



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION II  
245 PEACHTREE CENTER AVENUE N.E., SUITE 1200  
ATLANTA, GEORGIA 30303-1200

May 10, 2019

Mr. Joseph W. Shea,  
Vice President, Nuclear Regulatory Affairs  
and Support Services  
1101 Market Street, LP 4A  
Chattanooga, TN 37402-2801

SUBJECT: SEQUOYAH UNITS 1 AND 2 – NUCLEAR REGULATORY COMMISSION  
INTEGRATED INSPECTION REPORT 05000327/2019001 AND  
05000328/2019001

Dear Mr. Shea:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Units 1 and 2. On April 23, 2019, the NRC inspectors discussed the results of this inspection with Mr. Scott Hunnewell and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements. The inspectors also documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance or severity 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 II; the Director, Office of Enforcement; and the NRC resident inspector at Sequoyah.

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/**

Omar R. López-Santiago, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Docket Nos.: 05000327 and 05000328  
License Nos.: DPR-77 and DPR-79

Enclosure:  
Inspection Report 05000327/2019001 and 05000328/2019001

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SUBJECT: SEQUOYAH UNITS 1 AND 2 – NUCLEAR REGULATORY COMMISSION  
 INTEGRATED INSPECTION REPORT 05000327/2019001 AND  
 05000328/2019001 dated May 10, 2019

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**U.S. NUCLEAR REGULATORY COMMISSION**

**Inspection Report**

Docket Number(s): 05000327 and 05000328

License Number(s): DPR-77 and DPR-79

Report Number(s): 05000327/2019001 and 05000328/2019001

Enterprise Identifier: I-2019-001-0021

Licensee: Tennessee Valley Authority

Facility: Sequoyah, Units 1 and 2

Location: Soddy Daisy, TN 37379

Inspection Dates: January 01, 2019 to March 31, 2019

Inspectors: N. Childs, Resident Inspector  
W. Deschaine, Project Engineer  
D. Hardage, Senior Resident Inspector  
N. Hobbs, Resident Inspector  
T. Stephen, Senior Resident Inspector  
T. Fanelli, Senior Reactor Inspector

Approved By: Omar R. López-Santiago, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Quarterly inspection at Sequoyah 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. Findings and violations being considered in the NRC's assessment are summarized in the table below. Licensee-identified non-cited violations are documented in report sections: 71153.

### List of Findings and Violations

Failure to Account for Significant Degradation Mechanisms in ASCO Solenoid Operated Valves			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327, 05000328/2019-01 Closed	None	71111.21N
The NRC identified a Green finding and associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (CFR) 50.49(e)(5), for the licensee's failure to account for all significant degradation mechanisms for ASCO solenoid valve FSV-032-80.			

Failure to Account for Heat Rise in Foxboro/Weed Instruments			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327, 05000328/2019-002 Closed	None	71111.21N
The NRC identified a Green finding and associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (CFR) 50.49(e)(5), for the licensee's failure to account for the heat rise of specific components within the Foxboro/Weed instrument FT-063, in accordance with Section 5(1) of IEEE 323-1974.			

### Additional Tracking Items

Type	Issue number	Title	Report Section	Status
URI	05000327,05000328/2017008-03	Potential Inadequate Use of Thermal Aging and the Arrhenius Methodology	71111.21N	Closed

URI	05000327,05000 328/2017008-04	Potential Inadequate Determination of Failure Modes for Qualified Life for Foxboro/Weed Instrument	71111.21N	Closed
URI	05000327,05000 328/2017008-05	Potential Inadequate Justification for Eliminating Preventative Maintenance for ASCO Valves	71111.21N	Closed
URI	05000327,05000 328/2017008-06	Potential Unjustified Qualified Life for ASCO Solenoid Operated Valves (SOVs)	71111.21N	Closed
LER	05000327,05000 328/2018-002-00	LER 2018-002-00 for Sequoyah Nuclear Plant, Units 1 and 2, Exceeded Breach Margin Renders Both Trains of the Auxiliary Building Gas Treatment System Inoperable.	71153	Closed

## **PLANT STATUS**

Unit 1 operated at or near rated thermal power for the entire inspection period.

Unit 2 operated at or near rated thermal power for the entire inspection period.

## **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**

### 71111.04 - Equipment Alignment

#### Partial Walkdown (IP Section 02.01) (4 Samples)

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

- (1) Unit 1 'B' emergency diesel generator (EDG) while 1A EDG was out of service for planned maintenance on January 8, 2019
- (2) Unit 2 'B' motor driven auxiliary feedwater (AFW) pump and turbine driven AFW pump while 'A' motor driven AFW pump was out of service for planned maintenance on January 22, 2019
- (3) Unit 2 'B' emergency diesel generator (EDG) while 2A EDG out of service for planned maintenance on February 5, 2019
- (4) Unit 2 'B' Centrifugal Charging Pump (CCP) while 2A CCP was out of service for planned maintenance on February 19, 2019

### 71111.05A - Fire Protection (Annual)

#### Annual Inspection (IP Section 03.02) (1 Partial)

The inspectors evaluated fire brigade performance during an announced fire drill in the Auxiliary Building 6.9Kv Shutdown Board Room A on January 16, 2019.

### 71111.05Q - Fire Protection

#### Quarterly Inspection (IP Section 03.01) (5 Samples)

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

- (1) Unit 1 and Unit 2 vital battery rooms 1-4 on January 16, 2019
- (2) Unit 1 and Unit 2 cable spreading rooms on January 16, 2019
- (3) Unit 1 and Unit 2 auxiliary building, elevation 749' on February 6, 2019
- (4) Unit 1 and Unit 2 auxiliary building, elevation 734' on February 22, 2019
- (5) Unit 1 and Unit 2 turbine driven auxiliary feedwater pump rooms, elevation 669' on March 29, 2019

#### 71111.06 - Flood Protection Measures

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

The inspectors evaluated cable submergence protection in:

- SQN-0-MNWX-317-MH13B on February 25, 2019
- SQN-0-MNWX-317-MH14B on February 26, 2019

#### 71111.07A - Heat Sink Performance

##### Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

2B-1 and 2B-2 diesel generator heat exchangers inspection and state of cleanliness on February 11, 2019.

