



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
2056 WESTINGS AVENUE, SUITE 400  
NAPERVILLE, IL 60563-2657

January 31, 2025

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

SUBJECT: BYRON STATION – INTEGRATED INSPECTION REPORT 05000454/2024004  
AND 05000455/2024004

Dear David Rhoades:

On December 31, 2024, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Byron Station. On January 22, 2025, the NRC inspectors discussed the results of this inspection with H. Welt, 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 Byron 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 Byron 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 Szwarc, Dariusz  
on 01/31/25

Dariusz Szwarc, Chief  
Reactor Projects Branch 3  
Division of Operating Reactor Safety

Docket Nos. 05000454 and 05000455  
License Nos. NPF-37 and NPF-66

Enclosure:  
As stated

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Letter to David Rhoades from Dariusz Szwarc dated January 31, 2025.

SUBJECT: BYRON STATION – INTEGRATED INSPECTION REPORT 05000454/2024004  
AND 05000455/2024004

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

Docket Numbers: 05000454 and 05000455

License Numbers: NPF-37 and NPF-66

Report Numbers: 05000454/2024004 and 05000455/2024004

Enterprise Identifier: I-2024-004-0054

Licensee: Constellation Energy Generation, LLC

Facility: Byron Station

Location: Byron, IL

Inspection Dates: October 01, 2024, to December 31, 2024

Inspectors: N. Bolling, Resident Inspector  
A. Demeter, Senior Resident Inspector  
J. Heimke, Project Engineer  
T. Henning, Senior Operations Engineer  
R. Knutson, Illinois Emergency Management Agency  
J. Kutlesa, Sr. Emergency Preparedness Inspector  
J. Robb, Operations Engineer  
T. Wingfield, Operations Engineer

Approved By: Dariusz Szwarc, Chief  
Reactor Projects Branch 3  
Division of Operating Reactor Safety

Enclosure

## SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee’s performance by conducting an integrated inspection at Byron 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

Simultaneous Inoperability of Both Trains of the Control Room Temperature Control System Resulting in a Loss of Safety Function			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454,05000455/2024004-01 Open/Closed	[H.11] - Challenge the Unknown	71153
<p>A self-revealed finding of very low safety significance (Green) and associated non-cited violation of Technical Specification (TS) 5.4.1.a was identified for the licensee’s failure to implement procedure BOP VC-20, <i>VC Chilled Water System to VS Chilled Water System Crosstie Operation with One Train Inoperable for Maintenance</i>, Revision 4. Specifically, on July 7, 2024, while responding to a lowering oil level in the 0A control room temperature control (VC) system chiller, operators performed the service building chilled water system (VS) to VC crosstie on the incorrect train of the VC chilled water system. This error rendered both trains of the VC system inoperable, resulting in a 24-hour shutdown Limiting Condition for Operation (LCO) entry for both units. The simultaneous inoperability of both trains of VC resulted in a condition that could have prevented the fulfillment of its safety function, and thus an 8-hour notification to the NRC per 10 CFR 50.72(b)(3)(v).</p>			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
LER	05000454/2024-001-00	LER 2024-001-00 for Byron Station, Unit 1, Both Trains of Control Room Ventilation Temperature Control System Inoperable	71153	Closed
LER	05000454/2024-002-00	LER 2024-002-00 for Byron Station, Unit 1, Reactor Vessel Closure Head Penetration 31 Degraded	71153	Closed

## PLANT STATUS

Unit 1 began the inspection period during B1R25 Refueling Outage. The unit reached full power operation on October 8, 2024, and continued operating at or near full power for the remainder of the inspection period.

Unit 2 began the inspection period operating at full power, apart from minor reductions in power to support scheduled testing activities or small load changes requested by the transmission dispatcher.

## 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," 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

#### Seasonal Extreme Weather Sample (IP Section 03.01) (1 Sample)

- (1) The inspectors evaluated readiness for seasonal extreme weather conditions prior to the onset of seasonal cold temperatures on December 1, 2024.

### 71111.04 - Equipment Alignment

#### Partial Walkdown Sample (IP Section 03.01) (1 Sample)

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

- (1) Unit 0 and Unit 1 component cooling (CC) systems during a 1A CC pump work window ending November 1, 2024

## 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 a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

- (1) Fire Zones 11.3-1 and 11.3-2, Auxiliary Building 364'-0" Elevation Unit 1 and 2 Containment Pipe Penetration Area on October 3, 2024
- (2) Fire Zones 5.4-1 and 5.6-1, Division 11 and 12 Miscellaneous Electrical Equipment and Battery Rooms following changes to high-risk fire areas on October 15, 2024
- (3) Review of engineering evaluations of combustible loading impacts for permanent storage areas established prior to evaluation, as identified in Action Request (AR) 4695446, ending on November 8, 2024

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

- (1) Observation and evaluation of the station's fire brigade during an unannounced drill on December 10, 2024

## 71111.11A - Licensed Operator Requalification Program and Licensed Operator Performance

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

- (1) The inspectors reviewed and evaluated the licensed operator examination failure rates for the requalification annual operating exam administered from October 21, 2024, to November 22, 2024, and the biennial written examination completed on November 22, 2024.

