



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**
REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, ILLINOIS 60532-4352

May 3, 2022

Mr. David P. Rhoades
Senior Vice President
Constellation Energy Generation, LLC
President and Chief Nuclear Officer (CNO)
Constellation Nuclear
4300 Winfield Road
Warrenville, IL 60555

**SUBJECT: BRAIDWOOD STATION – INTEGRATED INSPECTION REPORT
05000456/2022001 AND 05000457/2022001**

Dear Mr. Rhoades:

On March 31, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Braidwood Station. On April 8, 2022, the NRC inspectors discussed the results of this inspection with Mr. G. Gogle, Acting Site Vice President and other members of your staff. The results of this inspection are documented in the enclosed report.

One finding of very low safety significance (Green) is documented in this report. This finding involved a violation of NRC requirements. We are treating this violation as a non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or the significance or severity of the violation 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 III; the Director, Office of Enforcement; and the NRC Resident Inspector at Braidwood Station.

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 III; and the NRC Resident Inspector at Braidwood Station.

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 Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,



Signed by Peterson, Hironori
on 05/03/22

Hironori Peterson, Chief
Branch 3
Division of Reactor Projects

Docket Nos. 05000456 and 05000457
License Nos. NPF-72 and NPF-77

Enclosure:
As stated

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Letter to David Rhoades from Hironori Peterson dated May 3, 2022.

SUBJECT: BRAIDWOOD STATION – INTEGRATED INSPECTION REPORT
05000456/2022001 AND 05000457/2022001

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

Docket Numbers: 05000456 and 05000457

License Numbers: NPF-72 and NPF-77

Report Numbers: 05000456/2022001 and 05000457/2022001

Enterprise Identifier: I-2022-001-0057

Licensee: Constellation Energy Generation, LLC

Facility: Braidwood Station

Location: Braceville, IL

Inspection Dates: January 01, 2022 to March 31, 2022

Inspectors: R. Bowen, Illinois Emergency Management Agency
D. Kimble, Senior Resident Inspector
J. Masse, General Engineer NRRAN
N. Shah, Senior Project Engineer
P. Smagacz, Resident Inspector

Approved By: Hironori Peterson, Chief
Branch 3
Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Braidwood Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC’s program for overseeing the safe operation of commercial nuclear power reactors. Refer to <https://www.nrc.gov/reactors/operating/oversight.html> for more information.

List of Findings and Violations

Inadequate Work Instructions for Disassembly/Reassembly of Safety Injection (SI) Cold Leg Throttle Valve			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000457/2022001-01 Open/Closed	[H.1] - Resources	71152A
<p>A self-revealed finding of very low safety significance (i.e., Green) and an associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, were identified for the licensee’s failure to include adequate detail within their maintenance work instructions for the disassembly/reassembly of 2SI8822B, Safety Injection System Copes-Vulcan Throttle Valve to 2B Reactor Coolant System (RCS) Cold Leg. Specifically, work instructions provided by the licensee under safety-related Work Order (WO) 4840548-02, Flow Change During 2BwOSR 5.5.8.SI-11: MVR - 2SI8822B, Disassemble / Inspect / Repair Valve: 2SI8822B, during Unit 2 Refuel Outage A2R20 in October of 2018 contained less than adequate instructions for reassembly of the valve internals, such that valve internals were installed upside down within the valve body during reassembly. Operation of the valve in this condition ultimately placed abnormal stress on the valve internals, causing the internals to crack in several locations. This condition was subsequently revealed when the licensee opened the 2SI8822B valve again for inspection during the most recent A2R22 Refuel Outage in October 2021.</p>			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000456,05000457/2021004-01	2SI8822B Cold Leg Injection Throttle Valve Cage Failure	71152S	Closed

PLANT STATUS

Unit 1 and Unit 2 began the inspection period operating at full power. With the exception of short duration reductions in power to support scheduled testing activities and load changes requested by the transmission system dispatcher, both units remained operating at or near full 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 activities described in IMC 2515, Appendix D, "Plant Status," conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities, and completed on-site portions of IPs. 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 03.02) (1 Sample)

- (1) The inspectors evaluated the adequacy of the overall preparations to protect risk significant systems from an impending snowstorm during the week ending February 5, 2022.

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated system configurations during partial physical alignment verifications of the following systems/trains:

- (1) The 1B and 2A Station Air Compressors (SACs) while protected and in standby following a trip of the 1A SAC and the failure of the Unit 2 SAC to start and run on demand, during the week ending January 29, 2022.
- (2) The Unit 2 Containment Spray (CS) Train while protected during planned 2B CS Train maintenance, during the week ending February 12, 2022.
- (3) The 2A Emergency Diesel Generator (EDG) while protected during emergent 2B EDG corrective maintenance, during the week ending March 26, 2022.
- (4) The 1B Safety Injection (SI) Train during 1A SI Train maintenance, during the week ending April 2, 2022.

