



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

May 14, 2019

Mr. George A. Lippard III
Vice President, Nuclear Operations
South Carolina Electric & Gas Co.
Bradham Blvd & Hwy 215
P.O. Box 88, Mail Code 800
Jenkinsville, SC 29065

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED
INSPECTION REPORT 05000395/2019001

Dear Mr. Lippard III:

On March 31, 2019, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your Virgil C. Summer Nuclear Station, Unit 1. On April 24, 2019, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

NRC inspectors documented two findings of very low safety significance (Green) in this report. These findings involved violations of NRC requirements; one of these violations was determined to be Severity Level IV under the traditional enforcement process.

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 Summer.

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 Summer.

G. Lippard

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Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 3

Docket No.: 05000395

License No.: NPF-12

Enclosure:

Inspection Report 05000395/2019001

cc w/ encl: Distribution via Listserv

SUBJECT: VIRGIL C. SUMMER NUCLEAR STATION, UNIT 1 – NRC INTEGRATED INSPECTION REPORT 05000395/2019001 dated May 14, 2019

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OFFICE	RII: DRS	RII:DRS	RII:DRP	RII:DRS	RII:DRP	RII:DRP	RII:DRP
NAME	T. Fanelli	NMorgan	EHilton	GOttenberg	JReece	RTaylor	RMusser
SIGNATURE	5/10/2019	5/9/2019	5/10/2019	5/10/2019	5/6/ 2019	5/10/2019	5/14/2019
DATE	5/ /2019	5/ /2019	5/ /2019	5/ /2019	5/ /2019	5/ /2019	5/ /2019

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U.S. NUCLEAR REGULATORY COMMISSION

Inspection Report

Docket Number(s): 05000395

License Number(s): NPF-12

Report Number(s): 05000395/2019001

Enterprise Identifier: I-2019-001-0017

Licensee: South Carolina Electric & Gas Co.

Facility: Virgil C. Summer Nuclear Station, Unit 1

Location: Jenkinsville, SC 29065

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

Inspectors: T. Fanelli, Senior Reactor Inspector
E. Hilton, Resident Inspector
N. Morgan, Reactor Inspector
G. Ottenberg, Senior Reactor Inspector
J. Reece, Senior Resident Inspector

Approved By: Randall A. Musser, Chief
Reactor Projects Branch 3
Division of Reactor Projects

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Quarterly inspection at Summer Unit 1 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.

List of Findings and Violations

Failure to Appropriately Evaluate Internal Heat Rise in ASCO Solenoid Valves			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000395/2019001-01 Open/Closed	None (NPP)	71111.21N
The inspectors identified a Green finding and associated Non-cited Violation (NCV) of 10 CFR 50.49(e)(5) for the licensee's failure to appropriately consider heat rise and applicable accelerated aging criteria in the qualification of ASCO valve IPV02020-20A-MS, in accordance with IEEE 323-1974.			

Failure to take Technical Specification (TS) actions for inoperable Reactor Building Cooling Unit (RBCU) Condensate Flow Monitor (TS 3.4.6.1) and submit Licensee Event Report (LER)(10 CFR 50.73(a))			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Barrier Integrity	Green Severity Level IV NCV 05000395/2019001-02 Open/Closed	[P.3] - Resolution	71152
The inspectors identified a Green finding with an associated enforcement problem involving a non-cited violation (NCV) of TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems," for a failure to take TS actions for inoperable RBCU Condensate Flow Monitor and a severity level IV NCV of 10 CFR 50.73(a) for a failure to issue an LER.			

Additional Tracking Items

Type	Issue number	Title	Report Section	Status
URI	05000395/20180 10-04	Unjustified Qualified Life for ASCO Valves	71111.21N	Closed

URI	05000395/20180 10-05	Potential High Radiation Dose Areas with Unqualified Components	71111.21N	Closed
URI	05000395/20180 10-06	Potential Unjustified Activation Energy for Barton Transmitters	71111.21N	Closed

PLANT STATUS

Unit 1 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

71111.01 - Adverse Weather Protection

Impending Severe Weather Sample (IP Section 03.03) (1 Sample)

The inspectors evaluated readiness for impending adverse weather conditions for a severe thunderstorm warning issued for Fairfield County on February 12, 2019.

