



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

November 3, 2022

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

SUBJECT: QUAD CITIES NUCLEAR POWER STATION – INTEGRATED INSPECTION  
REPORT 05000254/2022003 AND 05000265/2022003

Dear Mr. Rhoades:

On September 30, 2022, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Quad Cities Nuclear Power Station. On October 11, 2022, the NRC inspectors discussed the results of this inspection with Mr. B. Wake, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

Two findings of very low safety significance (Green) are documented in this report. One of these findings 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 Quad Cities Nuclear Power Station.

If you disagree with a cross-cutting aspect assignment or a finding not associated with a regulatory requirement 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 Quad Cities Nuclear Power 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 Ruiz, Robert  
on 11/03/22

Robert Ruiz, Chief  
Reactor Projects Branch 1  
Division of Operating Reactor Safety

Docket Nos. 05000254 and 05000265  
License Nos. DPR-29 and DPR-30

Enclosure:  
As stated

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Letter to David Rhoades from Robert Ruiz dated November 3, 2022.

SUBJECT: QUAD CITIES NUCLEAR POWER STATION – INTEGRATED INSPECTION REPORT 05000254/2022003 AND 05000265/2022003

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

Docket Numbers: 05000254 and 05000265

License Numbers: DPR-29 and DPR-30

Report Numbers: 05000254/2022003 and 05000265/2022003

Enterprise Identifier: I-2022-003-0054

Licensee: Constellation Nuclear

Facility: Quad Cities Nuclear Power Station

Location: Cordova, IL

Inspection Dates: July 01, 2022, to September 30, 2022

Inspectors: J. Cassidy, Senior Health Physicist  
Z. Coffman, Resident Inspector  
C. Hunt, Senior Resident Inspector  
C. Mathews, Illinois Emergency Management Agency  
A. Tran, Project Engineer

Approved By: Robert Ruiz, Chief  
Reactor Projects Branch 1  
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 Quad Cities Nuclear Power 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

Failure to Perform General Visual Examination of Accessible Surfaces of Containment Penetrations Required by Paragraph 10 CFR 50.55a(g)(4)			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000254/2022003-01 Open/Closed	[H.12] - Avoid Complacency	71111.08G
<p>The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation (NCV) of 10 CFR 50.55a(g), “Inservice Inspection Requirements,” for the licensee’s failure to perform general visual examinations specified in American Society of Mechanical Engineers (ASME) Section XI, Subsection IWE, Table IWE-2500-1, “Examination Category E-A, Containment Surfaces.” Specifically, the licensee failed to perform general visual examinations of the accessible surfaces of flued head components at containment penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12 in accordance with IWE Table-2500-1 (E-A) to determine the general condition and detect evidence of degradation.</p>			

Failure to Incorporate FLEX Time-Sensitive Actions into Site Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000254,05000265/2022003-02 Open/Closed	[H.7] - Documentation	71152A
<p>Inspectors identified a finding of very low safety significance (Green) associated with the failure of the licensee to incorporate all required FLEX time sensitive actions into site procedures. Specifically, the licensee failed to incorporate a required FLEX time sensitive action into the site operator time response program. This omission prevents future configuration changes at the site, or revisions to operating procedures, from being evaluated, per programmatic requirements, to determine if the proposed changes would have an adverse impact on the site’s ability to perform the missing time sensitive action.</p>			

### Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
URI	05000254/2019001-01	Insulation Not Removed Prior to General Visual Examination of Containment Surface Areas	71111.08G	Closed

## **PLANT STATUS**

### Unit 1

The unit began the inspection period at full-rated thermal power. On September 9, 2022, the unit performed a planned downpower to approximately 25 percent to perform a drywell entry to address a reactor recirculating pump oil leak as well as conduct repairs to the 1B feedwater regulating valve. The unit returned to full-rated thermal power on September 12, 2022. All other times, the unit was at full-rated thermal power, with the exception of short-term power reductions for control rod sequence exchanges, testing, and as requested by the transmission system operator.

### Unit 2

The unit began the inspection period at full-rated thermal power. On July 4, 2022, the unit was manually tripped due to a 2A feedwater regulating valve failure. The unit returned to full-rated thermal power on July 7, 2022, where it remained for the rest of the inspection period, with the exception of short-term power reductions for control rod sequence exchanges, testing, and as requested by the transmission system operator.

## **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

#### External Flooding Sample (IP Section 03.03) (1 Sample)

- (1) The inspectors evaluated that site flood protection barriers, mitigation plans, procedures, and equipment are consistent with the licensee's design requirements and risk analysis assumptions for coping with external flooding on September 8, 2022.

## 71111.04 - Equipment Alignment

### Partial Walkdown Sample (IP Section 03.01) (5 Samples)

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

- (1) 1B residual heat removal service water (RHRSW) during 1A RHRSW drain work on August 11, 2022
- (2) 2B residual heat removal (RHR)/RHRSW during planned maintenance on the 2A RHRSW loop on August 25, 2022
- (3) 2A core spray during planned maintenance on 2B core spray on September 8, 2022
- (4) Unit 2 high pressure cooling injection (HPCI) during planned primary containment isolation group 2 partial isolation testing on September 27, 2022
- (5) Unit 2 reactor core isolation cooling (RCIC) during maintenance of Unit 2 HPCI on September 12, 2022

### Complete Walkdown Sample (IP Section 03.02) (2 Samples)

- (1) The inspectors evaluated system configurations during a complete walkdown of the Unit 1 turbine building closed cooling water system on August 8, 2022.
- (2) The inspectors evaluated system configurations during a complete walkdown of the Unit 1 RCIC system on August 31, 2022.

## 71111.05 - Fire Protection

### Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 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 Zone (FZ) 8.2.8.A, Unit 1 turbine building MG set 1B on July 14, 2022
- (2) FZ 3.0, services building, elevation 609'-0", cable spreading room on July 26, 2022
- (3) FZ station blackout building, station blackout diesels on August 3, 2022
- (4) FZ 8.2.1.A, Unit 1 condensate pump room on August 30, 2022
- (5) FZ 1.1.2.5, Unit 2 standby gas treatment/standby liquid control, elevation 666'-6" on September 1, 2022
- (6) Unit 1 feedwater relief valve mezzanine on September 10, 2022

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

- (1) The inspectors evaluated the onsite fire brigade training and performance during an unannounced fire drill on September 20, 2022.