Complete Walkdown Sample (IP Section 03.02) (1 Sample)

The inspectors evaluated system configuration during a full system physical alignment verification of the following system/trains:

- (1) The Unit 1 Auxiliary Feedwater (AF) system, during the weeks ending March 12 through March 31, 2022

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (3 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting physical inspections and reviews to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Fire Zone 12.1-0; Fuel Handling Building, 426' and 401' Elevations, during the week ending February 19, 2022
- (2) Fire Zones 9.1-1 and 9.4-1; Turbine Building, 401' Elevation, 1B EDG, during the week ending March 12, 2022
- (3) Fire Zone 11.1B-0; Auxiliary Building, 330' Elevation, 1B/2B Essential Service Water (SX) Pump Room, during the week ending March 26, 2022

Fire Brigade Drill Performance Sample (IP Section 03.02) (1 Sample)

The inspectors evaluated the performance and training of the on-site fire brigade during observation of the following drill activities:

- (1) Observation of announced and unannounced fire drills with multiple crews on March 10, 2022

71111.11Q - Licensed Operator Requalification 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 the following licensed operator activities in the control room:

- (1) Various activities involving on-watch operations crews. These activities included, but were not limited to:
 - Unit 1 power maneuvering in response to the system transmission dispatcher, during the week ending January 29, 2022.
 - Response to station and instrument air system transients, including trips on multiple SACs, during the week ending January 29, 2022.

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

The inspectors observed and evaluated the following licensed operator training activity:

- (1) A complex casualty graded scenario involving a crew of licensed operators was observed in facility's simulator on February 24, 2022

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (2 Samples)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

- (1) Maintenance effectiveness review of the Unit 1 and 2 EDG starting air systems, during the weeks ending March 12 through March 31, 2022
- (2) Maintenance effectiveness review of Unit 1 and 2 Copes Vulcan manual throttle valves within the station's emergency core cooling systems, during the weeks ending March 12 through March 31, 2022

71111.13 - Maintenance Risk Assessments and Emergent Work Control

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

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

- (1) Review and evaluation of the risk associated with emergent work activities for the Unit 2 Control Rod Drive 2BD Power Supply Cabinet, as documented in Issue Reports (IRs) 4467108 and 4468189, during the week ending January 29, 2022
- (2) Evaluation of the emergent work associated with the 2C Circulating Water Pump that required the pump to be secured with the unit operating power, as documented in WOs 5206556 and 4639101, during the week ending March 5, 2022
- (3) Evaluation of the emergent work associated with the Unit 1 Westinghouse Ovation™ digital control system, as documented in WO 5236261, during the weeks ending March 5 through March 12, 2022
- (4) Evaluation of the emergent work associated with the 2S-47 Fire Protection Zone Alarm and CO2 Actuation/Suppression system, as documented in WO 4944490, during the week ending March 12, 2022
- (5) Evaluation of the emergent jacket water cooling system repairs on the 2B EDG, as documented in WO 5240543, during the weeks ending March 19 through March 26, 2022.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (7 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

- (1) Evaluation of the operability of the 1A EDG following receipt of a 1A EDG Trouble Alarm, as documented in IR 4468690, during the week ending January 15, 2022
- (2) Evaluation of the operability of the 1B SX system following identification of a degraded cubicle cooler valve, as documented in IR 4472535, during the week ending January 22, 2022
- (3) Evaluation of the operability of the 1RE9159A Containment Isolation Valve following identification of anomalous closing time, as documented in IR 4473614, during the week ending January 29, 2022
- (4) Evaluation of the operability of the 2B EDG following identification of a jacket water leak, as documented in IR 4472544, during the weeks ending February 12 through March 19, 2022
- (5) Evaluation of the operability of the Unit 2 N43 Power Range Nuclear Instrument following identification of an anomalous voltage reading during routine surveillance testing, as documented in IR 4480091, during the week ending February 26, 2022
- (6) Evaluation of the operability of the RCS pressure boundary following identification of boric acid near 1CV050D in containment, as documented in IR 4482584, during the weeks ending March 12 through March 31, 2022
- (7) Evaluation of the operability of the core exit thermocouples, as documented in IR 4484367, during the weeks ending March 19 through March 31, 2022

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (2 Samples)

The inspectors evaluated the following post-maintenance testing activities to verify system operability and functionality:

- (1) Functional and operational testing of the Unit 2 SAC following overhaul and repairs after mechanical failure, as documented in WO 4858793, during the weeks ending February 19 through February 26, 2022
- (2) Functional and operational testing of the 1B Component Cooling Water Pump following replacement of the pump's 4 KV circuit breaker, as documented in WO 4870082, during the week ending March 19, 2022

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance testing activities:

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

- (1) 1BwOSR 3.8.1.2-2: EDG Operability Surveillance, as documented in WO 5214083, during the week ending January 15, 2022
- (2) 1BwOSR 3.7.5.4-2: Unit 1 Diesel Driven Auxiliary Feedwater Pump Surveillance, as documented in WO 5225008, during the weeks ending February 12 through February 19, 2022

Inservice Testing (IP Section 03.01) (1 Sample)

