheet 4	Single Line Diagram Common Feedwater 125 VDC Power Distribution Panel D-151 and D-191	NEW
E-1, Sheet 3	Single Line Diagram Common Feedwater 4.16 KV SWGR Bus A-15 and A-19	NEW
E-4, Sheet 2	Single Line and Relay Metering Diagram Common Feedwater 4.16 KV Swgr Bus A-15	NEW
E-4, Sheet 3	Single Line and Relay Metering Diagram Common Feedwater 4.16 KV Swgr Bus A-19	NEW
E-20, Sheet 20	Single Line Diagram Common Feedwater 480 VAC Power Distribution Panels PP51 and PP91	NEW
38-CFW-2, Sheet 1	Large Pipe Isometric Common Feedwater EL. 335’-0”	N
38-CFW-4, Sheet 1	Large Pipe Isometric Common Feedwater EL. 335’-0”	N

Drawings

Number	Title	Revision
38-CFW-8, Sheet 1	Large Pipe Isometric Common Feedwater EL. 339'-0"	N
38-CFW-9, Sheet 1	Large Pipe Isometric Common Feedwater EL. 339'-0"	N
38-CFW-10, Sheet 1	Large Pipe Isometric Common Feedwater EL. 339'-0"	N

Miscellaneous

Number	Title	Revision
EC 58224	NFPA 805 Common Feedwater Parent EC Online Mechanical Installation	000
EC 58247	CFW Unit 1 EFW Flow Path Testing	000
EC 65067	Shutdown Cooling HX Replacement	000

Section 1R19: Post-Maintenance Testing

Procedures

Number	Title	Revision
2311.002	Service Water System Flow Test	021
2104.039	HPSI System Operation	082
1107.001	Electrical System Operations	113

Miscellaneous

Number	Title	Revision
ECT-49820-01	Post Modification Testing for Reactor Coolant System High Point Vent Valve 2SV-4670-2 Control Circuit Modification	000
ECT-49819-01	Post Modification Testing for Reactor Coolant System High Point Vent Valve 2SV-4669-1 Control Circuit Modification	000
EC 58247-01	CFW Unit 1 EFW Flow Path Testing	000
ECT-58169-01	CFW System Recirculation Flow Path Testing	
ECT-49822-01	Post Modification Testing for Containment Isolation Valve 2CV-5038-1 Control Circuit Modification	000
OP-1107.001	Electrical System Operations	112
CALC-91-R-201301	Service Water Performance Testing Methodology	027

Procedures

Number	Title	Revision
CALC-94-E-0063-001	Verification of Ability to Cool to Cold Shutdown within Times Stated in the SAR	002
EN-LI-118	P36A Failure to Start, Attachment 9.6, Condition Analysis Template	024
COPD-001	Operations Expectations and Standards	074
1015.001	Conduct of Operations	114
ECT-58169-01	CFW System Recirculation Flow Path Testing	000
38-CFW-8	Large Pipe Isometric Common Feedwater	N
M-204, Sh. 7	Piping and Instrument Diagram Common Feedwater System	N

Condition Reports (CRs)

CR-ANO-1-2017-01771	CR-ANO-1-2017-01764	CR-ANO-2-2017-03754
CR-ANO-2-2017-03757	CR-ANO-2-2017-03032	CR-ANO-C-2000-0106
CR-AO-C-2007-01469	CR-ANO-C-2006-00272	CR-ANO-C-2008-01864

Section 1R20: Refueling and Other Outage Activities

Procedures

Number	Title	Revision
OP-2104.004	Shutdown Cooling System	059
OP-2102.010	Plant Cooldown	053
OP-2103.011	Draining the Reactor Coolant System	056
OP-2203.029	Loss of Shutdown Cooling	020
OP-1102.010	Plant Shutdown and Cooldown	080
OP-2102.004	Power Operation	061

Section 1R22: Surveillance Testing

Procedures

Number	Title	Revision
EN-OP-119	Protected Equipment Postings	008
OP-1106.006	Emergency Feedwater Pump Operation	100