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) Walkdown of 'A' and 'B' motor driven emergency feedwater (MDEFW) pumps while the turbine driven emergency feedwater (TDEFW) pump was tagged out for preventive maintenance (PM) on January 23, 2019
- (2) Walkdown 'B' MDEFW pump and TDEFW pump while 'A' MDEFW was tagged out for PM on March 4, 2019
- (3) Walkdown 'B' residual heat removal (RHR) pump while 'A' RHR pump was tagged out for PM on March 5, 2019
- (4) Walkdown 'B' reactor building (RB) spray pump while 'A' RB spray pump was tagged out for PM on March 7, 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) Service water pumphouse (fire zones SWPH01, 02, 03, 04.02, 05.01.01, .02, .03 and 05.02.01, .02, .03) on January 26, 2019
- (2) Diesel generator rooms 'A' and 'B' (fire zones DG01.01, 01.02, DG02.01, 02.02) on January 26, 2019
- (3) Intermediate building 436' elevation (fire zones IB12, 13, 14, 15, 23.03, 24) on January 26, 2019
- (4) Intermediate building 436' elevation (fire zones IB01.25.05.01, .02, IB01.25.06.01, .02, IB01.14) on February 12, 2019
- (5) 1DA Switchgear room (fire zone IB01.20) on March 5, 2019

71111.07A - Heat Sink Performance

Annual Review (IP Section 02.01) (1 Sample)

The inspectors evaluated readiness and performance of:

'A' service water (SW) pump motor lube oil heat exchangers inspection and cleaning per WO1716932 on February 21, 2019

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (4 Samples)

The inspectors observed and evaluated:

- (1) The inspectors observed and evaluated licensed operator performance in the control room during reactor water makeup and emergency feedwater (EFW) surveillance test on January 16, 2019.
- (2) The inspectors observed and evaluated licensed operator performance in the control room during pre-job brief for inservice testing for emergency feedwater backup air supply check valves on January 15, 2019.
- (3) The inspectors observed and evaluated licensed operator performance in the control room during downpower to 95 percent for turbine stop valve testing and 'D' feedwater booster pump (FWBP) corrective maintenance on March 8, 2019.
- (4) The inspectors observed and evaluated licensed operator performance in the control room during an increase power to 100 percent after 'D' FWBP maintenance on March 10, 2019.

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

The inspectors observed and evaluated an operator requalification simulator training scenario occurring on January 28, 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) Cycle 23 Maintenance Rule (a)(3) assessment on January 15, 2019
- (2) STP-220.007A unsatisfactory results caused inoperability of EFW flow control valve, IFV03556-EF, on February 20, 2019

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

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

- (1) Yellow risk condition for solid state protection system (SSPS) actuation test on 'B' Train, on January 19, 2019
- (2) Yellow risk condition for TDEFW PMs while 'C' condensate pump is out of service (OOS) WO190017, on January 23, 2019
- (3) Emergent work associated with 'C' main feedwater isolation valve corrective maintenance XVG01611C WO1904561, on February 12, 2019
- (4) Yellow risk condition on SSPS actuation logic and relay test on February 29, 2019

71111.15 - Operability Determinations and Functionality Assessments

Sample Selection (IP Section 02.01) (4 Samples)

The inspectors evaluated the following operability determinations and functionality assessments in review of Condition Reports (CRs):

- (1) CR-18-05620, Nuclear instrument, N31, is diverging from N32 on January 25, 2019
- (2) CR-19-00060, 'B' EDG exhaust manifold bolting material not torqued per vendor requirements on February 22, 2019
- (3) CR-18-05831, Operability evaluation of IFV03556-EF, EFW flow control valve on February 15, 2019
- (4) CR-18-05993, Reactor building spray on February 1, 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) Post maintenance testing (PMT) on diesel driven fire pump, replaced valve due to seat leakage which caused inadvertent start of electric fire pump WO1703778, on January 7, 2019
- (2) Performed maintenance on TDEFW lube oil system WO1813509, on January 25, 2019
- (3) Performed corrective maintenance on 'C' main feedwater isolation valve, PMT verified proper indication and no external leakage WO1904561, on February 12, 2019
- (4) Performed maintenance on 'A' RB spray pump WO1807891, on March 14, 2019
- (5) 'A' SW pump / motor retest for major maintenance WO1820611, on March 25, 2019
- (6) 'C' SW pump retest after electrical maintenance WO1811980, on March 26, 2019

71111.21N - Design Bases Assurance Inspection (Programs)

The inspectors evaluated Environmental Qualification program information to facilitate closure of the unresolved items opened on April 4, 2018 in Design Bases Assurance Inspection (Programs) Report 05000395/2018010 (ADAMS Accession No. ML18094A162).

