



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

November 5, 2019

Mr. John Dinelli
Site Vice President
Entergy Operations, Inc.
N-TSB-58
1448 S.R. 333
Russellville, AR 72802-0967

SUBJECT: ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 – INTEGRATED INSPECTION
REPORT 05000313/2019003 AND 05000368/2019003 AND INDEPENDENT
SPENT FUEL STORAGE INSTALLATION INSPECTION REPORT
07200013/2019001

Dear Mr. Dinelli:

On September 30, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Arkansas Nuclear One, Units 1 and 2. On October 3, 2019, 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.

Two findings of very low safety significance (Green) are documented in this report. Two of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or significance of the violations documented in this inspection report, 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/

John L. Dixon, Jr., Chief
Reactor Projects Branch D
Division of Reactor Projects

Docket Nos. 05000313, 05000368, and
07200013
License Nos. DPR-51 and NPF-6

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV®

ARKANSAS NUCLEAR ONE, UNITS 1 AND 2 – INTEGRATED INSPECTION REPORT
 05000313/2019003 AND 05000368/2019003 AND INDEPENDENT SPENT FUEL STORAGE
 INSTALLATION INSPECTION REPORT 07200013/2019001 – November 5, 2019

DISTRIBUTION:

SMorris, RA
 MShaffer, DRA
 AVegel, DRP
 TInverso, DRP
 RLantz, DRS
 GMiller, DRS
 MHay, DNMS
 LHowell, DNMS
 GWarnick, DNMS
 LBrookhart, DNMS
 ESimpson, DNMS
 CSmith, DNMS
 NFields, DNMS
 Wallen, DFM
 DCylkowski, RC
 JQuichocho, RIV/OEDO
 VDricks, ORA

JWeil, OCA
 TWengert, NRR
 AMoreno, RIV/OCA
 BMaier, RSLO
 RAzua, IPAT
 JDixon, DRP
 BCorrell, IPAT
 JBraisted, DRP
 CHenderson, DRP
 TDebey, DRP
 TSullivan, DRP
 AEIam, DRP
 PJayroe, IPAT
 MHerrera, DRMA
 R4Enforcement
 ROP Reports

DOCUMENT NAME: R:_REACTORS_ANO\2019\ANO2019003-IR-CH.docx
 ADAMS ACCESSION NUMBER: ML19310H020

| | | | | | |
|--|-------------|---|------------|---|-------------|
| <input checked="" type="checkbox"/> SUNSI Review JDixon | | <input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive | | <input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available | |
| OFFICE | SRI:DRP/D | RI:DRP/D | RI:DRP/D | BC:DRS/EB1 | C:DRS/EB2 |
| NAME | CHenderson | TSullivan | TDeBey | VGaddy | NTaylor NHT |
| DATE | 10/30/2019 | 10/30/2019 | 10/30/2019 | 10/31/19 | 10/31/19 |
| OFFICE | BC:DRS/OB | ATL:DRS/IPAT | BC:DRS/RCB | BC:DNMS/RxIB | BC:DRP/D |
| NAME | GWerner GEW | RAzua | MHaire | GWarnick | JDixon |
| DATE | 10/30/2019 | 10/30/2019 | 10/30/19 | 10/30/2019 | 11/5/19 |

OFFICIAL RECORD COPY

U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Numbers: 05000313, 05000368, and 07200013

License Numbers: DPR-51 and NPF-6

Report Numbers: 05000313/2019003, 05000368/2019003, and 07200013/2019001

Enterprise Identifier: I-2019-003-0005 and I-2019-001-0084

Licensee: Entergy Operations, Inc.

Facility: Arkansas Nuclear One, Units 1 and 2

Location: Russellville, AR

Inspection Dates: July 1, 2019 to September 30, 2019

Inspectors: L. Brookhart, Senior Spent Fuel Storage Inspector
T. DeBey, Resident Inspector
N. Fields, Health Physicist
M. Hayes, Operations Engineer
S. Hedger, Emergency Preparedness Inspector
C. Henderson, Senior Resident Inspector
J. Kirkland, Senior Operations Engineer
T. Sullivan, Resident Inspector

Approved By: John L. Dixon, Jr., Chief
Reactor Projects Branch D
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection and an independent spent fuel storage installation inspection at Arkansas Nuclear One, Units 1 and 2, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

| Failure to Install Correct Component and Perform Post Maintenance Testing | | | |
|---|---|----------------------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Initiating Events | Green NCV 05000368/2019003-01 Open/Closed | [H.14] - Conservative Bias | 71111.19 |
| The inspectors reviewed a self-revealed, Green finding and associated non-cited violation of Arkansas Nuclear One, Unit 2, Technical Specification 6.4.1.a, for the licensee's failure to properly pre-plan and perform maintenance that can affect the performance of safety-related equipment. Specifically, the licensee failed to install the correct diodes for control element assembly hold bus 2C70 and to perform post-maintenance testing to demonstrate component functionality. | | | |

| Failure to Promptly Identify and Correct a Condition Adverse to Quality | | | |
|--|---|-----------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Initiating Events | Green NCV 05000368/2019003-02 Open/Closed | [P.2] - Evaluation | 71152 |
| The inspectors reviewed a self-revealed, Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to promptly identify and correct conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances. Specifically, the licensee failed to promptly identify and correct damage to Unit 2's reactor coolant pump C controlled bleed off piping in 2011, 2015, and 2017, when insulation was removed making the piping available for inspection. | | | |

Additional Tracking Items

| Type | Issue Number | Title | Report Section | Status |
|------|----------------------|--|----------------|--------|
| LER | 05000313/2018-004-01 | Reactor Trip Due to the Loss of a Non-Vital 4160 Volt Bus. | 71153 | Closed |
| LER | 05000368/2019-001-00 | Reactor Trip Due to a Reactor Coolant Pump Motor Failure. | 71153 | Closed |

PLANT STATUS

Unit 1 began the inspection period at full power where it remained for the rest of the reporting period except for minor reductions in power to support scheduled surveillances.

Unit 2 began the inspection period in shutdown for Forced Outage 2F19-01, as a result of a fault in reactor coolant pump motor B, which started on May 26, 2019. On July 28, 2019, Unit 2 commenced a reactor startup and the reactor was made critical. The unit was returned to full power on July 30, 2019, where it remained for the rest of the reporting period except for minor reductions in power to support scheduled surveillances and for degraded condenser vacuum conditions.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at <http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html>. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed plant status activities described in IMC 2515, Appendix D, "Plant Status," and conducted routine reviews using IP 71152, "Problem Identification and Resolution." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04Q - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

- (1) Unit 2 train A chemical and volume control system with charging pump C operating on August 6, 2019
- (2) Unit 1 emergency diesel generator 2 fuel oil system with emergency fuel oil bunker T-57A on recirculation on August 16, 2019
- (3) Unit 2 train A 4160 volt safety-related switchgear room coolers D and C on August 29, 2019

71111.05A - Fire Protection (Annual)

Annual Inspection (IP Section 03.02) (1 Sample)

- (1) Unit 2 fire drill for a main generator hydrogen fire, Fire Zone 2200-M, Fire Area B-2, on August 26, 2019

71111.05Q - Fire Protection

Quarterly Inspection (IP Section 03.01) (4 Samples)

The inspectors evaluated fire protection program implementation in the following selected areas:

- (1) Unit 1 and Unit 2 fire risk management actions for common feedwater pump B unavailability for Fire Areas 2200-MM turbine building 372 feet nonvital switchgear area and Unit 2 transformer yard on August 15, 2019
- (2) Unit 1 fire impairment for reverse osmosis unit installation in the drumming station for Fire Zones 34-Y, 2026-Y, and 20-Y-2 on August 16, 2019
- (3) Unit 1 and Unit 2 alternate AC diesel generator building Fire Zone 3040 on September 3, 2019
- (4) Unit 2 control room safety-related panels for Fire Zone 2002 and 2199-G, Fire Area G, on September 12, 2019

71111.06 - Flood Protection Measures

Inspection Activities - Underground Cables (IP Section 02.02c.) (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) Unit 1 and Unit 2 manhole 10 flood seals for the emergency diesel generator fuel oil vault on September 9, 2019

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) Unit 2 train A 4160 volt safety-related switchgear room cooler D replacement on September 5, 2019

71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

Requalification Examination Results (IP Section 03.03) (1 Sample)

- (1) The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exam administered on August 15, 2019.