#### 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)

The inspectors observed and evaluated licensed operator performance in the main control room during auxiliary feedwater pump testing, safety injection accumulator filling and pressurization, and reactivity manipulations on March 8, 2019.

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

The inspectors observed an evaluated simulator scenario on February 14, 2019.

#### 71111.12 - Maintenance Effectiveness

##### Routine Maintenance Effectiveness Inspection (IP Section 02.01) (2 Samples)

The inspectors evaluated the effectiveness of routine maintenance activities associated with the following equipment and/or safety significant functions:



- (1) Review of System 90, Radiation Monitors on January 17, 2019
- (2) Review of PRA evaluation to revise auxiliary feedwater emergency supply maintenance rule performance criteria to allow one additional functional failure per train, on February 20, 2019

#### 71111.13 - Maintenance Risk Assessments and Emergent Work Control

##### Risk Assessment and Management Sample (IP Section 03.01) (5 Samples)

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

- (1) Unit 1 and Unit 2, week of January 6 – January 12, 2019, including protected equipment status reviews for scheduled maintenance on 1A emergency diesel generator, on January 10, 2019
- (2) Unit 1 and Unit 2, week of January 20 – January 26, 2019, including protected equipment status reviews for scheduled maintenance on 2A AFW pump and replacement of 1B-B 480v shutdown board transformer, on January 24, 2019
- (3) Verified Green risk while 2A-A EDG out of service for maintenance on February 5, 2019
- (4) Main Control Room (MCR) air handling unit (AHU) A-A out of service for maintenance on February 7, 2019
- (5) Unit 1 and Unit 2, week of February 25 – March 1, 2019, including protected equipment status reviews for scheduled maintenance on 1B 690 penetration room cooler and 2b safety injection pump room cooler, on February 26, 2019

#### 71111.15 - Operability Determinations and Functionality Assessments

##### Sample Selection (IP Section 02.01) (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) 480V shutdown board transformer tap settings not set correctly (CR 1484508), on January 22, 2019
- (2) Through wall leak on 1B CCP seal heat exchanger component cooling system (CCS) return line (CR 1485583), on January 25, 2019
- (3) Loss of downstream dam analysis for ultimate heat sink design basis conflict (CR 1485220), on January 24, 2019
- (4) Safety related cables for K-A essential raw cooling water pump in manhole 52A submerged (CR 1495514) on March 7, 2019
- (5) Active boric acid leak on common high pressure line to residual heat removal (RHR) pump flow transmitters (CR 1493790), on February 26, 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) 1-SI-OPS-082-007.A, Electrical Power System Diesel Generator 1A-A after 1A-A DG 4-year maintenance outage, on January 18, 2019
- (2) WO 119450103, Inspect and Clean Diesel Generator 2B-1 Heat Exchanger, on February 14, 2019
- (3) WO 118840720, Replace Existing RHR Pump Room Cooler 1A-A on February 20, 2019
- (4) WO 119635442, Replace FCV-63-47, SIS Pump 1A Inlet Valve molded case circuit breaker on 480v Reactor MOV board on February 22, 2019
- (5) WO119779465, Replace limit switches on 2-MVOP-63-175-B, SIS pump B-B discharge to RWST shutoff valve, on February 27, 2019
- (6) WO 119465679, Replace bearings on El. 690 Penetration Room Cooler Motor 1B, on February 27, 2019

#### 71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated the environmental qualification program information to facilitate closure of the unresolved items opened on January 24, 2018, in Design Bases Assurance Inspection (Programs) Report 05000327, 328/2017008 (ADAMS Accession No. ML18026A544).

#### Select Sample Components to Review - Risk Significant/Low Design (Inside/Outside Containment) (IP Section 02.01) (8 Partials)

- (1) FT-063-0020, weed instrument, safety injection system pump b flow transmitter
- (2) PSV-068-0334, reactor coolant system pressurizer power operated relief valve
- (3) MTRB-030-0074-A, reactor lower compartment cooling fan motor
- (4) 2-MTRA-074-0020-B, RHR motor 2B
- (5) MVOP-063-0072-A, sump swap-over valve
- (6) MVOP-070-087, thermal barrier return containment isolation valve
- (7) PS-030-0046B, containment high pressure alarm switch
- (8) FSV-032-80, containment air control isolation solenoid valve

#### 71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

#### In Service Testing (IST) (IP Section 03.01) (1 Sample)

2-SI-SXP-003-201.A, 2A Motor Driven Auxiliary Feedwater Pump Section XI Test, on January 23, 2019

#### Surveillance Testing (IP Section 03.01) (4 Samples)

- (1) 0-PI-SXV-082-201.B, 1A Diesel Generator Start Air Valve Test, Time Frame B, on January 11, 2019
- (2) 1-SI-SXP-072-201.A, 1A Containment Spray Pump Test, on February 7, 2019
- (3) 1-SI-SXP-003-201.S, Turbine Driven AFW pump Performance Test, March 8, 2019
- (4) 2-SI-OPS-202-253.A, Functional Test of Loss of Voltage Relays on 6.9KV Shutdown Board 2A-A, on March 10, 2019

#### 71114.06 - Drill Evaluation

##### Drill and/or Simulator-Based Licensed Operator Requalification Training (IP Section 02.01) (1 Sample)

The inspectors evaluated:

Emergency preparedness drill conducted on March 27, 2019

#### **OTHER ACTIVITIES – BASELINE**

#### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

##### BI01: Reactor Coolant System (RCS) Specific Activity Sample (IP Section 02.10) (2 Samples)

- (1) Unit 1 RCS activity (January 2018 - December 2018)
- (2) Unit 2 RCS activity (January 2018 - December 2018)

##### BI02: RCS Leak Rate Sample (IP Section 02.11) (2 Samples)

- (1) Unit 1 RCS leakage (January 2018 - December 2018)
- (2) Unit 2 RCS leakage (January 2018 - December 2018)

#### 71152 - Problem Identification and Resolution

##### Annual Follow-up of Selected Issues (IP Section 02.03) (1 Sample)

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

Corrective actions for air header reduction leading to AOP-M.02 entry (CR 1423454)

#### 71153 - Followup of Events and Notices of Enforcement Discretion

##### Event Report (IP Section 03.02) (1 Sample)

The inspectors evaluated the following licensee event reports which can be accessed at <https://lersearch.inl.gov/LERSearchCriteria.aspx>:

LER 05000327, 328/2018-002, Exceeded Breach Margin Renders Both Trains of the Auxiliary Building Gas Treatment System Inoperable.  
 The circumstances surrounding this LER are documented in the results section.

**OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL**

60855.1 - Operation of an Independent Spent Fuel Storage Installation at Operating Plants

Operation of an ISFSI at Operating Plant (1 Sample)

The inspectors evaluated the licensee’s independent spent fuel storage installation cask loadings during the week of February 11, 2019 (Campaign #12). Specifically, the inspectors observed the following activities:

- Fuel selection and fuel loading
- Closure welding and non-destructive weld evaluations
- Transfer and transport evolutions

**INSPECTION RESULTS**

Minor Violation	71111.21N
<p>Minor Violation: During the inspector's review of URI 05000327, 328/2017008-03, "Potential Inadequate Use of Thermal Aging and the Arrhenius Methodology," the inspectors identified that the licensee did not verify that extrapolated accelerated aging data did not contain material phase changes and reactions in accordance with IEEE 323-1974 and NUREG-0588.</p> <p>For multiple components reviewed during the original inspection, the licensee extrapolated high temperature accelerated aging data more than 100°C from tested temperatures to correlate them to normal operating temperatures. When performing these extrapolations beyond 30°C from the lowest Arrhenius data point, the licensee did not ensure that alternate reactions and material phase changes would not occur over these large temperature ranges. The extrapolations were not based on testing that was the same as predicted under the required normal service conditions as required by IEEE 323-1974. The inaccuracies of the extrapolations over such large temperature ranges could be considerable and are not assured to be bounded by the margins in the design. The inspectors determined that the failure to verify that extrapolated accelerated aging data did not contain material phase changes and reactions in accordance with IEEE 323-1974 and NUREG-0588 was a performance deficiency.</p> <p>Screening: The inspectors determined the performance deficiency was minor. This performance deficiency was screened in accordance with Inspection Manual Chapter (IMC) 0612 Appendix B, "Issue Screening," dated January 1, 2018, and was determined to be of minor significance because the failure to verify that extrapolated accelerated aging data did not contain material phase changes and reactions in accordance with IEEE 323-1974 and NUREG-0588 could not be reasonably be viewed as a precursor to a significant event, would not have the potential to lead to a more significant safety concern if left uncorrected, did not relate to a performance indicator that would have caused the performance indicator to exceed a threshold, and did not adversely affect a cornerstone objective. Specifically, with the information at hand the inspectors did not determine that any material phase changes or alternate reactions occurred over the extrapolated temperatures.</p>	

Enforcement: This failure to comply with 10 CFR 50, Appendix B, Criterion III, Design Control, constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy.

The licensee entered this into their corrective action program as CR 1503048 to restore compliance. This minor violation closes URI 05000327,05000328/2017008-03.

Failure to Account for Significant Degradation Mechanisms in ASCO Solenoid Operated Valves

Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327, 05000328/2019-01 Closed	None	71111.21N

The NRC identified a Green finding and associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (CFR) 50.49(e)(5), for the licensee's failure to account for all significant degradation mechanisms for ASCO solenoid valve FSV-032-80.

Description: The safety function of valve FSV-032-80 was to provide containment isolation on the control air headers for 30 days in the event of a containment phase B isolation signal. The licensee used two different ASCO qualification reports to qualify different parts of the valves: test report AQS-21678/TR, dated 1979, for the elastomers; and test report AQR-67368, dated 1983, for the solenoid coils. The qualified life of the solenoid valve was 32.55 years, based on the seat elastomer material as the most limiting component. Equipment qualification document package (EQDP) SQNEQ-SOL-005 specified that the ASCO solenoid valves must comply with the replacement component requirements of 10 CFR 50.49. The licensee qualification standards for these valves included IEEE Standard 323-1974 as supplemented by NUREG-0588. The inspection identified two examples of non-conformances with IEEE 323-1974 that adversely affected the qualified life of the solenoid valve, reducing it from 32.55 years to less than 19 years.

Standard IEEE 323-1974, Section 6.5.2 Mathematical Modeling, required, in part, that, "...The mathematical model shall be based upon established principles, verifiable test data, or operating experience data. The mathematical model shall be such that the performance of the electric equipment is a function of time and the pertinent environmental parameters. All environmental parameters listed in the equipment specification must be accounted for in the construction of the mathematical model unless it can be shown that the effects of the parameter of interest are dependent on the effects of the remaining environmental parameters..." The qualified life characteristics did not account for all significant types of degradation.

Example 1: In 1989, in response to NRC Information Notice (IN) 89-66, ASCO released a field notice that specified temperature rise values at four generic room temperatures specifically for static (no air flow) conditions. The inspectors determined that the licensee's analysis of the qualified life calculations did not account for potential differences between the oven used during the original artificial aging done in in AQR-67368 and the oven used in ASCO's internal heat rise determination of the data that was given in the field notice. Although ASCO did not document the oven ratings at the time of original qualification to meet the IEEE standard above, the commonly used standards for accelerated aging were

IEEE 98-1972 and ANSI/ASTM D2436-1968. These standards required the use of forced air ovens that were calibrated to a maximum  $\pm 3^{\circ}\text{C}$  for the highest oven temperatures. Emails from ASCO have confirmed that the qualification oven was a forced air oven, but the documentation could not confirm if the fans were on. NRC report NUREG/CR-5141 documented that forced air in ovens has a dramatic effect on heat dissipation of solenoid valves. The licensee's addition of the temperatures measured in stagnant air conditions to the qualification report's forced-air oven temperature produced unsubstantiated qualified life results.