## 71111.11B - Licensed Operator Requalification Program and Licensed Operator Performance

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

- (1) Biennial Requalification Written Examinations

The inspectors evaluated the quality of the licensed operator biennial requalification written examination administered on November 22, 2024.

#### Annual Requalification Operating Tests

The inspectors evaluated the adequacy of the facility licensee's annual requalification operating test administered from October 21, 2024, to November 22, 2024.

#### Administration of an Annual Requalification Operating Test

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

### Requalification Examination Security

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

### Remedial Training and Re-examinations

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

### Operator License Conditions

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

### Control Room Simulator

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

## 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)

- (1) The inspectors observed and evaluated various activities involving on-watch operations crews in the main control room through October 23, 2024.

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

- (1) Observed the performance of a complex casualty graded scenario by a crew of licensed plant operators in the facility's simulator on October 22, 2024

## 71111.12 - Maintenance Effectiveness

### Maintenance Effectiveness (IP Section 03.01) (1 Sample)

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 high head FLEX pumps through November 25, 2024



Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSC remains capable of performing its intended function:

- (1) Safety-related diesel engine fuel injectors on November 19, 2024

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (2 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 grounds on safety-related DC Bus 111, as documented in AR 4811632
- (2) Review and evaluation of the risk associated with focused troubleshooting following failure of the 2B auxiliary feedwater (AF) pump battery charger, as documented in AR 4815109.

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (4 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 1RY455A Pressurizer Power Operated Relief Valve (PORV), as documented in AR 4803295
- (2) Evaluation of the operability of the Safety Injection (SI) System following boric acid leakage from flow orifice flange 2FE-972, as documented in AR 4779851
- (3) Evaluation of the operability of 1A diesel generator (DG) following discovery of a leak on the lower jacket water cooler, as documented in AR 4812560
- (4) Evaluation of the operability of Unit 1 emergency core cooling system (ECCS) following incorrect measurement of throttle valves, as documented in AR 4805388

71111.20 - Refueling and Other Outage Activities

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

- (1) The inspectors evaluated the remaining activities through power ascension for Refuel Outage B1R26 from October 1, 2024, to October 4, 2024.

#### 71111.24 - Testing and Maintenance of Equipment Important to Risk

The inspectors evaluated the following testing and maintenance activities to verify system operability and/or functionality:

##### Post-Maintenance Testing (PMT) (IP Section 03.01) (4 Samples)

- (1) Functional and operational testing of C High Head FLEX Pump (0FX02PC) following modification of hydraulic cooler, as documented in Work Order (WO) 5394984.
- (2) Functional and operational testing of 2A AF pump following oil change and coupling grease replacement, as documented in WO 5366693.
- (3) Functional and operational testing of the 2A SX pump following a maintenance window, as documented in various work orders.
- (4) Functional and operational testing of the 2B AF pump following adjustments to turbocharger intake boot on December 9, 2024.

##### Surveillance Testing (IP Section 03.01) (2 Samples)

- (1) 1BOSR 8.1.12-1, Unit 1 1A Diesel Generator ESF Actuation Test Signal Start and Non-Emergency Trip Bypass Test and Generator Differential Trip Test on October 2, 2024
- (2) 1BOSR 7.5.4-2, Unit 1 Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance on November 13, 2024

##### Inservice Testing (IST) (IP Section 03.01) (1 Sample)

- (1) 2BOSR 5.5.8.CS.5-2c, Inservice Testing of the 2A Containment Spray Pump, as documented in WO 5564286 on October 4, 2024.

#### 71114.02 - Alert and Notification System Testing

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

- (1) The inspectors evaluated the following maintenance and testing of the alert and notification system:
  - Annual siren inspection and maintenance records for the period of October 2022 – October 2024.

#### 71114.03 - Emergency Response Organization Staffing and Augmentation System

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

- (1) The inspectors evaluated the readiness of the Emergency Preparedness Organization.

#### 71114.04 - Emergency Action Level and Emergency Plan Changes

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

- (1) The inspectors evaluated the following submitted Emergency Action Level and Emergency Plan changes.
  - EP-AA-1002, Radiological Emergency Plan Annex for Byron Station, Revision 38
  - EP-AA-1002 Addendum 1, On-Shift Staffing Technical Basis for Byron Station, Revision 3
  - EP-AA-120-1001, Re-Link BYR Emergency Plan to the Fleet and Revise Plan to Reflect IPAWS Implementation, Evaluation No. 22-07.

This evaluation does not constitute NRC approval.