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (2 Samples)

The inspectors evaluated internal flooding mitigation protections in the:

- (1) Compartment 8.2.8 C&D, switchgear area, elevation 647', turbine building
- (2) Action Request (AR) 4516035, "Leak-by of Check Valve Found for RHR Service Water Vault B/C," on August 30, 2022

71111.07A - Heat Exchanger/Sink Performance

Annual Review (IP Section 03.01) (1 Sample)

The inspectors evaluated readiness and performance of:

- (1) 1A turbine building closed cooling water heat exchanger

71111.11Q - Licensed Operator Regualification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

- (1) The inspectors observed and evaluated licensed operator performance in the control room during the start up from forced outage Q2F68 on July 6, 2022.

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

- (1) The inspectors observed and evaluated licensed operator regualification training in the control room simulator on August 12, 2022.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (4 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) HPCI (HP2300-03) on July 11, 2022
- (2) a(3) MR assessment on August 15, 2022
- (3) AR 4513893, "Unit 1 SBO [station blackout] Fail to Start," on August 3, 2022
- (4) AR 4509196, "2A FRV [feedwater regulating valve] Failed Close," on August 25, 2022

### Quality Control (IP Section 03.02) (1 Sample)

The inspectors evaluated the effectiveness of maintenance and quality control activities to ensure the following SSCs remained capable of performing their intended function:

- (1) Work Order (WO) 5157552, "Relocate 1/2 EDGCW [emergency diesel generator cooling water] Piping Crosstie to ECCS [emergency core cooling system] Room Cooler 63123"  
WO 5282970, "Repair Leak in ECCS Room Cooler Line"  
WO 4859990, "MM [mechanical maintenance] HPCI Turbine Overhaul for 10 Year PM [preventive maintenance] Inspection"  
WO 4761761, "Replace 14" Line from 2C RHRSW Pump to 24"x14" Reducer"  
WO 5180674, "Install Banana Jacks for QCOP 1000-43 per EC 634917"

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

#### Risk Assessment and Management Sample (IP Section 03.01) (3 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) Unit 2 manual trip due to low reactor water level, Unit 2 orange shutdown safety risk on July 4, 2022
- (2) E-2 Certification meeting and risk management for work week 09/05/2022 and Unit 1 1B FRV locked up in the fully open position on September 8, 2022
- (3) E-2 Certification meeting and risk management for work week 09/12/2022 on August 31, 2022

### 71111.15 - Operability Determinations and Functionality Assessments

#### Operability Determination or Functionality Assessment (IP Section 03.01) (6 Samples)

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

- (1) AR 4514602, "EOID: U2 HPCI Room Temp Greater than 100 Degrees F," on August 3, 2022
- (2) AR 4513893, "Unit 1 Station Blackout Diesel Fail to Start," August 1, 2022
- (3) AR 4515811, "30 DPM Leak in U1 RB [reactor building] Basement Overhead," August 9, 2022
- (4) AR 4509198, "Both Trains of SBGT [standby gas treatment] Not Producing Required Flow," on July 11, 2022
- (5) AR 4519722, "CR [control room] HVAC [heating, ventilation, and air conditioning] B Compressor Noise," on September 28, 2022
- (6) AR 4515301, "U2 Rod F-9 Showing Double Dashes," on September 26, 2022

### 71111.18 - Plant Modifications

#### Severe Accident Management Guidelines (SAMG) Update (IP Section 03.03) (1 Sample)

- (1) The inspectors verified the site Severe Accident Management Guidelines were updated in accordance with the [PWR/BWR] generic severe accident technical guidelines and validated in accordance with NEI 14-01, "Emergency Response Procedures and Guidelines for Beyond Design Basis Events and Severe Accidents," Revision 1 on July 21, 2022.

### 71111.19 - Post-Maintenance Testing

#### Post-Maintenance Test Sample (IP Section 03.01) (8 Samples)

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

- (1) Standby gas treatment A/B following Unit 2 scram on July 4, 2022
- (2) Secondary containment following Unit 2 scram on July 4, 2022
- (3) Unit 1 SBO diesel following fail to start on August 10, 2022
- (4) 2B RHRSW post planned maintenance on August 24, 2022
- (5) Unit 2 RCIC operability test post pressure switch replacement on September 13, 2022
- (6) Unit 1 core spray operability test post breaker replacement on September 21, 2022
- (7) Unit 2 emergency diesel generator (EDG) load test post 18-year inspection on September 22, 2022
- (8) Unit 2 core spray operability test post relay replacements on September 27, 2022

### 71111.22 - Surveillance Testing

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

#### Surveillance Tests (other) (IP Section 03.01) (3 Samples)

- (1) Unit 2 EDG monthly load run on July 8, 2022
- (2) 1/2 EDG monthly load run on July 18, 2022
- (3) OP QCOS 7500-5 1/2 'A' SBTG operability on August 29, 2022

#### FLEX Testing (IP Section 03.02) (1 Sample)

- (1) FLEX generator surveillance on July 20, 2022

## **RADIATION SAFETY**

### 71124.05 - Radiation Monitoring Instrumentation

#### Walkdowns and Observations (IP Section 03.01) (8 Samples)

The inspectors evaluated the following radiation detection instrumentation during plant walkdowns:

- (1) Area radiation monitors in the reactor building
- (2) Area radiation monitors in the fuel handling building
- (3) Friskers used at the main exit from the radiologically controlled area
- (4) Portable radiation protection equipment stored 'ready for use' at the radiation protection checkpoint entrance
- (5) Personal contamination monitors 'ready for use' at the exit from the radiologically controlled area
- (6) Personal contamination monitors 'ready for use' at the primary access facility exit
- (7) Continuous air monitors in the reactor building
- (8) Continuous air monitors in the fuel handling building

#### Calibration and Testing Program (IP Section 03.02) (10 Samples)

The inspectors evaluated the calibration and testing of the following radiation detection instruments:

- (1) High Volume Air Sampler RAdCO, Serial Number 060
- (2) N.E. Technologies Large Article Monitor, Serial Number 1
- (3) ThermoScientific Small Article Monitor SAM-12, Serial Number 12233
- (4) ThermoScientific Portal Monitor PM-12, Serial Number 12047
- (5) Low Volume Air Sampler; Serial Number 323
- (6) Personal Contamination Monitor ARGOS-5; Serial Number 1512-223
- (7) Eberline Portal Monitor PM-7, Instrument Number PM-10
- (8) FASTSCAN Whole Body Counter
- (9) ACCUSCAN Whole Body Counter
- (10) Area Radiation Monitor, Instrument Number 1-1705

#### Effluent Monitoring Calibration and Testing Program Sample (IP Sample 03.03) (2 Samples)

The inspectors evaluated the calibration and maintenance of the following radioactive effluent monitoring and measurement instrumentation:

- (1) Reactor building vent monitor
- (2) Liquid radwaste effluent monitor, Instrument Number 0-1799

## OTHER ACTIVITIES – BASELINE

### 71151 - Performance Indicator Verification

The inspectors verified licensee performance indicators submittals listed below:

#### MS05: Safety System Functional Failures (SSFFs) Sample (IP Section 02.04) (2 Samples)

- (1) Unit 1 (July 1, 2021, through June 30, 2022)
- (2) Unit 2 (July 1, 2021, through June 30, 2022)

#### MS06: Emergency AC Power Systems (IP Section 02.05) (2 Samples)

- (1) Unit 1 (July 1, 2021, through June 30, 2022)
- (2) Unit 2 (July 1, 2021, through June 30, 2022)

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

#### Annual Follow-Up of Selected Issues (Section 03.03) (3 Samples)

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

- (1) Wildlife intrusion into the 13.8kV switchyard causing temporary loss of power to site buildings on September 12, 2022
- (2) Failure to identify a condition adverse to quality and enter it into the corrective action program on July 26, 2022
- (3) Failure to incorporate all required FLEX time sensitive actions into site procedures on August 11, 2022

### 71152S - Semiannual Trend Problem Identification and Resolution

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

- (1) The inspectors reviewed the licensee’s maintenance rule program for a potential adverse trend in the identification of high safety significant maintenance rule functional failures that might be indicative of a more significant safety issue.

## INSPECTION RESULTS

Failure to Perform General Visual Examination of Accessible Surfaces of Containment Penetrations Required by Paragraph 10 CFR 50.55a(g)(4)			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000254/2022003-01 Open/Closed	[H.12] - Avoid Complacency	71111.08G
The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation (NCV) of 10 CFR 50.55a(g), “Inservice Inspection Requirements,” for the licensee’s failure to perform general visual examinations specified in American Society of Mechanical Engineers (ASME) Section XI, Subsection IWE, Table IWE-2500-1, “Examination Category E-A, Containment Surfaces.” Specifically, the licensee failed to perform general visual examinations of the accessible surfaces of flued head components at containment			

penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12 in accordance with IWE Table-2500-1 (E-A) to determine the general condition and detect evidence of degradation.

Description:

NRC Inspection Report 05000254/2019001 (ML19127A066) documented an unresolved item (URI) regarding the licensee's general visual examination of surface areas covered by insulation. Specifically, on March 20, 2019, the inspectors observed the licensee's general visual examination of Class MC surface areas of flued head components at containment penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12. The inspectors noted that the licensee did not remove thermal insulation covering flued head components at the subject containment penetrations. The licensee's examiners could only displace a relatively small portion of blanket-type insulation to visually examine the containment surface area under the insulation. For metallic-type insulation, the licensee's examiners could not examine any portion of containment surface area covered by the insulation. The licensee documented these components as insulated in visual examination Nondestructive Examination (NDE) Report Q1R25-IWE-01 with no recordable/relevant indications identified for any of the 23 examination attributes listed in the NDE report.

The inspectors inquired why the insulation was not removed prior to the examinations like other observed NDEs. Specifically, the inspectors questioned whether the licensee could credit the IWE general visual examination of the subject containment penetrations covered by insulation. In response to the inspector's questions, the licensee provided a white paper documenting their position with regards to the containment accessible surface areas. The white paper stated, in part, "During the Q1R25 Inservice Inspection (ISI) examinations (March 2019) the NRC Region III inspector observed multiple containment penetrations [...] located in the main steam isolation valve (MSIV) room which were classified by Constellation as "inaccessible" since the penetrations are covered by thermal insulation." The licensee's classification of these penetrations as inaccessible was different from their original CISI boundary drawings that were in effect at that time. Specifically, drawings 1-CISI-1001, Sheets 1 and 2, Revisions E and C, respectively, designated certain flued head component surface areas of these containment penetrations as "accessible from at least one side for visual inspection." Their position, according to the white paper, was "to not remove thermal insulation when performing General Visual examinations on containment accessible surfaces areas in accordance with Table IWE-2500-1, Examination Category E-A, as supported by ASME Code Section XI Interpretation XI-1-13-25." The licensee supported their position by stating, in part:

*The requirements of Subarticle IWE-2310 apply when performing general visual examinations under Examination Category E-A, Item E1.11. Paragraph IWE-2310(c) states that "visual examinations shall be performed, either directly or remotely, by line of sight from floors, platforms, walkways, ladders, or other permanent vantage points, unless temporary access is required by the inspection plan." Removal of thermal insulation to perform the Examination Category E-A, Item E1.11 general visual examinations is not required because removal of the insulation would be a temporary measure to permit examination of surfaces that would otherwise be inaccessible for examination in accordance with the requirement of IWE-2310(c). Temporary access requiring removal of insulation is not specified in the ISI Plan. ASME Interpretation XI-1-13-25 [...] confirms the intent of the code with respect to accessibility of containment surfaces covered by thermal insulation. [...] This interpretation also supports Constellation's*

*conclusion that the performed examinations comply with ASME Code Section XI*

*Subsection IWE. As such, an alternative to the requirements of Subsection IWE in accordance with 10 CFR 50.55a(z) is not needed.*