Procedures

Number	Title	Revision
OP-2309.049, Supplement 2B	2DG2 Operational Test without 2 hour run	035
OP-2305.017	Local Leak Rate Testing Attachment 32 Penetration 2C-1	035
OP-2305.054	Offsite Power Transfer Test	012
OP-2307.016	Unit 2 2D-11, 2D-12 & 2D-13 Battery Surveillance	038

Condition Reports (CRs)

CR-ANO-C-2017-01996 CR-ANO-2-2017-02758

Miscellaneous

Number	Title	Revision
WO 00470494	2D-11 Performance Discharge Test	008

Section 2RS1: Radiological Hazard Assessment and Exposure Controls

Procedures

Number	Title	Revision
EN-FAP-OU-100	Refueling Outage Preparation and Milestones	009
EN-FAP-RP-004	Personnel Contamination Mitigation Plans	002
EN-NF-102	Corporate Fuel Reliability	005
EN-OP-111	Failed Fuel ODMI Implementation Action Plan	000
EN-RP-100	Radiation Worker Expectations	011
EN-RP-101	Access Control for Radiologically Controlled Areas	013
EN-RP-105	Radiological Work Permits	016
EN-RP-110	ALARA Program	014
EN-RP-110-05	ALARA Planning and Controls	002
EN-RP-123	Radiological Controls for Highly Radioactive Objects	001
EN-RP-142	Failed Fuel Response	002
EN-RP-306	Calibration and Operation of the Eberline PM-7	002
EN-RP-312	Operation and Calibration of the Canberra GEM-5	001
EN-RP-313	Operation and Calibration of the ARGOS-5AB Personnel Contamination Monitor	002

Audits and Self-Assessments

Number	Title	Date
LO-ALO-2017-00025	Radiation Safety – Hazard Assessment and Airborne Controls	March 22, 2017

Condition Reports (CR)

CR-ANO-C-2017-00309	CR-ANO-1-2016-03306	CR-ANO-1-2016-03339
CR-ANO-C-2017-00890	CR-ANO-1-2016-03737	CR-ANO-1-2016-03725
CR-ANO-C-2016-03571	CR-ANO-1-2016-02485	CR-ANO-1-2016-03777
CR-ANO-C-2016-04275	CR-ANO-1-2016-05120	CR-ANO-1-2016-03290
CR-ANO-1-2016-04743	CR-ANO-1-2016-02562	CR-ANO-C-2016-03231
HQN-2016-01432		

Radiation Work Permits

Number	Title	Revision
20172405	Tours and Inspections in Support of 2R25 (Including Associated Radiological Planning Sheets, and Radiological Surveys)	000
20172471	RVCH (Reactor Vessel Channel Head) Volumetric Exam (Including Associated Radiological Planning Sheets, Radiological Surveys, and ALARA Plans)	000
20172500	Replace - Shut Down Cooling Heat Exchanger (Including Associated Radiological Planning Sheets, Radiological Surveys, and ALARA Plans)	000

Air Sample Radiation Surveys

Number	Title	Date
AS-ANO-2017-03779	Decon Room Vacuum Change Out	April 8, 2017
AS-ANO-2017-03783	HRA/HCA Bull Pen ICI Flange Mounts Cleaning	April 9, 2017
AS-ANO-2017-03796	Boron Clean Up I/S HRA	April 10, 2017
AS-ANO-2017-03797	Noble Gas Sample U1 RAB 125	April 11, 2017
AS-ANO-2017-03803	Airborne Tritium U2 RB - FTC	April 11, 2017
AS-ANO-2017-03805	Reactor Head Inspection	April 11, 2017

Miscellaneous Documents

Number	Title	Date
	Engineering Change Notice Logs, 2016 and 2017, U1/U2	April 13, 2017
	2R25 Outage Control Center (OCC) Director Logs	April 11, 2017
TSR 17-2-111	Temporary Shielding Request, RCS Sample Isolation	April 11, 2017
	2R25 Radiation Safety Behavior Observation Scorecards	April 11, 2017
2017-0008	ALARA Manager Committee Meeting Minutes	January 12, 2017
2017-0010	ALARA Manager Committee Meeting Minutes	January 23, 2017
Lic. ID 5720	National Source Tracking System Annual Inventory Reconciliation Report	January 10, 2017
52680741-01	Semi-Annual Leak Test of Sealed Sources	February 13, 2017
	EN-RP-143 Attachment 9.5 Source Control (Inventory)	February 9, 2017

