



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

October 25, 2017

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 INTEGRATED INSPECTION REPORT
05000313/2017003 and 05000368/2017003

Dear Mr. Anderson:

On September 30, 2017, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Arkansas Nuclear One facility, Units 1 and 2. On October 11, 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 one finding of very low safety significance (Green) in this report. This finding involved a violation of NRC requirements. The NRC is treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violation or significance of this NCV, 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.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at <http://www.nrc.gov/reading-rm/adams.html> and at the NRC Public Document Room in accordance with 10 CFR 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

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

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

Enclosures:
Inspection Report 05000313/2017003
and 05000368/2017003
w/ Attachment: Supplemental Information

ARKANSAS NUCLEAR ONE – NRC INTEGRATED INSPECTION REPORT
05000313/2017003 and 05000368/2017003 – October 25, 2017

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U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket: 05000313; 05000368

License: DPR-51; NPF-6

Report: 05000313/2017003; 05000368/2017003

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: July 1 through September 30, 2017

Inspectors: C. Henderson, Senior Resident Inspector
B. Tindell, Senior Resident Inspector
J. Dixon, Senior Project Engineer
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Approved By: Neil O'Keefe
Chief, Project Branch E
Division of Reactor Projects

Enclosure

SUMMARY

IR 05000313/2017003; 05000368/2017003; 07/01/2017 – 9/30/2017; Arkansas Nuclear One, Units 1 and 2; Equipment Alignment.

The inspection activities described in this report were performed between July 1 and September 30, 2017, by the resident inspectors at Arkansas Nuclear One and inspectors from the NRC's Region IV office. One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. 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: Mitigating Systems

- Green. The inspectors identified a non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to maintain train separation between safety-related service water trains when swapping the swing high pressure injection (HPI) pump between trains. Specifically, by following procedure OP 1104.002, "Makeup and Purification System Operation," Revision 89, operators cross-tied service water trains, placing the system in an unanalyzed condition. This condition resulted in the train A electrical equipment room emergency chiller and train B reactor building emergency cooling coils being inoperable for a maximum of 25 minutes per occurrence. Additionally, it was determined that service water temperatures over the past 3 years did not result in an actual loss of function associated with these components if a design basis accident would have occurred. The immediate corrective actions were to assess past operability for not maintaining service water train separation and to revise Operating Procedure 1104.002 with adequate work instructions to maintain service water train separation. The licensee entered this deficiency into the corrective action program as Condition Report CR-ANO-1-2017-02518.

The licensee's failure to maintain safety-related service water train separation when swapping the swing HPI pump between trains was a performance deficiency. The performance deficiency was more than minor because it was associated with the procedural quality attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events. Specifically, the licensee's failure to maintain service water train separation placed the system in an unanalyzed condition and was subsequently determined to cause the train A electrical equipment room emergency chiller and train B reactor building emergency cooling coils to be inoperable for a maximum of 25 minutes per occurrence. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding had very low safety significance (Green) because it: was not a design deficiency; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, non-technical specification train. Specifically, inspectors confirmed that service water temperatures were never high enough to result in an actual loss of function for either limiting component. The finding had

a cross-cutting aspect in the area of human performance associated with conservative bias because the licensee failed to determine whether the proposed action was safe to proceed, rather than unsafe in order to stop. Specifically, in December 2015 when this approach was revised to declare only the non-protected service water train inoperable, the licensee did not ensure that the transition lineup was analyzed to be within safety analyses before adopting the revised steps. [H.14]. (Section 1R04)

PLANT STATUS

Arkansas Nuclear One, Unit 1, began the inspection period at full power, where it remained for the rest of the reporting period.

Arkansas Nuclear One, Unit 2, began the inspection period in a shutdown status for Refueling Outage 2R25, which started on March 29, 2017. On July 7, 2017, the station commenced reactor startup and the reactor was made critical. On July 8, 2017, the station synchronized the main generator to the grid and began power ascension. The plant returned to full power on July 11, 2017, and remained there for the rest of the inspection period.

REPORT DETAILS

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

Readiness to Cope with External Flooding

a. Inspection Scope

On September 28, 2017, the inspectors completed an inspection of the station's readiness to cope with external flooding. After reviewing the licensee's flooding analysis, the inspectors chose the following plant areas that were susceptible to flooding:

- Unit 1 and Unit 2 start-up transformer 2
- Unit 1 and Unit 2 emergency diesel generator fuel oil storage building
- Unit 1 and Unit 2 train bay hatches
- Unit 1 safety related manways

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

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

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walk-Down

a. Inspection Scope

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

- September 1, 2017 – Unit 1 train A high pressure injection pump
- September 1, 2017 - Unit 1 train B high injection system, including service water supply to high pressure injection pump coolers
- September 14, 2017 - Unit 2 emergency diesel generator 1 and 2 during Unit 1 and Unit 2 startup transformer 2 outage

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 or trains were correctly aligned for the existing plant configuration.

These activities constituted three partial system walk-down samples, as defined in Inspection Procedure 71111.04.

b. Findings

Introduction. The inspectors identified a Green finding and associated non-cited violation of Technical Specification 5.4.1.a for the licensee's failure to maintain train separation between safety-related service water (SW) trains when swapping the swing high pressure injection (HPI) pump between trains. Specifically, by following procedure OP 1104.002, "Makeup and Purification System Operation," Revision 89 to swap high pressure injection pumps, operators cross-tied service water trains, placing the system in an unanalyzed condition.

Description. Following the failure of the train A HPI breaker, the inspectors reviewed the Unit 1 procedure OP 1104.002, "Makeup and Purification System Operation," Revision 89, for placing the swing HPI pump B into service and HPI pump C into standby in support of maintenance activities. From this review, the inspectors identified that the procedure contained instructions that did not maintain safety-related SW train separation.