The licensee's position of considering the containment surface area covered by removable thermal insulation as inaccessible was based on ASME Code Interpretation XI-1-13-25, which stipulated it was not a requirement of IWE-1230 that containment surface covered by thermal insulation be considered accessible for general visual examination in accordance with Table IWE-2500-1 (E-A). However, the inspectors noted the Code inquiry (dated November 13, 2013) that prompted Interpretation XI-1-13-25 stated its purpose was "to clarify whether removal of containment shell or liner plate thermal insulation panels is required in order to make containment surfaces accessible for visual examination in accordance with IWE-2500, Table IWE-2500-1, Examination Category E-A." The Code inquiry further explained, "In many cases, this insulation material is not intended to be removed and is physically attached to the containment surface." Therefore, the inspectors, in consultation with staff of the Office of Nuclear Reactor Regulations (NRR), noted that Interpretation XI-1-13-25 was intended to address the accessibility for visual examination of containment shell or liner plate with insulation panels physically attached and not intended to be removed. However, the licensee's general visual examinations under the scope of the URI were *not (emphasis noted)* on the containment shell or liner plate with insulation panels physically attached and not intended to be removed.

As documented in the URI description, the insulation covering the flued head components of the subject containment penetrations appeared to be similar to and no more difficult to remove than insulation removed prior to other NDE examinations observed by the inspectors. In addition, at the time of the inspectors' observation of the general visual examination, the licensee CISI boundary drawings 1-CISI-1001, Sheets 1 and 2, Revisions E and C, respectively, designated the flued head surface area within the IWE boundary up to the containment wall, with exception of the bellow area under the bolted protective cover plate, as "accessible from at least one side for visual inspection." These drawings designated the bellow area under the bolted protective cover as "inaccessible for visual inspection," not because of the insulation covering these surface areas, but because of the bolted bellow protective cover shown to obstruct the visual access by line of sight for visual examination.

Quad Cities Generating Station Inservice Inspection (ISI) Program Plan, ER-QC-330-1001, Revision 0, delineated the code of record for the third 120-month containment inservice inspection (CISI) interval as the ASME Section XI Code, 2013 Edition. This program document was applicable for the third CISI interval, which was effective from September 9, 2018, through September 8, 2028. The current interval for the CISI was subject to the requirements of the 2013 Edition of the ASME Section XI, Subsection IWA, "General Requirements," and Subsection IWE, "Requirements for Class MC and Metallic Liners of Class CC Components of Light-Water Cooled Plants."

Subsection IWA, Subarticle IWA-1500, "Accessibility," stipulated, in part, that provisions for accessibility shall include considerations for sufficient space for removal and storage of insulation. The inspection accessibility provisions of IWA-1500 applied to all Section XI Subsections, including Subsection IWE for the CISI.

Subsection IWE, Subarticle IWE-1230, "Accessibility for Examination," stipulated, in part, that the openings and penetrations of Class MC containment vessels, parts, and appurtenances

remain accessible for either direct or remote visual examination, from at least one side of the vessel, for the life of the plant. This subarticle also stipulated, in part, that surface areas of Class MC containment vessels, parts, and appurtenances were considered inaccessible if visual access by line of sight from permanent vantage points was obstructed by permanent plant structures, equipment, or components.

The flued head components at containment penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12, were classified by the licensee as Class MC and were subject to general visual examination requirements in accordance with Subsection IWE, Table IWE-2500-1, Examination Category E-A, Containment Surfaces. Table IWE-2500-1 (E-A), Item E1.11, "Accessible Surface Areas," required general visual examination of all accessible surface areas in accordance with IWE-2310, "Visual Examinations. Subarticle IWE-2310 as well as IWE-2311, "General Visual Examinations," required general visual examinations to be performed in accordance with IWE-2500 and Table IWE-2500-1 (E-A) to determine the general condition of containment surfaces and detect evidence of degradation.

NRC Inspection Manual, Part 9900: Technical Guidance titled, "American Society of Mechanical Engineers Boilers and Pressure Vessel Code, Sections III & XI," stated, "ASME Code Interpretations are not incorporated into the Code of Federal Regulations and, therefore, the NRC is not bound by these interpretations." Although the NRC recognized ASME as the official interpreter of the ASME Code, Code Interpretations were not incorporated by reference into 10 CFR 50.55a and did not receive NRC approval.

Based on the above, the inspectors, in consultation with NRR, determined the licensee misapplied Interpretation XI-1-13-25 given the background information leading to the issuance of the Interpretation. In addition, the licensee did not have an NRC-approved Code relief request to use the Interpretation as the basis to consider the surface areas of flued head components at containment penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12 as inaccessible due to the removable insulation covering the surface areas. Because the insulation obstructed visual access by line of sight when performing general visual examinations, the inspectors determined the licensee was not performing the general visual examinations required by Subsection IWE, Table IWE-2500-1 (E-A).

Corrective Actions: At the time of this inspection, the licensee was still evaluating its planned corrective actions to restore compliance.

Corrective Action References: AR 4514438, "NRC ID: Potential Green NCV for IWE Containment Inspections"; AR 4518346, "NRC ID: IR 04514438 Correction - IWE Inspection Potential NCV"

Performance Assessment:

Performance Deficiency: The licensee's failure to perform general visual examination of the accessible flued head component surface areas of containment penetrations specified in ASME Table IWE-2500-1, Examination Category E-A, was contrary to 10 CFR 50.55a(g)(4) and was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the SSC and Barrier 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. Specifically, the failure to perform general visual examination of the

accessible surface areas of flued head penetration component does not provide reasonable assurance that degraded containment flued head penetration components would be timely detected to 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 determined the finding was of very low safety significance (Green) because the finding did not represent an actual open pathway in the physical integrity of reactor containment. Also, the licensee's performance of 10 CFR Part 50, Appendix J, "Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors," provided reasonable assurance for reactor containment integrity.