Section 2RS3: In-Plant Airborne Radioactivity Control and Mitigation

Procedures

Number	Title	Revision
1104.033	Reactor Building Ventilation	079
2104.035	Ventilation Systems Operations	043
EN-RP-131	Air Sampling	015
EN-RP-203	Dose Assessment	009
EN-RP-310	Operation and Initial Setup of the Eberline AMS-4 Continuous Air Monitor	004
EN-RP-501	Respiratory Protection Program	005
EN-RP-502	Inspection and Maintenance of Respiratory Protection Equipment	009
EN-RP-502-01	FireHawk M7 SCBA	001
EN-RP-502-02	Flow Testing MSA Breathing Apparatus	000
EN-RP-503	Selection, Issue, and Use of Respiratory Protection Equipment	007

Radiological Work Permits

Number	Title	Revision
20172401	Radiation Protection Activities During 2R25	000

Radiological Work Permits

Number	Title	Revision
20172407	Decontamination Activities During 2R25 (Bulk Work)	000
20172430	2R25 Refueling Path Activities	000
20172471	Perform Inspections of Unit 2 Reactor Head	000

Audits and Self-Assessments

Number	Title	Date
	Respiratory Protection Program Evaluation	November 30, 2015
LO-ALO-2016-00036	HEPA and Vacuum Control	June 21, 2016
	Respiratory Protection Program Evaluation	November 30, 2016
LO-ALO-2017-00025	Radiation Safety – Hazard Assessment and Airborne Controls	March 22, 2017

Radiological Surveys

Number	Title	Date
ANO-1704-0111	2R6-01 U2 Rx Building 426’ General Area	April 2, 2017
ANO-1704-0123	2R2-01 U2 Rx Building 354’ General Area	April 2, 2017
ANO-1704-0144	2R5-01 U2 Rx Building 405’ General Area	April 2, 2017
AS-ANO-2017-03784	U2 Containment Air Sample	April 9, 2017
AS-ANO-2017-03800	U2 Containment Air Sample	April 11, 2017
AS-ANO-2017-03808	U2 Containment Air Sample	April 12, 2017

Miscellaneous Documents

Title	Revision Date
1R26 Post Outage ALARA Report	2016
ANO Emergency Plan	042
ANO Unit 1 FSAR	026
ANO Unit 2 FSAR	021
Inspection and Maintenance of Respiratory Protection Equipment	December 7, 2016
Inspection and Maintenance of Respiratory Protection Equipment	January 3, 2017

Miscellaneous Documents

Title	Revision Date
Laboratory Report Compressed Air/Gas Quality Testing	January 11, 2017

Condition Reports (CRs)

CR-ANO-C-2015-04198	CR-ANO-C-2015-05088	CR-ANO-C-2016-03997
CR-ANO-1-2016-03339	CR-ANO-2-2015-04435	CR-ANO-2-2015-04456
CR-ANO-C-2017-00890	CR-ANO-2-2017-01191	CR-ANO-1-2016-03306
HQN-2015-01256	HQN-2016-00476	HQN-2016-00830
HQN-2016-01490	HQN-2016-01432	HQN-2015-01247
HQN-2016-00937		

Section 4OA1: Performance Indicator Verification

Procedures

Number	Title	Revision
EN-LI-114	Regulatory Performance Indicator Process	007
RPD-5	Radiation Protection Directive – Review of NRC Performance Indicators	002

Miscellaneous Documents

Title	Date
Selected Occupational Radiation Safety Performance Indicator Data Sheets	October 2016 - March 2017
Selected Public Radiation Safety Performance Indicator Data Sheets	October 2016 - March 2017
Selected Barrier Integrity Safety Performance Indicator Data Sheets	January 2017 – March 2017

Section 4OA2: Problem Identification and Resolution

Condition Reports (CRs)

CR-ANO-1-2017-01645	CR-ANO-1-2017-01695	CR-ANO-1-2017-01462
CR-ANO-1-2017-00606	CR-ANO-1-2017-01893	

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

Procedures

Number	Title	Revision
OP-1015.037	Post Transient Review	020
EN-OM-119	On-Site Safety Review Committee	015
OP-1203.025	Natural Emergencies	024

Condition Reports (CRs)

CR-ANO-1-2016-00985 CR-ANO-1-2016-00998

Work Orders (WOs)

WO 00441124 WO 00441573

The following items are requested for the
Occupational Radiation Safety Inspection
Arkansas Nuclear One (ANO)
Inspection Dates April 10 to April 14, 2017
Integrated Report 2017002

Inspection areas are listed in the attachments below.