71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Requalification Program (IP Section 03.04) (1 Sample)

- (1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examination administered on July 8, 2019.

Annual Regualification Operating Tests

The inspectors evaluated the adequacy of the licensee's annual regualification operating test.

Administration of an Annual Regualification Operating Test

The inspectors evaluated the effectiveness of the licensee in administering regualification operating tests required by 10 CFR 55.59(a)(2), and that the facility licensee is effectively evaluating their licensed operators for mastery of training objectives.

Regualification Examination Security

The inspectors evaluated the ability of the licensee to safeguard examination material, such that the examination is not compromised.

Remedial Training and Re-examinations

The inspectors evaluated the effectiveness of remedial training conducted by the licensee and reviewed the adequacy of re-examinations for licensed operators who did not pass a required regualification examination.

Operator License Conditions

The inspectors evaluated the licensee's program for ensuring that licensed operators meet the conditions of their licenses.

Control Room Simulator

The inspectors evaluated the adequacy of the licensee's control room simulator in modeling the actual plant, and for meeting the requirements contained in 10 CFR 55.46.

Problem Identification and Resolution

The inspectors evaluated the licensee's ability to identify and resolve problems associated with licensed operator performance.

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) Unit 2 short notice downpower to 96.6 percent reactor power for degraded main condenser A vacuum on August 7, 2019

Licensed Operator Regualification Training/Examinations (IP Section 03.02) (1 Sample)

- (1) Unit 1 licensed operator training scenario on September 12, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the risk assessments for the following planned and emergent work activities:

- (1) Unit 1 and Unit 2 common feedwater system and alternate AC emergency diesel generator availability during a loss of the 13.8 kV London line on July 9, 2019
- (2) Unit 1 emergent work for train B turbine driven emergency feedwater pump steam admission valve failure to return to automatic during surveillance testing on August 1, 2019
- (3) Unit 1 and Unit 2 planned emergency diesel generator pump maintenance with common feedwater pump B unavailable due to emergent corrective maintenance on August 7, 2019
- (4) Unit 2 emergent work for train B main steam and feedwater isolation solid state relay failure for Channel 1 on August 27, 2019
- (5) Unit 1 and Unit 2 emergent work for the auto transformer on August 29, 2019
- (6) Unit 1 emergent work for emergency diesel generator 2 trip on high crankcase pressure during surveillance testing on September 9, 2019

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 02.02) (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Unit 2 shutdown cooling system operability on July 18, 2019
- (2) Unit 2 service water pump A high temperature winding operability on August 28, 2019
- (3) Unit 2 containment cooling fan B mode restraint operability on August 29, 2019
- (4) Unit 2 train B emergency feedwater system discharge valves to steam generators A and B failed to open operability on September 18, 2019
- (5) Unit 1 and Unit 2 emergency cooling pond operability during service water bay B maintenance with a leaking sluice gate on September 19, 2019

71111.19 - Post-Maintenance Testing

Post Maintenance Test Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Unit 2 reactor coolant pump A, B, C, and D control bleed off line replacement on July 22, 2019
- (2) Unit 1 and Unit 2 common feedwater pump post maintenance testing following bearing replacement on August 16, 2019
- (3) Unit 2 train B main steam and feedwater isolation solid state relay replacement for Channel 1 on August 27, 2019
- (4) Unit 1 and Unit 2 alternate AC diesel generator temperature and pressure control valve replacement on September 3, 2019
- (5) Unit 2 lowering control element assembly hold bus C2 voltage and two control element assemblies dropped on September 5, 2019

- (6) Unit 1 emergency diesel generator 2 repair of the high crankcase pressure switch on September 9, 2019

71111.20 - Refueling and Other Outage Activities

Refueling/Other Outage Sample (IP Section 03.01) (1 Sample)

- (1) Unit 2 Forced Outage 2F19-01, as a result of a fault on reactor coolant pump motor B, on July 29, 2019

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (2 Samples)

- (1) Unit 2 control element assemblies drop time testing for operating for an extended period of time on the lower gripper and the hold bus on July 19, 2019
- (2) Unit 1 engineering safeguards actuation system analog Channel 1, 2, and 3 monthly surveillance testing on August 16, 2019

71114.02 - Alert and Notification System Testing

Inspection Review (IP Section 02.01-02.04) (1 Sample)

- (1) The inspectors evaluated the maintenance and testing of the alert and notification system between April 1, 2017, and August 24, 2019.

71114.03 - Emergency Response Organization Staffing and Augmentation System

Inspection Review (IP Section 02.01-02.02) (1 Sample)

- (1) The inspectors evaluated the readiness of the Emergency Response Organization between April 1, 2017, and August 24, 2019. Inspectors also evaluated the licensee's ability to staff their emergency response facilities in accordance with emergency plan commitments.

71114.04 - Emergency Action Level and Emergency Plan Changes

Inspection Review (IP Section 02.01-02.03) (1 Sample)

- (1) The inspectors evaluated the 10 CFR 50.54(q) emergency plan change process and practices between April 1, 2017, and August 24, 2019. The evaluation reviewed screenings and evaluations documenting the implementation of this process. The reviews of the change process documentation do not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

Inspection Review (IP Section 02.01 - 02.11) (1 Sample)

- (1) The inspectors evaluated the maintenance of the emergency preparedness program between April 1, 2017, and August 24, 2019. The evaluation reviewed activations of

the emergency plan, the conduct of drills and exercises, licensee audits and assessments, and the maintenance of equipment important to emergency preparedness.

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

- (1) Unit 2 resin leak in the drumming station with a reactor coolant pump shaft shear and loss of coolant accident on August 23, 2019

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

EP01: Drill/Exercise Performance (IP Section 02.12) (1 Sample)

- (1) (July 1, 2018 – June 30, 2019)

EP02: ERO Drill Participation (IP Section 02.13) (1 Sample)

- (1) (July 1, 2018 – June 30, 2019)

EP03: Alert & Notification System Reliability (IP Section 02.14) (1 Sample)

- (1) (July 1, 2018 – June 30, 2019)

MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

MS07: High Pressure Injection Systems (IP Section 02.06) (2 Samples)

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - June 30, 2019)

MS08: Heat Removal Systems (IP Section 02.07) (2 Samples)

- (1) Unit 1 (July 1, 2018 - June 30, 2019)
- (2) Unit 2 (July 1, 2018 - Jun 30, 2019)

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (IP Section 02.03) (2 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

- (1) Unit 2 containment air cooler B auxiliary contact high resistance and C breaker trip due to relay failures on September 5, 2019
- (2) Unit 2 reactor coolant pump C control bleed off line through wall leak on September 12, 2019

71153 - Followup of Events and Notices of Enforcement Discretion

Event Followup (IP Section 03.01) (1 Sample)

- (1) Unit 2 lowering level in the spent fuel pool due to a failed air seal between the spent fuel pool and cask loading pit on August 29, 2019

Event Report (IP Section 03.02) (2 Samples)

The inspectors evaluated the following licensee event reports (LERs):

- (1) LER 05000313/2018-004-01, Reactor Trip Due to the Loss of a Non-Vital 4160 Volt Bus, (ADAMS Accession No. ML19238A058)

The circumstances surrounding this LER are documented in Inspection Report 05000313/2019001 and 05000368/2019001 as FIN 05000313/2019001-03 and NCV 05000313/2019001-04.