Select Sample Components to Review - Primary Containment (Inside Containment) (IP Section 02.01) (1 Partial)

IPCV00445A Pressurizer Power Operated Relief Valves (ASCO)

Select Sample Components to Review - Risk Significant/Low Design (Inside/Outside Containment) (IP Section 02.01) (2 Partials)

- (1) (Partial) IPT00456 Barton Pressurizer Transmitter / 764
- (2) (Partial) IPV02020 20A Main Steam Power Operated Relief Valves ASCO / WP-HVA-206-381-3RVU

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

In Service Testing (IST) (IP Section 03.01) (3 Samples)

- (1) STP-220-007B, "Backup Air Supply Check Valve Test for Emergency Feedwater Valves," Revision 7, WO1817428 on January 17, 2019
- (2) STP-205.004, "RHR Pump and Valve Operability Test," Revision 9B (for 'B' RHR train) WO1819631 on January 17, 2019
- (3) STP-212.002, "Reactor Building Spray Pump Test," Revision 7A (for 'A' train) WO1817422 on January 4, 2019

Reactor Coolant System (RCS) Leak Detection (IP Section 03.01) (1 Sample)

STP-114.002, "Operational Leakage Calculation," Revision 12G, WO1820289 on March 5, 2019

Surveillance Testing (IP Section 03.01) (2 Samples)

- (1) STP-125.002A, "Diesel Generator A Operability Test," Revision 2E WO1820309 on February 27, 2019
- (2) STP-125.002B, "Diesel Generator B Operability Test," Revision 3 WO1820310 on February 14, 2019

71114.06 - Drill Evaluation

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

On February 20, 2019, the inspectors reviewed and observed the performance of a simulator drill that involved multiple equipment failures which required an ALERT, Site Area Emergency and General Emergency to be declared. The inspectors assessed emergency

procedure usage, emergency plan classification, notifications and the licensee's identification and entrance of any problems into their corrective action program. This inspection evaluated the adequacy of the licensee's conduct of the drill and critique performance. Drill issues were captured by the licensee in CR-19-00690.

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (1 Sample)

January 1, 2018, through December 31, 2018

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (1 Sample)

January 1, 2018, through December 31, 2018

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (1 Sample)

January 1, 2018, through December 31, 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 issue:

CR-18-04866, Failure of reactor building cooling unit (RBCU) flow switch, IFS01900B, due to debris on March 12, 2019

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 Partial)

Review of Safety Analysis Report (SAR); Safety Evaluation Report (SER) and Certificate of Compliance (CoC) for the dry cask storage system (DCSS) on March 20, 2019.

INSPECTION RESULTS

Minor Violation	71111.21 N
<p>Minor Violation: During the inspector's review of URI 05000395/2018010-06, "Potential Unjustified Activation Energy for Barton Transmitters," the inspectors identified that the licensee did not appropriately determine the qualified life of the Barton 764 transmitter because they failed to account for all significant types of degradation, as required by 10 CFR 50.49(e)(5). When calculation 0980-036-016, "Qualified Life of Barton 764 Transmitter (Westinghouse Qualified)" was performed on September 1, 1988, it assumed the metal film resistor within the transmitter housing was the most limiting subcomponent of the device and used an activation energy associated with that subcomponent. However, the calculation did not account for the operating temperature of the metal film resistor due to self-heating effects caused by current (I) and resistance (R) in the circuit.</p> <p>The original qualification of the transmitter was performed by Westinghouse, using the methodology described in WCAP-8587, "Methodology for Qualifying Westinghouse WRD Supplied NSSS Safety Related Electrical Equipment," which stated in Appendix D, section 4.1, Normal Operating Temperature (T_0):</p> <p>"In estimating the component or material operating temperature, consideration must be given to such phenomena as localized ambient hot spots within electronic cabinets and component self-heating (I^2R) effects. The value of T_0 employed depends on whether the component/system to be aged is energized or deenergized during the simulation:</p> <p>a) Energized - The ambient temperature is used for T_0. However, if the components or material is enclosed in a confined space, a value representing the increase in temperature (typically 15°F) from outside to inside the enclosure is added to the external ambient temperature..."</p> <p>The licensee described this deficiency in their corrective action program in CR 18-00500.</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 account for heat rise of the metal film resistors could not be reasonably 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, the licensee reviewed data recorded for the actual ambient temperatures near the installed component, and determined that their assumption for normal ambient temperature in the qualified life calculation was conservative by 17°F. Since the licensee's temperature margin bounded the expected additional internal heating, the violation was considered minor.</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>This minor violation closes URI 050000395/2018010-06.</p>	