In Unit 1, the three HPI pumps receive cooling water from two trains of safety-related SW. The inspectors noted that the instructions for placing the swing HPI pump in service caused operators to establish SW cooling from the train it was being connected to in a make-before-break fashion such that the two trains of SW became cross-tied. This system configuration did not maintain safety-related SW train separation as assumed in accident analyses. In contrast, the inspectors noted that Unit 2 procedures for realigning the swing HPI pump appropriately used a break-before-make approach, ensuring SW train separation was maintained. The inspectors noted that the licensee routinely placed the swing HPI pump into service in one train or the other to support scheduled maintenance.

The inspectors promptly informed the licensee of this condition. Immediate corrective actions were taken to assess past operability of not maintaining safety-related SW train separation and to revise OP 1104.002 with instructions to maintain SW train separation. The licensee agreed that the service water system was not analyzed to demonstrate being capable of performing their safety functions with the trains being cross-tied. The past operability assessment determined the train A electrical equipment room emergency chiller (VCH-4B) and train B reactor building emergency cooling coils

(VCC-2C/D) would not receive adequate SW flow to assure their ability to provide the required cooling during worst-case conditions in the event of a failure of the train A or train B SW pump, respectively. Therefore, the licensee concluded that these functions could be inoperable during the pump swap at maximum allowed SW temperatures. The licensee determined that procedure to implement a train swap for the swing HPI pump took a maximum of 25 minutes to complete. Additionally, the licensee determined that SW temperatures over the past 3 years were never high enough to result in an actual loss of function associated with VCH-4B and VCC-2C/D.

The inspectors concluded that the primary causal factor in establishing a procedure that used the make-before-break approach was that the licensee failed to determine whether the proposed action was safe to proceed, rather than unsafe in order to stop. Specifically, in December 2015 when this approach was revised to declare the non-protected service water train inoperable, the licensee did not ensure that the transition lineup was analyzed to be within safety analyses before adopting the revised steps.

Analysis. The licensee's failure to maintain safety-related SW train separation when swapping the swing HPI pump between trains was a performance deficiency. The performance deficiency was determined to be more than minor because it was associated with the procedural quality attribute of the Mitigating Systems Cornerstone, and adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events. Specifically, the failure to maintain SW train separation when performing OP 1104.002 placed the plant in an unanalyzed condition which resulted in VCH-4B and VCC-2C/D being inoperable for a maximum of 25 minutes. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that the finding had very low safety significance (Green) because it: was not a design deficiency; did not represent a loss of system and/or function; did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time; and did not result in the loss of a high safety-significant, nontechnical specification train. Specifically, inspectors confirmed that during the last 3 years SW temperatures were never high enough to result in an actual loss of function for either limiting component. The finding had a cross-cutting aspect in the area of human performance associated with conservative bias because the licensee failed to determine whether the proposed action was safe to proceed, rather than unsafe in order to stop. Specifically, in December 2015 when this approach was revised to declare the non-protected service water train inoperable, the licensee did not ensure that the transition lineup was evaluated to be within safety analyses before adopting the revised steps. [H.14].

Enforcement. Technical Specification 5.4.1.a requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Appendix A to Regulatory Guide 1.33, "Quality Assurance Program Requirements," Revision 2, February 1978. Regulatory Guide 1.33, Appendix A, Section 9.a, states 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. Contrary to the above, between December 2015 and September 2017, the licensee failed to properly pre-plan and perform maintenance that can affect the performance of safety-related equipment in accordance with written procedures, document instructions, or drawings appropriate to the circumstances. Specifically, the licensee failed to

maintain adequate work instructions to maintain safety-related SW train separation when performing OP 1104.002, "Makeup and Purification System Operation," Revision 89, section 9.4.3 to place the swing HPI pump B into service in support of maintenance activities. This condition resulted in VCH-4B and VCC-2C/D being inoperable for a maximum of 25 minutes per occurrence. The immediate corrective actions were to assess the operability of not maintaining service water train separation and to revise OP 1104.002 with adequate work instructions to maintain service water train separation. This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy, because it was very low safety significance (Green) and was entered into the licensee's corrective action program as Condition Report CR-ANO-1-2017-02518. (NCV 05000313/2017003-01, "Failure to Maintain Safety-Related Service Water Train Separation")

.2 Complete Walk-Down

a. Inspection Scope

The inspectors performed a complete system walk-down inspection of two risk-significant structures, systems, and components (SSCs). The inspectors reviewed the licensee's procedures and system design information to determine the correct system lineup for the existing plant configuration. The inspectors also reviewed open condition reports, in-process design changes, temporary modifications, and other open items tracked by the licensee's operations and engineering departments. The inspectors then visually verified that the system was correctly aligned for the existing plant configuration.

- September 8, 2017 – Unit 2 high pressure safety injection system
- September 28, 2017 – Unit 1 and Unit 2 startup transformer 2

These activities constituted two complete 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:

- July 27, 2017 - Unit 1 upper north piping penetration room, Fire Zone 1038. Fire Area 79-U
- August 14, 2017 - Unit 2 auxiliary building general area access elevation 317 feet, Fire Zone 2006-LL, Fire Area B-6

- August 21, 2017 - Unit 2 west dc equipment room, Fire Zone 2099-W, Fire Area MM
- September 11, 2017 - Unit 2 emergency diesel generator room north, Fire Zone 2094Q, Fire Area KK
- September 14, 2017 - Unit 2 cable spreading room, Fire Zone 2098-L, Fire Area G
- September 14, 2017 - Unit 2 core protection calculator room, Fire Zone 2098-C, Fire Area G

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

No findings were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

On September 8, 2017, the inspectors completed an inspection of the station's ability to mitigate flooding due to internal causes. After reviewing the licensee's flooding analysis, the inspectors chose one plant area containing risk-significant SSCs that were susceptible to flooding:

- Unit 2 auxiliary building general access elevation 317 feet

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

These activities constituted completion of one flood protection measures sample, as defined in Inspection Procedure 71111.06.

b. Findings

No findings were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

On August 22, 2017, the inspectors completed an inspection of the readiness and availability of risk-significant heat exchangers. The inspectors reviewed the results of the licensee's inspections for the Unit 1 high pressure injection pump A oil cooler. Additionally, the inspectors walked down the heat exchanger to observe its performance and material condition and verified that the heat exchanger was correctly categorized under the Maintenance Rule and was receiving the required maintenance.