71114.05 - Maintenance of Emergency Preparedness

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

- (1) The inspectors evaluated the maintenance of the emergency preparedness program.

71114.06 - Drill Evaluation

Additional Drill and/or Training Evolution (1 Sample)

The inspectors evaluated:

- (1) Emergency response organization tabletop drill on October 17, 2024.

**OTHER ACTIVITIES – BASELINE**

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

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

- (1) Unit 1 (October 1, 2023 – September 30, 2024)
- (2) Unit 2 (October 1, 2023 – September 30, 2024)

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

- (1) July 1, 2022, through September 30, 2024

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

- (1) July 1, 2022, through September 30, 2024

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

- (1) July 1, 2022, through September 30, 2024

## 71152A - Annual Follow-up Problem Identification and Resolution

### Annual Follow-up of Selected Issues (Section 03.03) (1 Sample)

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

- (1) The inspectors reviewed the corrective actions associated with the results of the 2024 Comprehensive Engineering Team Inspection.

## 71152S - Semiannual Trend Problem Identification and Resolution

### Semiannual Trend Review (Section 03.02) (1 Sample)

- (1) The inspectors reviewed the licensee's corrective action program to identify potential trends in the implementation of the protected equipment program that might be indicative of a more significant safety issue.

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

### Event Report (IP Section 03.02) (2 Samples)

The inspectors reviewed, evaluated, and closed the following licensee event reports (LERs):

- (1) LER 2024-002-00, *Byron Station, Unit 1, Reactor Vessel Closure Head Penetration 31 Degraded* (ADAMS Accession No. [ML24312A225](#)). On September 13, 2024, during scheduled liquid penetration testing of previous weld overlay repair on control rod drive mechanism penetration number 31, four indications were discovered that were determined to be unacceptable per the acceptance criteria of the ASME Section III code. Each unacceptable indication was identified during a scheduled ASME Section XI examination. An approved ASME Section XI code repair method was applied consisting of blending or grinding the indications to remove or reduce the size to meet the applicable acceptance criteria in ASME Section III. A post repair confirmatory liquid penetration test showed ASME Section III acceptance criteria were met. This LER is Closed.
- (2) LER 2024-001-00, *Byron Station, Unit 1, Both Trains of Control Room Ventilation Temperature Control System Inoperable*, (ADAMS Accession No. [ML24249A074](#)). The inspection conclusions associated with this LER are documented in this report under Inspection Results Section 71153. This LER is Closed.

## INSPECTION RESULTS

Observation: Review of Corrective Actions Associated with the 2024 Comprehensive Engineering Team Inspection	71152A
<p>The inspectors performed a detailed review of several issue reports (ARs) related to non-cited violations (NCVs) and observations made during the 2024 Comprehensive Engineering Team Inspection (CETI). These included, but were not limited to:</p> <ol style="list-style-type: none"> <li>1. AR 4754261, NRC ID'd: Minor Violation Identified During 2024 CETI, 02/23/2024</li> <li>2. AR 4765536, Trend in Maintenance Work Package Documentation, 04/11/2024</li> <li>3. AR 4736401, NRC CETI – 2A SX Pump coupling outside of tolerances, 01/24/2024</li> <li>4. AR 4748841, NRC ID CETI – Acceptance Criteria Removed from Procedure, 02/08/2024</li> <li>5. AR 4753850, NRC ID'd: Minor Violation Identified During 2024 CETI, 02/23/2024</li> <li>6. AR 4749899, NRC CETI ID-Active vs Passive Class of MOVs 1/2SX007, 02/19/2024</li> <li>7. AR 4754262, NRC ID's: Minor Violation Identified During 2024 CETI, 02/23/2024</li> </ol> <p>The inspectors observed that the corrective actions generated in response to the CETI were commensurate with the safety significance of the NCVs and observations generated during the inspection.</p> <p>One such action includes the reclassification of the 1/2SX007. The licensee promptly created procedure 1/2BOSR 5.5.8.SX-4, <i>Component Cooling Heat Exchanger Essential Service Water Outlet Valve Stroke Surveillance</i>, to demonstrate compliance with required inservice testing to verify the operational readiness of valves, whose function is required for safety. The licensee also made changes to BMP 3229-1, <i>Preventive Maintenance of Miscellaneous Pump Couplings</i>, to address concerns over the as-found and as-left coupling tolerance issues identified during the inspection.</p> <p>No findings or violations of NRC requirements of more-than-minor safety significance were identified by the inspectors in the course of this review.</p>	
Observation: Trend in Implementation of Protected Equipment Program	71152S
<p>The inspectors performed a review of plant issues, particularly those entered into the licensee's corrective action program (CAP) over the past several months. During their review, the inspectors noted a trend involving the implementation of the Protected Equipment Program. Specific CAP entries reviewed by the inspectors included:</p> <ol style="list-style-type: none"> <li>1. AR 4739796, NRC Identified Discrepancy in Protected Equipment Posting</li> <li>2. AR 4768917, NRC Identified Protected Equipment not posted correctly</li> <li>3. AR 4800826, B1R26 LL – Protected Equipment Discrepancy Identified</li> </ol> <p>During the first three quarters of 2024, the licensee had three documented occurrences of improper implementation of the protected equipment program that were discovered by individuals external to the operations department. The first two occurrences were discovered by the NRC and the third was discovered by an outside observer.</p> <p>10 CFR 50.65 requires, in part, that before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, and corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result</p>	