Unresolved Item (Closed)	Unjustified Qualified Life for ASCO Valves 05000395/2018010-04	71111.21N
<p>Description: An unresolved item (URI 05000395/2018010-04) was opened in inspection report 05000395/2018010 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML18094A162) to determine if the licensee's failure to adequately evaluate the qualified life of their ASCO solenoid operated valves (SOVs) was a more than minor performance deficiency. The URI was opened to provide for further review of other test information that the licensee believed to be applicable to the qualified life determination. Specifically, the inspectors reviewed the licensee's re-evaluation of the qualified lives of the ASCO SOVs and noted that the licensee corrected a non-conservative error in their use of heat rise data provided by ASCO for specific models of ASCO valves, and also accounted for previous conservatisms in assumed ambient temperature conditions. While the licensee's re-evaluation determined that the equipment had remained qualified while installed in the plant, the newly established qualified lives of the equipment required adjustment to the planned replacement schedule of the equipment. The inspectors determined that the performance deficiency was more than minor and documented a violation of 10 CFR 50.49(e)(5). The URI identified as 05000395/2018010-04 is now closed.</p> <p>Corrective Action Reference(s): CR 18-00175</p>		

Unresolved Item (Closed)	Potential High Radiation Dose Areas with Unqualified Components 05000395/2018010-05	71111.21N
<p>Description: Unresolved Item (URI) 05000395/2018010-05 was opened on April 4, 2018, in Design Bases Assurance Inspection Report 05000395/2018010 (ADAMS Accession Number ML1809A162) to review the licensee's environmental qualification licensing basis documentation and post-accident dose rate calculations for equipment outside of containment in a radiation environment to determine if a performance deficiency existed. Specifically, the URI was opened to address concerns related to the licensee's lack of performing an analysis to determine the radiation exposure to shielded components adjacent to electrical and blank penetrations outside of containment.</p> <p>The inspectors reviewed the licensee's Final Safety Analysis Report, the NRC Safety Evaluation Report (SER) and the licensee's evaluation of containment penetration streaming dose rates during a loss-of-coolant accident. The inspectors noted that the SER stated that the licensee's method for determining dose would not be reviewed and the licensee's evaluation found that the dose rates due to streaming through the penetrations would be minimal, such that the zone designations would not require modification. Based on the results of this review, the issue discussed in URI 05000395/2018010-05 was determined to not represent a licensee performance deficiency or a violation of applicable regulatory requirements. This URI is closed.</p> <p>Corrective Action Reference(s): CR-18-00684</p>		

Unresolved Item (Closed)	Potential Unjustified Activation Energy for Barton Transmitters 05000395/2018010-06	71111.21N
<p>Description: Unresolved item (URI) 05000395/2018010-06 was opened in inspection report 05000395/2018010 (ADAMS Accession No. ML18094A162), to determine whether the activation energy used for the reviewed Barton transmitters was appropriate and, if not, whether the licensee had the responsibility to verify the information provided by their vendors and contractors.</p> <p>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 Numbers 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 the activation energy used for the Barton transmitters.</p> <p>However, during the URI follow-up, the inspectors identified a minor violation of 10 CFR 50.49(e)(5) for the licensee's failure to account for heat rise of specific components within these Barton transmitters, as discussed in the associated minor violation in this report. This URI is now closed.</p> <p>Corrective Action Reference(s): CR 18-00500</p>		