Example 2: In 2009, the licensee changed the activation energy for Viton elastomers used in some of the ASCO valves. The life calculations used a DuPont test report (V-D-3-301) that defined the activation energy and justified it based on aging in an air environment with oxidation as an aging mechanism. However, the licensee credited a test report in which valves were cycled using pure nitrogen gas. The use of nitrogen gas during accelerated aging prevented elastomer oxidation, and invalidated the model's intended correlation between time, temperature, and oxidation degradation to the elastomer's end of life condition. In 1990, the EQDP for the ASCO solenoid valves provided a discussion on the qualification testing's use of nitrogen gas during accelerated aging and LOCA testing for ASCO solenoid valves. The discussion recognized the primary aging mechanism (oxidation) degraded the valve elastomers to a greater degree than nitrogen and recognized that the use of pure nitrogen gas during qualification masked the actual aging effects of air (oxidation). The licensee's failure to consider oxidation as a failure mechanism overestimated the time to reach the end of life conditions in the plant environment. This non-conformance would reduce the life of the valves, including normally de-energized valves.

Corrective Action(s): The licensee entered these examples into their corrective action program, which required updates to the EQ binders and other corrective actions due to the nonconforming condition. The licensee determined that operability was maintained.

Corrective Action Reference(s): CR 1503045

Performance Assessment:

Performance Deficiency: The failure to account for significant degradation mechanisms in the ASCO solenoid-operated valves was a performance deficiency. Specifically, the licensee made changes to the original qualified life calculation of these valves by incorrectly incorporating heat rise data and failing to account for oxidizing environments.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of systems that respond to initiating events. Specifically, the failure to adequately account for all significant degradation mechanisms in qualified life extrapolations could adversely affect the reliability of the ASCO solenoid-operated valve relied upon in harsh environments.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations". The inspectors determined the finding was of very low safety significance (Green) because the finding was a deficiency affecting the qualification of a mitigating structure, system, or component (SSC) and the SSC maintained its operability.

Cross-cutting Aspect: Not Present Performance. No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR 50.49(e)(5) required, in part, that "Consideration must be given to all significant types of degradation which can have an effect on the functional capability of the equipment." The equipment must be replaced or refurbished at the end of this designated life unless ongoing qualification demonstrates that the item has additional life."

Contrary to the above, since 1989, the licensee failed to consider all significant types of degradation which can have an effect on the functional capability of the equipment, and replace or refurbish the equipment at the end of its designated life or demonstrate through ongoing qualification that the item had additional life. Specifically, the licensee failed to adequately account for heat rise and consider the degrading effects of oxygen in solenoid valve FSV-032-80. This led to an overestimation of the qualified life and the licensee failed to replace the affected equipment at the end of its designated life or to provide ongoing qualification to demonstrate that the valve had additional life.

This finding closes URIs 05000327,05000328/2017008-05

Enforcement Action: This violation is being treated as an Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Account for Heat Rise in Foxboro/Weed Instruments			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327, 05000328/2019-02 Closed	None	71111.21N
The NRC identified a Green finding and associated non-cited violation (NCV) of Title 10 Code of Federal Regulations (CFR) 50.49(e)(5), for the licensee's failure to account for the heat rise of specific components within the Foxboro/Weed instrument FT-063, in accordance with Section 5(1) of IEEE 323-1974.			
<u>Description:</u> The purpose of the Foxboro/Weed instrument FT-063 was to monitor safety injection flow following an event. These instruments were required to operate for 100 days after an accident. Calculation SQNAPS2-217 determined that the qualified life of the instrument was 22.5 years based on an outside containment normal ambient temperature of 104°F and abnormal ambient temperature of 110°F. This qualified life value was based on the metal film resistor in the instrument being the most limiting component.			
The qualified life calculation failed to analyze localized temperatures that could be higher than the normal bulk temperature readings and abnormal temperatures. NRC Information Notice 87-65, "Plant Operation Beyond Analyzed Conditions," and Information Notice 89-30, "High Temperature Environments at Nuclear Power Plants," informed licensees of a generic problem for pressurized water reactors where operating experience has indicated that temperatures local to instruments often exceeded the bulk temperatures readings.			

Additionally, the calculation did not account for the internal temperature rises of the metal film resistor due to self-heating effects. Consideration of heat rise in the limiting subcomponent leads to a reduction in the overall qualified life of the transmitter. To date, the transmitter has been in service for over seven years.

Corrective Action(s): The licensee entered these examples into their corrective action program, which required updates to the EQ binders and other corrective actions due to the nonconforming condition. The licensee determined that operability was maintained.

Corrective Action Reference(s): CR 1503036

Performance Assessment:

Performance Deficiency: The licensee's failure to account for all significant types of degradation of the Foxboro/Weed instrument FT-063 outside of containment was a performance deficiency. Specifically, the licensee failed to account for the heat rise of specific components within the Foxboro/Weed instrument FT-063.

Screening: The inspectors determined the performance deficiency was more than minor because if left uncorrected, it would have the potential to lead to a more significant safety concern. Specifically, not accounting for internal heat rises could reduce the actual qualified life of transmitter to less than its currently scheduled replacement frequency.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter (IMC) 0609, Att. 4, "Initial Characterization of Findings," issued October 7, 2016, for the Mitigating Systems cornerstone, and IMC 0609, App. A, "The Significance Determination Process (SDP) for Findings At-Power," issued June 19, 2012, and determined the finding was of very low safety significance (Green) because the finding was a deficiency affecting the qualification of a mitigating structure, system, or component (SSC) and the SSC maintained its operability.

Cross-cutting Aspect: Not Present Performance. No cross cutting aspect was assigned to this finding because the inspectors determined the finding did not reflect present licensee performance.

Enforcement:

Violation: Title 10 CFR 50.49(e)(5) required, in part, that, "Equipment qualified by test must be preconditioned by natural or artificial accelerated aging to its end-of-installed life condition. Consideration must be given for all significant types of degradation...and the equipment must be replaced or refurbished at the end of this designated life."

Contrary to the above, since November 22, 1999 the licensee failed to consider all significant types of degradation which could have an effect on the functional capability of the equipment. Specifically, the licensee failed to consider the degrading effects of heat rise.