- (2) LER 05000368/2019-001-00, Reactor Trip Due to a Reactor Coolant Pump Motor Failure (ADAMS Accession No. ML19204A311)

The inspectors determined that the cause of the condition described in the LER was not reasonably within the licensee's ability to foresee and correct, and therefore, was not reasonably preventable. No performance deficiency nor violation of NRC requirements was identified.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

60855 - Operation of an ISFSI

Operation of an ISFSI (1 Sample)

- (1) The ANO independent spent fuel storage installation (ISFSI) consisted of four ISFSI pads containing two different cask designs. ANO had loaded 24 canisters of the Energy Solutions ventilated storage cask (VSC) VSC-24 design (Certificate of Compliance (CoC) No. 1007) from 1996 to 2003. Since that time, ANO had been loading HI-STORM 100S Version C overpacks containing either a multi-purpose canister (MPC)-24 or MPC-32 design. At the time of the routine inspection, the HI-STORM-100 ISFSI pads contained a total of 67 overpacks and the licensee was in the process of loading canister 68. ANO was currently loading canisters to the Holtec CoC No. 1014, Amendment 13, and Final Safety Analysis Report (FSAR), Revision 18.

The inspectors evaluated the licensee's ISFSI cask loading from July 22 through July 26, 2019. Specifically, the inspectors observed the following activities:

- Forced helium dehydration and helium backfill
- Heavy load lift by the vertical cask transporter (VCT) of the storage cask (HI-STORM) into the cask transfer facility (CTF) in preparation for stack-up operations.

The inspectors also evaluated the licensee's operational response and recovery actions associated with the small amount of helium leakage encountered when attempting to remove the removable valve operating assemblies from the MPC following initial helium backfill.

The inspectors performed a walkdown of all ISFSI radiologically controlled areas, including performing independent radiation surveys, a walkdown of the CTF, and a walkdown of the ISFSI haul path. The inspectors also performed a walkdown of the spent fuel floor for both Unit 1 and Unit 2, and a walkdown of the location of radiation monitors 2RITS-8750-1A and 2RITS-8750-1B. The inspectors performed a walkdown of the low profile transporter (LPT) in the turbine building train bay.

The inspectors evaluated the following:

- Spent fuel selection for the four Unit 1 casks and the four Unit 2 casks in this loading campaign (HI-STORMs 61-68)
- Compliance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 72.104 for calendar years 2017 and 2018
- Fire hazards analyses and control of combustibles for ISFSI operations
- Conditions for use of the cask supplemental cooling system
- Selected radiological surveys of the ISFSI and dry fuel storage casks
- Selected ISFSI condition reports
- Quality assurance (QA) program implementation, including recent QA audits, surveillances, receipt inspection, and quality control activities
- Compliance to technical specification for operational surveillance activities and FSAR required annual maintenance activities
- Documentation of annual maintenance activities for heavy lifting components, which included special lifting devices, the site's cask handling crane (Auxiliary Building L-3 crane), and the site's VCT

60857 - Review of 10 CFR 72.48 Evaluations

Review of 10 CFR 72.48 Evaluations (1 Sample)

- (1) The inspectors reviewed a list of 10 CFR 72.48 screenings performed by the licensee since October 2017. During this time period the licensee did not perform any 10 CFR 72.48 evaluations. The inspectors evaluated the following:
 - Selected licensee 10 CFR 72.48 screenings and associated changes, tests, or experiments
 - The process by which the licensee evaluates 10 CFR 72.48 screenings and evaluations performed by the Certificate of Compliance (CoC) holder
 - The licensee's change in CoC loading amendment from Amendment 5 to Amendment 13

- Changes made to the licensee's 10 CFR 72.212 Report (Revisions 11 and 12) since October 2017.

INSPECTION RESULTS

| Failure to Install Correct Component and Perform Post Maintenance Testing | | | |
|---|---|----------------------------------|----------------|
| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
| Initiating Events | Green NCV 05000368/2019003-01 Open/Closed | [H.14] - Conservative Bias | 71111.19 |
| <p>The inspectors reviewed a self-revealed, Green finding and associated non-cited violation of Arkansas Nuclear One, Unit 2, Technical Specification 6.4.1.a, for the licensee's failure to properly pre-plan and perform maintenance that can affect the performance of safety-related equipment. Specifically, the licensee failed to install the correct diodes for control element assembly hold bus 2C70 and to perform post-maintenance testing to demonstrate component functionality.</p> <p><u>Description:</u> In November 2018, during Refueling Outage 2R26, Work Order 52770071 was issued for replacement/refurbishment of the Unit 2 control element assembly (CEA) hold bus 2C70. The hold bus is designed to provide DC voltage to hold a CEA subgroup in a fixed reactor core location when the normal CEA power supply is unavailable. During the performance of the hold bus work, two diodes of the wrong type were installed. The postmaintenance testing (PMT) in Work Order 52770071, step 4.2, Section 6 (Attachment 1) required verification that the hold bus would hold a CEA subgroup. The PMT was not performed, but a note was added to the work order to indicate that it would be done during a potential forced outage and that the maintenance work order was updated to have a scheduled task prior to reactor startup. However, the testing was not done before the Unit 2 reactor startup following Refueling Outage 2R26. The presence of the two incorrect diodes ensured that transfer of CEA subgroups 1 through 10 to hold bus 2C70 would have resulted in a dropped CEA during power operations. This would have required immediate operator action to reduce power by 28 percent or greater in accordance with technical specifications and Procedure OP-2203.003, "CEA Malfunction," Revision 25, and the potential recovery of the dropped CEA or the performance of a reactor shutdown to meet technical specification requirements.</p> <p>On January 7, 2019, the licensee documented in Condition Report CR-ANO-2-2019-00041 that preventive maintenance on hold bus 2C70 was not fully completed. The condition report referenced two work orders that had not been completed, including Work Order 52770071. This condition report was closed on January 14, 2019, with no additional corrective actions taken for hold bus 2C70.</p> <p>On July 27, 2019, during Unit 2's Forced Outage 2FP19-01, the licensee performed a voltage adjustment to lower hold bus 2C70 voltage due to concerns with CEA drop times. The PMT for this maintenance was to place a CEA subgroup onto hold bus 2C70 as a functional test. When the CEA subgroup was transferred to hold bus 2C70, two CEAs inserted into the reactor core. The licensee's troubleshooting of the event determined two incorrect diodes were installed during Refueling Outage 2R26. The licensee entered this issue into the corrective action program as Condition Report CR-ANO-2-2019-02163 and performed a human performance analysis.</p> <p>The licensee's human performance analysis identified two causal factors:</p> | | | |

- Inadequate work instruction: Work Standard T23467 had vague open-ended repair instructions without materials identified for the repairs
- Inadequate verification and validation practices: Craft performing the work did not verify that the parts being installed were the correct ones for that component/application

The human performance evaluation focused on why the incorrect diodes were installed, but did not determine why the licensee failed to perform the required post-maintenance test prior to reactor startup from Refueling Outage 2R26 and why no additional actions were taken when it was identified in Condition Report CR-ANO-2-2019-00041. The licensee entered this issue into the corrective action program as Condition Report CR-ANO-2-2019-02607 and performed an adverse condition analysis.