Failure to Appropriately Evaluate Internal Heat Rise in ASCO Solenoid Valves			
Cornerstone	Significance	Cross-cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000395/2019001-01 Open/Closed	None (NPP)	71111.21N
<p>The inspectors identified a Green finding and associated Non-cited Violation (NCV) of 10 CFR 50.49(e)(5) for the licensee's failure to appropriately consider heat rise and applicable accelerated aging criteria in the qualification of ASCO valve IPV02020-20A-MS, in accordance with IEEE 323-1974.</p>			

Description: The safety function of ASCO solenoid operated valve (SOV), IPV02020-20A-MS, was to provide isolation of the main steam line if a high-energy line break occurred. The valves were qualified in ASCO test report AQR-67368. The licensee's qualified life calculation misapplied the heat rise of the coils within the valves and its effects on the elastomer seat material. The originally calculated qualified life of the solenoid valve was 33.9 years and was based on the seat elastomer material being the most limiting component.

In 1989, the licensee received information from ASCO which documented that heat rise values of subcomponents within the solenoid valve were higher than what was being considered in qualified life calculations. The ASCO field notification stated, in part, "thermal qualified life values may vary depending on the method used for determination as well as the data used in thermal life calculations. ... Since there are many variables that must be considered in qualified life calculations and since the NRC has not endorsed any single thermal qualified life calculation method, ASCO leaves it to each individual user to determine the appropriate qualified life calculation method for each specific application."

In 1993, the licensee's contractor, Impell Corporation, reanalyzed the qualified life established by ASCO qualification report AQR-67368, and used information from the ASCO field notification dated 10/27/1989. As a result of the inspection team's questions regarding the calculated qualified life, the licensee discovered that the Impell EQ qualified life calculations for some ASCO SOVs were non-conservative due to an error in selecting the correct heat rise input from the vendor drawings.

In follow-up to URI 05000395/2018010-04, the inspectors reviewed the licensee's re-evaluation of the qualified lives of the ASCO SOVs and noted that the licensee corrected a non-conservative error in their use of heat rise data provided by ASCO for specific models of ASCO valves, and also accounted for previous conservatisms in assumed ambient temperature conditions. While the licensee's re-evaluation determined that the equipment had remained qualified while installed in the plant, the newly established qualified lives of the equipment required adjustment to the planned replacement schedule because the new calculations determined a reduced qualified life.

Additionally, the inspectors determined that neither the Impell calculations nor the licensee's re-analysis of the qualified life calculations accounted for the differences between the oven used during the original artificial aging done in in AQR-67638 and the oven used in ASCO's internal heat rise determination of the data that was given in the field notice. The oven used by ASCO in determining the heat rise was a static air oven, while the oven used during artificial aging was forced air. The result of this would over report the heat rise assumed during artificial aging conditions. The result of the errors resulted in a non-trivial reduction in qualified life.

Corrective Action(s): The licensee re-evaluated the qualified lives of the ASCO SOVs after correcting for the incorrect use of the heat rise information provided by ASCO. The licensee determined that the equipment remained qualified while it had been installed in the plant, and adjusted the replacement schedule for the equipment as necessary. At the time of this reporting, the licensee was still in the process of evaluating the impact of the aging oven differences.

Corrective Action Reference(s): CR 18-00175

Performance Assessment:

Performance Deficiency: The licensee's failure to appropriately consider heat rise and applicable accelerated aging criteria in the qualification of ASCO valve IPV02020-20A-MS in accordance with IEEE 323-1974 was a performance deficiency (PD).

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, the failure to appropriately consider heat rise and applicable accelerated aging criteria would have led to the equipment being installed in the plant beyond their qualification if the replacement schedule had not been adjusted.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations". 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 design or qualification deficiency of a mitigating 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) requires, 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 May 1993, 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 at the equipment at the end of its designated life unless ongoing qualification demonstrated that the item had additional life. Specifically, the licensee failed to consider the degrading effects of heat rise and replace the affected equipment at the end of its designated life. The disposition of this finding and associated violation closes URI 050000395/2018010-04.

