



**UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II**

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ATLANTA, GEORGIA 30303-1257

May 7, 2018

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

**SUBJECT: SEQUOYAH NUCLEAR PLANT – NUCLEAR REGULATORY COMMISSION
INTEGRATED INSPECTION REPORT 05000327/2018001 AND
05000328/2018001**

Dear Mr. Shea:

On March 31, 2018, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Sequoyah Nuclear Plant Units 1 and 2. On April 5, 2018, the NRC inspectors discussed the results of this inspection with Mr. Dennis Dimopoulos and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two self-revealing findings of very low safety significance in this report. These findings involved violations of NRC requirements. The NRC is treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2.a of the Enforcement Policy.

Further, inspectors documented a licensee-identified violation which was determined to be of very low safety significance in this report. The NRC is treating this violation as an NCV consistent with Section 2.3.2.a of the Enforcement Policy.

If you contest the violations or significance of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region II; the Director, Office of Enforcement; and the NRC resident inspector at the Sequoyah Nuclear Plant.

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 II; and the NRC resident inspector at the Sequoyah Nuclear Plant.

J.Shea

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/

Anthony D. Masters, Chief
Reactor Projects Branch 5
Division of Reactor Projects

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

Enclosure:
IR 05000327/2018001 and 05000328/2018001

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J.Shea

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**U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report**

Docket Number(s): 50-327, 50-328

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

Report Number(s): 05000327/2018001 and 05000328/2018001

Enterprise Identifier: 1-2018-001-0063

Licensee: Tennessee Valley Authority (TVA)

Facility: Sequoyah Nuclear Plant

Location: Soddy-Daisy, TN 37379

Inspection Dates: January 1, 2018 to March 31, 2018

Inspectors: D. Hardage, Senior Resident Inspector
G. Eatmon, Resident Inspector
W. Deschaine, Resident Inspector

Approved By: A. Masters, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring licensee’s performance by conducting a quarterly integrated inspection at Sequoyah Nuclear Plant, 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. NRC and self-revealed findings, violations, and additional items are summarized in the table below. Licensee-identified non-cited violations (NCVs) are documented in report sections: 71153.

List of Findings and Violations

Essential Raw Cooling Water Pumps Inoperable due to Frozen Motor Bearing Cooling Lines			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327, 328/2018001-01 Closed	None	71111.15 - <u>Operability Determinations and Functionality Assessments</u>
A self-revealing Green NCV of Technical Specification 5.4.1, “Procedures,” was identified when Sequoyah/TVA did not establish, implement and maintain applicable procedures recommended in Regulatory Guide 1.33, Appendix A, Section 9, “Procedures for Performing Maintenance.” Specifically, the essential raw cooling water (ERCW) pump motor maintenance procedure, 0-MI-MRR-067-002.0, ‘Removal/Disassembly/Reassembly Instruction for ERCW Pumps’ does not contain specific direction for the slope of the motor bearing cooling supply and return lines for the motor reassembly.			

Improper Calibration of Reactor Trip Instrumentation Results in a Condition Prohibited by Technical Specifications			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327/2018001-02 Closed	H.9 – Training	71153 – Licensee Event Reports
A self-revealing Green finding and associated NCV of Sequoyah Unit 1 Technical Specification 5.4, “Procedures,” was identified on June 25, 2016, when the licensee did not implement procedures to calibrate Delta-T/Tavg Channel IV with the correct test equipment input impedance settings, which resulted in Delta-T/Tavg Channel IV being out of technical specifications allowed tolerances.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
Licensee Event Report (LER)	05000327/2016-006-00	Improper Calibration of Reactor Trip Instrumentation Results in Condition Prohibited by Technical Specifications	71153	Closed

Type	Issue number	Title	Report Section	Status
LER	05000327/2016-009-00	Manual Reactor Trip During Startup Due to a Control Rod Misalignment	71153	Closed

Type	Issue number	Title	Report Section	Status
LER	05000327,05000328/2017-001-00	Breached Door Renders Both Trains of the Auxiliary Building Gas Treatment System Inoperable	71153	Closed

Type	Issue number	Title	Report Section	Status
LER	05000327, 05000328/2017-002-00	Automatic Actuation of Emergency Diesel Generators Due to Loss of Power to 6.9kV Shutdown Board	71153	Closed

PLANT STATUS

Unit 1 began the inspection period at 100 percent rated thermal power (RTP). On February 5, 2018, operators reduced power to 25 percent RTP to remove the main turbine from service to perform maintenance on the turbine's electrohydraulic control system. The unit returned to 100 percent RTP on February 7, 2018, and remained there for the rest of the inspection period.