This closes URI 05000327, 05000328/2017008-04.

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



Minor Violation	71111.21N
<p>Minor Violation: The safety function of valve FSV-032-80 was to provide containment isolation on the control air headers for 30 days in the event of a containment phase B isolation signal. The ASCO solenoid-operated valves were originally environmentally qualified by the manufacturer, using an activation energy of 1.0 eV. Based on this activation energy, normally-energized valves had a qualified life of approximately 16.83 years. In 2009, the licensee made a change to the qualified life calculation of these valves by incorporating an activation energy of 1.37 eV. The source of this activation energy was the Nuclear Utility Group for Environmental Qualification (NUGEQ). Applying an activation energy of 1.37 eV to normally energized valves resulted in a qualified life of approximately ~209 years at a 40°C room temperature and ~155 years at 110°C room temperature.</p> <p>The inspectors reviewed the bases of the 1.37 eV and determined that it assigned an activation energy of one coil type (1.37 eV) to that of different coil types (i.e. different material compositions) which had demonstrated activation energies less than 1.37 eV (less than 1.0 eV). Information from the manufacturer stated that one of four possible coil designs could have been used in the manufacture of these valves, and that there were no efforts made by the manufacturer (ASCO) to differentiate which type of coil was installed in a given valve. Based on this, the inspectors determined that the licensee's justification for using 1.37 eV as the activation energy was inadequate. For the normally energized valves installed, the demonstrated qualified life of the coils reduced from 155 and 209 years to approximately ~17 and ~21 years.</p> <p>Screening: The inspectors determined the performance deficiency was minor. This performance deficiency was screened in accordance with Inspection Manual Chapter (IMC) 0612 Appendix B, "Issue Screening," dated January 1, 2018, and was determined to be of minor significance because the licensee's use of a non-conservative activation energy for coil could not be reasonably be viewed as a precursor to a significant event, would not have the potential to lead to a more significant safety concern if left uncorrected, did not relate to a performance indicator that would have caused the performance indicator to exceed a threshold, and did not adversely affect a cornerstone objective. Specifically, for valve FSV-032-80, failure of the coil would not prevent the valve from performing its safety function.</p> <p>Enforcement: This failure to comply with 10 CFR 50.49(e)(5) constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. The licensee has taken actions to restore compliance.</p> <p>The licensee entered this into their corrective action program as CR 1503045 to restore compliance. This minor violation closes URI 05000327, 328/2017008-06.</p>	

Licensee-Identified Non-Cited Violation	71153
<p>This violation of very low safety significance was identified by the licensee and has been entered into the licensee corrective action program and is being treated as a Non-Cited Violation, consistent with Section 2.3.2 of the Enforcement Policy.</p> <p>Violation: 10 CFR Part 50, Appendix B, Criterion V, requires in part, that activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings.</p>	

0-TI-SXX-00-016.0, "Breaching of the Shield Building, ABSCE, or ECRPB Barriers," Revision 38, Attachment 1, "Breach Permit" is the quality procedure that the licensee implements when breaching the auxiliary building secondary containment enclosure (ABSCE) boundary when conducting maintenance. Breach Permits require an individual to be positioned in the main control room (MCR) with the sole responsibility of notifying field personal at the breach site in case an emergency closure of the breach is required.

Contrary to the above, on November 24, 2018, from 0930 to 1435 eastern standard time (EST), the licensee blocked open door A118 which created a breach in the ABSCE boundary but failed to position an individual in the MCR with the sole responsibility of notifying field personal at the breach site in case an emergency closure of the breach is required. This resulted in the inoperability of the auxiliary building secondary containment enclosure boundary and thus inoperability of both trains of the ABGTS.

Significance: Green.

The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations". Using IMC 0609, Appendix A, Exhibit 3, the inspectors determined that this finding was of very low safety significance (Green) because the finding only represents a degradation of the radiological barrier function provided for the auxiliary building.

This LIV closes LER 05000327, 328/2018002-00.

Corrective Action Reference(s): CR 1469554

Unresolved Item (Closed)	Potential Inadequate Use of Thermal Aging and the Arrhenius Methodology 05000327, 05000328/2017008-03	71111.21N
<p>Description: Unresolved Item (URI) 05000327, 328/2017008-03 was opened on January, 24, 2018, in Design Bases Assurance Inspection (Programs) Report 05000327, 328/2017008 (Agencywide Documents Access and Management System (ADAMS) Accession Number: ML18026A544), to determine whether the use of the Arrhenius methodology without consideration for the limits of extrapolation and confidence bounds for statistical uncertainties constituted a performance deficiency.</p>		
<p>The inspectors reviewed safety evaluation reports, calculations, procedures, and equipment qualification data packages. For multiple components listed in the original URI, the inspectors determined that the extrapolation of high temperature accelerated aging data of more than 100°C from their aging temperatures to correlate to normal operating temperatures failed to ensure that alternative reactions and material phase changes would not occur over these large ranges. The inspectors determined that this implementation of the Arrhenius Methodology constituted a violation of 10 CFR 50 Appendix B Criterion III. The licensee captured this violation in their corrective action program to restore compliance. The URI 05000327, 328/2017008-03 is now closed.</p>		
<p>Corrective Action Reference(s): CR 1366022 CR 1503048</p>		