**Cross-Cutting Aspect:** H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Specifically, individuals did not thoroughly review planned visual examinations, but instead, relied on past practices perceived as successful. While the URI observations occurred in 2019, this issue was reflective of current performance because the associated licensee examination practices continued at the time of this URI closure.

**Enforcement:**

**Violation:** Title 10 CFR 50.55a(g)(4) required, in part, that "throughout the service life of a boiling water-cooled nuclear power facility, components that are classified as Class MC pressure retaining components and their integral attachments must meet the requirements set forth in the Section XI of the American Society of Mechanical Engineers Boiler & Pressure Vessel Code." In addition, paragraph 50.55a(g)(4)(ii) required, in part, that inservice examination of components conducted during successive 120-month inspection intervals must comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in paragraph (a) of section 50.55a or an optional NRC approved ASME Code Case. At the time of this NRC inspection, Quad Cities Generating Station ISI program plan, "ER-QC-330-1001," Revision 0, delineated the code of record for the 120-month CISI interval as the 2013 Edition ASME Section XI Code, which was the latest edition listed in paragraph (a) of section 50.55a.

ASME Section XI-2013 Edition, Subarticle IWE-2311, "General Visual Examinations," stated, "General visual examinations shall be performed in accordance with IWE-2500 and Table IWE-2500-1 (E-A) to determine the general condition of containment surfaces and detect evidence of degradation." Table IWE-2500-1, Examination Category E-A, Containment Surfaces, Item E1.11, "Accessible Surface Areas," required general visual examination of all accessible surface areas of flued head joined to the penetration in accordance with Subarticle IWE-2310, "Visual Examinations." Subarticle IWE-2310, "Visual Examinations," stated, in part, that the following requirements apply to IWE-2311:

- (a) Painted or coated areas shall be visually examined for evidence of flaking, blistering, peeling, discoloration, and other signs of distress.*
- (b) Noncoated areas be examined for evidence of cracking, discoloration, wear, pitting, corrosion, gouges, surface discontinuities, dents, and other signs of surface irregularities.*
- (c) Visual examinations shall be performed, either directly or remotely, by line of sight from floors, platforms, walkways, ladders, or other permanent vantage points, unless temporary access required by the inspection plan.*

Contrary to the above, on March 20, 2019, the licensee's inservice examination of components conducted during successive 120-month inspection intervals failed to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in paragraph (a) of section 50.55a or an optional NRC approved ASME Code Case. Specifically, the licensee failed to perform general visual examinations of the accessible surfaces of flued heads joined to penetrations X-7A, X-7B, X-7C, X-7D, X-8, X-9A, X-9B, X-10, and X-12 in accordance with IWE-2500 and IWE Table-2500-1 (E-A) to determine the general condition and detect evidence of degradation as required by IWE-2311. In addition, the licensee failed to meet the applicable visual examinations requirements contained in IWE-2310. The licensee did not meet these requirements because the examinations were conducted with removable thermal insulation attached to the surfaces of the affected components obstructing the examination line on sight. The code of record for the licensee's 120-month CISI interval was the 2013 Edition ASME Section XI Code and the licensee did not use a relevant NRC approved ASME Code Case.

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: 05000254/2019001-01.

URI	Insulation Not Removed Prior to General Visual Examination of Containment Surface Areas URI 05000254/2019001-01	71111.08G
Description: This URI was closed to a Green finding with an associated NCV described above.		

Failure to Incorporate FLEX Time-Sensitive Actions into Site Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green FIN 05000254,05000265/2022003-02 Open/Closed	[H.7] - Documentation	71152A
Inspectors identified a finding of very low safety significance (Green) associated with the failure of the licensee to incorporate all required FLEX time sensitive actions into site procedures. Specifically, the licensee failed to incorporate a required FLEX time sensitive action into the site operator time response program. This omission prevents future configuration changes at the site, or revisions to operating procedures, from being evaluated, per programmatic requirements, to determine if the proposed changes would have an adverse impact on the site's ability to perform the missing time sensitive action.			
<p><u>Description:</u></p> <p>In response to NRC Order EA-12-049, "Issuance of Order to Modify Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events," dated March 12, 2012, the licensee drafted RS-13-025, "Overall Integration Plan in Response to March 12, 2012, Commissioning Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events (Order Number EA-12-049)." Subsequently, the licensee developed CC-QC-118-1003, "Quad Cities Power Station Final Integrated Plan Document," in accordance with NEI 12-06,</p>			

"Diverse and Flexible Coping Strategies (FLEX) Implementation Guide," which was endorsed by the NRC.

NEI 12-06, Revision 4, defines time sensitive actions (TSAs) as tasks, manual actions or decisions that are identified as having time constraints in Attachment 1A of the final integrated plan, "Sequence of Events Timeline." The licensee's sequence of events timeline, contained in both RS-13-025 and CC-QC-118-1003, identified 9 TSAs for an extended loss of all AC power and validated those actions in accordance with NEI 12-06, Appendix E via EC 404409, "Integrated Review of Flex Action IAW NEI Validation Process," Revision 0.

Licensee corporate procedure CC-AA-118, "Diverse and Flexible Coping Strategies (FLEX), Spent Fuel Pool Instrumentation, and Hardened Containment Vent System (HCVS) Program Document," Section 2.14, states that TSAs are included in the site FLEX final integrated plan and governed by the OP-AA-102-106, "Operator Response Time Program," requirements for implementation.

OP-AA-102-106 states that FLEX TSAs shall be listed on Attachment 2 of the procedure and that FLEX TSAs shall be re-validated as required by CC-AA-118 if physical changes to the plant, FLEX strategy, or staffing levels are determined to impact the ability to meet a FLEX time constraint. Additionally, it states that the licensee should ensure that operating procedure changes are reviewed for impact on TSAs in accordance with AD-AA-101, "Processing Procedures and T&RMs," which states that if a procedure change has the potential to impact FLEX mitigation strategies (CC-AA-118), then the group proposing the change should interface with the FLEX program engineer and confirm the impacts are being addressed.

CC-QC-118, "Site Implementation of Diverse and Flexible Coping Strategies (FLEX), Spent Fuel Pool Instrumentation, and Hardened Containment Vent System (HCVS) Program," implements corporate procedure CC-AA-118 at Quad Cities. Included in CC-QC-118, Attachment 6, is a list of the TSAs associated with the site's final integrated plan.