Unit 2 operated at or near 100 percent RTP 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 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 (3 Samples)

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

- (1) Unit 1 and 2 ERCW, on January 23, 2018
- (2) Unit 2 emergency diesel generator 'A' starting air, on February 13, 2018
- (3) Unit 2 component cooling water system 'A' while component cooling water pump 'B' was out of service, on February 15, 2018

Complete Walkdown (1 Sample)

The inspectors evaluated system configurations during a complete walkdown of:

- (1) Unit 1 and Unit 2 component cooling system, on March 26, 2018

71111.05AQ - Fire Protection Annual/Quarterly

Quarterly Inspection (5 Samples)

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

- (1) Unit 2, auxiliary building – El. 669, on January 25, 2018
- (2) Unit 1 and Unit 2, control building – El. 706, on January 25, 2018
- (3) Unit 1 and Unit 2, auxiliary building – El. 759, on February 15, 2018

- (4) Unit 1 and Unit 2, auxiliary building – El. 714, on March 7, 2018
- (5) Unit 1 and Unit 2, auxiliary building- El. 690, on March 26, 2018

71111.06 - Flood Protection Measures

Cables (1 Sample)

The inspectors evaluated cable submergence protection in:

- (1) HH82 on February 21, 2018
- (2) MH32A1, MH33, MH14A, MH24, and MH25 on February 21, 2018

71111.07 - Heat Sink Performance

Heat Sink (1 Sample)

The inspectors observed the licensee's component cooling water (CCS) 1A2 heat exchanger inspection and the state of cleanliness of the heat exchanger plates on March 6, 2018.

71111.11 - Licensed Operator Requalification Program and Licensed Operator Performance

Operator Requalification (1 Sample)

The inspectors observed and evaluated, Identification and Immediate Actions for a Faulted Steam Generator Isolation and Steam Generator Tube Rupture on February 27, 2018.

Operator Performance (1 Sample)

The inspectors observed and evaluated licensed operator performance in the main control room during the unplanned Unit 1 downpower to 25 percent RTP on February 5, 2018, in response to turbine control anomalies.

71111.12 - Maintenance Effectiveness

Routine Maintenance Effectiveness (2 Samples)

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

- (1) Review of Sequoyah's thirteenth 10 CFR 50.65 (a)(3) periodic evaluation on March 16, 2018
- (2) Review of Function 040-C, ERCW Equipment Room Sumps on March 16, 2018

71111.13 - Maintenance Risk Assessments and Emergent Work Control (4 Samples)

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

- (1) Unit 1 and Unit 2, week of January 14 – January 20, 2018, including protected equipment status reviews for scheduled maintenance on the 'L-B' ERCW pump and the emergent inoperability of 'P-B' and 'M-B' ERCW pumps due to loss of motor cooling water flow
- (2) Unit 1 elevated risk due to emergent main turbine controls malfunction and downpower to 25 percent RTP to remove the turbine from service and perform corrective maintenance, on February 5-7, 2018
- (3) Unit 1 and Unit 2, week of March 4 – March 10, 2018, including protected equipment status reviews for scheduled maintenance on the '1A' component cooling system heat exchanger and the emergent removal from service of the 'A' common station service transformer
- (4) Unit 1 and Unit 2, week of March 19 – March 23, 2018, including protected equipment status reviews for scheduled maintenance on the '2A' safety injection pump

71111.15 - Operability Determinations and Functionality Assessments (5 Samples)

The inspectors evaluated the following operability determinations and functionality assessments:

- (1) Unit 1 and 2, ERCW pump motor cooling lines susceptible to freezing, Condition Report (CR)1380675, on January 29, 2018
- (2) Unit 1 and 2, B-B ERCW SWP failed Section XI acceptance criteria, CR1379440, on February 1, 2018
- (3) Unit 1, SIS pump discharge to RWST valve nuts have less than full thread engagement, CR 1384800, on February 26, 2018
- (4) Unit 1, reactor trip breaker 'A' abnormal light indications, CR1383922 on, March 21, 2018
- (5) Unit 1 and 2, Incorrect sized breaker installed in plant, CR1388832, on March 28, 2018