- (1) 1BwOSR 5.5.8.RH-5A: Group A Inservice Testing (IST) Requirements for Residual Heat Removal Pump 1RH01PA, as documented in WO 5230274, during the week ending March 31, 2022

RCS Leakage Detection Testing (IP Section 03.01) (1 Sample)

- (1) Review of Unit 1 RCS leakage surveillance data, as documented in IRs 4461023, 4468523, 4475005, and 4475753, during the week ending February 5, 2022

71114.06 - Drill Evaluation

Select Emergency Preparedness Drills and/or Training for Observation (IP Section 03.01) (1 Sample)

The inspectors evaluated site's emergency plan by observing the following emergency response organization (ERO) activities:

- (1) A site-wide emergency preparedness drill performed on January 25, 2022

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors reviewed and verified selected portions of the licensee's performance indicator submittals listed below:

IE01: Unplanned Scrams per 7000 Critical Hours Sample (IP Section 02.01) (2 Samples)

- (1) Unit 1 (January 1, 2021 through December 31, 2021)
- (2) Unit 2 (January 1, 2021 through December 31, 2021)

IE03: Unplanned Power Changes per 7000 Critical Hours Sample (IP Section 02.02) (2 Samples)

- (1) Unit 1 (January 1, 2021 through December 31, 2021)
- (2) Unit 2 (January 1, 2021 through December 31, 2021)

IE04: Unplanned Scrams with Complications (USwC) Sample (IP Section 02.03) (2 Samples)

- (1) Unit 1 (January 1, 2021 through December 31, 2021)
- (2) Unit 2 (January 1, 2021 through December 31, 2021)

71152A - Annual Follow-Up Problem Identification and Resolution

Annual Follow-Up of Selected Issues (Section 03.03) (2 Samples)

The inspectors conducted in-depth reviews of the licensee's implementation of the CAP related to the following issues:

- (1) Review and assessment of the station's corrective actions from a missed TS surveillance on Unit 2, as documented in IR 4469855, during the weeks ending January 29 through March 31, 2022
- (2) Review and assessment of the station's corrective actions following identification of the mis-assembly of 2SI8822B (Safety Injection Manual Throttle Valve for the 2B RCS Cold Leg), as documented in IRs 4455415 and 4477366, during the weeks ending March 12 through March 31, 2022

INSPECTION RESULTS

Inadequate Work Instructions for Disassembly/Reassembly of Safety Injection (SI) Cold Leg Throttle Valve			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000457/2022001-01 Open/Closed	[H.1] - Resources	71152A
<p>A self-revealed finding of very low safety significance (i.e., Green) and an associated non-cited violation (NCV) of 10 CFR Part 50, Appendix B, Criterion V, Instructions, Procedures, and Drawings, were identified for the licensee’s failure to include adequate detail within their maintenance work instructions for the disassembly/reassembly of 2SI8822B, Safety Injection System Copes-Vulcan Throttle Valve to 2B Reactor Coolant System (RCS) Cold Leg. Specifically, work instructions provided by the licensee under safety-related Work Order (WO) 4840548-02, Flow Change During 2BwOSR 5.5.8.SI-11: MVR - 2SI8822B, Disassemble / Inspect / Repair Valve: 2SI8822B, during Unit 2 Refuel Outage A2R20 in October of 2018 contained less than adequate instructions for reassembly of the valve internals, such that valve internals were installed upside down within the valve body during reassembly. Operation of the valve in this condition ultimately placed abnormal stress on the valve internals, causing the internals to crack in several locations. This condition was subsequently revealed when the licensee opened the 2SI8822B valve again for inspection during the most recent A2R22 Refuel Outage in October 2021.</p>			
<p><u>Description:</u></p> <p>Unit 2 entered Refuel Outage A2R22 on October 18, 2021. Part of the scheduled outage work activities included full flow surveillance testing of the Unit 2 SI system under surveillance procedure 2BwOSR 5.5.8.SI-11, Comprehensive Inservice Testing (IST) Requirements for Unit 2 Safety Injection Pumps and Safety Injection System Check Valve Stroke Test. As discussed in IR 4454447, the total flow acceptance criteria for the test of 140 gpm was not met, with the measured value being 139.6 gpm. Additionally, criterion within 2BwOSR 5.5.8.SI-11 requires the licensee to evaluate the need for SI system flow balancing if the three lowest line flows are less than 439 gpm, and/or the difference between the highest and lowest line flows is greater than 10 gpm. In this instance, the value obtained for the three lowest line flows was 437.6 gpm, and the value obtained for the difference between the highest and lowest line flows was 13 gpm.</p> <p>Due to past issues with foreign material having been introduced into the Unit 2 SI system, the licensee developed a comprehensive plan to disassemble and inspect several throttle valves within the system where tight clearances might trap foreign material in the flow stream. As discussed in IR 4455415, small amounts of foreign material were identified within the 2SI8822B, 2SI8822C, and 2SI8822D Cold Leg Injection SI Throttle Valves. As part of their</p>			

corrective actions, the licensee removed the materials that were found and sent them out for laboratory analysis off site. The licensee also flushed the system thoroughly and conducted flow balancing to restore each cold leg injection flow path to its optimum value. The licensee was able to show by calculation that the small amount by which the SI system flow was found out-of-tolerance was within the existing margin for the system and did not impact the system function. The inspectors did not identify any issues with the licensee's CAP actions taken for these aspects of the condition.