Corrective Actions: The licensee replaced the incorrect diodes and performed the required post maintenance testing prior to reactor startup from Forced Outage 2FP19-01. Additionally, the licensee revised the work standard for the hold bus refurbishment to include instructions and materials for the refurbishment.

Corrective Action References: Condition Reports CR-ANO-2-2019-00041, CR-ANO-2-2019-02163, CR-ANO-2-2019-02150, and CR-ANO-2-2019-02607

Performance Assessment:

Performance Deficiency: The licensee's failure to properly pre-plan maintenance activities to ensure the correct components were installed and to perform the required post-maintenance testing was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have adversely impacted the equipment performance attribute of the Initiating Events Cornerstone and would have affected the associated cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, if a control element assembly subgroup was transferred to hold bus 2C70 during power operations, it would have resulted in one control element assembly dropping into the reactor core.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors determined that the finding had very low safety significance (Green) because the finding did not cause a reactor trip and the loss of mitigation equipment relied upon to transition the plant from the onset of the trip to a stable shutdown condition.

Cross-Cutting Aspect: H.14 - Conservative Bias: Individuals use decision-making-practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, the licensee failed to consider the risk-significance of the proposed action to defer postmaintenance testing following hold bus 2C70 diode replacement to ensure equipment functionality. Additionally, the licensee failed to consider the risk-significance of the proposed action to close Condition Report CR-ANO-2-2019-00041 with no additional actions to verify hold bus 2C70 functionality.

Enforcement:

Violation: Unit 2 Technical Specification 6.4.1.a requires, in part, that written procedures be established, implemented, and maintained covering the applicable procedures in Appendix A to Regulatory Guide 1.33. Appendix A, Section 9.a, states, in part, that maintenance that can affect the performance of safety-related equipment should be properly preplanned and performed in accordance with written procedures, documented instructions, or drawings appropriate to the circumstances. Work Order 52770071, step 4.1, provides instructions to refurbish the hold bus 270 power supply, and step 4.2, Section 6 (Attachment 1), provides instructions to perform the post maintenance testing of the hold bus 2C70 power supply.

Contrary to the above, on November 2018, the licensee failed to properly preplan and implement maintenance that can affect the performance of safety-related equipment. Specifically, the licensee failed to have adequate work instructions in Work Order 52770071, step 4.1, to install the correct diodes for hold bus 2C70 and implement step 4.2 to perform Section 6 (Attachment 1), post maintenance testing. This condition resulted in the installation of the incorrect diodes and the failure to perform post maintenance testing for hold bus 2C70.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Promptly Identify and Correct a Condition Adverse to Quality

| Cornerstone | Significance | Cross-Cutting Aspect | Report Section |
|-------------------|---|-----------------------|----------------|
| Initiating Events | Green NCV 05000368/2019003-02 Open/Closed | [P.2] - Evaluation | 71152 |

The inspectors reviewed a self-revealed, Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," for the licensee's failure to promptly identify and correct conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances. Specifically, the licensee failed to promptly identify and correct damage to Unit 2's reactor coolant pump C controlled bleed off piping in 2011, 2015, and 2017, when insulation was removed making the piping available for inspection.

Description: In May 2019, during full power operations, Unit 2 operators observed an unexplained rise in the containment sump level which was not commensurate with the existing plant conditions. This prompted the operators to commence a reactor coolant system leak investigation. Prior to completion of the online leak investigation, Unit 2 experienced a reactor trip and entered Forced Outage 2FP19-01, as a result of a fault in reactor coolant pump motor B. During Forced Outage 2FP19-01, the licensee discovered that reactor coolant pump C controlled bleed off (CBO) piping was leaking due to a through wall crack in a socket weld. The licensee entered this issue into the corrective action program as Condition Report CR-ANO-2-2019-01365 and performed an adverse condition analysis.

The licensee's adverse condition analysis determined the direct cause associated with the through wall leak on the CBO piping was a crack initiated from external damage from a thin cutting tool. The CBO piping was also subjected to vibration loads, which resulted in the propagation of a through wall crack due to cyclic fatigue. The causal factor was poor maintenance work practices that led to significant CBO piping damage which likely took place

during 2008 when the removal/replacement of fibrous insulation on various lines was authorized due to damaged insulation. During the insulation removal/replacement, which occurred multiple times since 2008, the licensee did not document any observed damage to the CBO piping.

The licensee documented damage to reactor coolant pump C CBO piping insulation three times since 2011 (Condition Reports CR-ANO-2-2011-00567, CR-ANO-2-2015-03185, and CR-ANO-2-2017-01735), which provided them the opportunity to identify and correct the damage. In each instance, the licensee only addressed the replacement of the insulation, and no instructions were incorporated into the work orders which replaced the insulation to also inspect the underlying CBO piping. The licensee stated that damage to the CBO piping most likely occurred during 2008 when the removal/replacement of fibrous insulation on various lines was authorized due to damaged insulation; however, damage to the CBO piping could also have occurred when the insulation was replaced in 2011 and 2015, and during the permanent removal of the insulation in 2017. The licensee's focus was the vibration-induced insulation damage, and the licensee did not thoroughly evaluate the issue to determine if the CBO piping was also damaged. Specifically, the licensee did not use its internal and external operating experience to thoroughly review the vibration-induced insulation damage to identify the CBO piping damage in 2011, 2015, or 2017.

The inspectors noted that NRC Information Notice (IN) 2007-21, "Pipe Wear Due to Interaction of Flow Induced Vibration and Reflective Metal Insulation," provided operating experience to licensees that significant wear marks were observed on the outside wall of chemical and volume control system stainless steel piping due to interaction between the piping base metal and the installed reflective metal insulation. The NRC IN stated that the most probable cause of the abrasive wear was flow induced vibration combined with end cap to piping interaction. The NRC IN recommended that licensees review the information for applicability to their facilities and consider actions, as appropriate, to identify and address similar problems, up to and including the periodic removal of insulation to allow visual inspection for piping degradation. Additionally, the licensee had its own internal operating experience associated with damage identified on piping that interfaces with the reactor coolant system. In 1989, 1994, and 2009, the licensee identified cuts on piping (Condition Reports CR-ANO-1-1989-00110, CR-ANO-2-1994-00183, and CR-ANO-2-2009-02680) and, in 2014, gouges were noted during ASME inspections of charging piping to the reactor coolant pump B discharge cold leg (Condition Report CR-ANO-2-2014-01157).

Corrective Actions: The licensee replaced reactor coolant pump A, B, C, and D CBO lines and performed an extent of condition that identified one additional location that required replacement.

Corrective Action Reference: Condition Report CR-ANO-2-2019-01365

Performance Assessment:

Performance Deficiency: The licensee's failure to promptly identify and correct a condition adverse to quality when removing reactor coolant pump CBO insulation was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the equipment performance attribute of the Initiating Events Cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as

power operations. Specifically, the failure to promptly identify and correct the damage on the reactor coolant pump CBO piping resulted in a failed socket weld and a reactor coolant leak, which degraded the safety-related ASME Class II boundary.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors determined the finding had very low safety significance (Green) because the finding after a reasonable assessment of degradation (1) did not result in exceeding the reactor coolant system leak rate for a small loss-of-coolant accident; and (2) likely did not affect other systems used to mitigate a loss-of-coolant accident resulting in a total loss of their function.