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

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 July 18, 2017, the inspectors observed a portion of an annual requalification test for Unit 2 licensed operators. 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 July 19, 2017, the inspectors observed a portion of an annual requalification test for Unit 1 licensed operators. 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:

- July 7, 2017 - Unit 2 reactor startup activities following refueling outage

- August 11, 2017 - Unit 1 quarterly control rod drive mechanism verification of freedom of movement surveillance

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

.1 Routine Maintenance Effectiveness

a. Inspection Scope

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

- July 27, 2017 - Unit 1 and Unit 2 heat trace system, failures of heating elements and controllers in boric acid systems
- September 14, 2017 - Unit 1 and Unit 2 high pressure injection system, failures of pumps to start and flow instruments
- September 28, 2017 - Unit 1 and Unit 2 startup transformer 2 oil pumps

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), verified that the licensee was appropriately tracking degraded performance and conditions in accordance with the Maintenance Rule, and walked down components in the field to verify system function and condition.

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

b. Findings

No findings were identified.

.2 Quality Control

a. Inspection Scope

On August 31, 2017, the inspectors reviewed the licensee's quality control activities for safety-related 4160 volt Siemens vacuum breakers through: (1) a review of parts

installed in the safety-significant system that were purchased as commercial-grade parts but were dedicated prior to installation in a quality-grade application; (2) a review of the licensee's control of quality parts during maintenance associated with the maintenance process; (3) a review of whether quality control verifications were properly specified in accordance with the licensee's Quality Assurance Program, and were implemented as specified, during work associated with work packages reviewed.

These activities constituted completion of one quality control sample, 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

On September 27, 2017, the inspectors reviewed a risk assessment performed by the licensee prior to changes in plant configuration and the risk management actions taken by the licensee in response to elevated risk associated with Unit 1 and Unit 2 startup transformer 2, ten-year maintenance window outage. The inspectors verified that this risk assessment was 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 assessment and verified that the licensee implemented appropriate risk management actions based on the result of the assessment.

The inspectors also observed portions of four emergent work activities that had the potential to cause an initiating event, to affect the functional capability of mitigating systems, or to impact barrier integrity:

- August 8, 2017 - Unit 1 emergency feedwater initiation and control system instrumentation Channel D overcurrent condition
- August 11, 2017 - Unit 1 high pressure injection pump A breaker failure
- September 12, 2017 - Unit 1 reactor protection system channel D tripped due to spike on nuclear instrument 8
- September 12, 2017 - Unit 1 potential fuel leak as indicated by elevated Xenon and Iodine activity in the reactor coolant system's sample

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

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

b. Findings

No findings were identified.

1R15 Operability Determinations and Functionality Assessments (71111.15)

a. Inspection Scope

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

- August 11, 2017 - operability determination of Unit 2 service water pipe leak in lower piping penetration room
- August 14, 2017 - operability determination of Unit 1 emergency feedwater initiation and control system Channel D overcurrent condition
- August 22, 2017 - operability determination of Unit 1 high pressure pump B oil leak from the gear box and motor outboard bearing
- August 28, 2017 - operability determination of Unit 2 safety injection tank D out leakage
- September 20, 2017 - operability determination of Unit 2 emergency safety vault Door 206 nonconforming/degraded condition for internal flooding and high energy line break

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 five operability review samples, as defined in Inspection Procedure 71111.15.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

a. Inspection Scope

On August 18, 2017, the inspectors reviewed a permanent modification to Unit 1 emergency diesel generator 1 and 2 to install improved equipment performance on engine fuel injectors. The inspectors reviewed the design and implementation of the modification. The inspectors verified that work activities involved in implementing the modification 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 of the SSC as modified.

These activities constituted completion of one sample 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 six post-maintenance testing activities that affected risk-significant SSCs:

- July 21, 2017 - Unit 1 high pressure injection pump C post-maintenance test
- September 12, 2017 - Unit 1 emergency feedwater steam admission valve (CV-2613) for the turbine drive pump post maintenance test
- September 12, 2017 - Unit 1 high pressure injection pump A and B discharge isolation valves (CV-1227 and CV-1228, respectively) post-maintenance tests following system outage
- September 13, 2017 - Unit 2 high pressure injection pump B flow control valve post-maintenance test
- September 24, 2017 - Unit 1 and Unit 2 startup transformer 2 hi-pot testing of the 6900 volt
- September 24, 2017 - Unit 1 and Unit 2 startup transformer 2 hi-pot testing of 4160 volt electrical busses

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

b. Findings

No findings were identified.

1R20 Refueling and Other Outage Activities (71111.20)

a. Inspection Scope

During the station's Unit 2 refueling outage that concluded on July 8, 2017, 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. This verification included the following:

- Monitoring of heat-up and startup activities

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

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

Other surveillance tests:

- September 13, 2017 - Unit 2 high pressure injection pump B flow control valve surveillance testing
- September 15, 2017 - Unit 1 high pressure injection pump B flow control valve surveillance testing
- September 24, 2017 – Unit 1 and Unit 2 startup transformer 2 high potential testing

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 three surveillance testing inspection samples, as defined in Inspection Procedure 71111.22.

b. Findings

No findings were identified.