Please provide the requested information on or before March 1, 2017.

Please submit this information using the same lettering system as below. For example, all contacts and phone numbers for Inspection Procedure 71124.01 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 contact Martin Phalen at (817) 200-1158 or Martin.Phalen@nrc.gov.

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.

1. Radiological Hazard Assessment and Exposure Controls (71124.01) and Performance Indicator Verification (71151)
Date of Last Inspection: October 3-7, 2016

A. List of contacts and telephone numbers for the Radiation Protection Organization Staff and Technicians

B. Applicable organization charts

C. ALL radiation protection-related licensee (ANO) and corporate (Entergy) assessments and audits, all independent or third party radiation protection-related assessments and audits, all radiation protection-related self-assessments, and all radiation safety-related LERs, including but not limited to radiation monitoring instrumentation and radioactive effluents, releases and / or spills, written since July 1, 2016

D. Procedure indexes for the radiation protection procedures

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.

1. Radiation Protection Program Description
2. Radiation Protection Conduct of Operations
3. Personnel Dosimetry Program
4. Posting of Radiological Areas
5. High Radiation Area Controls
6. RCA Access Controls and Radiation Worker Instructions
7. Conduct of Radiological Surveys
8. Radioactive Source Inventory and Control
9. Declared Pregnant Worker Program

F. List of corrective action documents (including corporate and sub-tiered systems) since July 1, 2016

a. Initiated by the radiation protection organization
b. Assigned to the radiation protection organization

NOTE: The lists should indicate the significance level of each issue and the search criteria used. Please provide in document formats which are "searchable" so that the inspector can perform word searches.

If not covered above, a summary of corrective action documents since July 1, 2016, involving unmonitored releases, unplanned releases, or releases in which any dose limit or administrative dose limit was exceeded (for Public Radiation Safety Performance Indicator verification in accordance with IP 71151)

Additionally, a copy of ALL radiation protection AND chemistry department root cause evaluations, apparent cause evaluation, and condition evaluations performed since July 1, 2016

G. List of radiologically significant work activities scheduled to be conducted during the inspection period (If the inspection is scheduled during an outage, please also include a list of work activities greater than 1 rem, scheduled during the outage with the dose estimate for the work activity.)

H. List of active radiation work permits

I. Radioactive source inventory list

   a. All radioactive sources that are required to be leak tested

   b. All radioactive sources that meet the 10 CFR Part 20, Appendix E, Category 2 and above threshold. Please indicate the radioisotope, initial and current activity (w/assay date), and storage location for each applicable source.

J. The last two leak test results for the radioactive sources inventoried and required to be leak tested. If applicable, specifically provide a list of all radioactive source(s) that have failed its leak test within the last two years

K. A current listing of any non-fuel items stored within your pools, and if available, their appropriate dose rates (Contact / @ 30cm)

L. Computer printout of radiological controlled area entries greater than 100 millirem since the previous inspection to the current inspection entrance date. The printout should include the date of entry, some form of worker identification, the radiation work permit used by the worker, dose accrued by the worker, and the electronic dosimeter dose alarm set-point used during the entry (for Occupational Radiation Safety Performance Indicator verification in accordance with IP 71151).

3. In-Plant Airborne Radioactivity Control and Mitigation (71124.03)
Date of Last Inspection: February 2-6, 2015

A. List of contacts and telephone numbers for the following areas:

1. Respiratory Protection Program
2. Self-contained breathing apparatus

B. Applicable organization charts

C. Copies of audits, self-assessments, vendor or NUPIC audits for contractor support (SCBA), and LERs, written since date of last inspection related to:

1. Installed air filtration systems
2. Self-contained breathing apparatuses

D. Procedure index for:

1. Use and operation of continuous air monitors
2. Use and operation of temporary air filtration units
3. Respiratory protection

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.