During disassembly and inspection of the 2SI8822B Cold Leg Injection Throttle Valve, the licensee identified that the throttle valve cage had cracked and failed. The licensee replaced the valve internals and successfully rebalanced the SI cold leg injection flows as noted above. A comprehensive causal evaluation was commissioned by the licensee to investigate the circumstances surrounding the issue; this evaluation was not completed, however, prior to the end of the 4th Quarter 2021 inspection period and an unresolved item (URI 05000457/2021004-01) was documented by the inspectors in the station's 4th Quarter 2021 integrated inspection report (IR 05000456/2021004;05000457/2021004 – ADAMS Accession Number: [ML22028A195](#)).

During the licensee's formal causal evaluation into the 2SI8822B throttle valve cage cracking and failure, it was revealed that the valve's cage assembly had been installed upside down in the valve body on reassembly during the Unit 2 A2R20 Refuel Outage in October of 2018. Because of the fairly symmetric nature of the cage assembly, the licensee was able to successfully complete SI system flow balancing and post-maintenance testing by simply readjusting the 2SI8822B's typical valve position. In retrospect, while such an adjustment was atypical, it was permitted by the flow balancing procedure and allowed the SI system safety function to be maintained. Despite the valve's cage assembly fitting into the valve body upside down, this error caused the stack up of the internal components to be too high such that torquing the valve bonnet down onto the body crushed the outer cylinder of the cage assembly. The licensee concluded that it was likely that the valve's internal seat ring failed under the same torque loading that was applied during reassembly in A2R20, but that it was also possible that the cage assembly failed sometime later due to abnormal stress loading.

Review of the WO 4840548-02 work package and instructions from the 2SI8822B reassembly in A2R20 revealed two key issues. The WO did not reference the correct maintenance procedure. BwMP 3305-099, Disassembly/Reassembly of Copes Vulcan Throttle Valve, is the correct procedure, and written specifically for maintenance on the set of emergency core cooling system (ECCS) throttle valves that includes 2SI8822B. Instead, the WO instructions incorrectly referenced BwMP 3305-013, Disassembly-Reassembly of Copes Vulcan Manually Operated Throttling Globe Valves, which is a generic procedure not intended for use with the specific set of throttle valves that includes 2SI8822B. Perhaps more importantly, the WO instructions did not include a field fit-up measurement. This measurement is made by inserting the valve internal components and then comparing a measurement between the top flange of the body and the top surface of the internal components against acceptance criteria to ensure that the internal component effective stack up height is correct before assembling the valve bonnet. Although not referenced or required by the BwMP 3305-099 maintenance procedure, this field fit-up measurement is recommended by the vendor. As part of their formal causal evaluation, the licensee concluded that had such a field fit-up measurement been performed, as recommended by the vendor, that it is likely that the incorrect orientation of the cage assembly would have been identified and corrected during reassembly and that damage to the valve internals would have been prevented.

Corrective Actions: The inspectors did not identify any issues with the licensee's CAP actions taken for this aspect of the condition.

Corrective Action References:

- 4455415; Foreign Material Recovered from 2SI8822B/C/D Throttle Valves; 10/25/2021
- 4475336; 2SI8822B (A2R22) Autopsy Results; 02/01/2022
- 4477366; 2SI8822B Extent of Condition Investigation Findings; 02/10/2022

Performance Assessment:

Performance Deficiency: Safety-related Copes-Vulcan throttle valve 2SI8822B was disassembled and reassembled by the licensee during their Unit 2 A2R20 Refuel Outage in October of 2018. The work instructions provided by the licensee to technicians for reassembly of this valve were contained in WO 4840548-02, Flow Change During 2BwOSR 5.5.8.SI-11: MVR - 2SI8822B, Disassemble / Inspect / Repair Valve: 2SI8822B. The inspectors concluded that the licensee's failure to have referenced the proper maintenance procedure, BwMP 3305-099, or to have included the vendor recommended field fit-up measurement within these instructions contributed to the incorrect installation of the 2SI8822B valve internals and the ultimate failure of the valve cage assembly. Further, the inspectors concluded that this failure constituted a performance deficiency that was within the licensee's ability to have foreseen and that should have been prevented.