Inspectors noted that one TSA, FLEX sequence of events timeline action #16 to defeat RCIC high area temperature isolations, was not incorporated into site procedure CC-QC-118 from the site's final integrated plan. Additionally, the inspectors determined that the same TSA was not identified in Attachment 2 of site procedure OP-QC-102-106, "Operator Response Time Program at Quad Cities," which implements corporate procedure OP-AA-102-106. The inspectors determined that the failure to incorporate the affected TSA into site procedures would prevent future configuration changes at the site, or revisions to operating procedures, from being evaluated to determine if the proposed changes would have an adverse impact on the site's ability to perform that time sensitive action.

**Corrective Actions:** The licensee documented this issue in the corrective action program under AR 4516508 and updated both affected procedures to include the missing time sensitive action.

**Corrective Action References:** AR 4516508, "NRC ID: Procedure Change Not Properly Incorporated"

Performance Assessment:

Performance Deficiency: Failure to incorporate all FLEX time sensitive actions identified as having time constraints into OP-QC-102-106 and CC-QC-118.

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 incorporate all required FLEX TSAs in OP-QC-102-106 and CC-QC-118 prevents future configuration changes at the site, or revisions to operating procedures, from being evaluated to determine if the proposed changes would have an adverse impact on the site's ability to perform that time sensitive action.

Additionally, the inspectors reviewed the examples provided in IMC 0612, Appendix E, "Examples of Minor Issues," dated January 1, 2021, and determined that the more than minor discussion under Example 3.g was appropriate because the inadequate procedural control of OP-QC-102-106 and CC-QC-118 may have impacted the licensee's ability to defeat the RCIC high temperature isolations since there were no procedural controls in place to evaluate configuration changes, or procedural changes, against the affected TSA.

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 screened the finding against the Flexible Coping Strategies (FLEX) screening questions under Section E, in Exhibit 2, and answered "No" to both screening questions. Therefore, the finding screen to very low safety significance (Green).

Cross-Cutting Aspect: H.7 - Documentation: The organization creates and maintains complete, accurate and up-to-date documentation. Specifically, the site failed to incorporate all required FLEX TSAs into site procedures as required. Additionally, the site had an opportunity to incorporate the FLEX time sensitive action in question into a new revision of OP-QC-102-106 in 2020, but the change was inadvertently dropped due to an administrative error.

Enforcement:

Inspectors did not identify a violation of regulatory requirements associated with this finding.

Minor Violation	71152A
<p>Minor Violation: 10 CFR 50 Appendix B, Criterion XVI, states, in part, measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected.</p> <p>Licensee procedure NO-AA-10, "Quality Assurance Topical Report (QATR)," Revision 98, Chapter 16, Section 16.2, states that the licensee implements a CAP to promptly identify and correct items or occurrences that are adverse to quality or might adversely affect safe operation of a nuclear generating station.</p> <p>Licensee procedure PI-AA-120, "Issue Identification and Screening Process," states that individuals discovering an issue should implement immediate actions upon discovery of an issue to ensure that the equipment, area, or situation is in a safe and stable condition, the applicable groups are notified to ensure appropriate immediate actions are taken and contact</p>	

the affected operations shift management to discuss potential operability or reportability of the issue. The individual is then directed to originate an issue report in the CAP.

Licensee procedure OP-AA-108-115, "Operability Determinations," directs deficient conditions affecting a Structures, Systems, or Component (SSC) to be entered into the CAP and operations shift management to determine and document the as-found and current operability status of the affected SSC.

Contrary to the above, on July 26, 2022, inspectors observed debris in the Unit 1 HPCI watertight door with the door closed and dogged. The inspectors reported the issue to the control room and the debris was subsequently removed by the field supervisor. However, the licensee failed to enter the issue into the CAP and therefore no operability determination of the door was performed for the time period that the debris was in place. After prompting from the inspectors, AR 4513195 was generated for the issue. The operations department subsequently determined that the door was operable and documented the operability basis per procedural guidance.

Screening: The inspectors determined the performance deficiency was minor.

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

Observation: Intrusion of Wildlife into the 13.8kV Switchyard Caused Temporary Partial Loss of Power	71152A
<p>On June 28, 2022, at approximately 2245, the licensee experienced an unexpected loss of power from the 13.8kV switchyard affecting several non-safety related buildings to include the station blackout (SBO) building. The licensee performed the applicable actions of QCOA 6100-17, "Loss of SBO [Station Blackout] Normal 13.8kV Transformer T42R-6 Feed to 4kV Bus 61 and 71," and started both SBO diesels and placed them on their associated safety buses to ensure the station's ability to cope with a station blackout event was maintained.</p> <p>The licensee determined that the cause of the outage was due to a woodland animal entering the switchyard and creating a short on one of the electrical bus segments. The licensee performed a walkdown of the switchyard following the event and identified minor damage to the ceramic insulator of a spare breaker that did not affect the overall function of the 13.8 kV system. No other damaged equipment was noted. No safety-related equipment was affected by the event. Following the walkdown, the licensee restored normal power from the switchyard to the affected areas. The licensee entered the issue into the corrective action program under AR 4502569.</p> <p>The inspectors reviewed the site's immediate actions and subsequent follow-up actions from the event. In addition, the inspectors reviewed the actions generated from AR 4502569 as well as performed a partial walkdown of the switchyard. Overall, the inspectors determined that the licensee's response to the event and follow-on actions were reasonable and adequate.</p> <p>The inspectors did not identify any findings or violations in this sample.</p>	