from the proposed maintenance activities. Procedure OP-AA-108-117, Protected Equipment Program, states that protected equipment actions taken in accordance with this procedure are classified as risk management actions for the purpose of compliance with 50.65(a)(4). The licensee implements OP-AA-108-117 at Byron using site-specific procedure OP-BY-108-117-1000, Byron Protected Equipment Program.

Per OP-BY-108-117-1000, operators install protected equipment postings and barriers which are subsequently walked down each shift to verify the postings remain properly established. On the occasions listed above, the licensee failed to implement the actions outlined in OP-BY-108-117-1000 when equipment that was supposed to be protected did not have the appropriate posting or barrier. In all three cases, shiftly walk downs had been performed by the operators in the rounds logs verifying the protected equipment postings were properly in place.

After the first occurrence on January 31, 2024, the issue and lessons learned were communicated to the department. Following the second occurrence on April 23, 2024, in addition to communicating the issue, standing order 24-011 was put in place to make changes to how rounds were performed for checking protected equipment. Instead of using a single sign off for all protected equipment, a paper copy would be used, and each piece of equipment would be signed off individually. Additionally, the field supervisor or unit supervisor would perform a walkdown of the protected equipment after placement to verify the accuracy of the postings. This standing order was terminated on June 2, 2024.

After the third occurrence on September 10, 2024, the previous standing order was resurrected as standing order 24-024 without a defined termination date.

During the periods of time where discrepancies did exist no work was performed on protected equipment, and following a walkdown of postings no other discrepancies 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.

Simultaneous Inoperability of Both Trains of the Control Room Temperature Control System Resulting in a Loss of Safety Function			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000454,05000455/2024004-01 Open/Closed	[H.11] - Challenge the Unknown	71153
A self-revealed finding of very low safety significance (Green) and associated non-cited violation of Technical Specification (TS) 5.4.1.a was identified for the licensee's failure to implement procedure BOP VC-20, <i>VC Chilled Water System to VS Chilled Water System Crosstie Operation with One Train Inoperable for Maintenance</i> , Revision 4. Specifically, on July 7, 2024, while responding to a lowering oil level in the 0A control room temperature control (VC) system chiller, operators performed the service building chilled water system (VS) to VC crosstie on the incorrect train of the VC chilled water system. This error rendered both trains of the VC system inoperable, resulting in a 24-hour shutdown Limiting Condition for Operation (LCO) entry for both units. The simultaneous inoperability of both trains of VC resulted in a condition that could have prevented the fulfillment of its safety function, and thus an 8-hour notification to the NRC per 10 CFR 50.72(b)(3)(v).			

Description:

At 1310 on July 7, 2024, the auxiliary building equipment operator (EO) noted the 0A VC system chiller oil level had dropped from a previous rounds reading of 37% to 15%. The EO notified the main control room (MCR), and the operations field supervisor was dispatched to review the condition.

At 1355, a briefing was held in the MCR to perform the crosstie of the VS chilled water system to the 0A VC chilled water system per procedure BOP VC-20, *VC Chilled Water System to VS Chilled Water System Crosstie Operation with One Train Inoperable for Maintenance*, Revision 4. At 1404, while the briefing was in progress, the auxiliary building EO notified the MCR that the oil level in the 0A VC chiller had further decreased to 0% in the sight glass, but that oil was still visible with foam present.

Following the briefing, two EOs obtained keys to unlock the individual valves needed to perform the crosstie. At approximately 1435, the operations field supervisor notified the MCR that the oil level in the 0A VC chiller was no longer visible in the sight glass. The shift manager directed the crew to secure the 0A VC chiller and initiate the crosstie. At 1440, the 0A VC chiller was secured, declared inoperable, and operators continued performing BOP VC-20 to establish the crosstie. At approximately 1520, operators completed the crosstie manipulations and began to discuss securing VS loads as control room temperature did not lower as expected. Shortly after, operators identified that the 0B VC train had been cross tied to VS, and subsequently made inoperable. While performing steps F.2.f.6 and F.2.f.7 of BOP VC-20, EOs incorrectly opened 0WO422B and 0WO423B and left closed 0WO422A and 0WO423A. The EOs were briefed to perform the evolution on the A train valves, which was the correct action. The control copy of the procedure was correctly marked up, but the field copy for the EOs was marked up incorrectly to operate the B train valves.