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 to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the inspectors determined that the licensee's failure to have included adequate detail within their maintenance work instructions for the reassembly of 2SI8822B contributed to the failure of the valve internals, and as such, had an adverse impact on the component's reliability. The inspectors also compared the finding with the examples listed in Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E, "Example of Minor Issues." Example 4.k was found to be similar in that the performance deficiency adversely affected Mitigating Systems Cornerstone of Reactor Safety objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Because the finding involved a deficiency affecting the design or qualification of a mitigating system, structure, or component (2SI2288B) that did not impact component operability or PRA [Probabilistic Risk Analysis] functionality, the inspectors determined the finding to be of very low safety significance (i.e., Green). Specifically, even though the performance deficiency contributed to the ultimate cracking of the 2SI8822B valve internals, the component was always able to demonstrate its ability to perform its specified safety function through surveillance testing.

Cross-Cutting Aspect: H.1 - Resources: Leaders ensure that personnel, equipment, procedures, and other resources are available and adequate to support nuclear safety. Specifically, this finding involved a missed opportunity for licensee technicians to have been provided with work instructions that were more appropriate for the circumstances involved.

Enforcement:

Violation: Appendix B to 10 CFR Part 50, Criterion V, Instructions, Procedures, and Drawings, requires 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. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Contrary to this requirement, during the licensee's Unit 2 A2R20 Refuel Outage in October of 2018, manual throttle valve 2SI8822B, a safety-related component subject to the requirements of Appendix B to 10 CFR Part 50, was reassembled using written instructions in WO 4840548-02, Flow Change During 2BwOSR 5.5.8.SI-11: MVR - 2SI8822B, Disassemble / Inspect / Repair Valve: 2SI8822B, that were not appropriate to the circumstances. Specifically, these work instructions did not reference the correct maintenance procedure, BwMP 3305-099, Disassembly/Reassembly of Copes Vulcan Throttle Valve, nor did they specify a field fit-up measurement that was recommended by the component vendor.

URI 05000457/2021004-01, *2SI8822B Cold Leg Injection Throttle Valve Cage Failure*, is closed.

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

The disposition of this finding and associated violation closes URI: 05000456,05000457/2021004-01.

Observation: Missed Technical Specification Surveillance	71152A
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The inspectors performed a detailed review of IR 4469855, Surveillance Closed Out in Passport with Work Not Performed. The issue involved Technical Specification (TS) surveillance procedure 2BwOSR 3.5.2.2-2, Unit Two ECCS [Emergency Core Cooling System] and CS [Containment Spray] Venting and Valve Alignment / UT Verification Surveillance, which went past due on December 27, 2021. On December 10, 2021, station personnel in the Operations Services group mistakenly closed the work order controlling this instance of the surveillance (WO 5209621) to work performed during the fall 2021 Unit 2 A2R22 Refuel Outage. The error was not identified until January 4, 2022, when the paperwork for WO 5209621 could not be located. Upon discovery, the station immediately invoked TS Surveillance Requirement (SR) 3.0.3 and performed the applicable surveillance procedure, 2BwOSR 3.5.2.2-2, which passed.

In accordance with the station's TS Bases, "Surveillances are performed to verify the operability of systems and components, and that variables are within specified limits." The inspectors chose this issue for an in-depth review of the licensee's actions within their corrective action program (CAP) because of the risk associated with not performing TS surveillances and/or not performing those surveillances within their specified frequencies, which potentially could mask the presence of an inoperable safety-significant system or component. Consequently, for this detailed Problem Identification and Resolution inspection sample, the inspectors focused on assessment of the licensee's corrective actions taken both for this specific error, as well as those targeted at the more generic issue of addressing the administrative controls and tracking that could impact properly registering surveillance credit.

The inspectors determined that the missed performance of the 2BwOSR 3.5.2.2-2 surveillance within its specified frequency had constituted a violation of the requirements of TS 5.4.1(a), which requires that written procedures be established, implemented, and maintained for the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. In this case, Section 1.f of Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, contains the requirement for administrative procedures associated with surveillance test schedules, and licensee procedure WC-AA-111, *Surveillance Program Requirements*, Revision 7, is an applicable procedure. Section 4.5 of this procedure states that TS required surveillances should be performed by their due date and shall be performed within the specified surveillance interval, with the maximum allowable extension not to exceed 25% of the surveillance interval. However, because the missed 2BwOSR 3.5.2.2-2 surveillance was successfully completed within the 24-hour period stipulated in TS SR 3.0.3, the error did not result in any adverse consequences and the inspectors concluded that the violation had not adversely impacted the Reactor Safety Mitigating Systems Cornerstone objective. As a result, the issue was determined to be a violation of minor significance that was not subject to formal actions per Section 2.3.1 of the NRC Enforcement Policy.

The inspectors did not identify any issues with the licensee's CAP actions taken. Actions targeting the more generic issue of the administrative controls and tracking that could impact the proper registering of surveillance credit were focused on various enhancements to communications and training for applicable station personnel, as well as evaluation of possible procedure changes to create a formal mechanism to put into place a means to identify work orders erroneously taken to "finished" within the licensee's work order tracking database. Actions targeting this specific event included conducting a review of work orders with issues preventing proper closure for credit; no other similar issues were identified.

No findings or violations of NRC requirements of more than minor safety significance were identified by the inspectors in the course of this review.