1. Respiratory protection program
2. Use of self-contained breathing apparatuses
3. Air quality testing for SCBAs
4. Use of installed plant systems, such as containment purge, spent fuel pool ventilation, and auxiliary building ventilation

F. A summary list of corrective action documents (including corporate and sub-tiered systems) written since date of last inspection, related to the Airborne Monitoring program including:

1. Continuous air monitors
2. Self-contained breathing apparatuses
3. Respiratory protection program

NOTE: The lists should indicate the <u>significance level</u> of each issue and the <u>search criteria</u> used. Please provide in document formats which are “searchable” so that the inspector can perform word searches.

G. List of SCBA qualified personnel - reactor operators and emergency response personnel

H. Inspection records for self-contained breathing apparatuses (SCBAs) staged in the plant for use since date of last inspection.

I. SCBA training and qualification records for control room operators, shift supervisors, STAs, and OSC personnel for the last year.

A selection of personnel may be asked to demonstrate proficiency in donning, doffing, and performance of functionality check for respiratory devices

J. List of respirators (available for use) by type (APR, SCBA, PAPR, etc.), manufacturer, and model.

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 31500011. The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid Office of Management and Budget control number.

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

Information Request
January 5, 2017
Notification of Inspection and Request for Information
Arkansas Nuclear One Unit 2
NRC Inspection Report 05000368/2017002

INSERVICE INSPECTION DOCUMENT REQUEST

Inspection Dates: May 1-12, 2017

Inspection Procedures: IP 71111.08 "Inservice Inspection (ISI) Activities"

Inspector: Jim Drake

A. Information Requested for the In-Office Preparation Week

The following information should be sent to the Region IV office in hard copy or electronic format (ims.certrec.com preferred), in care of Jim Drake, by March 17, 2017, to facilitate the selection of specific items that will be reviewed during the onsite inspection week. The inspector will select specific items from the information requested below and then request from your staff additional documents needed during the onsite inspection week (Section B of this enclosure). We ask that the specific items selected from the lists be available and ready for review on the first day of inspection. Please provide requested documentation electronically if possible. If requested documents are large and only hard copy formats are available, please inform the inspector(s), and provide subject documentation during the first day of the onsite inspection.

If you have any questions regarding this information request, please call the inspector as soon as possible.

Based on the current schedule, on May 1, 2017, reactor inspector from the Nuclear Regulatory Commission's (NRC) Region IV office will perform the baseline inservice inspection at Arkansas Nuclear One, Unit 2, using NRC Inspection Procedure 71111.08, "Inservice Inspection

Activities." Experience has shown that this inspection is a resource intensive inspection both for the NRC inspector and your staff. The date of this inspection may change dependent on the outage schedule you provide. In order to minimize the impact to your onsite resources and to ensure a productive inspection, we have enclosed a request for documents needed for this inspection. These documents have been divided into two groups. The first group (Section A of the enclosure) identified information to be provided prior to the inspection to ensure that the inspector are adequately prepared. The second group (Section B of the enclosure) identifies the information the inspector will need upon arrival at the site. It is important that all of these documents are up to date and complete in order to minimize the number of additional documents requested during the preparation and/or the onsite portions of the inspection.

We have discussed the schedule for these inspection activities with your staff and understand that our regulatory contact for this inspection will be Ms. Natalie Mosher of your licensing organization. The tentative inspection schedule is as follows:

Preparation week: April 17, 2017
Onsite weeks: May 1 - 12, 2017

Our inspection dates are subject to change based on your updated schedule of outage activities. If there are any questions about this inspection or the material requested, please contact the lead inspector Jim Drake at (817) 200-1558. (E-mail to: James.Drake@nrc.gov).

A.1 ISI/Welding Programs and Schedule Information

- A detailed schedule (including preliminary dates) of:

- Nondestructive examinations planned for ASME Code Class Components performed as part of your ASME Section XI, risk informed (if applicable), and augmented inservice inspection programs during the upcoming outage.