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

Failure to take Technical Specification (TS) actions for inoperable Reactor Building Cooling Unit (RBCU) Condensate Flow Monitor (TS 3.4.6.1) and submit Licensee Event Report (LER)(10 CFR 50.73(a))			
Cornerstone	Significance/Severity	Cross-cutting Aspect	Report Section
Barrier Integrity	Green Severity Level IV NCV 05000395/2019001-02 Open/Closed	[P.3] - Resolution	71152
<p>The inspectors identified a Green finding with an associated enforcement problem involving a non-cited violation (NCV) of TS 3.4.6.1, "Reactor Coolant System Leakage Detection Systems," for a failure to take TS actions for inoperable RBCU Condensate Flow Monitor and a severity level IV NCV of 10 CFR 50.73(a) for a failure to issue an LER.</p> <p><u>Description:</u> On October 29, 2018, during a refueling outage the licensee initiated CR-18-04866 to document the failure of flow switch, IFS01900B, which is associated with the RBCU condensate flow monitor required by TS 3.4.6.1. The licensee determined that the failure was due to debris which had collected around the flow switch. In NRC Inspection Report 05000395/2018002 (ML18226A252), the inspectors documented historical licensee corrective actions which included a self-imposed correction action program (CAP) requirement for a corrective action to preclude repetition (CAPR) to prevent future debris involved flow switch failures. A recent previous failure involved the 'A' channel switch, IFS01900A, identified in CR-17-05839, in which the inoperability was due to the accumulation of debris or trash analyzed as "mostly inert material (corrosion products), some microbiological growth, and some oil droplets." The inspectors noted that this event was sufficient for the ability to of the licensee to foresee and correct the debris problem later identified in the 'B' channel flow switch, IFS01900B.</p> <p>Following the failure of IFS01900B identified in CR-18-04866, the licensee performed a past operability review documented in engineering services procedure, ES-120, dated December 6, 2018, which concluded that both IFS01900A and IFS01900B were inoperable from September 17, 2017, to October 6, 2018. Additionally, the licensee concluded in technical work record, TWR-JB42566, dated December 18, 2018, that during this time period the requirements specified by TS 3.4.6.1, action c. were met based on the completion of work orders for daily reactor coolant system (RCS) water inventory balance (leakage) calculations. However, the inspectors performed a verification of the ES120 and the TWR and determined that the licensee failed to perform the RCS leakage calculation for approximately 81 hours (from November 9 to November 12, 2017), and for approximately 36.5 hours (from May 5 to May 6, 2018) due to power changes on the unit. While the work orders for the time period specified were closed, they documented that no work or testing was performed. The inspectors conveyed this information to the licensee who later developed a position paper on February 7, 2019, documenting why they still met TS 3.4.6.1 action c. This was reviewed by the NRC (region and headquarters) who concluded on April 4, 2019, that the licensee failed to comply with TS 3.4.6.1.</p> <p>The inspectors also determined that the licensee had failed to adequately implement the CAPR identified in CA009 of CR-07-02167 considering that debris or foreign material had repeatedly impacted the RBCU drain flow high switches documented in 2017 and 2018 CR's following completion of the licensee's long term corrective action in 2011.</p>			

The inspectors also noted that the 60 day reporting requirement in § 50.73(a) expired before the licensee submitted their position paper. Consequently, the inspectors determined that the licensee failed to comply with 10 CFR 50.73(a). The licensee initiated CR-19-01287 on April 5, 2019, to document the conclusion and initiation of an LER.

Corrective Action(s): The licensee initiated actions to identify causes and appropriate corrective actions for not adequately implementing a CAPR, the failure to comply with TS 3.4.6.1, and for the failure to submit a LER.

Corrective Action Reference(s): CR-18-04866 and CR-19-01287.

Performance Assessment:

Performance Deficiency: The licensee's failure to take TS actions for inoperable RBCU Condensate Flow Monitor as required by TS 3.4.6.1 and subsequently submit an LER as required by 10 CFR 50.73(a) was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the RCS Equipment and Barrier Performance attribute of the Barrier Integrity cornerstone. Specifically, the licensee failure to recognize RCS leakage detection system inoperability and perform actions required by TS 3.4.6.1 limited the ability of the licensee to monitor RCS inventory and detect and protect against radionuclide releases.