71111.18 - Plant Modifications (1 Sample)

The inspectors evaluated the following temporary or permanent modifications:

- (1) SQN-1-2017-062-002, Crimp and Furminite CVCS drain line, on February 14, 2018

71111.19 - Post Maintenance Testing (5 Samples)

The inspectors evaluated the following post maintenance tests:

- (1) Work Order (WO) 118594012, 6.9kv shutdown board loss of voltage, overvoltage and degraded voltage relay calibration, on January 22, 2018
- (2) WO 119368856, Remove A train SSPS from service to allow troubleshooting of blown fuse for A reactor trip breaker shunt coil, on February 4, 2018
- (3) WO 119229100, Install TMOD SQN-1-2017-062-002 to reduce unidentified RCS leakage, on February 12, 2018
- (4) WO 119191043, 1A component cooling system heat exchanger cleaning, on March 9, 2018
- (5) WO 118828740, Belt inspection, fan bearing lube and clean of Spent Fuel Pool and Thermal Barrier Booster Pump cooler B-B, on March 30, 2018

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Routine (1 Sample)

- (1) 1-SI-OPS-082-007.A, Electrical Power System Diesel Generator 1A-A, on February 26, 2018

In-service (2 Samples)

- (1) 1-SI-SXP-063-201.A, Safety Injection Pump 1A-A Performance Test, on February 7, 2018
- (2) 2-SI-SXP-074-201.B, Residual Heat Removal Pump 2B-B Performance Test, on March 5, 2018

Reactor Coolant System Leak Detection (1 Sample)

- (1) 0-SI-OPS-068-137.0, Unit 1 Reactor Coolant System Water Inventory, on March 22, 2018

71114.06 - Drill Evaluation

Emergency Planning Drill (2 Samples)

- (1) The inspectors evaluated the emergency preparedness drill on January 31, 2018. The drill included:
 - loss of the annunciator system
 - a main feedwater pump tripping
 - loss of offsite power with both emergency diesel generators not being available
- (2) The inspectors evaluated the emergency preparedness drill on March 7, 2018. The drill included:
 - a reactor coolant system (RCS) unidentified leak of 33 gpm occurred
 - an earthquake then happened damaging the 1B 6.9 KV Shutdown Board, unisolable Main Steam line breaks on Steam Generators 1 and 4 occurred, a large rupture to the RWST, and a small break LOCA.
 - the small break LOCA enlarged to a full shear of the #1 Cold Leg and both RHR pumps seized due to the shaking caused by the earthquake
 - the use of the Severe Accident Management Guidelines (SAMG)

OTHER ACTIVITIES – BASELINE

71152 - Problem Identification and Resolution

Annual Follow-up of Selected Issues (1 Sample)

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

- (1) Reactor Trip Breaker A (RTA) abnormal light indications from a fuse failure, CR 1383922, on March 30, 2018

71153 - Follow-up of Events and Notices of Enforcement Discretion

Licensee Event Reports (4 Samples)

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

- (1) LER 05000327/2016-006-00, Improper Calibration of Reactor Trip Instrumentation Results in Condition Prohibited by Technical Specifications on September 12, 2016
- (2) LER 05000327/2016-009-00, Manual Reactor Trip During Startup Due to a Control Rod Misalignment, on February 27, 2017
- (3) LER 05000327,05000328/2017-001-00, Breached Door Renders Both Trains of the Auxiliary Building Gas Treatment System Inoperable, on April, 26, 2017
- (4) LER 05000327, 05000328/2017-002-00, Automatic Actuation of Emergency Diesel Generators Due to Loss of Power to 6.9kV Shutdown Board, on June 25, 2016

Personnel Performance (1 Sample)

The inspectors evaluated the loss of 'B' train ERCW to both units and licensee's performance on January 18.