Cornerstone: Emergency Preparedness

1EP2 Alert and Notification System Evaluation (71114.02)

a. Inspection Scope

The inspector verified the adequacy of the licensee's methods for testing the primary and backup alert and notification system (ANS). The inspector also reviewed the

licensee's program for identifying emergency planning zone locations requiring tone alert radios and for distributing the radios, and reviewed audits of distribution records. The inspector interviewed licensee personnel responsible for the maintenance of the primary and backup ANS and reviewed a sample of corrective action system reports written for ANS problems. The inspector compared the licensee's ANS testing program with criteria in NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1; Federal Emergency Management Agency (FEMA) Report REP-10, "Guide for the Evaluation of Alert and Notification Systems for Nuclear Power Plants," and the licensee's current FEMA-approved alert and notification system design report, "Design Report Update, Upgraded Public Alert and Notification System (ANS), Arkansas Nuclear One," dated May 2016.

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

b. Findings

No findings were identified.

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

a. Inspection Scope

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

These activities constituted completion of one ERO staffing and augmentation testing sample, as defined in Inspection Procedure 71114.03.

b. Findings

No findings were identified.

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

a. Inspection Scope

The inspector performed an on-site review of the licensee's Emergency Plan, Revision 42. This revision addressed numerous changes:

- Removal of supplemental position of the duty emergency planner, offsite monitoring team radio communicator, emergency operations facility (EOF) building security, purchasing and procurement support, and technical support center (TSC) administrative services support

- Combination of duties for the operational support center (OSC) radiation and chemistry coordinator positions into one position
- Restructuring some of the positional reporting structure in the EOF, TSC, and OSC organizations
- Movement of several ERO support positions from the TSC to the OSC
- Revision of a reference to the drill and exercise cycle to reflect the 8-year interval adopted in previous revisions of the plan
- Removal of references to maintenance and training for a site supplemental volunteer rescue support group
- Revisions to address several editorial changes

This revision was compared to its previous revision; to the criteria of NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1; and to the standards in 10 CFR 50.47(b) to determine if the revision adequately implemented the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspector verified that the revision did not decrease the effectiveness of the emergency plan. This review was not documented in a safety evaluation report and did not constitute approval of licensee-generated changes; therefore, this revision is subject to future inspection.

These activities constituted completion of one emergency action level and emergency plan changes sample, as defined in Inspection Procedure 71114.04.

b. Findings

No findings were identified.

1EP5 Maintenance of Emergency Preparedness (71114.05)

a. Inspection Scope

The inspector reviewed the following for the period of November 2015 to April 2017:

- After-action reports for emergency classifications and events
- After-action evaluation reports for licensee drills and exercises
- Independent audits and surveillances of the licensee's emergency preparedness program
- Self-assessments of the emergency preparedness program conducted by the licensee
- Licensee evaluations of changes made to the emergency plan and emergency plan implementing procedures

- Drill and exercise performance issues entered into the licensee's corrective action program
- Emergency preparedness program issues entered into the licensee's corrective action program
- Maintenance records for equipment supporting the emergency preparedness program
- Emergency response organization and emergency planner training records

The inspector reviewed summaries of 368 corrective action program reports associated with emergency preparedness and selected 38 to review against program requirements, to determine the licensee's ability to identify, evaluate, and correct problems in accordance with planning standard 10 CFR 50.47(b)(14) and 10 CFR Part 50, Appendix E, IV.F. The inspector verified that the licensee accurately and appropriately identified and corrected emergency preparedness weaknesses during critiques and assessments.

The inspector reviewed summaries of eight licensee evaluations of the impact of changes to the emergency plan and implementing procedures, and selected three to review against program requirements to determine the licensee's ability to identify reductions in the effectiveness of the emergency plan in accordance with the requirements of 10 CFR 50.54(q)(3) and 50.54(q)(4). The inspector verified that evaluations of proposed changes to the licensee emergency plan appropriately identified the impact of the changes prior to being implemented.

The inspector reviewed summaries of 272 records pertaining to the maintenance of equipment and facilities used to implement the emergency plan, and selected eight to review against program requirements to determine the licensee's ability to maintain equipment in accordance with the requirements of 10 CFR 50.47(b)(8) and 10 CFR Part 50, Appendix E, IV.E. The inspector verified that equipment and facilities were maintained in accordance with the commitments of the licensee's emergency plan.

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

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index: Emergency AC Power Systems (MS06)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of July 1, 2016, through June 30, 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 mitigating system performance index for emergency ac power systems Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.2 Mitigating Systems Performance Index: High Pressure Injection Systems (MS07)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of July 1, 2016, through June 30, 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 mitigating system performance index for high pressure injection systems Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.3 Mitigating Systems Performance Index: Heat Removal Systems (MS08)

a. Inspection Scope

The inspectors reviewed the licensee's mitigating system performance index data for the period of July 1, 2016, through June 30, 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 mitigating system performance index for heat removal systems Unit 1 and Unit 2, as defined in Inspection Procedure 71151.

b. Findings

No findings were identified.

.4 Drill/Exercise Performance (EP01)

a. Inspection Scope

The inspectors reviewed the licensee's evaluated exercises and selected drill and training evolutions that occurred between July 2016 and March 2017 to verify the accuracy of the licensee's data for classification, notification, and protective action recommendation (PAR) opportunities. The inspectors reviewed a sample of the licensee's completed classifications, notifications, and PARs to verify their timeliness and accuracy. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

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

b. Findings

No findings were identified.