Cross-Cutting Aspect: P.2 - Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the licensee failed to thoroughly evaluate CBO piping for damage, using internal and external operating experience, when insulation was removed due to vibration induced damage in 2011, 2015, and 2017.

Enforcement:

Violation: Title 10 of the Code of Federal Regulations Part 50, Appendix B, Criterion XVI, "Corrective Action," requires that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.

Contrary to the above, between February 2011 and September 2017, the licensee failed to promptly identify and correct a condition adverse to quality. Specifically, the licensee failed to promptly identify and correct damage to reactor coolant pump C control bleed off line piping which eventually led to a failure of the line and subsequent reactor coolant leak requiring a forced shutdown to make repairs in May 2019.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On July 11, 2019, the inspectors presented the Unit 1 biennial requalification inspection results to Mr. D. Pehrson, Senior Manager, Operations, and other members of the licensee staff.
- On July 25, 2019, the inspectors presented the independent spent fuel storage installation inspection results to Mr. R. Anderson, Site Vice President, and other members of the licensee staff.
- On August 15, 2019, the inspectors presented the Unit 1 biennial requalification inspection results to Mr. R. Martin, Superintendent, Operations Training, and other members of the licensee staff.
- On August 15, 2019, the inspectors presented the Unit 2 annual requalification inspection results to Mr. R. Martin, Superintendent, Operations Training, and other members of the licensee staff.