- Examinations planned for Alloy 82/182/600 components that are not included in the Section XI scope (If applicable)

- Examinations planned as part of your boric acid corrosion control program (Mode 3 walkdowns, bolted connection walkdowns, etc.)

- Welding activities that are scheduled to be completed during the upcoming outage (ASME Class 1, 2, or 3 structures, systems, or components)

- A copy of ASME Section XI Code Relief Requests and associated NRC safety evaluations applicable to the examinations identified above.

- A list of ASME Code Cases currently being used to include the system and/or component the Code Case is being applied to.

- A list of nondestructive examination reports which have identified recordable or rejectable indications on any ASME Code Class components since the beginning of the last refueling outage. This should include the previous Section XI pressure test(s) conducted during start up and any evaluations associated with the results of the pressure tests.

- A list including a brief description (e.g., system, code class, weld category, nondestructive examination performed) associated with the repair/replacement activities of any ASME Code Class component since the beginning of the last outage and/or planned this refueling outage.

- If reactor vessel weld examinations required by the ASME Code are scheduled to occur during the upcoming outage, provide a detailed description of the welds to be examined and the extent of the planned examination. Please also provide reference numbers for applicable procedures that will be used to conduct these examinations.

- Copy of any 10 CFR Part 21 reports applicable to SSCs within the scope of Section XI of the ASME Code that have been identified since the beginning of the last refueling outage.

- A list of any temporary non-code repairs in service (e.g., pinhole leaks).

- Please provide copies of the most recent self-assessments for the inservice inspection, welding, and Alloy 600 programs.

- Copy of the procedures for welding techniques, and NDE that will be used during the outage.

A.2 Boric Acid Corrosion Control Program

- Copy of the procedures that govern the scope, equipment and implementation of the inspections required to identify boric acid leakage and the procedures for boric acid leakage/corrosion evaluation.

- Please provide a list of leaks (including code class of the components) that have been identified since the last refueling outage and associated corrective action documentation. If during the last cycle, the unit was shut down, please provide documentation of containment walkdown inspections performed as part of the boric acid corrosion control program.

A.3 Additional Information Related to all Inservice Inspection Activities

- A list with a brief description of inservice inspection, and boric acid corrosion control program related issues (e.g., PVAR) entered into your corrective action program since the beginning of the last refueling outage. For example, a list based upon data base searches using key words related to piping such as: inservice inspection, ASME Code, Section XI, NDE, cracks, wear, thinning, leakage, rust, corrosion, boric acid, or errors in piping examinations.

- Provide training (e.g. Scaffolding, Fall Protection, FME, Confined Space) if they are required for the activities described in A.1 through A.3.

- Provide copies of the applicable editions of the ASME Code (Sections V, VIII, IX, and XI) for the inservice inspection program and the repair/replacement program.

- Please provide names and phone numbers for the following program leads:

  Inservice inspection (examination, planning)
  Containment exams
  Reactor pressure vessel head exams
  Snubbers and supports
  Repair and replacement program
  Licensing
  Site welding engineer
  Boric acid corrosion control program
  Steam generator inspection activities (site lead and vendor contact)

B. Information to be provided Onsite to the Inspector(s) at the Entrance Meeting (April 10, 2017):

B.1 Inservice Inspection / Welding Programs and Schedule Information

- Updated schedules for inservice inspection/nondestructive examination activities, including planned welding activities, and schedule showing contingency repair plans, if available.

- For ASME Code Class welds selected by the inspector from the lists provided from section A of this enclosure, please provide copies of the following documentation for each subject weld:

  - Weld data sheet (traveler)

  - Weld configuration and system location

  - Applicable Code Edition and Addenda for weldment.

  - Applicable Code Edition and Addenda for welding procedures

  - Applicable welding procedures used to fabricate the welds

  - Copies of procedure qualification records (PQRs) supporting the weld procedures from B.1.b.v.

  - Copies of welder's performance qualification records (WPQ)

  - Copies of the nonconformance reports for the selected welds (If applicable). radiographs (if radiographic testing was performed).

  - Copies of the preservice examination records for the selected welds

  - Readily accessible copies of nondestructive examination personnel qualifications records for reviewing

- For the inservice inspection related corrective action issues selected by the inspector from section A of this enclosure, provide a copy of the corrective actions and supporting documentation.