.5 Emergency Response Organization Drill Participation (EP02)

a. Inspection Scope

The inspectors reviewed the licensee's records for participation in drill and training evolutions between July 2016 and March 2017 to verify the accuracy of the licensee's data for drill participation opportunities. The inspectors verified that all members of the licensee's ERO in the identified key positions had been counted in the reported performance indicator data. The inspectors reviewed the licensee's basis for reporting the percentage of ERO members who participated in a drill. The inspectors reviewed drill attendance records and verified a sample of those reported as participating. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

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

b. Findings

No findings were identified.

.6 Alert and Notification System Reliability (EP03)

a. Inspection Scope

The inspectors reviewed the licensee's records of Alert and Notification System tests conducted between July 2016 and March 2017 to verify the accuracy of the licensee's data for siren system testing opportunities. The inspectors reviewed procedural guidance on assessing Alert and Notification System opportunities and the results of periodic alert and notification system operability tests. The inspectors used Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, to determine the accuracy of the reported data. The specific documents reviewed are described in the attachment to this report.

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

b. Findings

No findings were identified.

40A2 Problem Identification and Resolution (71152)

.1 Routine Review

a. Inspection Scope

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

b. Findings

No findings were identified.

.2 Semiannual Trend Review

a. Inspection Scope

The inspectors reviewed the licensee's corrective action program, performance indicators, system health reports, and other documentation to identify trends that might indicate the existence of a more significant safety issue. The inspectors verified that the licensee was taking corrective actions to address identified adverse trends. The inspectors did not review any cross-cutting themes because none exist at the site.

The inspectors identified the following trend and reviewed the licensee's response to it. The inspectors identified multiple examples associated with the effectiveness of the manner in which the licensee implemented planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process included:

- CR-ANO-1-2016-05551 and CR-ANO-1-2017-01751. NRC NCV 05000313/2017001-03, "Inadvertent Reactivity Addition." Specifically, the licensee failed to perform post-maintenance testing (PMT) on newly installed integrated control system cards before returning the system to service. This resulted in an unplanned reactor power increase because the card had a failed component. The inspectors noted that the licensee relied on informal expectations rather than a formal process to ensure that post-maintenance testing of new circuit cards were performed. The corrective actions were to update: (1) maintenance Work Orders (WO) 50235622 and 50235594 with required PMTs; (2) Operating Procedure (OP) 1104.002, "Plant Startup," with required steps to verify reactor and steam generator input/output.
- CR-ANO-1-2017-01764. NRC NCV 05000313/2017002-03, "Failure to Comply with Emergency Core Cooling System Technical Specifications." Specifically, the licensee failed to ensure the operability of high pressure injection pump A after reinstalling its feeder breaker during a unit outage. This violation involved a shift manager waiving the expected PMT to verify operability of the pump following reinstallation of its feeder breaker. The corrective action was to revise COPD-001, "Operations Expectations and Standards," to require an operations manager or assistant operations manager to agree if a shift manager wanted to invoke a waiver to not perform a functionality/operability PMT in order to ensure PMTs were performed when appropriate.
- CR-ANO-2-2016-00587. Unit 2 shutdown when the safety injection tank D leakage through the number 2 high pressure safety injection header check valve, 2SI-13D, reached a leak rate of 360 gpd with a degrading trend. This was classified as a significant condition adverse to quality. The root cause of the event was that work planning, execution, and procedural guidance for repair of 2SI-13D was inadequate during Refueling Outage 2R24 to ensure body-to-bonnet sealing condition causing the pressure seal leakage was identified and corrected during the scheduled valve repair window. This included disagreements about the best method to repair the valve given its history of unsuccessful repairs. The corrective action to prevent reoccurrence was to revise procedure OP-2402.003, "2SI-13A, B, C, D Maintenance," to include recommendations from Electric Power Research Institute 1009701, "Pressure Seal Bonnet Valve Maintenance Guide," to optimize the sealing condition of the valve body, bonnet, and pressure seal gasket.
- CR-ANO-C-2017-00089. Licensee personnel do not plan, schedule, and coordinate work effectively. As a result, delays in returning risk-significant equipment to service occurred and safety-related equipment unavailability gets extended. Contributing to this was managers have not aligned behaviors across departments to the work management process. This CR summarized multiple examples of work management problems.

- CR-ANO-C-2017-03593 and CR-ANO-C-2017-03439. The licensee identified inadequate work instructions associated with WOs 415775, 388803, and 423142 for startup transformer 2. Additional work instructions were developed by the overall project lead and vendor. However, the added work instructions were not submitted to Planning to be included in the work order process.

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

b. Observations and Assessments

The inspectors reviewed the examples identified above developed the following observations and assessments concerning an apparent trend:

The inspectors concluded multiple aspects of the work management were impacted. The failure to plan work orders such that the coordination of activities, resources allotted, and execution of tasks is completed in a consistent, risk informed manner, and that verification that the work has been completed satisfactorily prior to declaring safety-related equipment operable is an apparent trend. The inspectors noted that the licensee developed appropriate corrective actions for the areas impacted by work management. These included, but not limited to, improvement of work order instructions; coordination of work order activities and organizational resources; and PMT requirements.

c. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On July 14, 2017, the inspector presented the results of the onsite inspection of the licensee's emergency preparedness program to Mr. Richard 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 August 21, 2017, the inspector presented the results of the inspection involving maintenance of emergency preparedness to Mr. Tony Sherrill, Manager, Emergency Planning, and other members of the licensee staff. The licensee acknowledged the issues presented. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

On October 11, 2017, the inspectors presented the resident inspection results to Mr. Richard 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.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee Personnel