OTHER ACTIVITIES – TEMPORARY INSTRUCTIONS, INFREQUENT AND ABNORMAL

International Atomic Energy Agency (IAEA) Operational Safety Review Team (OSART) Assessment – August 14 – August 31, 2017

The International Atomic Energy Agency is an independent intergovernmental, science and technology-based organization, in the United Nations family, that serves as the global focal point for nuclear cooperation. One of the services provided is an independent assessment of licensee performance by senior staff members from the IAEA member states. This assessment team is called an Operational Safety Review Team, or OSART. The focus of the review by the OSART is on the safety and reliability of plant operation through review of the operation of the plant and the performance of TVA's management and staff. The NRC believes that it would be beneficial for the U.S. Nuclear power industry to continue to volunteer and participate in the OSART missions. To help ensure that U.S. licensees participate in the operational safety assessment review team missions, the NRC has decided to and will grant a one-time regulatory inspection credit (a reduction in the baseline program) for those baseline programs that overlap with the OSART review as directed and outlined in Manual Chapter 2515, Section 08.05,

“Baseline Inspection Credit for Operational Safety Review Team Effort,” dated March 28, 2017. Between August 14 and August 31, 2017, TVA personnel debriefed the inspectors about issues identified by the OSART assessment team on a daily basis. The inspectors also participated in weekly OSART team leader debriefs and the OSART team exit on August 31, 2017. The inspectors used the information provided during the daily and weekly debriefs and the final OSART exit meeting to screen the issues identified by OSART for immediate safety concerns. None were identified.

NRC inspectors reviewed both a draft and final version of the OSART report. Inspectors screened the issues documented in the reports to identify issues that required additional NRC review in accordance with the reactor oversight process. Issues identified as requiring additional NRC follow-up will be reviewed by inspectors during routine baseline inspection activities. Findings identified will be documented in applicable NRC inspection reports. Based on the results of the inspectors’ review and assessment of the scope of OSART activities through the debriefs and the review of the draft and final OSART mission report, NRC Region II management approved for Sequoyah regulatory inspection credit in the baseline inspection procedures described in Section 08.05 of Inspection Manual Chapter (MC) 2515. Based on the summary of radiation safety-related inspection activities documented in the OSART draft and final report and radiation protection activities observed during the OSART inspection, radiation safety inspection activities for Sequoyah will be credited 31 hours. The inspectors determined that due to the timing of the issuance of the final OSART mission report, providing credit for emergency preparedness inspections that will not be performed until September 2019, did not meet the intent of the credit guidelines established in IMC 2515; therefore the hours credited to emergency preparedness inspection activities for Sequoyah will be zero. Inspection areas contained within the NRC inspection procedures (IP 71111.22 and IP 71111.05AQ) are not documented in the report therefore hours credited to Surveillance Testing and Fire Protection inspection activities for Sequoyah will be zero. Full regulatory inspection credit for the IP 71152B, Problem Identification & Resolution as described in IMC 2515 of 125 hours will be credited based on the OSART. The NRC has made the final OSART report publicly available on the NRC website, Agency Documents Access and Management System (ADAMS) accession number ML18061A036.

INSPECTION RESULTS

Observation	71152 – Annual Follow-up of Selected Items
<p><u>Annual Follow-up of Selected Issues: Reactor Trip Breaker abnormal light indications caused by a fuse failure</u></p> <p>The inspectors conducted a detail review of CR 1383922, “Reactor Trip Breaker A (RTA) abnormal light indications from a fuse failure.” The inspectors chose this sample due to a number of issues the site has had regarding Bussmann KWN and KTN type fuses dating back to 2011 and a 2005 Part 21 report on these type fuses from Bussmann. For CR 1383922, the licensee determined that inadequate heating during the manufacturing process caused a poor solder connection, thus causing the fuse to open up inadvertently. The failure caused by a manufacturing defect was previously identified by review of the 2005 Part 21 report and by a Root Cause performed in 2011. The inspectors reviewed the licensee’s corrective actions to evaluate the population of Bussmann fuses installed in the plant and risk rank replacement of these fuses with a different kind. The inspectors determined that the licensee’s plan to address this issue was reasonable commensurate with the safety significance of equipment that might be affected by these type of fuses.</p>	