Minor Performance Deficiency	71152S
<p>Minor Performance Deficiency: Licensee procedure ER-AA-320, "Maintenance Rule Implementation Per NEI 18-10," Revision 00, states that the licensee should review equipment failures and determine if a high safety significant (HSS) maintenance rule function failure (MRFF) has occurred. If so, the licensee should evaluate whether the function needs to be moved to (a)(1) status in the site's the maintenance rule program.</p> <p>The licensee defines a MRFF of the HPCI system, in part, as:</p> <p><i>Any failure that would prevent the HPCI system from being manually started or re-started to restore reactor vessel inventory as required by emergency operating procedures, or safe shutdown and other non-design basis events.</i></p> <p>Contrary to above, the inspectors determined that the licensee non-conservatively limited the scope of the evaluation of a HPCI gland seal exhaust condenser level switch failure occurring on December 1, 2021, and did not identify the failure as a HSS MRFF. Specifically, the licensee failed to consider non-design basis events in the MRFF determination as directed by the maintenance rule program. As a result, the licensee failed to recognize this issue as a HSS MRFF in the initial MRFF determination as well as in the programmatic (a)(3) assessment performed after the failure.</p> <p>The inspectors determined that not identifying a HSS MRFF was a performance deficiency. The inspectors reviewed examples of minor issues in accordance with Inspection Manual Chapter 0612, Appendix E, "Examples of Minor Issues," dated January 1, 2021, and determined that the minor example discussion under section 8.g was most applicable to the performance deficiency. Specifically, the mitigating system cornerstone was not adversely affected because licensee actions from the corrective action program evaluation under AR 4464185 covered the actions that would have been directed by the licensee's maintenance rule program under ER-AA-320.</p> <p>Screening: The inspectors determined the performance deficiency was minor.</p>	

Observation: Multiple Instances of Failing to Recognize High Safety Significant Maintenance Rule Functional Failures	71152S
<p>The site's maintenance rule program is captured under ER-AA-320, "Maintenance Rule Implementation Per NEI 18-10," and endorses industry guidance found NEI 18-10, "Monitoring the Effectiveness of Nuclear Power Plant Maintenance." One of the stated purposes of NEI 18-10, is as follows,</p> <p><i>To provide the utilities with a risk-informed framework that supports the implementation and monitoring of a maintenance effectiveness program that complies with 10 CFR 50.65, leverages utility resources effectively and efficiently, and is focused on equipment performance commensurate with safety.</i></p> <p>ER-AA-320 defines HSS as those SSCs that are significant contributors to plant risk based on probabilistic risk assessment (PRA) evaluations or based on the decision of the maintenance rule expert panel. HSS is equivalent to "risk significant," as discussed in Regulatory Guide 1.160, "Monitoring the Effectiveness of Maintenance at Nuclear Power Plants."</p>	

ER-AA-320 defines MRFF as the failure (event or condition) of an SCC to perform its maintenance rule function that required its inclusion within the scope of the maintenance rule. The loss of function can be either direct (i.e., the SSC that performs the function fails to perform the maintenance rule function), or indirect (i.e., the SSC fails to perform its maintenance rule function as the result of the failure of another SSC, either safety or non-safety related).

Every 2 years the site performs an assessment of the maintenance rule program per 10 CFR 50.65, (a)(3), and documents the formal assessment of maintenance effectiveness in accordance with ER-AA-320-1007, "Maintenance Rule 18-10 – Periodic (a)(3) Assessment."

Inspectors performed a review of the licensee's most recent (a)(3) assessment and a sample of recent HSS MRFF determinations and had the following observations:

1. The licensee failed to recognize a HSS MRFF for the ½ emergency diesel generator (EDG) cooling water pump failing to start (AR 04479617) on February 21, 2022. The ½ EDG cooling water pump is a support component that is monitored under the EDG maintenance rule function DG6600-01. The licensee determined that this failure was not a MRFF because,

*While the ½ EDGCWP lost its automatic start function it did not lose its ability to be started manually. Since the EDG maintenance rule functions allows for manual start of the equipment, this is not a MRFF.*

The inspectors noted that the design basis function of the EDG is to start automatically within 13 seconds and accept full load within 40 seconds. Vendor documentation concerning cooling water flow requirements to the EDG indicates that the maximum time that the diesel can run at full continuous load without cooling water is significantly less than the design basis mission time of the diesel. Since actions to designate a dedicated operator in the field to restore EDG cooling water were not in place prior to the failure, crediting manual actions to start the cooling water pump would not be appropriate to apply to this failure; therefore, the inspectors determined that the licensee's MRFF determination was not technically justifiable.

The inspectors also noted that although the site did not correctly identify this failure as a HSS MRFF, a corporate subject matter expert identified the issue during a subsequent review. As a result, the required actions as outlined in ER-AA-320 were taken by the site.

2. The licensee failed to recognize a HSS MRFF for a 2A feedwater regulating valve hydraulic leak on July 1, 2021. The leak was of such a magnitude that the site performed an unplanned emergency down power to 75 percent rated power while equipment operators performed manual actions to maintain oil level in the hydraulic reservoir to prevent a loss of hydraulics to the system (AR 4432710). The site stated that this event was not a MRFF because, in part:

*A functional failure occurs when there is an inability of the feedwater control system to automatically maintain water level in the reactor vessel between +24" and +36" during normal operation.*

*Since the 2B FRV remained in automatic operation and could control the Unit 2 reactor vessel level within the required operating band while the reactor was in Mode 1, no MRFF event occurred. Unit 2 was required to be down powered to approximately 75% power while*

*the 2A FRV was secured and corrective maintenance was performed to address the failed hydraulic seal cartridge.*

The inspectors noted that the evaluation failed to account for the fact that the site performed an unplanned emergency down power to isolate the 2A FRV and, without that action, water level would not have been maintained with only the 2B FRV during normal operation at 100 percent power. The evaluation also failed to account for the exigent actions taken by the equipment operators to ensure the continued operation of the feedwater system hydraulic skid; actions that aren't credited manual actions in the maintenance rule program. Finally, ER-AA-320 defines an unplanned down power of greater than 20 percent as a plant level event, and by default, a MRFF; therefore, the inspectors determined that the licensee's MRFF determination was not technically justifiable.

The inspectors noted that although the site did not correctly identify this failure as a HSS MRFF, the actions prescribed in ER-AA-320 were taken for the failure being a plant level event. These actions were the same as if the MRFF determination would have been correctly determined. Therefore, the requirements of ER-AA-320 were satisfied.