R. Anderson, Site Vice President
L. Blocker, Nuclear Independent Oversight Manager
G. Brown, Security Manager
L. Blocker, Regulator and Performance Improvement, Director
P. Butler, Design and Program Engineering Manager
B. Daiber, Engineering Programs and Components Manager
T. Evans, Assistant to Site Vice President
T. Hatfield, Supervisor, Design and Program Engineering
G. Hudnall, Corrective Action Program Manager
G. Kilpatrick, Training Manager
J. Kirkpatrick, General Manager, Plant Operations
P. McCray, Site Projects Senior Manager
S. Morris, Chemistry Manager
N. Mosher, Licensing Specialist
R. Penfield, Regulatory Assurance Director
S. Pyle, Regulatory Assurance Manager
B. Pace, Product Manager
T. Sherrill, Emergency Planning Manager
B. Short, Senior Licensing Specialist
M. Skartvedt, System Engineering Manager
D. Vogt, Senior Operations Manager

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed

05000313/2017003-01 NCV Failure to Maintain Service Water Train Separation
(Section 1R04)

LIST OF DOCUMENTS REVIEWED

Section 1R01: Adverse Weather Protection

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	3M Marine Adhesive/Sealant Fast Cure 4000 UV Technical Data	February 2007
51913	Engineering Change	
53994	Engineering Change	

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1402.240	Inspection of Watertight Hatches	001
1402.246	Inspection of Miscellaneous External Flood Components, Features, and Tools	000

Condition Reports (CR-ANO-)

C-2016-00830 C-2017-03633 C-2017-03690 C-2017-03707

Work Orders

373608

Section 1R04: Equipment Alignment

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
48770	Engineering Change	
51777	Engineering Change	
CALC-ANOC-CS-15-00003	ANO Flood Protection Design Basis	005
M-210 Sheet 1	Piping and Instrument Diagram Service Water	150
STM 2-05	ANO Unit-2 ECCS	020
STM 2-05	ANO Unit-2 STM ECCS	020

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Makeup and Purification System Operation	085, 089
1104.029	Service Water and Auxiliary Cooling System	116
1105.003	Engineering Safeguards Actuation System	019
1107.001	Electrical System Operations	114
1202.003	Overcooling	011
1202.010	ESAS	012
1203.053	Inadvertent ESAS Actuation	001
2104.001	Safety Injection Tank Operation	052
2104.029	Service Water System Operations	108

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2104.039	Unit-2 HPSI System Operation	082
2107.001	Electrical System Operations	123
2107.007	ESF Electrical Bus Outage	019
2304.199	Unit-2 HPSI Flow and Pressure Red Channel Instrumentation	010
2403.013	HPSI Motor Inspection and Maintenance 2P89 A,B,C	010

Condition Reports (CR-ANO-)

1-2015-02822	1-2017-02518	2-2014-02881	2-2015-02811	2-2017-02518
2-2017-03179	2-2017-04283	2-2017-04689	2-2017-04908	2-2017-04946
C-2017-00296	C-2017-02899	C-2017-02913		

Work Orders

397661	52727984
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Section 1R05: Fire ProtectionMiscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
	Fire Hazards Analysis	017
2B-317-2006-LL	Fire plan 317' general access	
CALC-ANOC-CS-15-00003	Unit-2 Auxiliary bldg. 317'	005
EC 49958	ANO-2 Door 265 Thermal Release Link NFPA 805 Change	000

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1000.120	ANO Fire Impairment Program	025
2306.025	Unit 2 Fire Door Inspection Procedure	018
CALC-ANOC-CS-15-00003	Unit-2 Aux Bldg 317'	005
FB-00-2007	Fire barrier key plan 317'	002
FP-2103	Unit-2 Fire Zones intermediate floor plan EL 368 and 372	

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
FS-2103	Fire Protection Plan Intermediate Floor Plan	
FS-2106	Fire protection plan elev 317'	000
FZ-2041	Fire zone detail general access area/stair no. 2001	003
FZ-2094Q	Unit-2 EDG room north	
PFP-U1	Pre-Fire Plan, Unit 1	004
PFP-U2	Pre-Fire Plan, Unit 2	016

Condition Reports (CR-ANO-)

2-2017-04982

Section 1R06: Flood Protection MeasuresMiscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CALC-15-E-0007-20	Reduced Latching Requirements for Watertight Doors	000
CALC-95-R-0024-01	Basic Requirements for the Component Database on Station Doors and Hatches	013
CALC-ANOC-CS-15-00003	ANO Flood Protection Design Basis	005
EC-59915	Engineering Change	000
ER-94-R-0022-02	High energy line break doors and hatches	009

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1402.100	Watertight Door Maintenance	009
2203.051	Internal Flooding	007

Condition Reports (CR-ANO-)

2-2017-03718	2-2017-03781	2-2017-03785	2-2017-03817	2-2017-03930
2-2017-04252	2-2017-04477	2-2017-04488	2-2017-04514	2-2017-04680
2-2017-04682	2-2017-04748			

Section 1R07: Heat Sink Performance

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
CALC-87-D-1016-04	Thermal and Hydraulic Calc. for Lube Oil Coolers E29A, B, C	001
CALC-91-R-2013-01	Service Water Performance Testing Methodology	028
M-210 Sheet 1	Piping and Instrument Drawing Diagram Service Water	150
TD0015.0010	Installation, Operation and Maintenance Manual for Joseph Oats Corporation Lube Oil Heat Exchanger	000

Condition Reports (CR-ANO-)

1-2017-00164 1-2017-00682

Work Orders

468830 52264187 52474965

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

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
SES-1-016	ANO-1 Unit-1 Dynamic Exam Scenario	001
SES-2-005	ANO-2 Unit-2 Dynamic Exam Scenario	005
SES-2-031	ANO-1 Unit 1 Dynamic Exam Scenario	012

Section 1R12: Maintenance Effectiveness

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1307.037	Unit 1 Plant Freeze Protection Testing	021
1403.007	Unit 1 Heat Trace System Maintenance	007
2106.032	Unit 2 Freeze Protection Guide	027
2104.039	Unit 2 HPSI System Operation	082
EN-FAP-OM-021	Critical Decision Procedure Startup #2 transformer oil pumps	005