EXIT MEETINGS AND DEBRIEFS

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

- On April 8, 2022, the inspectors presented the integrated inspection results to Mr. G. Gugle, Acting Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Procedures	0BwOA ENV-1	Adverse Weather Conditions Unit 0	124
		OP-AA-102-102	General Area Checks and Operator Field Rounds	18
		OP-AA-108-111-1001	Severe Weather and Natural Disaster Guidelines	24
		OP-BR-102-1001	Augmented Operator Field Rounds	4
71111.04	Corrective Action Documents	4482577	1B SI Pump ASME Surveillance Data Not Recorded Properly	03/04/2022
		4485313	Missing EPN Tag	03/16/2022
		4485319	Minor Leak — 1B AF Pump	03/16/2022
	Drawings	M-37	Diagram of Auxiliary Feedwater Unit 1	BK
	Procedures	BwOP AF-E1	Electrical Lineup – Unit 1 Operating	15
		BwOP AF-M!	Operating Mechanical Lineup Unit 1	20
		BwOP CS-E2	Electrical Lineup — Unit 2 Containment Spray Electrical Lineup	2
		BwOP CS-M2	Operating Mechanical Lineup Unit 2	11
		BwOP DG-M3	Operating Mechanical Lineup Unit 2 2A D/G	15
		BwOP SA-E2	Electrical Lineup — Unit 2 Station Air System Operating	5
		BwOP SA-M2	Operating Mechanical Lineup Unit 2	16
		BwOP SI-E2	Electrical Lineup – Unit 1 Operating	12
BwOP SI-M2		Operating Mechanical Lineup Unit 1	27	
71111.05	Fire Plans	Pre-Fire Plan No. 178	Fire Zone 12.1-0; FH 401' Elevation, Fuel Handling Building	1
		Pre-Fire Plan No. 179	Fire Zone 12.1-0; FH 426' Elevation, Fuel Handling Building	1
		Pre-Fire Plan No. 61	Fire Zone 8.3-1; Turbine Building 401' Elevation, Unit 1 Turbine Building Grade Level — Southeast	4
		Pre-Fire Plan No. 62	Fire Zone 8.3-1; Turbine Building 401' Elevation, Unit 1 turbine Building Grade Level — Southwest	4
		Pre-Fire Plan No. 63	Fire Zone 8.3-1; Turbine Building 401' Elevation, Unit 1 Turbine Building Grade Level — Northeast	6
		Pre-Fire Plan No. 88	Fire Zone 9.1-1, 9.4-1; DG 401' Elevation, Diesel Generator Room 1B & Day Tank Room	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Pre-Fire Plan No. 97	Fire Zone 11.1B-0; Auxiliary Building 330' Elevation, Unit 2 Auxiliary Building Basement (1B/2B SX)	3
	Procedures	BwAP 1100-16	Fire/Hazardous Materials Spill and/or Injury Response	38
		BwAP 1100-3	Fire Chief (Designated Field Supervisor) Implementing Procedure	4
		BwAP 1100-4	Fire Brigade Implementing Procedure	5
		BwAP 1110-1	Fire Protection Program System Requirements	46
		BwAP 1110-3	Plant Barrier Impairment Program	40
		BwAR 0-37-A4	Unit One Area Fire	18
		BwOP FP-100 Fire Response Guidelines	Fire Response Guidelines	25
		BwOP PBI-1	Plant Barrier Impairment Program Pre-Evaluated Barrier Matrix	5
		CC-AA-201	Plant Barrier Control Program	14
		ER-AA-600-1069	High Risk Fire Area Identification	4
		ER-BR-600-1069	Site List of High Risk Fire Areas — Braidwood Unit 1 and 2	0
		OP-AA-201-003	Fire Drill Performance	20
		OP-AA-201-004	Fire Prevention for Hot Work	18
		OP-AA-201-005	Fire Brigade Qualification	11
		OP-AA-201-008	Pre-Fire Plan Manual	5
		OP-AA-201-009	Control of Transient Combustible Material	27
		OP-AA-201-012-1001	Operations On-Line Fire Risk Management	4
		OP-BR-201-012-1001	Braidwood On-Line Fire Risk Management	4
		71111.11Q	Operability Evaluations	OP-AA-300
TQ-AA-155	Conduct of Simulator Training and Evaluation			12
Procedures	OP-AA-101-111-1001		Operations Standards and Expectations	30
	OP-AA-101-113		Operator Fundamentals	15
	OP-AA-101-113-1006		4.0 Crew Critique Guidelines	11