Licensee Identified Non-Cited Violation	71153 – Licensee Event Reports
<p>This violation of very low safety significant 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: Sequoyah Unit 1 and Unit 2 Technical Specification 3.7.12, “Auxiliary Building Gas Treatment System (ABGTS),” requires two ABGTS trains be operable in modes 1, 2, 3, and 4.</p> <p>Contrary to the above, from March 3-7, 2017, the licensee blocked open door A212 resulting in the inoperability of the auxiliary building secondary containment enclosure boundary and thus inoperability of both trains of the ABGTS.</p> <p>Significance/Severity Level: Green. Using Inspection Manual Chapter 0609, Appendix A, “The Significance Determination Process (SDP) for Findings At-Power,” dated June 19, 2012, 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.</p> <p>Corrective Action Reference: CR1269767</p>	

Essential Raw Cooling Water Pumps Inoperable due to Frozen Motor Bearing Cooling Lines			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating System	Green	None	71111.15 -

	NCV 05000327/328/2018001-01 Closed		Operability Determinations and Functionality Assessments
<p>A self-revealing Green NCV of Technical Specification 5.4.1, "Procedures," was identified when Sequoyah/TVA did not establish, implement and maintain applicable procedures recommended in Regulatory Guide 1.33, Appendix A, Section 9, "Procedures for Performing Maintenance." Specifically, the ERCW pump motor maintenance procedure, 0-MI-MRR-067-002.0, 'Removal/Disassembly/Reassembly Instruction for ERCW Pumps' does not contain specific direction for the slope of the motor bearing cooling supply and return lines for the motor reassembly.</p>			
<p><u>Description</u> On January 18, 2018, at 0121, with ambient temperature below freezing, the licensee placed 'M-B' ERCW Pump in service and removed 'L-B' ERCW pump from service for maintenance. At 0342, operators started 'P-B' ERCW pump and secured 'M-B' ERCW pump due to increasing motor bearing temperatures on the 'M-B' ERCW pump. 'P-B' ERCW pump subsequently had increasing motor bearing temperatures. Operators started 'N-B' ERCW pump and stopped 'P-B' ERCW pump. At 0615, the 'B' ERCW header was declared inoperable on both units due to the inoperability of 'L-B', 'M-B' and 'P-B' ERCW pumps.</p> <p>ERCW pump motor bearing cooling is supplied from the pump discharge. The pump motor bearing cooling lines were originally heat traced to ensure water in the line would not freeze when a pump was not running and ambient temperatures were below freezing. ERCW motor bearing cooling was redesigned in 1989 to remove heat tracing and to slope the motor cooling lines such that the motor cooling water lines would self-drain, and thus be free of water and not susceptible to freezing when the pump is not in service. However, licensee procedure, 0-MI-MMR-067-002.0, 'Removal/Disassembly/Reassembly Instruction for ERCW Pumps' did not incorporate guidance to ensure the proper slope of the ERCW pump motor bearing cooling lines following maintenance such that the lines would self-drain. Inspection determined that five of the eight ERCW pumps 'J-A', 'K-A' and pumps 'M-B', 'N-B' and 'P-B' all had improperly sloped motor cooling lines that allowed water to remain in the lines when the pumps were not running.</p> <p>Corrective Actions: On January 18, licensee personnel mobilized temporary heat tracing and 480V space heaters to thaw the ERCW pump motor bearing cooling water lines. On January 18 at 1345, 'P-B' ERCW pump was restored to operable status following a pump run and verification of acceptable motor bearing cooling flow and bearing temperatures. This restored 'B' train ERCW to operable status. As an interim action, the licensee implemented Standing Order SO-18-003 to address the improper slopes for the motor cooling lines, and have operators declare the ERCW 'J-A,' 'K-A,' 'M-B,' 'N-B,' and 'P-B' pumps inoperable when outside air temperatures are below freezing unless the pumps are in service. The licensee completed corrective maintenance to ensure proper slope on all ERCW pump motor cooling water piping on February 16, 2018.</p> <p>Corrective Action Reference: : CR1380675, CR1378392, CR1378822, CR1378392</p>			
<p><u>Performance Assessment:</u></p> <p>Performance Deficiency: The licensee's failure to ensure ERCW motor maintenance procedure, 0-MI-MRR-067-002.0, 'Removal/Disassembly/Reassembly Instruction for ERCW Pumps' contained specific direction for the slope of the motor cooling supply and return lines for the motor reassembly was a performance deficiency.</p>			

Screening: The performance deficiency was associated with the maintenance procedure quality attribute of the mitigating system cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of the ERCW system to respond to an initiating event and prevent undesirable consequences. Specifically, the failure to ensure the ERCW motor maintenance procedure contained direction for the slope of the motor cooling supply and return lines resulted in the loss of motor cooling water flow that rendered standby ERCW pumps inoperable during ambient freezing conditions.