Condition Reports (CR-ANO-)

1-2014-01622	1-2015-00121	1-2015-02791	1-2015-04117	1-2016-00241
1-2016-02638	1-2016-03015	1-2017-01195	1-2017-01319	1-2017-01323
1-2017-01764	1-2017-02331	1-2017-02414	1-2017-02738	1-2017-02747
1-2017-02899	2-2015-00069	2-2017-00350	C-2017-03595	

Work Orders

00393829	00397511	50236613	52584557	52612473
52644580	52646742	52650300	52660856	

Section 1R13: Maintenance Risk Assessments and Emergent Work Control

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Makeup and Purification System Operation	089
COPD-024	Risk Assessment Guidelines	064
EN-WM-104	On line Risk Assessment	015

Condition Reports (CR-ANO-)

1-2017-02331	1-2017-02433	2-2013-02242
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Section 1R15: Operability Determinations and Functionality Assessments

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC 73309	CR-ANO-2-2017-04493 Leak Evaluation	000
EC 73511	Input for CR-ANO-1-2017-02434	000
M-2232 Sheet 1	Piping and Instrument Diagram Safety Injection System	122
M-2236 Sheet 1	Piping and Instrument Diagram Containment Spray System	095

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1032.036	Service Water Piping Leak Evaluation and Monitoring	004
1104.002	Makeup and Purification System Operation	089
1107.001	Electrical System Operation	113

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1402.100	Watertight Door Maintenance	009
2104.001	Safety Injection Tank Operations	051
2202.003	Loss of Coolant Accident	023
2203.051	Internal Flooding	007
EN-MA-125	Troubleshooting Control of Maintenance Activities	020
EN-OP-104	Operability Determination Process	011

Condition Reports (CR-ANO-)

1-2016-02372	1-2016-02406	1-2016-02518	1-2016-05314	1-2017-02434
2-2017-02718	2-2017-03718	2-2017-03785	2-2017-03930	2-2017-04252
2-2017-04493	2-2017-04514	2-2017-04532	2-2017-04547	2-2017-04560
2-2017-04880				

Work Orders

482060

Section 1R18: Plant Modifications

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC-51778	Post Modification Testing and Special Instructions for Startup #2 Transformer Outage	007
EC-70634	Unit-1 emergency diesel generator K4A modifications	000

Condition Reports (CR-ANO-)

1-2016-00241	1-2017-02477	2-2013-02242	2-2017-05129	C-2016-01850
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Work Orders

00392842	484763
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Section 1R19: Post-Maintenance Testing

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
EC-51778	Post Modification Testing and Special Instructions; 2A-111, 2A211, 2H-13, and 2H-23 Startup Transformer #2	007

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Makeup & Purification System Operation	090
1106.006	Emergency Feedwater Pump Operation	100
2104.039	Unit 2 HPSI System Operation	082
2017.001	Electrical System Operations	123

Condition Reports (CR-ANO-)

2-2013-02242 2-2017-05129 C-2016-01850

Work Orders

00456328	39751102	52641097	52668574	52668575
52671864	52713356	52716832	52722924	52722926

Section 1R20: Refueling and Other Outage Activities

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
2102.001	Plant Preheatup and Precritical Checklist	087
2102.002	Plant Heatup	080
2102.004	Power Operations	063
2102.016	Reactor Startup	025

Condition Reports (CR-ANO-)

2-2017-04075	2-2017-04092	2-2017-04093	2-2017-04097	2-2017-04105
2-2017-04124	2-2017-04182			

Section 1R22: Surveillance Testing

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Makeup & Purification System Operation	090
1106.006	Emergency Feedwater Pump Operation	100
2104.039	Unit 2 HPSI System Operation	082
2107.001	Electrical System Operations	123

Work Orders

00456328	39751102	52641097	52668574	52668575
52671864	52713356	52716832	52722924	52722926

Section 1EP2: Alert and Notification System Testing

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Arkansas Nuclear One (ANO) Nuclear Power Plant Alert and Notification System (ANS) Design Report Update	June 28, 2016
	Design Report Update, Upgraded Public Alert and Notification System (ANS), Arkansas Nuclear One (ANO)	May 2016
	Design Report Update, Upgraded Public Alert and Notification System (ANS), Arkansas Nuclear One (ANO), Supplement 1	February 2017
	Letter from L. Hammond, RAC Chair, FEMA Region VI, to D. Maxwell, Director, Camp Joseph T. Robinson, Regarding Backup Alert and Notification System (ANS) for Arkansas Nuclear One Emergency Planning Zone	November 27, 2012
EP-2006-0027	Letter from R. Holeyfield, Arkansas Nuclear One, to C. Meyer, Manager, Nuclear Planning & Response, Arkansas Department of Health & Human Services	August 9, 2006
IEAL-R/84-81	Arkansas Nuclear One Site-Specific Offsite Radiological Emergency Preparedness Alert and Notification System Quality Assurance Verification – Final Draft Report	February 25, 1985

Section 1EP3: Emergency Response Organization Staffing and Augmentation System

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision</u>
Form No. 1903.062C	Emergency Response Staffing Drill	029, 031

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1903.011	Emergency Response/Notifications	054
1903.062	Communications System Operating Procedure	030

Section 1EP4: Emergency Action Level and Emergency Plan Changes

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Date</u>
	Arkansas Nuclear One Emergency Plan, Revision 42	April 4, 2017
0CAN041701	Emergency Plan Revision 42, Arkansas Nuclear One – Units 1 and 2; Docket Nos. 50-313, 50-368, and 72-13; License Nos. DPR-51 and NPF-6	April 4, 2017