With both trains inoperable, Unit 1 and Unit 2 entered TS 3.7.11, Control Room Ventilation (VC) Temperature Control System, Condition D. Once the incorrect lineup was identified, the MCR directed restoration of the crosstie valves and restored the 0B VC chiller to operable status at 1634.

Corrective Actions: Upon discovery, the 0B VC system was returned to operable. Immediately following the event, the directly involved individuals were removed from watch-standing and remediated. The station determined the root cause to be inadequate briefing with contributing causes including lacking system knowledge and experience and less than adequate procedural guidance. Additional corrective actions taken include:

- Issuing a standing order requiring additional supervisory oversight during pre-job briefs and in-field manipulations.
- Review and reinforcement of the requirements for conducting effective pre-job briefs with each operating crew.
- Revising the applicable VS to VC crosstie procedures, to better human-engineer the procedure steps and add more detailed drawings.
- VS to VC crosstie training will be revised to include a review of the flow paths, heat up rates in the control room when cooling is not aligned, and the TS conditions for VC train inoperability.

Corrective Action References: 4785457; VS-VC crosstie performance issues; 07/07/2024

Performance Assessment:

**Performance Deficiency:** The inspectors determined that the failure to properly perform steps F.2.f.6 and F.2.f.7 of BOP VC-20 was contrary to TS 5.4.1.a and was a performance deficiency. Specifically, operators mistakenly opened 0WO422B and 0WO423B and left closed 0WO422A and 0WO423A. This was opposite of the intended valve manipulations for the desired system alignment. The incorrect valve manipulations caused both trains of VC to be inoperable and resulted in a loss of safety function for the VC system.

**Screening:** The inspectors determined the performance deficiency was more-than-minor because it was associated with the Human Performance attribute of the Barrier Integrity cornerstone and adversely affected the cornerstone objective to provide reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events.

**Significance:** The inspectors assessed the significance of the finding using IMC 0609 Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." The inspectors compared the finding with the examples listed in Inspection Manual Chapter (IMC) 0612, "Power Reactor Inspection Reports," Appendix E, *Example of Minor Issues* and found example 1.b to be similar. Specifically, the inspectors determined that the licensee's failure to follow BOP VC-20 rendered both trains of VC inoperable, resulting in a loss of safety function.

**Cross-Cutting Aspect: H.11 - Challenge the Unknown:** Individuals stop when faced with uncertain conditions. Risks are evaluated and managed before proceeding. Specifically, the supervisor did not perform an adequate brief and was not challenged when clear direction was not provided to the work group. The supervisor did not establish which train of crosstie valves would be used to perform the crosstie or validate procedures were marked up correctly during the brief. Field operators made assumptions on how the system operated and was designed, and did not stop the task when questions were raised in the field on the use of the 'B' train valves. The operators did not exhibit a questioning attitude by challenging the effectiveness of the abbreviated pre-job brief.

Enforcement:

**Violation:** Byron Unit 2 TS 5.4.1.a, requires, in part, that written procedures shall be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978.

NRC Regulatory Guide 1.33, Revision 2, Appendix A, Section 3 addresses "Procedures for Startup, Operation, and Shutdown of Safety-Related PWR Systems" and Section 3.p addresses "Control Room Heating and Ventilation."

The licensee established procedure BOP VC-20, *VC Chilled Water System to VS Chilled Water System Crosstie Operation with One Train Inoperable for Maintenance*, Revision 4, to crosstie the service building chilled water system to the control room temperature control (VC) system to maintain cooling to the control room while one VC chiller was inoperable. BOP VC-20, revision 4, Step F.2.f.6 and F.2.f.7, require the repositioning of valves 0WO422A/B and 0WO423A/B to vent and align the crosstie supply and return lines.



Contrary to the above, on July 7, 2024, the licensee failed to implement step F.2.f.6 and F.2.f.7 of BOP VC-20. Specifically, operators mistakenly opened 0WO422B and 0WO423B and left closed 0WO422A and 0WO423A. This was opposite of the intended valve manipulations for the desired system alignment.

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 January 22, 2025, the inspectors presented the integrated inspection results to H. Welt, Site Vice President, and other members of the licensee staff.
- On October 25, 2024, the inspectors presented the emergency preparedness inspection results to H. Welt, Site Vice President, and other members of the licensee staff.
- On November 22, 2024, the inspectors presented the biennial requalification program inspection results to H. Welt, Site Vice President, and other members of the licensee staff.
- On December 17, 2024, the inspectors presented the emergency action level and emergency plan changes inspection results to R. Pauley, Emergency Preparedness Manager, and other members of the licensee staff.