- On August 29, 2019, the inspectors presented the emergency preparedness program inspection technical debrief was conducted with Mr. J. Toben, Manager, Emergency Preparedness, and other members of the licensee staff.
- On September 26, 2019, the inspectors presented the emergency preparedness program inspection telephonic exit with Mr. B. Patrick, Director, Regulatory Assurance and Performance Improvement, and other members of the licensee staff.
- On October 3, 2019, the inspectors presented the integrated inspection results to Mr. J. Dinelli, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|----------------|---|------------------|
| 60855 | Calculations | HI-2125213 | Evaluation of MPC Lid Temperature under HI-TRAC Operation at ANO | 0 |
| | Corrective Action Documents | CR-ANO- | 1-2017-0355, 2-2019-02041, 2-2019-02065, C-2017-04091, C-2017-04221, C-2017-04585, C-2017-04833, C-2018-00313, C-2018-02422, C-2018-03438, C-2019-00149, C-2019-01006 | 07/24/2019 |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | 1-2019-02142, 1-2019-02404, C-2019-03052 | |
| | Miscellaneous | | 10 CFR 72.212 Evaluation Report ANO Independent Spent Fuel Storage Installation | 12 |
| | | | Unit 2 Station Log, Tuesday July 23, 2019 | 07/23/2019 |
| | Procedures | 1601.305 | Radiation Monitoring Requirements for Loading and Storage of the HI-STORM | 013 |
| | | 2203.012H | Annunciator 2K08 Corrective Action | 039 |
| | | 3305.003B | Unit 2 Operations Rounds Required Readings | 0 |
| | | EN-DC-215 | Fuel Selection for Holtec Dry Cask Storage | 11 |
| | | EN-RP-105 | Radiological Work Permits | 18 |
| | | OP-1015.003B | Unit Two Operations Logs | 80 |
| | | OP-2104.007 | Control Room Emergency Air Conditioning and Ventilation | 076 |
| | | OP-3403.005 | HI-STORM 100 System Loading Operations | 044 |
| | | OP-3406.005 | HI-STORM and HI-TRAC Transport Operations Using LPT, VCT, and Holtec Railcar | 018 |
| | | OP-3406.006 | Forced Helium Dehydration System Operations | 011 |
| | Radiation Surveys | ANO-1906-00461 | Map Number DFS-H8 Location Hi-Storm Work Order #454379 | 06/24/2019 |
| | | ANO-1907-00290 | Map Number DFS-H8 Location Hi-Storm Work Order #515364 | 07/17/2019 |
| | | ANO-1907-00291 | Map Number DFS-H9 Location Hi-Storm Work Order #515364 | 07/17/2019 |
| | Radiation Work Permits (RWPs) | RWP 2017-1061 | Load Dry Fuel Storage MPC and Store in Hi-Storm with Unit 1 Fuel (Includes DFS support activities) | 10/18/2017 |
| | | RWP 2017-1063 | Dry Fuel Storage Unit 1 | 03/07/2018 |
| | Work Orders 60855 | WO | 502367600, 52702275, 52800723 | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|--|---|------------------|
| 60857 | Engineering Changes | 72.48 Screening and Applicability Determinations | EN-DC-2015-008, EN-DC-215-009, EN-DC-215-010, EN-DC-215-011, EC 46581, EC-ANO-000074974-0000, | 07/24/2019 |
| | Procedures | EN-LI-100 | Process Applicability Determination | 25 |
| 71111.04Q | Calculations | CALC-91-E-0090-03 | ANO-2 Switchgear, Battery, DC, Corridor 2104 Emergency (Post-Accident) Temperature Evaluation | 7 |
| | Corrective Action Documents | CR-ANO- | 1-2019-02012, 2-2019-01429, 2-2019-01430, 2-2019-01432, 2-2019-01881, 2-2019-01887 | |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | C-2019-02993 | |
| | Drawings | M-217, Sheet 1 | Piping and Instrument Diagram Emergency Diesel Generator Fuel Oil Storage | 90 |
| | Engineering Changes | EC 20198 | ANO-2 Switchgear, Battery, DC, Corridor 2104 Emergency (Post-Accident) Temperature Evaluation | 0 |
| | | EC 69053 | 2VUC-2C Cooling Coil Casing Configuration Changes | 0 |
| | | EC 83577, Sheet 1 | 2VUC-2D Cooling Coil Replacement – Vendor Flange Material Change 2HCC-259-3 | 4 |
| | Procedures | EN-OP-102 | Protective and Caution Tagging | 23 |
| | | OP-1104.023 | Diesel Oil Transfer Procedure | 38 |
| | | OP-1104.036 | Emergency Diesel Generator Operation | 82 |
| | | OP-1203.012A | Annunciator K01 Corrective Action | 46 |
| | | OP-2104.035 | Ventilation System Operations | 45 |
| | | OP-2203.012U | Annunciator 2E12 Corrective Action | 23 |
| | | OP-2305.018 | Underground EDG F.O. Tank 2T-57A/B Recirculation and Cleanup | 16 |
| 71111.05A | Corrective Action Documents | CR-ANO- | C-2019-03123 | |
| | Fire Plans | PFP-U2 | Unit 2 Prefire Plans | |
| | Miscellaneous | FBDR-2019-14 | Fire Drill | |
| | Procedures | OP-1903.010 | Emergency Action Level Classification | 57 |
| | | OP-2203.034 | Fire or Explosion | 23 |
| 71111.05Q | Calculations | CALC-95-R- | Basis Requirements for the Component Database on Station | 16 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|----------------------|--|------------------|
| | | 00024-01 | Doors and Hatches | |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | C-2019-02986 | |
| | Fire Plans | FZ-3040 | Fire Zone Detail Alternate Generator Building – Area AGB 354' | 4 |
| | | FZ-2002 | Fire Zone Detail Control Room, Area G, Fire Zone 2199-G | |
| | | PFP-U1 | Unit 1 Prefire Plan | 21 |
| | Miscellaneous | ER-ANO-2004-0230-011 | Add Reverse Osmosis Unit to Fire Zone 2026-Y | 0 |
| | | ER-ANO-2004-0619-001 | RO Unit Watch Requirements | 0 |
| | | Fire Impairments | 8395, 8396, 8397 | |
| | Procedures | COPD-024 | Risk Assessment Guidelines | 68 |
| | | OP-1000.120 | ANO Fire Impairment Program | 25 |
| | Work Orders | WO | 52842614 | |
| 71111.06 | Calculations | CALC-ANOC-CS-15-0003 | ANO Flood Protection Design Basis | 8 |
| | Corrective Action Documents | CR-ANO- | 1-2009-02250, 1-2019-00521, 1-2019-00911, 1-2019-01310, 1-2019-01581, C-2019-00907, C-2019-01773, C-2019-01976 | |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | C-2019-03310 | |
| | Engineering Changes | EC 33613 | Conduit Internal Water Seal | 0 |
| | | EC 57218 | External Flooding Protection Design Basis | 0 |
| | Miscellaneous | CFSD-100 | BDBEE/ELAP Emergency Response | 3 |
| | | CFSG-005 | Initial Assessment and Flex Equipment Staging | 4 |
| | Procedures | OP-1203.025 | Natural Emergencies | 68 |
| | | OP-2203.008 | Natural Emergencies | 52 |
| | | ULD-0-TOP-17 | ANO Flooding | 1 |
| | Work Orders | WO | 374472, 521304, 525350, 525777 | |
| 71111.07A | Corrective Action | CR-ANO- | 2-2016-02844, 2-2017-01145, 2-2017-03648, 2-2019-00486, | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|-------------------|--|------------------|
| | Documents | | 2-2019-01881, 2-2019-01887, | |
| | Engineering Changes | EC 69053 | 2VUC-2C Cooling Coil Casing Configuration Changes | 0 |
| | | EC 83577, Sheet 1 | 2VUC-2D Cooling Coil Replacement – Vendor Flange Material Change 2HCC-259-3 | 4 |
| | Miscellaneous | | Cooling Coil Casing Configuration | 0 |
| | Procedures | EN-MA-145 | Maintenance Standard for Torque Applications | 9 |
| | Work Orders | WO | 528032 | |
| 71111.11A | Miscellaneous | | Unit 2 Annual Exam Results | |
| 71111.11B | Corrective Action Documents | CR-ANO- | 1-2018-01260, 1-2018-03238, 1-2018-03611, 1-2018-04206, 1-2018-04957, 1-2019-00756, 1-2019-01164, 1-2019-01480, 1-2019-01635 | |
| | Miscellaneous | | ANO1 Cycle 28 Core Reload Test | |
| | | | ANO1 Cycle 28 Simulator Operability Test | |
| | | | Unit 1 Licensed Operator 2018-2019 Requalification Cycle Curriculum (Sample Plan | |
| | | | Week 3 ANO Unit 1 2019 RO Biennial Requalification Exam | |
| | | | Week 3 ANO Unit 1 2019 SRO Biennial Requalification Exam | |
| | | | ANO Unit 1 Annual and Biennial Exam Results | |
| | | A1JPM-RO-AOP01 | Perform RO #1 Follow-up Actions for Remote Shutdown, Aux Feedwater Pump Available | 9 |
| | | A1JPM-RO-AOP39 | Respond to Loss of Instrument Air Pressure | 0 |
| | | A1JPM-RO-AOP41 | Perform Actions for an Inadvertent Actuation of ESAS | 1 |
| | | A1JPM-RO-AOP42 | Fire Affecting Safe Shutdown: Outside AO Actions (Fire Area C) | 0 |
| | | A1JPM-RO-ED017 | Perform Transfer of D11 from Normal Supply to Emergency Supply Using Local Controls at D01 | 6 |
| | | A1JPM-RO-EDG11 | Reset Emergency Diesel Generator #2 Overspeed Trip Mechanism | 10 |
| | | A1JPM-RO-EFIC2 | Perform EFW Pump (P-7A or P7B) Suction Transfer to Service Water | 13 |
| | | A1JPM-RO-EOP10 | Perform Actions Required to Correct Inadequate Core Cooling | 6 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|---------------------|---|------------------|
| | | A1JPM-RO-EOP13 | Emergency and Abnormal Operations | 8 |
| | | A1JPM-RO-EOP22 | Respond to Degraded Power (Verify both EDGs supplying associated ES buses with proper voltage, frequency and loading) | 3 |
| | | A1JPM-SRO-EAL09 | Classify an Emergency Event | 6 |
| | | A1JPM-SRO-EAL14 | Classify an Emergency Event | 3 |
| | | ANSI/ANS-3.4-1983 | Medical Certification and Monitoring of Personnel Requiring Operator Licenses for Nuclear Power Plants | |
| | | SES-1-007 | Dynamic Simulator Scenario Week 5 | 2 |
| | | SES-1-030 | Dynamic Simulator Scenario Week 4 | 1 |
| | | SES-1-036 | Dynamic Simulator Scenario Week 4 | 4 |
| | | SES-1-047 | Dynamic Simulator Scenario Week 5 | 2 |
| | | TQF-214-71111 | Assessment Plan for Licensed Operator Requalification (LOR) Program Pre-71111.11 Assessment | |
| | Procedures | 1063.008 | Operations Training Sequence | 46 |
| | | DG-TRNA-015-EXAMSEC | Simulator Exam Security Guidelines | 18 |
| | | EN-TQ-114 | Licensed Operator Requalification Training Program Description | 12 |
| | | EN-TQ-201-04 | SAT - Implementation Phase | 8 |
| | | EN-TQ-202 | Simulator Configuration Control | 10 |
| | | TQF-201-IM05 | Remedial Training Plan | 1 |
| 71111.11Q | Corrective Action Documents | CR-ANO- | 2-2019-02295 | |
| | Procedures | EN-OP-115 | Conduct of Operations | 26 |
| | | OP-1202.008 | Blackout | 18 |
| | | OP-1202.012 | Repetitive Tasks | 21 |
| | | OP-1203.045 | Rapid Plant Shutdown | 20 |
| 71111.13 | Corrective Action Documents | CR-ANO- | 1-2017-02104, 1-2019-01847, 1-2019-02219, 2-2019-02477, C-2017-04125, C-2019-01042, C-2019-02108, C-2019-02428, C-2019-02429, C-2019-02430, C-2019-02431, C-2019-02452, | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|-------------------|--|------------------|
| | | | C-2019-02485, C-2019-02486 | |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | C-2019-02877 | |
| | Drawings | E-4, Sheet 2 | Single Line and Relay Metering Diagram Common Feed Water 4.16 kV Switchgear Bus A-15 | 1 |
| | | E-4, Sheet 3 | Single Line and Relay Metering Diagram Common Feed Water 4.16 kV Switchgear Bus A-19 | 1 |
| | | M-217, Sheet 2 | P&ID EDG K-4A (DG-1) | 44 |
| | | M-217, Sheet 3 | P&ID EDG K-4B (DG-2) | 25 |
| | Engineering Changes | EC 70658 | K-4A and K-4B EDG Crankcase Pressure Trip Device Isolation Valve | 0 |
| | | EC 70659 | K-4A EDG Crankcase Pressure Trip Device Isolation Valve | 0 |
| | | EC-70864 | K-4B EDG Crankcase Pressure Trip Device Isolation Valve | 0 |
| | Procedures | COPD-024 | Risk Assessment Guidelines | 58, 68 |
| | | EM-MA-125 | Troubleshooting Control of Maintenance Activities | 24 |
| | | EN-DC-128 | Fire Protection Impact Reviews | 12 |
| | | EN-OP-119 | Protected Equipment Postings | 11 |
| | | EN-WM-104 | On Line Risk Assessment | 20 |
| | | OP-1104.036 | Emergency Diesel Generator Operations | 82 |