Significance: In accordance with Inspection Manual Chapter (IMC) 0609 Attachment 4 "Initial Characterization of Findings," dated October 7, 2016, this finding affected the mitigating systems cornerstone because ERCW provides the ultimate heat sink which impacts core decay heat removal. Using Inspection Manual Chapter (IMC) 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the inspectors determined that this finding was of very low safety significance (Green) because the finding (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality, (2) did not represent a loss of system and/or function, (3) did not represent an actual loss of function of at least a single train for longer than its allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time, and (4) did not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significant for greater than 24 hours in accordance with the licensee's maintenance rule program.

Cross-cutting Aspect: The inspectors did not assign a cross-cutting aspect because the finding did not reflect present licensee performance because the failure to update this licensee maintenance procedure with design requirement from the design change occurred outside the three year window.

Enforcement:

Violation: Sequoyah Technical Specification 5.4.1, "Procedures," requires, in part, that procedures be established, implemented and maintained for the applicable procedures recommended in Regulatory Guide 1.33, Appendix A, dated February 1987. Regulatory Guide 1.33, Section 9.a, requires, in part, that maintenance that can affect the performance of safety-related equipment should be properly performed in accordance with written procedures appropriate to the circumstances.

Contrary to the above, from May 1989 until January 2018, the licensee did not maintain procedures for maintenance on ERCW pumps appropriate to the circumstance; specifically, procedures to reassemble ERCW pumps lacked instructions to ensure the correct slope for the motor bearing cooling lines was maintained.

Disposition: This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy.

NCV 5000327/2018001-01; "Improper Calibration of Reactor Trip Instrumentation Results in a Condition Prohibited by Technical Specifications"

Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000327/328/2018001-02 Closed	H.9 – Training	71153 – Licensee Event Reports

A self-revealing Green finding and associated NCV of Sequoyah Unit 1 Technical Specification 5.4, "Procedures," was identified on June 25, 2016, when the licensee did not implement procedures to calibrate Delta-T/Tavg Channel IV with the correct test equipment input impedance settings, which resulted in Delta-T/Tavg Channel IV being out of technical specifications allowed tolerances.

Description: On June 23, 2016, the digital filter processor card associated with Unit 1 Delta-T/Tavg channel IV failed and operators declared Delta-T/Tavg channel IV inoperable. The card was replaced on June 24, 2016, and a channel calibration was performed prior to returning the channel to operable status. The normal measuring and test equipment (MTE) used to perform this calibration was not available. Maintenance personnel instead used a Fluke 8845A. Use of the Fluke 8845A was allowed by the calibration procedure; however, this instrument has a different default input impedance setting than the MTE. Maintenance personnel performing the calibration were unaware of the default input impedance difference and the procedure did not identify and require the use of the correct internal impedance setting. As a result, licensee procedure 1-SI-IFT-068-067.4, "Functional Test of ΔT/TAVG Channel IV Rack 13 Loop 1-T-68-67 (T-441/442)," was performed with the test instrumentation impedance setting not set correctly and resulted in Delta-T/Tavg Channel IV being adjusted incorrectly and out of technical specifications allowed tolerances. Operations personnel declared Delta-T/Tavg Channel IV operable on June 25 at 0215 based on the improper calibration. On June 27, 2016, licensee reactor engineers noted Tavg had taken a two-degree step change lower following the digital filter card replacement and the licensee began investigation and identified the incorrect input impedance was used during previous performance of the Delta-T/Tavg Channel IV calibration. On June 29 at 23:30, Delta-T/Tavg Channel IV was returned to operable status following calibration and functional testing using MTE with appropriately configured input impedance.