- For the nondestructive examination reports with relevant conditions on ASME Code Class components selected by the inspector from Section A above, provide a copy of the examination records, examiner qualification records, and associated corrective action documents.

- A copy of (or ready access to) most current revision of the inservice inspection program manual and plan for the current interval.

- For the nondestructive examinations selected by the inspector from section A of this enclosure, provide a copy of the nondestructive examination procedures used to perform the examinations (including calibration and flaw characterization/sizing procedures). For ultrasonic examination procedures qualified in accordance with ASME Code, Section XI, Appendix VIII, provide documentation supporting the procedure qualification (e.g. the EPRI performance demonstration qualification summary sheets). Also, include qualification documentation of the specific equipment to be used (e.g., ultrasonic unit, cables, and transducers including serial numbers) and nondestructive examination personnel qualification records.

B.2 Boric Acid Corrosion Control Program

- Please provide boric acid walk down inspection results, an updated list of boric acid leaks identified so far this outage, associated corrective action documentation, and overall status of planned boric acid inspections.

- Please provide any engineering evaluations completed for boric acid leaks identified since the end of the last refueling outage. Please include a status of corrective actions to repair and/or clean these boric acid leaks. Please identify specifically which known leaks, if any, have remained in service or will remain in service as active leaks.

B.3 Codes and Standards

- Ready access to (i.e., copies provided to the inspector(s) for use during the inspection at the onsite inspection location, or room number and location where available):

- Applicable Editions of the ASME Code (Sections V, IX, and XI) for the inservice inspection program and the repair/replacement program.

- Copy of the performance demonstration initiative (PDI) generic procedures with the latest applicable revisions that support site qualified ultrasonic examinations of piping welds and components (e.g., PDI-UT-1, PDI-UT-2, PDI-UT-3, PDI-UT-10, etc.).

- Boric Acid Corrosion Guidebook Revision 1 – EPRI Technical Report 1000975.

Additional Information Regarding Tornado-Generated Missile Protection Noncompliances

This attachment describes the plant areas the licensee identified as susceptible to tornado missile impact, the initial compensatory measures taken to restore operability, and the structure, system, and components (SSCs) and technical specifications (TS) affected.

Unit 1 Cable Trays in Electrical Equipment Room (Room 104, Elevation 368 feet)

Date Discovered: April 17, 2017

Condition Report: CR-ANO-1-2017-01171

NRC Notification: Licensee Event Report 05000313/2016-003-01 (ML17163A27)

SSCs and TS Affected:

- Cables for service water to emergency diesel generator A isolation valve CV-3806, TS 3.8.1 Action B
- Cables for atmospheric dump valve isolation valve CV-2676, TS 3.6.3 Action C
- Cables for emergency feedwater initiation and control channel A, TS 3.3.13 Action A, TS 3.3.14 Action A, and TS 3.3.12 Action A
- Cables for emergency core cooling system train A containment sump outlet valve CV-1405, TS 3.5.2 Action A and TS 3.6.3 Action A
- Cables for low pressure injection A block valve CV-1401, TS 3.5.2 Action A
- Cables for reactor coolant pump D seal return isolation valve CV-1270, TS 3.6.3 Action A
- Cables for emergency diesel generator A exhaust fans VEF-24A and VEF-24B, TS 3.8.1 Action B
- Cables for train A main feedwater isolation valve CV-2680, TS 3.7.3 Action A and TS 3.6.3 Action C
- Cables for high pressure injection isolation valves CV-1219 and CV-1220, TS 3.5.2 Actions A and C and TS 3.6.3 Action A
- Cables for letdown heat exchangers A and B outlet valves CV-1214 and CV-1216, TS 3.6.3 Action A
- Cables for high pressure injection train A recirculation isolation valve CV-1301, TS 3.5.2 Action A
- Cables for borated water storage tank outlet valve train A, CV-1407, TS 3.5.2 Action A, TS 3.6.5 Action A, and TS 3.6.6 Action A

- Cables for containment spray train A block valve CV-2401, TS 3.6.5 Action A, TS 3.6.6 Action A, and TS 3.6.3 Action A