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		OP-AA-103-102	Watch-Standing Practices	20
		OP-AA-103-102-1001	Strategies for successful Transient Mitigation	3
		OP-AA-103-103	Operation of Plant Equipment	2
		OP-AA-104-101	Communications	5
		OP-AA-111-101	Operating Narrative Logs and Records	19
		TQ-AA-10	Systematic Approach to Training Process Description	7
		TQ-AA-150	Operator Training Programs	22
		TQ-AA-201	Examination Security and Administration	18
		TQ-AA-306	Simulator Management	11
		TQ-BR-201-0113	Braidwood Training Department Simulator Examination Security Actions	25
71111.12	Corrective Action Documents	4467715	2A DG Starting Air Compressor #1 Cycling Every 15-20 Minutes	12/20/2021
		4482997	2DG01SA-C Degraded	03/07/2022
		4483273	2FSV-SA361A Porting Continuously	03/07/2022
		4483877	1DG01SB-D DB 1B Starting Air Dryer Drain Valve/s Leak By	03/10/2022
	Procedures	ER-AA-310-1002	Maintenance Rule Functions — Safety Significant Classification	3
		ER-AA-320-1003	Maintenance Rule 18-10 — Failure Definitions	0
		ER-AA-320-1004	Maintenance Rule 18-10 — Performance Monitoring and Dispositioning Between (a)(1) and (a)(2)	1
		ER-AA0320	Maintenance Rule Implementation per NEI 18-10	0
		ER-AA0320-1001	Maintenance Rule 18-10 — Scoping	0
	Work Orders	5197918-26	MVR — (OP1) 2SI8822D: Disassemble / Inspect / Repair Valve	10/24/2021
5197918-60		MVR — (OP1) 2SI8822C: Disassemble / Inspect / Repair Valve	10/24/2021	
71111.13	Corrective Action Documents	4467108	Unexpected Annunciator 2-10-D6: Rod Control Non-Urgent Failure	12/16/2021
		4468189	Reflash of Unit 2 Rod Control Non-Urgent Failure Alarm 2-10-D6	12/24/2021
		4482191	Hot Relay in 2CW02JC	03/03/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		4482314	Ovation™ System Trouble/Drop 5 Failure	03/03/2022
		4485341	2B DG Jacket Water Leak Worse	03/16/2022
	Drawings	KSV-47-21	Jacket Water Schematic	7
	Engineering Changes	635793	Install Temporary Power Supply in 2RD03J	01/13/2022
	Miscellaneous	BRW-2-2021-0304	Final ODM: Unit 2 RD Non-Urgent Failure	01/19/2022
	Procedures	BwHP 4006-021	Repair/Replacement Relay/Coil Assemblies	9
		CC-AA-112	Temporary Configuration Changes	29
		ER-AA-600	On-Line Risk Management	13
		ER-AA0600	Risk Management	7
		IP-ENG-001	Standard Design Process (SDP)	2
		MA-AA-716-004	Conduct of Troubleshooting	19
		MA-BR-772-215	Administration and Configuration Management of the Ovation System	6
		MA-BR-772-216	Ovation System Gross Function Test	4
		OP-AA-107	Integrated Risk Management	4
		OP-AA-108-117	Protected Equipment Program	7
		WC-AA-101-1006	On-Line Risk Management and Assessment	4
	Work Orders	4639101	2CW01PC: Replace Relay 3W3CX	03/03/2022
		4944490	Lower Cable Tunnel Area 2DD Low Pressure CO2 System Actuation 18-Month	03/08/2022
		5206556	Unit 2 Thermography of Circulating Water Pump Exciter Panels	03/03/2022
		5214697	Unexpected Annunciator 2-10-D6: Rod Control Non-Urgent Failure	01/03/2022
		5236261	Ovation System Trouble/Drop 5 Failure	03/03/2022
5240543		2B Diesel Generator Jacket Water Leak Worse	03/18/2022	
71111.15	Corrective Action Documents	4458973	U2 CETC, Nozzle 74 Connections Swapped Affecting Indications	11/05/2021
		4472457	1B SX Upper Cubicle Cooler Isolation Issue	01/18/2022
		4472535	1SX2157B Valve Handle Broken	01/18/2022
		4472544	2DG01KB has Jacket Water Leak	01/18/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
		4473614	1RE9159A Outside of Operability Limit for Close Time	01/24/2022	
		4480091	Voltage Fluctuations on 2N-NR8043 NM306 Output	02/23/2022	
		4482584	Dry Boric Acid on 1FIS-0612 1D RCP Bypass Flow Transmitter Hose	03/03/2022	
		4484367	2BwOSR 3.3.3.1 Non-Symmetric CETC Deviation Exceeds 60F	03/12/2022	
		4485341	2B DG Jacket Water Leak Worse	03/16/2022	
	Engineering Changes	405348	DG Closed System Leak Guidance (Lube Oil, Jacket Water, Fuel Oil)	0	
		625908	SX Cubicle Coolers with One Set of Coils/Fans Out of Service for Preventive Maintenance	0	
		626166	MR90 — Allow Disconnect SX Piping from 2A SX Cubicle Cooler	0	
		627864	1B SX Pump Cubicle Cooler Operable with One Half of Cooler Inservice	0	
		635519	Temporarily Exchange A Train and B Train Core Exit Thermocouples at Reactor Head Penetration 74 (E-15) for Unit 2	0	
		636286	Update Passport Classification for RCP Seal Bypass Instrument Lines	0	
	Procedures	CC-AA-309-101	Engineering Technical Evaluations	16	
		ER-AA-600-1012	Risk Management Documentation	14	
		OP-AA-106-101-1006	Operational Decision-Making Process	23	
		OP-AA-108-111	Adverse Condition Monitoring and Contingency Planning	16	
		OP-AA-108-115	Operability Determinations (CM-1)	24	
	71111.19	Procedures	1BwOSR 5.5.8.CC-6B	Group A IST Requirements for Component Cooling Water Pump (1CC01PB) and Discharge Check Valves	12
			2BwOS SA-1	Unit 2 Station Air Compressor Surge Point Testing	5
			BwOP CC-1	Component Cooling Water System Startup	23
	71111.19	Work Orders	4858793-10	OPS: 2SA01C Perform Post-Maintenance Testing	02/19/2022
4870082			Replace 4 KV Breaker for 1CC01PB	03/15/2022	
5218742			ASME Surveillance Requirements for Component Cooling Water Pump 1CC01PB	03/15/2022	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.22	Calculations	BYR97-272	Seismic Evaluation for Temporary Installation of Extension Piece on Kiene Valves on the Diesel Generators for Engine Analysis	0
	Corrective Action Documents	4461023	Unit 1 Containment H-3 DAC Trend	11/15/2021
		4468523	Unit 1 Containment H-3 DAC Trending Higher	12/28/2021
		4475005	Unit 1 Containment Sump Inputs 1RF008	01/31/2022
		4475753	Unit 1 Containment H-3 DAC Trend	02/03/2022
		4477279	1SX168 100 DPM Packing Leak When 1B AF Pump Runs	02/10/2022
	Procedures	1BwOSR 3.7.5.4-2	Unit One Diesel Driven Auxiliary Feedwater Pump Surveillance	21
		1BwOSR 3.8.1.2-2	1B Diesel Generator Operability Surveillance	49
		1BwOSR 5.5.8.RH-5A	Group A IST Requirements for Residual Heat Removal Pump 1RH01PA	23
		BwOP DG-1	Diesel Generator Alignment to Standby Condition	31
		BwOP DG-11	Diesel Generator Startup and Operation	53
		BwOP DG-12	Diesel Generator Shutdown	30
		BwVS 900-8	Diesel Generator Engine Analysis	11
		CC-AA-112	Temporary Configuration Changes	20
Work Orders	5214083	LR-IST-1B Diesel Generator Operability Monthly	01/12/2022	
71114.06	Procedures	EP-AA-1000	Standardized Radiological Emergency Plan	33
		EP-AA-1001	Radiological Emergency Plan Annex for Braidwood Station	35
71151	Miscellaneous		NRC Performance Indicator Data; Initiating Events — Unit/Reactor Shutdown Occurrences	01/01/2021 — 12/31/2021
			NRC Performance Indicator Data; Initiating Events — Unplanned Power Changes per 7000 Critical Hours	01/01/2021 — 12/31/2021
	Procedures	LS-AA-2001	Collecting and Reporting of NRC Performance Indicator Data	17
		LS-AA-2010	Monthly Data Elements for NRC/WANO Unit/Reactor Shutdown Occurrences	6
		LS-AA-2030	Monthly Data Elements for NRC Unplanned Power Changes per 7000 Critical Hours	6
71152A	Corrective Action	4455415	Foreign Material Recovered from 2SI8822B/C/D Throttle	10/25/2021