Significance: The inspectors assessed the significance of the finding using Appendix A, "Significance Determination of Reactor Inspection Findings for At - Power Situations". The inspectors used IMC 0609, "Significant Determination Process," Attachment 4, and Appendix A – Exhibit 3, and determined that the finding associated with TS 3.4.6.1 was of very low safety significance, Green, because the finding did not represent an actual RCS boundary issue, reactor containment isolation issue, nor control room, auxiliary spent or fuel pool issue. Additionally, the licensee had available at least one other RCS leakage detection system operable.

Cross-cutting Aspect: P.3 - Resolution: The organization takes effective corrective actions to address issues in a timely manner commensurate with their safety significance. The inspectors determined the finding had a cross-cutting aspect of resolution (P.3) in the area of problem identification and resolution, because the licensee did not successfully implement a CAPR in accordance with their procedures. Additionally, an attempt to correct the problem was not timely because attempted corrective actions were not implemented until the third refueling outage following identification of the problem.

Enforcement:

The ROP's significance determination process does not specifically consider the regulatory process impact in its assessment of licensee performance. Therefore, it is necessary to address this violation which impedes the NRC's ability to regulate using traditional enforcement to adequately deter non-compliance.

Severity: The inspectors determined that the 10 CFR 50.73(a) violation was, Severity Level IV, because it is similar to example 6.9.d.9 in the NRC Enforcement Policy.

Violation: TS LCO 3.4.6.1 requires in part that three of the specified TS required reactor coolant system leakage detection systems be operable.

Contrary to the above, the RBCU condensate flow monitor was inoperable and the licensee failed to complete the required TS actions for two time periods during September 17, 2017, to October 6, 2018.

10 CFR 50.73(a) requires in part that the licensee shall submit a LER for any event of the type described in the paragraph within 60 days after the discovery of the event.

Contrary to the above, the licensee failed to submit a LER prior to 60 days from December 6, 2018, for an event involving TS noncompliance or condition prohibited by TS described in 10 CFR 50.73(a).

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

EXIT MEETINGS AND DEBRIEFS

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

- On April 24, 2019, the inspectors presented the quarterly resident inspector results to Mr. George A. Lippard III and other members of the licensee staff.
- On March 28, 2019, the inspectors presented the Design Bases Assurance Inspection (programs) URI Closure Exit Meeting to Mr. Michael Moore and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	OAP-109.1	Guidelines for Severe Weather	5B
71111.04	Drawings	302-085	Emergency Feedwater Nuclear	5I
		302-641	Residual Heat Removal	2I
	Procedures	SOP-115	Residual Heat Removal	22E
		SOP-116	Reactor Building Spray	16F
		SOP-211	Emergency Feedwater System	14I
71111.05Q	Corrective Action Documents Resulting from Inspection	CR-19-00606	NRC Identified: Cable that supplies power to MVB03116C-SW (C SW Pump Disch Valve) has ground cable touching conduit where KaoWool wrap is not present. Fire Barrier ID is TR 73-CB.	February 15, 2019
	Miscellaneous	Design Bases Document	Cable and Raceway	2
		Fire Barrier Database	Fire Barrier 73-CB	July 10, 2001
	Procedures	STP-728.027	Diesel Generator Building Fire Barrier Inspection	5D
		STP-728.031	Service Water Pump House Building Fire Barrier Inspection	5D
		STP-728.047	Intermediate Building Elevations 476', 463', and 451' Fire Barrier Inspection	4C
		STP-728.048	Intermediate Building Elevation 436' Fire Barrier Inspection	4G
	Work Orders	1705297-001	CB Fire Barrier Inspection	July 17, 2017
71111.12	Procedures	ES-0514	Implementation of the Maintenance Rule Program	7
		ES-0514G	Maintenance Rule - Periodic (a)(3) Evaluation	1
		SAP-0157	Maintenance Rule Program	1
71111.21N	Calculations	DC00030-014	Access Area Occupancy Dose Calculations	Rev. 0
		NAI-2036-001	VC Summer Containment Penetration Streaming Dose Analysis	Rev. 0