| | | OP-1106.007 | Common Feedwater System | 5 |
| | | OP-1107.001 | Electrical System Operations | 123 |
| | | OP-1203.046 | Loss of Load Center | 15 |
| | | OP-2104.037 | Alternate AC Diesel Generator Operations | 34 |
| | | OP-2202.010 | Standard Attachments | 29 |
| | | OP-2203.012D | Annunciator 2K04 Corrective Action | 40 |
| | | OP-2203.012L | Annunciator 2K12 Corrective Action | 52 |
| | | OP-2203.012Z | Annunciator 2C435 Corrective Action | 8 |
| | | OP-2203.054 | Abnormal Grid | 3 |
| | Work Orders | WO | 530402, 531004, 5283255, 52798239, | |
| 71111.15 | Calculations | CALC-93-D-5015-06 | Unit 1 Intake Structure Natural Convection-GOTHIC Model | 2 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---|-------------------|--|------------------|
| | | CALC-93-R-1006-01 | Unit 1 Intake Structure Environmental Temperature Study | 2 |
| | | CALC-M-3600-139 | Intake Structure Critical Ambient Temperature | 0 |
| | Corrective Action Documents | CR-ANO- | 1-2018-02614, 1-2019-01897, 1-2019-02029, 1-2019-02304, 2-2018-00949, 2-2019-01372, 2-2019-01373, 2-2019-01374, 2-2019-01687, 2-2019-01861, 2-2019-01875, 2-2019-01887, C-2019-00310 | |
| | Corrective Action Documents Resulting from Inspection | CR-ANO- | 1-2019-01903 | |
| | Drawings | E-2014, Sheet 3 | Single Line Diagram 480 Volt Motor Control Centers 2B53 | 42 |
| | | E-2361 Sheet 1A | Schematic Diagram Containment Cooling Fan 2VSF1B | 9 |
| | | M-217, Sheet 2 | P&ID EDG K-4A (DG-1) | 44 |
| | Engineering Changes | EC 83577 | | |
| | | EC 83885 | P-4A SW Winding Temp | 0 |
| | Procedures | OP-1015.008 | Unit 2 SDC Control | 61 |
| | | OP-1015.048 | Shutdown Operations Protection Plan | 25 |
| | | OP-2104.029 | Service Water System Operations | 115 |
| | | OP-2106.006 | Emergency Feedwater Operations | |
| | | OP-2305.003 | ESF Response Time Test | 40 |
| | | OP-2305.062 | SW System Flow Testing | |
| | Work Orders | WO | 484566, 527146, 528032-01, 531004, 527962, 501701, 52813296 | |
| 71111.19 | Corrective Action Documents | CR-ANO- | 1-2019-02219, 2-2019-01374, 2-2019-01743, 2-2019-02104, 2-2019-02136, 2-2019-02260, 2-2019-02477 | |
| | Miscellaneous | | Flowserve Memo | 06/27/2017 |
| | Procedures | OP-1104.036 | Emergency Diesel Generator Operations | 82 |
| | | OP-1106.007 | Common Feedwater System | 6 |
| | | OP-2104.037 | | |
| | | OP-2304.037 | Unit 2 Plant Protection System Channel A Test | 54 |
| | | OP-2304.112 | Plant Protection System Response Time Test Channel A | 31 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|---------------------------|---|------------------|
| | Work Orders | WO | 487977-02, 525408, 527621, 527622, 52836554-01, 530402, 528622. 531004 | |
| 71111.20 | Corrective Action Documents | CR-ANO- | 2-2019-01365 | |
| 71111.22 | Corrective Action Documents | CR-ANO- | 1-2019-01956 Rev. 5, 2-2019-00328, 2-2019-01374, 2-2019-01743, | |
| | Engineering Changes | EC 82959 | | |
| | Miscellaneous | 741007 | Combustion Engineering Test Report | |
| | | STM 1-65 | Engineered Safeguards Actuation System | |
| | Procedures | OP-1304.049 | Unit 1 ESAS Analog Channel 1 Test | 28 |
| | | OP-1304.052 | Unit 1 ESAS Analog Channel 1 Calibration | 28 |
| | Work Orders | WO | 527621, 527622, 2790774, 52673734 | |
| 71114.02 | Miscellaneous | | 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 |
| | | EP-002 | Early Warning System | 15 |
| 71114.03 | Miscellaneous | Form 1903.062C, Change 31 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 06/27/2017 | 06/29/2017 |
| | | Form 1903.062C, Change 32 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 09/29/2017 | 10/04/2017 |
| | | Form 1903.062C, Change 32 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 10/31/2017 | 11/13/2017 |
| | | Form 1903.062C, Change 34 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 03/03/2018 | 03/17/2018 |
| | | Form 1903.062C, Change 34 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 06/17/2018 | 07/09/2018 |
| | | Form 1903.062C, Change 35 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 08/09/2018 | 08/16/2018 |
| | | Form 1903.062C, Change 35 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 12/21/2018 | 01/02/2019 |
| | | Form 1903.062C, Change 35 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 01/26/2019 | 02/04/2019 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---------------|--|--|------------------|
| | Procedures | Form 1903.062C, Change 35 | Emergency Response Staffing Drill, Scenario: ERO Test; Date: 05/05/2019 | 05/10/2019 |
| | | 1903.011 | Emergency Response/Notifications | 57 |
| | | EN-EP-310 | Emergency Response Organization Notification System | 8 |
| 71114.04 | Miscellaneous | Attachment 9.1, 10 CFR 50.54(q)(2) Review | Procedure/Document Number: 1903.010, Revision: 055 | 04/09/2018 |
| | | Attachment 9.1, 10 CFR 50.54(q)(2) Review | Procedure/Document Number: 1903.011, Revision: 056 | 10/25/2018 |
| | | Attachment 9.1, 10 CFR 50.54(q)(2) Review | Procedure/Document Number: 1903.062, Revision: 033 | 12/08/2017 |
| | | Attachment 9.1, 10 CFR 50.54(q)(2) Review | Procedure/Document Number: 1904.002, Revision: 042 | 09/21/2017 |
| | | Attachment 9.1, 10 CFR 50.54(q)(2) Review | Procedure/Document Number: 1903.011, Revision: 54 | 04/24/2017 |
| | | Attachment 9.2, 10 CFR 50.54(q)(3) Screening | Procedure/Document Number: 1903.069, Revision: 007 | 09/13/2017 |
| | | Attachment 9.2, 10 CFR 50.54(q)(3) Screening | Procedure/Document Number: OP-1903.011, OP-1903.011-Y, OP-1903.011-Z; Revisions: 056, 048, 047 | 10/25/2018 |
| | | Attachment 9.2, 10 CFR | Procedure/Document Number: 1903.010, Revision: 056 | 06/13/2018 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|---|--|--------------------|
| | | 50.54(q)(3) Screening | | |
| | | Attachment 9.2, 10 CFR 50.54(q)(3) Screening | Procedure/Document Number: OP-1903.010, Revision: 054 | 03/20/2018 |
| | | Attachment 9.3, 10 CFR 50.54(q)(3) Evaluation | Procedure/Document Number: 1903.010, Revision: 054 | 03/20/2018 |
| | | Attachment 9.3, 10 CFR 50.54(q)(3) Evaluation | Procedure/Document Number: OP-1903.010, Revision: 056 | 06/13/2018 |
| | | Attachment 9.3, 10 CFR 50.54(q)(3) Evaluation | Procedure/Document Number: 1903.069, Revision: 007 | 09/13/2017 |
| | | | | |
| | Procedures | 1604.051 | Eberline Radiation Monitoring System | 33 |
| | | 1903.010 | Emergency Action Level Classifications | 52, 54, 55, 56, 57 |
| | | 1903.062 | Communications System Operating Procedure | 35 |
| | | 1904.047 | Offsite Dose Projections | 47 |
| | | 2203.012K | Annunciator 2K11 Corrective Action | 50 |
| | | EN-EP-305 | Emergency Planning 10CFR50.54(q) Review Program | 4, 5, 6 |
| 71114.05 | Corrective Action Documents | CR- | HQN-2018-00961 | |
| | | CR-ANO- | C-2017-00961, C-2017-01742, C-2017-01851, C-2017-01972, C-2017-02758, C-2017-02938, C-2017-02950, C-2017-04431, C-2018-00456, C-2018-00525, C-2018-01424, C-2018-01658, C-2018-01783, C-2018-01851, C-2018-01882, C-2018-01890, C-2018-01947, C-2018-02809, C-2018-02810, C-2018-02879, C-2018-03597, C-2018-03686, C-2018-04572, C-2019-01825, C-2019-01851, C-2019-01890, C-2019-03166, C-2019-03203, C-2019-03621 | |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|---------------|-------------|--|------------------|
| | Miscellaneous | | Arkansas Nuclear One ERO Team "Green" Site Drill Report, September 5, 2018 | 06/02/2019 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: Arkansas Nuclear One | 06/06/2018 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: ANO | 02/08/2018 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: Arkansas Nuclear One | 02/25/2019 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: Arkansas Nuclear One | 10/17/2018 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: Arkansas Nuclear One | 06/07/2017 |
| | | | Nuclear Independent Oversight Functional Area Performance Report, Site: ANO | 10/19/2017 |
| | | | Arkansas Nuclear One Blue Team Site Drill Report, May 15, 2019 | 06/12/2019 |
| | | | Arkansas Nuclear One Radiological Monitoring Drill Report, April 17, 2019 | 05/16/2019 |
| | | | Arkansas Nuclear One HP/Post Accident Drill Report, April 17, 2019 | 05/17/2019 |
| | | | Arkansas Nuclear One Red Team Site Drill Report, February 6, 2019 | 02/28/2019 |
| | | | Arkansas Nuclear One ERO Red Team Drill Report, August 2, 2017 | 08/31/2017 |
| | | | Arkansas Nuclear One 2018 NRC Exercise Report, July 17, 2018 | 08/10/2018 |
| | | | Arkansas Nuclear One Radiological Monitoring Drill Report, December 4, 2018 | 02/20/2019 |
| | | | Arkansas Nuclear One HP/Post Accident Drill Report, December 4, 2018 | 02/19/2019 |
| | | | Arkansas Nuclear One Health Physics Drill 2018-01 Drill Package | 05/20/2019 |
| | | | Arkansas Nuclear One Blue Team Drill Report, May 30, 2018 | 05/30/2018 |
| | | EP-2017-027 | 2017 Medical Drill with Pope County EMS and UAMS | 12/06/2017 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|------------------------------------|--|------------------|
| | | EP-2018-001 | December 20, 2017 Pass Drill | 01/18/2018 |
| | | EP-2018-002 | December 14 and 19, 2017 Environmental Sampling Drill | 01/18/2018 |
| | | Form 1903.004-G | EAL State and Local Agreement | 12/11/2018 |
| | | Form 1903.004-N | Annual LOA/Contracts Review | 12/18/2018 |
| | | Form 1903.004N | Annual LOA/Contracts Review | 05/08/2018 |
| | | Form 1903.004M | ETE Update | 08/22/2017 |
| | | Form 1903-004-C | Quarterly Emergency Telephone Directory Review | 06/28/2019 |
| | | KLD TR-1022 | Arkansas Nuclear One, 2018 Population Update Analysis | 09/22/2018 |
| | | KLD TR-938 | Arkansas Nuclear One, 2017 Population Update Analysis | 09/23/2017 |
| | | MS-1 Drill Report EP-2018-20158 | 2018 Medical Drill with Pope County EMS and Saint Mary's Regional Medical Center (September 27, 2018) | 12/06/2018 |
| | | NQ-2017-009 | Emergency Preparedness Audit Package for QA-7-2017-ANO-1 | 07/11/2017 |
| | | NQ-2018-008 | QA Audit Report QA-7-2018-ANO-1, 2018 QA Audit of Emergency Preparedness at Arkansas Nuclear One (ANO) | 05/10/2018 |
| | | QA-07-2019-ANO-1 | Quality Assurance Audit Report | 05/20/2019 |
| | NDE Reports | Form 1903.004-G | EAL State and Local Agreement | 12/05/2017 |
| | Procedures | 1903.004 | Admin. & Maintenance of the Emergency Plan & Implementing Procedures | 35 |
| | | 1903.011 | Emergency Response/Notification | 54 |
| | | 1903.060 | Emergency Supplies and Equipment | 46 |
| | | 1903.069 | Equipment Important to Emergency Response | 9 |
| | | EN-EP-306 | Drills and Exercises | 9 |
| | | EN-EP-308 | Emergency Planning Critiques | 5 |
| | | EN-LI-102 | Corrective Action Program | 36 |
| | | EN-TQ-110 | Emergency Response Organization Training | 12, 13 |
| | Work Orders | WO | 00439733, 00481018, 00481536, 00494038, 004388830, 52610089, 52610090, 5263126 | |
| 71114.06 | Corrective Action Documents | CR-ANO- | C-2019-03055, C-2019-03063, C-2019-03064, C-2019-03065, C-2019-03066, C-2019-03092, C-2019-03094, C-2019-03095 | |
| | Procedures | OP-1903.010 | Emergency Action Level Classification | 57 |
| 71151 | Calculations | CALC-ANO1-SA- | ANO-1 Mitigating System Performance Index Basis | 1 |