**DOCUMENTS REVIEWED**

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.01	Corrective Action Documents	4809674	Winter Readiness - MCR Temp Low	10/15/2024
		4810586	0BOSR XFT-A1 Annual Plugged Heater IR	10/19/2024
	Procedures	0BOSR XFT-A1	Freezing Temperature Equipment Protection SH and Department Support Requirements	21
		BOP 199-XHT-1	Hot/Extreme Weather Operations	7
		BOP HT-1	Heat Tracing System Startup	3
		BOP HT-T1	Heat Tracing Locations	5
		BOP XFT-1	Cold Weather Operations	15
		WC-AA-107	Seasonal Readiness	28
71111.04	Procedures	BOP CC-10	Alignment of the U-0 CC Pump and U-0 CC HX to a Unit	37
		BOP CC-M1B	Train "B" Component Cooling System Valve Lineup (Train "B" Safety Loop and Seal Water HX)	8
71111.05	Corrective Action Documents	4695446	Permanent Storage Areas	08/09/2023
		4807717	New High Risk Fire Areas	10/08/2024
	Fire Plans	Pre-Fire Plan #114	Auxiliary Building 364'-0" Elevation Unit 1 Containment Pipe Penetration Area	2
		Pre-Fire Plan #116	Auxiliary Building 364'-0" Elevation Unit 2 Containment Pipe Penetration Area	3
		Pre-Fire Plan #47	Fire Zone 5.4-1 Auxiliary Building 451'-0" Elevation Division 11 Miscellaneous Electrical Equipment and Battery Room	3
		Pre-Fire Plan #51	Fire Zone 5.6-1 Auxiliary Building 451'-0" Elevation Division 12 Miscellaneous Electrical Equipment and Battery Room	4
71111.11B	Corrective Action Documents	AR 04398558-31	Human Factoring of Sim Test Guides	11/20/2024
		AR 04398558-32	Sim Testing Data Collection Practices	11/20/2024
		AR 04766594	Simulator Model Issue ID During FRV Dual Positioner Testing	04/08/2024
		AR 04785457	VS-VC Crosstie Performance Issues	07/07/2024
	Miscellaneous	BY-47	Simulator Evaluation Guide (SEG)	5
		BY-58	Simulator Evaluation Guide (SEG)	9
		BY-87	Simulator Evaluation Guide (SEG)	1
		BY-90	Simulator Evaluation Guide (SEG)	1

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		N-BY-TQ-ILT-WO-43E	Chilled Water System Lesson Plan	7
		N019c / Synchronize a DG to a Bus	Job Performance Measure (JPM)	3
		N035b / Local Abnormal Start of a D/G	Job Performance Measure (JPM)	0
		N036 / Purge the MCR from the RSP	Job Performance Measure (JPM)	13
		N054c / Swap WS Pumps	Job Performance Measure (JPM)	0
		N056 / Local Emergency Start of "B" AF Pump	Job Performance Measure (JPM)	10
		N062 / Perform a 50 gallon Boration of the RCS	Job Performance Measure (JPM)	8
		N075b / Perform Offsite AC Power Availability Surveillance	Job Performance Measure (JPM)	14
		N105 / Dilute RCS to Raise Tave	Job Performance Measure (JPM)	3
		N130a / Respond to 1A SX Pump Trip	Job Performance Measure (JPM)	5
		Operating Test Sample Plan	2023-2024 LOR Operating Test Sample Plan	11/12/2024
		S016t / Classify Event & Fill out	Job Performance Measure (JPM)	6

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		NARS form		
		S044t / Minimum Staffing	Job Performance Measure (JPM)	0
		SRB 23-1	Byron Simulator Review Board Minutes	06/29/2023
		SRB 23-2	Byron Simulator Review Board Minutes	08/18/2023
		SRB 24-1	Byron Simulator Review Board Minutes	08/30/2024
		SUD	Simulator-Unit Differences document	11/18/2024
		SWR-0138435	Malfunction FW24A 1A AF Pp XMR 1PT-AF051 FAIL Doesn't Prevent 1A AF Pp from Starting	06/02/2023
		SWR-0138675	Create Malfunctions for TV and GV Valves Being Stuck	10/12/2023
		SWR-0138713	RH TO CV LTDN valve Controller Ind Sticking	11/02/2023
		TQ-AA-150	Oral Board Remediation Package for Licensed Individual Operator	11/20/2024
		Training Attendance	Electronic Training Roster LORT Cycle 23-3	11/18/2024
		Training Attendance	Electronic Training Roster LORT Cycle 24-1	11/18/2024
		Training Plan	LOR 2024-2025 Short Range Training Plan	11/29/2023
		Training Plan	LOR 2022-2023 Short Range Training Plan	03/08/2022
		Training Request 240716-006	Develop & Include Training for LORT, EOC, ILT, and EOI on the VS/VC Crosstie	07/16/2024
		Training Request 240716-006	Loss of Safety Function	07/09/2024
		VISION ID 376471	LORT Cycle 24-2 Weekly Exam A	11/20/2024
		VISION ID 376817	LORT Cycle 24-2 Weekly Exam B	11/20/2024
		Written Exam	Crew D Biennial Written Exam (RO)	11/14/2024
		Written Exam	Crew D Biennial Written Exam (SRO)	11/14/2024
		Written Sample Plan	2023-2024 LOR Written Sample Plan	11/12/2024
71111.12	Corrective Action Documents	4679767	High Head Flex Pump Design Deficiency	05/22/2023
		4697929	0FX02PC High Head Flex Pump has Stuck Open or Bad Piston	08/22/2023