Unresolved Item (Closed)	Potential Inadequate Determination of Failure Modes for Qualified Life for Foxboro/Weed Instrument 05000327, 05000328/2017008-04	71111.21N
<p>Description: Unresolved Item (URI) 05000327, 328/2017008-04 was opened on January 24, 2018, in Design Bases Assurance Inspection (Programs) Report 05000327, 328/2017008 (ADAMS Accession Number: ML18026A544) to determine if a performance deficiency and violation of 10 CFR 50.49 requirements existed. The inspectors questioned: (1) the omission of the 0.72eV activation energy for polysulfone as listed in the qualification documentation for the Foxboro/Weed instrument; (2) the failure to account for the heat rise of specific components within the Foxboro/Weed instrument FT-063; (3) the failure to implement the accelerated aging (Arrhenius) methodology in accordance with the IEEE 101-1972 standard; and (4) the failure to adequately address the failure modes of the various electronic components to determine the most limiting component.</p> <p>For Item 1, the inspectors reviewed safety evaluation reports, calculations, procedures, and equipment qualification data packages. The licensee determined that 0.72 eV (which was listed for information only) was based on a failure mode of tensile strength and was not appropriate for this application. Based on this review, the inspectors review did not identify a performance deficiency associated with this concern.</p> <p>For Item 2, the inspectors reviewed the licensee's aging analysis and determined that the analysis did not account for the internal heat rise of the metal film resistor. The inspectors determined that this concern constituted a performance deficiency and a more than minor violation of 10 CFR 50.49(e)(5). The licensee entered the violation into their corrective action program as to restore compliance.</p> <p>For Items 3 and 4, the inspectors reviewed additional information provided by the licensee, performed further inspection, and held discussions with an NRC environmental qualification panel to resolve this URI. Additionally, the inspectors reviewed the updated guidance in ADAMS Accession Number ML18338A088 and Inspection Manual Chapter Inspection Procedure 71111.21N (Accession No. ML19036A556), which stated that:</p> <p>"Beyond ensuring that vendor programs satisfy the 10 CFR Part 50, Appendix B, requirements and confirming that EQ equipment is received as procured, licensees are not required to validate information (e.g., activation energy) contained in the EQ reports provided by Appendix B vendors."</p> <p>Based on the additional review and the above-mentioned guidance, the inspectors did not identify a performance deficiency associated with these concerns.</p> <p>URI 05000327, 328/2017008-04 is now closed.</p> <p>Corrective Action Reference(s): CR1503036</p>		

Unresolved Item (Closed)	Potential Inadequate Justification for Eliminating Preventative Maintenance for ASCO Valves 05000327, 05000328/2017008-05	71111.21N
<p>Description: Unresolved Item (URI) 05000327, 328/2017008-05 was opened January 24, 2018, in inspection report 0500327, 328/2017008 (ADAMS Accession No. ML18026A544) to determine if a performance deficiency existed related to the adequacy of the licensee's justification for eliminating the replacement of components that have a shorter life than the qualified life of the ASCO NP-1 valve assemblies. Specifically, the URI was opened to (1) evaluate the licensee's bases for changing the activation energies of elastomeric materials used in the ASCO valve assemblies, (2) evaluate the licensee's assessment of how AQS-21678/TR met NUREG-0588 Category 1 requirements, (3) evaluate the adequacy of the licensee's use of component heat rise data, and (4) evaluate the licensee's considerations of elastomer degradation in oxygen vs nitrogen gas, and their use of apparent radiation dose margin to account for these differences.</p> <p>For Items 1 and 2, the inspectors reviewed additional information provided by the licensee in equipment qualification data packages and test reports determined that no performance deficiencies existed.</p> <p>For Items 3 and 4, the inspectors reviewed additional information provided by the licensee in equipment qualification data packages and test reports and determined that the concerns constituted more than minor violations of 10 CFR 50.49(e)(5). The licensee entered the violation into their corrective action program to restore compliance. URI 05000327, 328/2017008-05 is now closed.</p>		
Corrective Action Reference(s): CR1503045		

Unresolved Item (Closed)	Potential Unjustified Qualified Life for ASCO Solenoid Operated Valves (SOVs) 05000327, 05000328/2017008-06	71111.21N
<p>Description: Unresolved Item (URI) 05000327, 328/2017008-06 was opened on January 24, 2018, in Design Bases Assurance Inspection (Programs) Report 05000327, 328/2017008 (ADAMS Accession Number: ML18026A544) to determine if a performance deficiency existed. Specifically, the URI was opened to review the adequacy the licensee's analysis and justification for discounting realistic failure modes, changing the activation energy, and calculating a new qualified life for ASCO NP-1 valves assemblies.</p> <p>The inspectors reviewed additional information provided by the licensee, safety evaluation reports, calculations, procedures, and equipment qualification data packages. The inspectors determined that the concern constituted a violation of 10 CFR 50.49(e)(5). The licensee entered this into their corrective action program to restore compliance. The URI 05000327, 328/2017008-06 is now closed.</p>		
Corrective Action Reference(s): CR1503045		

## **EXIT MEETINGS AND DEBRIEFS**

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

- On April 23, 2019, the inspector presented the inspection results to Mr. Scott Hunnewell and other members of the licensee staff.
- On March 29, 2019, the inspector presented the Design Bases Assurance Inspection programs URI Closure Exit Meeting to Kimberly Hulvey and other members of the licensee staff.

## DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
60855.1	Corrective Action Documents	Condition Reports (CRs)	1489901; 1489940; 1490108; 1490369	
60855.1	Miscellaneous	Completed performance of SQN-DCS-300.1FW	Spent Fuel Cask Loading Verification (FW)	February 12, 2019
		Field Change #SQN-12-MPCFW130-01	Field Change to Fuel Selection – MPC Location 36 (3-15)	February 11, 2019
		PFE-3818	Completed NFTP-100FW Procedure for Fuel and Component Selection for SQN Dry Cask Storage Campaign 12	Revision 0
60855.1	Procedures	0-GO-17	Spent Fuel/Dry Cask Operations	Revision 6
		HPP-2244-500	TVA Sequoyah Procedure – HI-STORM FW Site Transportation	Revision 7
		NFTP-100FW	Fuel Selection for Dry Cask Storage – Holtec FW Design	Revision 4
		NPG-SPP-03.13	Independent Spent Fuel Storage Installation (ISFSI) FSAR Management Process	Revision 1
		SQN-DCS-300.1FW	Spent Fuel Cask Loading Verification (FW)	Revision 1
71111.04	Corrective Action Documents	Condition Reports (CRs)	1488296	
71111.04	Procedures	0-SO-82-2	Diesel Generator 1B-B	Revision 58
		0-SO-82-8	Diesel Generator 2B-B Support Systems	Revision 26
		0-SO-82-8, Att.1	Diesel Generator 2B-B Support Systems Power Checklist 0-82-8.01	Chg. 6
		2-SO-3-2	Auxiliary Feedwater System	Revision 51
		2-SO-62-1	Charging and Volume Control System	Revision 72
71111.05Q	Miscellaneous	Fire Drill Package LMS 82402	6.9KV Shutdown Board Room B	January 15, 2019