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Documents		Valves	
		4469855	Surveillance Closed Out in Passport with Work Not Performed	01/04/2022
		4475336	2SI8822B (A2R22) Autopsy Results	02/01/2022
		4477366	2SI8822B Extent of Condition Investigation Findings	02/10/2022
	Procedures	2BwOSR 3.4.2.2-2	Unit Two ECCS [Emergency Core Cooling System] and CS [Containment Spray] Venting and Valve Alignment / UT Verification Surveillance	30
		2BwOSR 5.5.8.SI-11	Comprehensive Inservice Testing (IST) Requirements for Unit 2 Safety Injection Pumps and Safety Injection System Check Valve Stroke Test	15
		BwMP 3305-013	Disassembly-Reassemble of Copes Vulcan Manually Operated Throttling Globe Valves	7
		BwMP 3305-099	Disassemble/Reassembly of Copes Vulcan Throttle Valve	2
		NO-AA-10	Quality Assurance Topical Report (QATR)	97
		PI-AA-120	Issue Identification and Screening Process	11
		PI-AA-125	Corrective Action Program (CAP) Procedure	7
		PI-AA-125-1001	Root Cause Analysis Manual	6
		PI-AA-125-1003	Corrective Action Program Evaluation Manual	6
		PI-AA-125-1004	Effectiveness Review Manual	2
	WC-AA-111	Surveillance Program Requirements	7	
	Work Orders	4840548-02	Flow Change During 2BwOSR 5.5.8.SI-11: MVR - 2SI8822B, Disassemble / Inspect / Repair Valve	10/13/2018
		5197918-03	MVR - (OP1) 2SI8822B: Disassemble / Inspect / Repair Valve	10/24/2021