Section 1EP5: Maintenance of Emergency Preparedness

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Arkansas Nuclear One ERO Yellow Team Drill Report, March 1, 2017	
	Arkansas Nuclear One, 2016 State of Arkansas Environmental Monitoring Report	June 14, 2017
	August 17, 2016 Exercise Drill Report	September 15, 2016
	Detailed Scenario	July 27, 2016
	Emergency Preparedness Drill, Detailed Scenario	March 1, 2017
	Emergency Preparedness Exercise, Detailed Scenario	August 17, 2016
	Emergency Preparedness Tabletop, Detailed Scenario	July 12, 2017

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
0CAN051702 (Enclosure)	Annual Radiological Environmental Operating Report for 2016	May 4, 2017
EN-EP-305, Attachment 9.1	10 CFR 50.54(q) Screening – 1903.066, Revision 026, “Emergency Response Facility – Operational Support Center (OSC)”	December 1, 2015
EN-EP-305, Attachment 9.2	10 CFR 50.54(q)(3) Screening – 1903.011, Revision 052	September 29, 2016
EN-EP-305, Attachment 9.2	10 CFR 50.54(q)(3) Screening – EPlan, Revision 42	March 9, 2017
EN-EP-305, Attachment 9.3	10 CFR 50.54(q)(3) Evaluation – EPlan, Revision 42	March 9, 2017
EP-2016-026	July 27, 2016, Full Scale Drill Report	August 24, 2016
EP-2016-028	2016 Off-Hours Accountability Drill Report	December 19, 2016
EP-2016-029	December 14, 2016, Environmental Sampling Drill	December 20, 2016
EP-2016-030	2016 MS-1 Medical Drill with Pope County EMS and St. Mary’s Hospital	December 20, 2016
EP-DRILL-031- 20161214	Arkansas Nuclear One Health Physics Drill 2016-01 Drill Package	December 14, 2016
EP-DRILL-2016- 004-20160630	Arkansas Nuclear One Health Physics Drill 2016-01 Drill Package	June 30, 2016
JPM-EP-COMM- CA1	Emergency Response Notification (CA1)	000
KLD TR - 856	Arkansas Nuclear One, 2016 Population Update Analysis	September 24, 2016
NQ-2016-014	Quality Assurance Audit Report QA-7-2016-ANO-1 Emergency Planning	May 31, 2016
QA-7-2017- ANO-1	Quality Assurance Audit Report, Audited Area Title: Emergency Preparedness	July 11, 2017
Scenario #: EOF-PI-2016-05	Entergy Mini-Drill	September 13, 2016

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1903.004	Admin. and Maintenance of the Emergency Plan and Implementing Procedures	033
1903.060	Emergency Supplies & Equipment	045
1903.069	Equipment Important to Emergency Response	006
1905.002	Offsite Emergency Monitoring	019
EP-003	OSC Emergency Response Facility Walkthrough	020
EP-005	Control Room Emergency Response Facility Walkthrough Surveillance	018
EP-008	EOF Emergency Response Facility Walkthrough	037
EP-010	TSC Emergency Response Facility Walkthrough	036
EP-017	Alternate Emergency Response Facility Walkthrough	015
EP-020	JIC Emergency Response Facility Walkthrough	010
EP-023	AJIC Emergency Response Facility Walkthrough	003

Condition Reports (CR-ANO-)

1-2015-03866	2-2017-01405	2-2017-01413	C-2014-02135	C-2015-03866
C-2015-04307	C-2015-04365	C-2015-04521	C-2015-04901	C-2015-05098
C-2016-00419	C-2016-00461	C-2016-01754	C-2016-01804	C-2016-01824
C-2016-01938	C-2016-02012	C-2016-02020	C-2016-02039	C-2016-02049
C-2016-02050	C-2016-02200	C-2016-02726	C-2016-02773	C-2016-03028
C-2016-03323	C-2016-03343	C-2016-03349	C-2016-05148	C-2016-05328
C-2016-05372	C-2016-05375	C-2017-00678	C-2017-01682	C-2017-01692
C-2017-01832	C-2017-02688	C-2017-02753		

Work Orders

426318	430837	432930	434598	448598
454867	52564307	52614730		

Section 4OA1: Performance Indicator Verification

Miscellaneous Documents

<u>Number</u>	<u>Title</u>
ANO2-SA-06-001	ANO-2 MSPI Basis Document Support Analysis
ECH-NE-09-00041	ANO1 Mitigation System Performance Index Basis Document

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Unit 1 Makeup & Purification System Operation	060
2104.039	Unit 2 HPSI System Operation	082
EN-LI-114	Regulatory Performance Indicator Process	007, 008

Condition Reports (CR-ANO-)

1-2016-02638	1-2016-03015	1-2017-01195	1-2017-01319	1-2017-01323
1-2017-01764	1-2017-02331	1-2017-02414	1-2017-02738	1-2017-02747
2-2015-00069	2-2017-00350			

Section 4OA2: Problem Identification and Resolution

Miscellaneous Documents

<u>Number</u>	<u>Title</u>	<u>Revision/Date</u>
	Performance Review Meeting Report ANO/Production	July 2017
	Performance Review Meeting Report ANO/Production	March 2017
EC 58907	ANO-2 2SI-3B Check Valve Replacement	000

Procedures

<u>Number</u>	<u>Title</u>	<u>Revision</u>
1104.002	Plant Startup	106, 105
2402.003	2SI-13A, B, C, and D Maintenance	015
COPD-001	Operations Expectations and Standards	075
EN-WM-105-ANO-RC	Planning	003

Condition Reports (CR-ANO-)

1-2016-05551	1-2017-01751	1-2017-01764	2-2016-00587	2-2017-02902
2-2017-05135	C-2015-02832	C-2015-03033	C-2015-03034	C-2017-00089
C-2017-01789				

Work Orders

50235595	50235622
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