- Cables for service water train A to intermediate water coolers isolation valve CV-3820, TS 3.7.7 Action A and TS 3.8.1 Action B

- Cables for train A pressurizer makeup block valve CV-1233, TS 3.5.2 Action A

- Cables for low pressure injection supply to high pressure injection train A valve CV-1276, TS 3.5.2 Action A

- Cables for train A low pressure injection suction from reactor coolant system isolation valve CV-1434, TS 3.5.2 Action A

- Cables for train A low pressure injection suction from borated water storage tank isolation valve CV-1436, TS 3.5.2 Action A

- Cables for train A emergency feedwater isolation valve to steam generator A, CV-2627, TS 3.7.5 Action B, TS 3.6.3 Action C

- Cables for instrument power supply train A to qualified condensate storage tank level indication, wide range neutron flux, wide range reactor coolant system pressure, and steam generator A and B low range water level, TS 3.3.15 Action A and TS 3.7.6 Action A

Unit 1 Conduits in Turbine Building (Room 73, Elevation 354 feet)

Date Discovered: April 17, 2017

Condition Report: CR-ANO-1-2017-01171

NRC Notification: Licensee Event Report 05000313/2016-003-01 (ML17163A27)

SSCs and TS Affected:

- Cables for service water pump C, TS 3.7.7 Action A and TS 3.8.1 Action B

- Cables for service water train A to auxiliary cooling water isolation valve CV-3643, TS 3.7.7 Action A

- Cables for service water train B to emergency feedwater pump isolation valves CV-3851 and CV-2806, TS 3.7.5 Action B

- Cables for service water A and B crosstie valves CV-3640, CV-3646, CV-3644, and CV-3642, LCO 3.0.3

- Cables for low pressure injection train B suction from reactor coolant system isolation valve CV-1435, TS 3.5.2 Action A

- Cables for low pressure injection train B suction from borated water storage tank isolation valve CV-1437, TS 3.5.2 Action A and LCO 3.0.3

- Cables for low pressure injection train A block valve CV-1401, TS 3.5.2 Action A and LCO 3.0.3

- Cables for high pressure injection train A isolation valves CV-1278 and CV-1279, TS 3.5.2 Action A and TS 3.6.3 Action A

- Cables for decay heat removal cooler train A outlet valve CV-1428, TS 3.5.2 Action A

- Cables for emergency feedwater initiation and control channel A to main steam isolation valve closing solenoid valve SV-0611, TS 3.3.13 Action A

- Cables for emergency core cooling system train A containment sump isolation valves CV-1405 and CV-1414, TS 3.5.2 Action A and TS 3.6.3 Action A

- Cables for service water train A to intermediate cooling water heat exchangers isolation valve CV-3820, TS 3.7.7 Action A and TS 3.8.1 Action B

- Cables for pressurizer makeup train A block valve CV-1233, TS 3.5.2 Action A and TS 3.6.3 Action A

- Cables for seal return train A isolation valves CV-1270, CV-1271, CV-1272, and CV-1273, TS 3.6.3 Action A

Unit 2 Conduit in Controlled Access Area (Rooms 2136 and 2145, Elevation 386 feet)

Date Discovered: April 6, 2017

Condition Report: CR-ANO-2-2017-01555

NRC Notification: Licensee Event Report 05000368/2017-001-00 (ML17150A48)

SSCs and TS Affected:

- Cables for emergency diesel generator train A output breaker 2A-308, TS 3.8.1 Action B

Compensatory Measures for Tornado-Generated Missile Protection Noncompliances:

- The licensee confirmed the readiness of equipment and procedures dedicated to the Diverse and Flexible Coping Strategy (FLEX).

- The licensee verified that site procedures and training were in place to respond to a predicted tornado, including: site walkdowns to remove or secure potential missiles, and work management controls to protect or restore safe shutdown equipment.

- The licensee updated site procedures and training to respond to a predicted tornado to include the identified tornado missile vulnerabilities and a list of redundant equipment to protect or restore upon identification.

- The licensee verified that site procedures and training were in place to respond to an actual tornado, including: abnormal and emergency operating procedures, FLEX, and prompt damage assessment.

- The licensee instituted control room briefings and training sessions to establish a heightened level of station awareness for the vulnerabilities.