| Inspection Procedure | Type | Designation | Description or Title | Revision or Date |
|----------------------|-----------------------------|-----------------------|---|------------------|
| | | 16-00001 | | |
| | | CALC-ANO2-SA-06-00001 | ANO-2 Mitigating System Performance Index Basis | 3 |
| | Corrective Action Documents | CR-ANO- | 1-2019-01658 | |
| | Miscellaneous | | Communicator Scenario HU6 | 11/13/2018 |
| | | A1SPG-SRO-EAL | Emergency Action Level Classification | 3 |
| | | A1SXMLOR1902 | Arkansas Nuclear One, Unit 1, Performance Evaluation Scenario | 0 |
| | | SES-2-007 | Arkansas Nuclear One, Unit 2, Dynamic Exam Scenario | 7 |
| | | SES-2-013 | Arkansas Nuclear One, Unit 2, Dynamic Exam Scenario | 8 |
| | | SES-2-031 | Arkansas Nuclear One, Unit 2, Dynamic Exam Scenario | 8 |
| | | | | |
| | Procedures | 1903.057 | Emergency Action Level Classification | 57 |
| | | EN-LI-114 | Regulatory Performance Indicator Process | 15 |
| 71152 | Corrective Action Documents | CR-ANO- | 2-2019-01365, 2-2019-01445, 2-2019-01687, 2-2019-01746, 2-2019-01820, 2-2019-02033, 2-2019-02118, | |
| 71153 | Corrective Action Documents | CR-ANO- | 2-2019-02506 | |
| | Drawings | M-2235, Sheet 1 | P&ID Fuel Pool System | 76 |
| | Procedures | OP-2104.006 | Fuel Pool Systems | 60 |
| | | OP-2203.002 | Spent Fuel Pool Emergencies | 18 |
| | | OP-2203.012K | Annunciator 2K11 Corrective Action | 50 |