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
		4709470	1B AF Pump EOC Fuel Dilution Review Results	10/13/2023	
		4710871	2B AF Diesel Rebuilt Injectors Did Not Pass Inspection	10/19/2023	
		4724879	Flex Pump Operating Strategy	12/21/2023	
		4736725	Revise PM for Flex Pump Battery Replacement	01/26/2024	
		4753970	C High Head FLEX Pump Needs further repair	02/28/2024	
		4754267	Flex DG Load Requirements Compared To CC-AA-118 Req	02/29/2024	
		4763519	Refurbished Injector for 16V149 Aux Feed Diesel	04/04/2024	
		4765443	0FX02PC- 0C High Head FLEX Pump Needs Additional Work	04/11/2024	
		4765868	Results for 2B EDG Fuel Injector Testing	04/09/2024	
		4775101	Delays in 0C Flex Pump from Vendor	05/17/2024	
		4788514	WR needed for 0C High Head Flex pump	07/22/2024	
		4810401	0FX02PA Will Not Develop Flow and Pressure	10/18/2024	
		Procedures	NISP-EN-02	Standard Item Equivalency Process	1
			NO-AA-10	Quality Assurance Topical Report	98
SM-AA-300	Procurement Engineering Support Activities		11		
SM-AA-300-1001	Procurement Engineering Process and Responsibilities		25		
71111.13	Corrective Action Documents	4811632	DC Bus 111 Grounds	10/23/2024	
		4815109	2B AF Pump B-1 Capacity Test 2AF01EB-1 AC Input Breaker Trip	11/04/2024	
	Procedures	2BHSR AF-2BA	Unit 2 2B Diesel Aux Feed Pump Battery Bank B Battery A (2AF01EB-A) Capacity Test	3	
71111.15	Calculations	BYR14-053	Pressurizer PORV Air Accumulator Tank Requirements	1	
	Corrective Action Documents	4554488	Leak on gasket on pipe 2SI16E	02/14/2023	
		4779851	WO#5371750 for 2SI16E Deferred Beyond BACC Eval Exp. Date	06/10/2024	
		4803295	1RY455A As-Left Acceptance Criteria Not Met	09/20/2024	
		4805388	Incomplete Record Submitted to EDMS	09/25/2024	
		4812560	1A DG Lower Jacket Water Cooler 1DG01KA-X2 leaking	10/27/2024	
	Engineering Changes	435859	Pressurizer PORV Limits for Maximum Full Open Pressure To Meet The Number Of PORV Open/Close Cycles From PORV Accumulators Per Calculation BYR14-053	09/14/2024	
Procedures	1BMSR 5.2.7-1	ECCS Throttle Valves Mechanical Stop and Position	77		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Verification Surveillance	
		1BOSR 5.5.8.SI.2-1	Unit One IST Check Valve Stroke Test for 1SI8819A/B/C/D	6
		1BOSR 5.5.8.SI.5-1c	Unit One Comprehensive Inservice Testing (IST) Requirements for Safety Injection Pump 1SI01PA	9
		1BOSR 5.c.3-1	Unit One Safety Injection System Cold Leg Flow Balance	6
71111.24	Procedures	0/1/2BHSR PM-2	Calibration of Time Delay Relays	32
		0BOSR FX-A1	FLEX Pump Annual Flow Surveillance	12
		1BOSR 7.5.4-2	Unit One Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance	41
		1BOSR 8.1.12-1	Unit 1 1A Diesel Generator ESF Actuation Test Signal Start and Non-Emergency Trip Bypass Test and Generator Differential Trip Test	16
		1BOSR 8.1.2-1	Unit One 1A Diesel Generator Operability Surveillance	40
		2BOSR 5.5.8.AF.5-1a	Unit Two Group A Inservice Testing (IST) Requirements for Motor Driven Auxiliary Feedwater Pump 2AF01PA	13
		2BOSR 5.5.8.CS.5-2c	Unit Two Comprehensive Inservice Testing (IST) Requirements for Containment Spray Pump 2CS01PA	11
		2BOSR 7.5.4-2	Unit Two Diesel Driven Auxiliary Feedwater Pump Monthly Surveillance	40
		BOP AF-5	Motor Driven Auxiliary Feedwater Pump A Startup on Recirc	34
		BOP AF-5T1	Motor Driven Auxiliary Feedwater Pump Operating Log	7
	Work Orders	5363240	2AP05EW Relay #SX1AX for 2SX01PA	10/24/2024
		5363240	2AP05EW Relay #SX1AX for 2SX01PA	10/24/2024
		5366693	Change Pump Coupling Grease 2AF01PA	10/29/2024
		5394984	3 Year Performance Full Flow Test of FLEX Pump	10/15/2024
		5456769	NRC CETI - 2A SX Pump Coupling Outside of Tolerances	10/24/2024
		5456769	NRC CETI - 2A SX Pump Coupling Outside of Tolerances	10/24/2024
		5564286	2CS01PA Comprehensive IST Requirements for Containment Spray Pump	10/04/2024
71114.02	Procedures	EP-AA-1000	Exelon Nuclear Standardized Radiological Emergency Plan	33
		EP-AA-1002	Radiological Emergency Plan Annex for Byron Station	38
71114.03	Miscellaneous	EP-AA-1002	Byron Station On-Shift Staffing Technical Basis	2