Corrective Actions: The licensee performed the calibration and functional testing of Delta-T/Tavg Channel IV with the correct input impedance to restore compliance on June 29, 2016. The licensee has revised calibration procedures to ensure the correct impedance settings are used.

Corrective Action Reference: CR 1187308

Performance Assessment:

Performance Deficiency: The licensee's failure to ensure the test equipment used to perform calibration of Delta-T/TAVG Channel IV was configured to the appropriate input impedance was a performance deficiency.

Screening: This performance deficiency was associated with the mitigating systems

cornerstone and was more than minor because it adversely affected the cornerstone objective to ensure availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, licensee personnel use of the Fluke 8845A with the incorrect input impedance setting resulted in the inoperability of reactor protection system input signals.

Significance: This performance deficiency was associated with the mitigating systems cornerstone. The inspectors screened this finding using IMC 0609, Appendix A, "The Significant Determination Process (SDP) For Findings At-Power," dated June 19, 2012. Because all three questions in Section C of Exhibit 2, "Mitigating Systems Screening Questions," were answered "no," the finding screened as Green.

Cross-cutting Aspect: The inspectors determined that the finding has a cross-cutting aspect of training in the human performance area because licensee personnel had not been trained on the use of the Fluke 8845A and were not aware of the difference in default input impedance settings. (H.9)

Enforcement:

Violation: Violation: Sequoyah Unit 1 Technical Specification 5.4.1 requires, in part, that procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Appendix A, section 9.a requires, in part, that maintenance of safety-related equipment is performed in accordance with written procedures appropriate to the circumstances.

Contrary to the above, on June 25, 2016, the licensee did not implement procedures to calibrate Delta-T/Tavg Channel IV with the correct test equipment input impedance settings. The licensee restored compliance on June 29, 2016 by performing the calibration and functional testing of Delta-T/Tavg Channel IV with the correct input impedance settings.

Disposition: "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 April 5, 2018, the inspector presented the quarterly resident inspector inspection results to Mr. D. Dimopoulos, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure 71111.04

Procedures

- 0-SO-67-1, Essential Raw Cooling Water, Revision 109
- 2-SO-70-1, Att.3, Component Cooling Water System "A" Train Valve Checklist 2-70-1.03, December 31, 2012
- 0-SO-30-10 Att. 9, Auxiliary Building Ventilation Systems, Plant Operability Impacts (Tech Spec/TRM) Associated with ESF Coolers, August 22, 2016
- 0-SO-82-7, Diesel Generator 2A-A Support Systems, Revision 25

Inspection Procedure 71111.05

Procedures

- Sequoyah Fire Protection Report, Part II – Fire Protection Plan, Revision 36
- PFP NO: AUX-0-669-00, Fire Protection Pre-Fire Plans Auxiliary Building – El. 669, Revision 4
- PFP NO: AUX-0-669-02, Fire Protection Pre-Fire Plans Auxiliary Building – El. 669 (Unit 2 Side), Revision 10
- PFP NO: AUX-0-669-03, Fire Protection Pre-Fire Plans Auxiliary Building – El. 669 (Unit 1 Side), Revision 7
- B87 150915 003, SQN Combustible Loading Calculation for Room 669.0-A01, Revision 5
- PFP NO: CON-0-706-00, Fire Protection Pre-Fire Plans Control Building – El. 706, Revision 7
- MMTP-102, Erection of Scaffolds/Temporary Work Platforms and Ladders, Revision 14
- SQN-DC-V-1.3.4, Category 1 Cable Tray Support Systems, August 20, 1975
- B87 960829 003, Guidelines for the Erection of Scaffolding, Revision 2
- PFP NO: AUX-0-749-00, Fire Protection Pre-Fire Plans Auxiliary Building – El. 749 & 759, Revision 4
- PFP NO: AUX-0-749-01, Fire Protection Pre-Fire Plans Auxiliary Building – El. 749 (Unit 1 Side), Revision 9
- PFP NO: AUX-0-749-02, Fire Protection Pre-Fire Plans Auxiliary Building – El. 749 (Unit 2 Side), Revision 10

Condition Reports

- 1383239, Housekeep issue Unit 2 AB El 669
- 1343240, NRC observation of Pre-Fire Plans
- 1380273, NRC Identified: Ladder installed without appropriate evaluation/approval