71111.21N	Corrective Action Documents Resulting from Inspection	CR-18-00175	The NRC Inspector for the EQ DBAI questioned the qualified life of Asco solenoid valve XVG09684B-20-CC. Investigation determined that the EQ qualified life calculations for some ASCO solenoid valves (SOV) are non-conservative apparently due to an error in selecting the design input vendor drawings.	
		CR-18-00500	NRC identified NRC DBAI EQ Program inspection challenged the qualified life for Barton installed as IPT00456 and the calculation use of 0.78 electron Volts (eV) for the activation energy. This is identified as NRC Item of Concern #1.	
		CR-18-00684		
	Miscellaneous	Appendix 12A	Updated Final Safety Analysis Report	Rev. 0
		EIR 82438	Virgil C. Summer Nuclear Station EQ Radiation Dose Licensing Basis	2/21/2018
		EQDP-H-IN1-B05-1	Transmitters- Barton	Rev. 2
		NUREG 0588 Revision 4	Virgil C. Summer Nuclear Station, Docket No. 50/395, NUREG 0588 Revision 4, Response Letter	2/19/1982
		NUREG-0717	Safety Evaluation Report related to the operation of Virgil C. Summer Nuclear Station, Unit No. 1, Supplement 4	August 1982
	71152	Corrective Action Documents	CR 12-05070	
CR 14-02540				
CR 15-03574				
CR 17-02128				
Corrective Action Documents Resulting from Inspection		CR 18-04928	Lack of Technical Rigor in Transport Analysis TR05220-008	Dated 3/28/2019
		CR 19-00357	Handwritten Portions of the Diver Reports Illegible	Dated 1/28/2019
Drawings		1-MS-22-249	SW Flow Path Isometric	Rev. 4
		1-MS-22-255	SW Flow Path Isometrics	Rev. 5
		1-MS-22-256	SW Flow Path Isometrics	Rev. 11
		1-MS-22-569	SW Flow Path Isometrics	Rev. 7
		1-MS-50-175	Fisher Diaphragm Actuated Control Valve	Rev. 7

71152	Engineering Changes	ECR 50695	Installation of the Cured-In-Place-Piping	
	Engineering Evaluations	MPR Report 0310-0026-RPT-002	"Supply of Emergency Feedwater from the Service Water System – Licensing and Design Basis Review,"	Rev. 0
		TR05220-008	Service Water Supply Quality Relative to The Emergency Feedwater System	Rev. 0
	Miscellaneous	Alpha Service Water Bay	Divers Inspection	Dated 5/1/2017
		EQ Report No. 985	ASCO Solenoid Valve EQ Maintenance Data Sheets	
		GL 89-13 Responses		
		ICP-240.167	EQ Equipment Maintenance	Rev. 6
		RF23 Service Water Inspections	Service Water Bay Inspection and Pre-Cleaning Videos	
		SW Health Report	System Health Report	Dated 3/14/2017
		SW Health Report	System Health Report	8/21/2017
		SW Health Reports	System Health Report	3/26/2018
		TR00160-020	License Renewal Evaluation of the Service Water System Reliability and In-Service Testing Program	Rev. 3
		Valve Cage Photo Review		
		Vendor Manual	Fisher Controls Valve Regulator Manual for 67F and 67R	7/29/1976
	Procedures	CP-913	SW Biocide Treatment Equipment Operation	Rev. 12
		CP-923	Service Water Chemical Addition	Rev. 7
		ES-505	Service Water System Corrosion Monitoring and Control Program	Rev. 1
		ES-505	Service Water System Corrosion Monitoring and Control Program	Rev. 2

71152	Procedures	ES-505	Service Water System Corrosion Monitoring and Control Program	Rev. 3
		ES-505	Service Water System Corrosion Monitoring and Control Program	Rev. 4
		ES-505	Service Water System Corrosion Monitoring and Control Program	Rev. 5
		ES-560.211	SW Heat Exchanger Performance	Rev. 13
		ICP-240.169	FCV Diagnostic Testing	Dated 10/23-27/2019
		SAP-0156	License Renewal Program	Rev. 0
		SAP-0999	Corrective Action Program	Rev. 18
		SAP-1255	SW Reliability Optimization Program	Rev. 2
	Work Orders	1410966		
		1410969		
		1508250		
		1600049-013		
		1602828-002		
		1604087-004		
		1704898		
1709919				
1709922-002				