71111.05Q	Procedures	AUX-0-669-01	Fire Protection Pre-Fire Plans Auxiliary Building El. 669 Unit 1 Side	Revision 7
		AUX-0-669-02	Fire Protection Pre-Fire Plans Auxiliary Building El. 669 Unit 2 Side	Revision 8
		AUX-0-734-01	Fire Protection Pre-Fire Plans Auxiliary Building El. 734 Unit 1 Side	Revision 10
		AUX-0-734-02	Fire Protection Pre-Fire Plans Auxiliary Building El. 734 Unit 2 Side	Revision 9
		AUX-0-749-01	Fire Protection Pre-Fire Plans Auxiliary Building El. 749 Unit 1 Side	Revision 7
		AUX-0-749-02	Fire Protection Pre-Fire Plans Auxiliary Building El. 749 Unit 2 Side	Revision 8
		CON-0-706-00	Fire Protection Pre-Fire Plans Control Building El. 706	Revision 6
71111.06	Corrective Action Documents	Condition Reports (CRs)	1488493; 1489048; 1490224	
71111.06	Work Orders	WOs	119957381; 119957387	
71111.07A	Procedures	NPG-SPP-09-14	Generic Letter 89-13 Implementation	Revision 4
71111.07A	Work Orders	WOs	119450103; 119450111	
71111.11Q	Miscellaneous	Simulator Evaluation Guide S-113	SBLOCA, LOOP, Loss of CCP	
71111.11Q	Procedures	0-SO-62-7	Boron Concentration Control	Revision 85
		1-SI-SXP-003-201.S	Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test	Revision 27
		1-SO-63-1	Cold Leg Safety Injection Accumulators	Revision 50
71111.12	Corrective Action Documents	Condition Reports (CRs)	1286947; 1377202; 1418184; 1425071; 1470146; 1470556; 1472608	
71111.12	Miscellaneous	Agenda	Maintenance Rule Expert Panel Meeting	February 20, 2019
		SQN-0-19-004	PRA Evaluation Response	Revision 0
		NPG-SPP-03.4	Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65	Revision 3
71111.12	Procedures	TI-4	Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting – 10CFR50.65	Revision 31
71111.12	Work Orders	WOs	120038015	

71111.13	Corrective Action Documents	CRs	1484500	
71111.13	Miscellaneous	0-PE-2019 / 0-82-0002A	Protected Equipment for 2A-A Diesel Generator Inoperable	February 5, 2019
		0-PE-2019 / 1-63-0007	Protected Equipment for 690 Penetration Room Cooler 1B-B Maintenance	February 26, 2019
		2-TO-2019-W/W	Clearance for Safety Injection 2B-B Room Cooler Maintenance	February 26, 2019
		POD	Plan of the Day	February 5, 2019
		Work status update	Main Control Room Air Handling Unit AHU A-A	February 7, 2019
71111.13	Procedures	0-GO-16	System Operability Checklists	Revision 24
		NPG-SPP-07.3	Work Activity Risk Management Process	Revision 26
		NPG-SPP-07.3.4	Protected Equipment	Revision 4
71111.15	Corrective Action Documents	Condition Reports (CRs)	1484508; 1485220; 1485583; 1493790	
71111.15	Miscellaneous	EWR-13-ENG-317-152	Water Level at Which Subject Safety Related Cable Conduits Would be in Contact for Specific Hand Holes/Man Holes	Revision 5
		UFSAR Chapter 2, Section 2.4.11.6.1	Loss of Downstream Dam	Revision 27
		UFSAR Chapter 3, Section 3.2	Classification of Structures, Systems, and Components	Revision 27
		UFSAR Chapter 6, Section 6.2.1.3.4	Containment Pressure Transient – Long Term Analysis	Revision 27
		UFSAR Chapter 9, Section 9.2.1	Component Cooling System	Revision 27
71111.15	Operability Evaluations	Past Operability Evaluation (POE) for CR 1484508,	480V Shutdown Board Transformer Tap Settings Incorrect	Revision 0



71111.15	Operability Evaluations	POE for CR 1485583	Through Wall Leak on CCS Piping	Revision 0
		POE for CR 1493790	Active Boric Acid Leak on Common High Pressure Line	Revision 0
		Prompt Determination of Operability (PDO) for CR 1485220	Conflicts with Margin Statements in Described in FSAR for Loss of Downstream Dam Analysis	Revision 0
71111.15	Procedures	NEDP-22	Operability Determinations and Functional Evaluations	Revision 19
		NEDP-27	Past Operability Evaluations	Revision 4
		NPG-SPP-06.8	Leak Reduction Program	Revision 7
		OPDP-8	Operability Determination Process and Limiting Conditions for Operation Tracking	Revision 24
71111.19	Corrective Action Documents	Condition Reports (CRs)	1333862; 1493879; 1494036; 1492335	
71111.19	Miscellaneous	Completed performance of 1-SI-OPS-082-007.A	Electrical Power System Diesel Generator 1A-A	January 11, 2019
		PM 041542000	Preventative Maintenance Work Instructions SQN-2-CLR-082-0290/1	
71111.19	Procedures	0-MI-EMV-317-146.0	Inspection and Preventive Maintenance of Limitorque Motor Operators Maintenance Instruction	Revision 50
		0-PI-SFT-030-755.0	Equipment Cooler Operability Test	Rev. 16
		0-PI-SFT-067-001.A	ERCW Train A Flow Monitoring	Rev. 4
		0-SI-SXI-000-201.0	ASME Section XI Inservice Pressure Test	Rev. 25
		0-SI-SXV-000-206.0	Testing of Category A and B Valves after Work Activities, Upon Release from a Hold Order, or when Transferred From Other Documents	Rev. 7