Inspection Procedure 71111.06

Procedures

- SQN-0-MNWX-317-HH3, PM#052053000, Attachment A

Work Orders

- WO118840468

Inspection Procedure 71111.07

Procedures

- 0-TI-SXX-000-146.0, Program for Implementing NRC Generic Letter 89-13, Revision 4
- 0-MI-MRR-070-611.0, Component Cooling System Heat Exchanger Maintenance, Revision 12

Work Orders

- WO119191043

Inspection Procedure 71111.11

E-0, Reactor Trip or Safety Injection, Revision 39
E-2, Faulted Steam Generator Isolation, Revision 16
E-3, Steam Generator Tube Rupture, Revision 23

CR1303568, Unit 2 Turbine and Rx Shutdown due to main turbine drain line steam break

Inspection Procedure 71111.12

Procedures

TI-4, Maintenance Rule Performance Indicator Monitoring, Trending, and Reporting –
10CFR50.65, Revision 30

Inspection Procedure 71111.13

Procedures

NPG-SPP-07.3, Work Activity Risk Management Process, Revision 22
NPG-SPP-07.2.4, Forced Outage or Short Duration Planned Outage Management, Revision 7
NPG-SPP-07.2, Outage Management, Revision 8

Inspection Procedure 71111.15

Procedures

NEDP-22, Operability Determinations and Functional Evaluations, Revision 18
OPDP-8, Operability Determination Processes and Limiting Conditions for Operation Tracking,
Revision 24
0-SI-SXP-067-202.B, ERCW Traveling Screen Wash Pump B-B Performance Test, Revision 13
Functionality Evaluation Documentation for CR 1265450 & 1379440, dated January 23, 2018

Condition Reports

1379440, B-B ERCW SWP failed Section XI acceptance criteria
1384033, perform extent of condition review for part 21 report

Work Orders

118629224
119368807

Inspection Procedure 71111.18

Procedures

NPG-SPP-09.3, Plant Modifications and Engineering Change Control, Revision 27
NPG-SPP-09.4, 10 CFR 50.59 Evaluations of Changes, Tests, and Experiments, Revision 12
NPG-SPP-09.5, Temporary Modifications Temporary Configuration Changes, Revision 12

Inspection Procedure 71111.19

Procedures

NPG-SPP-06.3, Pre-/Post-Maintenance Testing, Revision 1
NPG-SPP-06.9, Testing Programs, Revision 1
NPG-SPP-06.9.1, Conduct of Testing, Revision 10
NPG-SPP-06.9.3, Post-Modification Testing, Revision 9
1-SI-OPS-202-253.A, Function Test of Loss of Voltage Relays On 6.9KV Shutdown Board 1A-A,
Revision 20

Work Orders

WO118594012

WO119341490

WO119191043

Inspection Procedure 71111.22

Procedures

NPG-SPP-06.9.1, Conduct of Testing, Revision 10

1-SI-SXP-063-201.A, Safety Injection Pump 1A-A Performance Test, Revision 21

1-SI-OPS-082-007.A, Electrical Power System Diesel Generator 1A-A, Revision 66

2-SI-SXP-074-201.B, Residual Heat Removal Pump 2B-B Performance Test, Revision 17

Work Orders

WO118641678

WO118691071

WO118702873

Inspection Procedure 71114.06

Procedures

EPIP-1, Emergency Plan Classification Matrix, Revision 52

EPIP-2, Notification of Unusual Event, Revision 35

EPIP-3, Alert, Revision 37

EPIP-4, Site Area Emergency, Revision 39

EPIP-5, General Emergency, Revision 48

Inspection Procedure 71152

Procedures

NPG-SPP-22.300, Corrective Action Program, Revision 10

NPG-SPP-22.303, "CR Actions, Closures and Approvals," Revision 10

Inspection Procedure 71153

Operator Chronological Logs

AOP-C.01 Rod Control Malfunctions, Revision 26

0-MI-EBR-202-007.5, 6.9kV ABB Type 7.5 HK Breaker Inspection, Revision 0001

NPG-SPP-06.14 TROUBLESHOOTING PLAN

CR 1299591, Unit Board 28 Breaker 1814 Failed Open During Shutdown board 2A-A Transfer

Work Order # 118762584