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		Addendum 1		
		N/A	ERO Staff Training Records: 20 Records	Various
71114.04	Calculations	EP-AA-1002 Addendum 1	On-Shift Staffing Technical Basis for Byron Station	Rev 3
		EP-AA-120-1001	Re-Link BYR Emergency Plan to the Fleet and Revise Plan to Reflect IPAWS Implementation	No. 22-07
	Procedures	EP-AA-1002	Radiological Emergency Plan Annex for Byron Station	Rev 38
71114.05	Miscellaneous	N/A	Off-Site Emergency Plan Alert and Notification System Addendum (ANS) for Byron	2
		NOS BYR-24-02 (AR 4748979)	Emergency Preparedness Audit Report	04/17/2024
71114.06	Procedures	EP-AA-1002 Addendum 3	Constellation Emergency Action Levels for Byron Station	6
		EP-AA-1102	ERO Fundamentals	19
		EP-AA-122	Drills and Exercise Program	22
71151	Miscellaneous		NRC Performance Indicator Data; Barrier Integrity – RCS Identified Leakage	October 2023 through September 2024
		LS-AA-2110	Monthly Data Elements for NRC ROP Indicator - ERO Drill Participation	8
		LS-AA-2120	Monthly Data Elements for NRC ROP Indicator - Drill Exercise Performance	5
		LS-AA-2130	Monthly Data Elements for NRC ROP Indicator - ANS Reliability	6
71152A	Corrective Action Documents	4734806	NRC ID CETI – 2SX004 Test Documentation Discrepancy	01/23/2024
		4736401	NRC CETI – 2A SX Pump coupling outside of tolerances	01/24/2024
		4739318	NRC ID: CETI- 0SX007 Test Documentation Discrepancy	01/30/2024
		4739361	NRC ID CETI – Procedure Processing Error Identified	06/16/2023
		4741559	NRC CETI – Discrepancy in WO Documentation	02/02/2024
		4747942	NRC ID CETI: 2VI-DG137 Calibration Data Discrepancy	02/07/2024
		4748050	NRC ID CETI – Work Package Documentation Errors	02/07/2024
4748718	Trend – CETI Identified Work Pkg Documentation Discrepancies	02/28/2024		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date	
		4748841	NRC ID CETI – Acceptance Criteria Removed from Procedure	02/08/2024	
		4748941	NRC CETI Concern with BOP CC-10	02/09/2024	
		4748946	NRC ID – 2024 – 4.16 kV Relay setting calc 19-AN-7	02/09/2024	
		4749899	NRC CETI ID-Active vs Passive Class of MOVs 1/2SX007	02/19/2024	
		4753850	NRC ID'd: Minor Violation Identified During 2024 CETI	02/23/2024	
		4754261	NRC ID'd: Minor Violation Identified During 2024 CETI	02/23/2024	
		4754262	NRC ID's: Minor Violation Identified During 2024 CETI	02/23/2024	
		4765536	Trend in Maintenance Work Package Documentation	04/11/2024	
	Procedures	1BOSR 5.5.8.SX-4	Component Cooling Heat Exchanger Essential Service Water Outlet Valve Stroke Surveillance	1	
		2BOSR 5.5.8.SX-4	Component Cooling Heat Exchanger Essential Service Water Outlet Valve Stroke Surveillance	1	
		BMP 3229-1	Preventive Maintenance of Miscellaneous Pump Couplings	33	
	71152S	Corrective Action Documents	4739796	NRC Identified Discrepancy in Protected Equipment Posting	01/31/2024
			4768917	NRC Identified Protected Equipment not posted correctly	04/23/2024
4800826			B1R26 LL – Protected Equipment Discrepancy Identified	09/10/2024	