71111.19	Procedures	0-SI-SXV-063-266.0	ASME Code Valve Testing	Rev. 36
		NPG-SPP-06.3	Pre-/Post-Maintenance Testing	Revision 2
		NPG-SPP-06.9.1	Conduct of Testing	Revision 12
		TI-50	Air Flow Measurement and Balancing Methods	Rev. 20
71111.19	Work Orders	WOs	119465679; 119779465; 120275015; 119415844; 119450103; 118840720; 120260364; 119635442; 120264042	
71111.21N	Engineering Evaluations	Response to URI 05000327, 328/2017008-03	Potential Inadequate Use of Thermal Aging and the Arrhenius Methodology	
		Response to URI 05000327, 328/2017008-05:	Potential Inadequate Justification for eliminating Preventive Maintenance for ASCO Valves	
		Response to URI 05000327, 328/2017008-06	Potential Unjustified Qualified Life for ASCO Solenoid Operated Valves	
		SQNEQ - IPT-002	Foxboro N-EI 0 Pressure & DP Series Pressure Transmitters	Rev. 70
		SQNEQ-SOL-005	ASCO Solenoid Valves, (AC Construction) Model 206-380 Series & NP8300 Series	Rev. 47
71111.21N	Miscellaneous	ANSI/ASTM D2436-1968	Standard Specification for Forced-Convection Laboratory Ovens for Electrical Insulation	
		ASCO Notice	Field Notification Concerning the Qualified Life of ASCO Catalog NP-1 Valves," discusses the various options available when calculating qualified life of ASCO Catalog NP-1 valves and provides the latest available temperature rise data for the ASCO Catalog NP-1 valves series.	
		IEEE 323-1974	IEEE Standard for Qualifying Class 1E Equipment for Nuclear Power Generating Stations	
		IEEE 98-1972	IEEE Standard for the Preparation of Test Procedures for the Thermal Evaluation of Solid Electrical Insulating Materials	
		Information Notice (IN) 89-66	Qualification Life of Solenoid Valves	dated 9/11/1989

71111.21N	Miscellaneous	NP-1558	Review of Equipment Aging Theory and Technology	dated 9/1980
		NRC Memorandum	User Need Request on the Acceptability of the Arrhenius Method for EQ for LOCA, ML003701987	dated 2/24/2000
		NUREG-0588	Interim Staff Position on Environmental Qualification of Safety-Related Electrical Equipment	Rev. 1
		NUREG/CR 3424	Test Program and Failure Analysis of Class 1E Solenoid Valves	
		NUREG/CR 5141	Aging and Qualification Research on Solenoid Operated Valves	
		SEQ-LTR-2018-001	Letter: Selection of Activation Energy for a Polysulfone Seal Component	Dated 1/16/2018
		Test Report No. AQR-67368	Report on Qualification of Automatic Switch Co. (ASCO) Catalog, NP-1 Solenoid Valves for Safety-Related Applications in Nuclear Power Generating Stations, dated 8/19/83	Rev. 1
		Test Report No. AQS21678/TR	Qualification Tests of Solenoid Valves by Environmental Exposure to Elevated Temperature, Radiation, Wear Aging, Seismic Simulation, Vibration Endurance, Accident Radiation and Loss-of-Coolant Accident (LOCA) Simulation, dated July 1979	Rev. A
71111.22	Miscellaneous	Completed performance of 0-PI-SXV-082-201.B	Diesel Starting Air Valve Test for DG Set 1A-A, Time Frame B	January 11, 2019
		Completed performance of 1-SI-SXP-003-201.S	Turbine Driven Auxiliary Feedwater Pump 1A-S Performance Test	March 8, 2019
		Completed performance of 1-SI-SXP-072-201.A	Containment Spray Pump 1A-A Performance Test	February 7, 2019

71111.22	Miscellaneous	Completed performance of 2-SI-OPS-202-253.A	Functional Test of Loss of Voltage Relays on 6.9KV Shutdown Board 2A-A	
		Completed performance of 2-SI-SXP-003-201.A	Motor Driven Auxiliary Feedwater Pump 2A-A Performance Test	January 23, 2019
71111.22	Procedures	NPG-SPP-06.9.2	Surveillance Test Program	Revision 7
71111.22	Work Orders	WOs	119421619; 119421632; 119430681	
71114.06	Miscellaneous	2019 SQN March Drill		March 27, 2019
71114.06	Procedures	0-TI-DXX-000-018.0	Post-Seismic Event Engineering Response	Revision 1
		AOP-N.05	Earthquake	Revision 28
		EPDP-3	Emergency Plan Exercises and Preparedness Drills	15
		EPIP-1	Emergency Plan Classification Matrix	Revision 53
		EPIP-10	Medical Emergency Response	Revision 30
71151	Corrective Action Documents Resulting from Inspection	CR 1503900	Decimal Error in September 2018 CDE Data	April 1, 2019
71151	Miscellaneous	TVA Nuclear Performance Report		December 2018
71151	Procedures	NPG-SPP-02.2	Performance Indicator Program	Revision 10
71152	Corrective Action Documents	Apparent Cause Analysis for CR 1423454		
		Condition Report (CRs)	1423454; 1422673; 1423196; 1187595; 1188485	
71152	Miscellaneous	FSAR Section 9.3 Auxiliary Systems		Amendment 28
		Standing Order SO 17-005	Clearance Preparation/Review/Authorization Guidelines	Revision 0

71152	Miscellaneous	Standing Order SO-18-026	Post Clearance Issuance Manipulation Rigor	Revision 0
71152	Procedures	NPG-SPP 22.300,	Corrective Action Program	Revision 10
		NPG-SPP 22.300,	Corrective Action Program	Revision 12
71153	Corrective Action Documents	Condition Reports (CRs)	1469554	
71153	Miscellaneous	Breach Permit 2018-64		
		Operator Chronological Logs		November 24, 2018
71153	Operability Evaluations	Past Operability Evaluation for CR 1469554		
71153	Procedures	0-TI-SXX-000- 016.0	Breaching of the Shield Building, ABSCE, or ECRPB Barriers	Revision 38
		0-TI-SXX-000- 016.0	Breaching of the Shield Building, ABSCE, or ECRPB Barriers	Revision 39