3. The licensee failed to recognize a HSS MRFF for the failure of a level switch in the Unit 1 HPCI gland seal exhaust (GSE) subsystem that rendered HPCI unavailable to meet its PRA credited functions on December 1, 2021 (AR 04464185). The site stated that this event was not a HSS MRFF because the safety-related mission time of HPCI is 10 minutes and since the switch failed after 10 minutes had elapsed the failure occurred outside the design basis mission time and therefore wasn't a MRFF.

The inspectors noted that a MRFF of HPCI under maintenance rule function 2300-03 is defined, in part, as:

*Any failure that would prevent the HPCI system from being manually started or re-started to restore reactor vessel inventory as required by emergency operating procedures, or safe shutdown and other non-design basis events.*

The site's PRA model specifically states that a failure of the GSE subsystem results in the failure of the HPCI system to meet the success criteria for its credited PRA functions. Specifically, if the GSE subsystem is not available, steam that would otherwise be condensed in the GSC has the potential to enter the equipment space. This additional heat input is not accounted for in the current licensee calculations for environment qualification of the room. The HPCI room has a temperature sensor that is designed to trip the turbine at 155 degrees Fahrenheit. Therefore, the additional heat input from the failed GSE subsystem has the potential to cause an unwanted automatic trip of the HPCI turbine during an actual event and prevent it from being restarted. The inspectors determined that the licensee non-conservatively limited the scope of their evaluation of the event and as a result failed to recognize this issue as a HSS MRFF. The failure to recognize this event as a MRFF, in the initial determination as well as in the a(3) assessment, was a performance deficiency and is documented as minor in this report.

The licensee captured the inspectors comments in the CAP under ARs 4519042, 4518182, and 4522744.

## **EXIT MEETINGS AND DEBRIEFS**

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

- On October 11, 2022, the inspectors presented the integrated inspection results to Mr. B. Wake, Site Vice President, and other members of the licensee staff.
- On July 20, 2022, the inspectors presented the inservice inspection: Closure of URI 05000254/2019001-01 inspection results to Mr. M. Humphrey, Acting Regulatory Assurance Manager, and other members of the licensee staff.
- On October 19, 2022, the inspectors presented the radiation protection inspection results to Mr. W.K. Akre, Radiation Protection 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	AR 4507725	EOID: Staged Equipment Blocking Flex Building	06/27/2022
	Procedures	QCOA 0010-22	Local Intense Precipitation Response Procedure	16
		WC-AA-107	Seasonal Readiness	24
71111.04	Corrective Action Documents	AR 4299841	1B TBCCW HX Requires Additional Maintenance	11/25/2019
		AR 4304891	1A TBCCW HX Requires Additional Maintenance	12/17/2019
		AR 4464099	Tube Unable to be Plugged in 1B TBCCW Heat Exchanger	12/01/2021
		AR 4505927	1A TBCCW Pump Tripped	06/16/2022
	Corrective Action Documents Resulting from Inspection	AR 4516340	NRC ID: 1B TBCCW Oil Bubbler Appears Low	08/11/2022
		AR 4517636	NRC ID: U1 TBCCW Header Pressure PI Below Green Band	08/18/2022
	Drawings	M-21	Diagram of Turbine Building Closed Cooling Water	08/16/2001
	Miscellaneous	QC-PSA-005.17	Turbine Building Closed Cooling Water System (TBCCW) Notebook	6
Procedures	QCOA 3800-03	Total Failure of the TBCCW System	16	
71111.05	Corrective Action Documents	AR 4523749	Quarterly Fire Brigade Drill Tracking/Trending Crew D	09/20/2022
	Fire Plans	FZ 1.1.2.5	Unit 2 RB 666'-6" Elev. Stand-by Gas Treatment 4th Floor East	July 2009
		FZ 3.0	SB 609'-0" Elevation Cable Spreading Room	October 2013
		FZ 8.2.1.A	Unit 1 TB 547'-0" Elev. Condensate Pump Room	October 2016
		FZ 8.2.8.A	Unit 1 TB 639'-0" Elev. MG Set 1B	October 2016
		FZ Station Blackout Building	Unit 1/2 SBO 595'-0" Elev. Station Blackout Building	February 2022
71111.06	Corrective Action Documents	AR 4516035	Leak by of Check Valve Found for RHR Service Water Vault B/C	08/10/2022
	Miscellaneous	QC-PSA-012	Internal Flood Evaluation Summary and Notebook	7
	Procedures	CC-AA-201	Plant Barrier Control Program	14

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		LS-AA-106	Plant Operations Review Committee	14
		QCOS 0100-01	Unit 1 RHR Service Water Vault Flood Seal Leakage Testing	6
		QCTP 0130-11	Internal Flood Protection Program	5
	Work Orders	WO 5122141	B/C RHRSW Vault Sump PP CK VLV/HI LVL Alarm Test	08/09/2022
71111.07A	Corrective Action Documents	AR 4522274	Sealing Flange Degradation On 1A TBCCW Heat Exchanger	09/13/2022
	Procedures	QCTP 0820-10	Heat Exchanger and Room Cooler Inspection	7
71111.08G	Corrective Action Documents	AR 4231978	NRC ISI Inspection - IWE Examination Accessibility Question	03/22/2019
	Corrective Action Documents Resulting from Inspection	AR 4514438	NRC ID: Potential Green NCV for IWE Containment Inspections	08/02/2022
		AR 4518346	NRC ID: IR 04514438 Correction-IWE Inspection Potential NCV	08/23/2022
	Drawings	1-CISI-1001, Sheet 1	IWE Boundary Drawings, Piping and Instrument Penetration Details, Configuration No. 1	E
		1-CISI-1001, Sheet 2	IWE Boundary Drawings, Piping and Instrument Penetration Details, Configuration No. 2	C
	Miscellaneous	XI-1-13-25	ASME Code Interpretation	03/07/2014
	NDE Reports	Q1R25-IWE-001	ASME IWE (Class MC) Containment and IWL (Class CC) Metallic Liners Visual Examination NDE Report	03/31/2019
	Procedures	ER-AA-330-007	Visual Examination of Section XI Class MC Surfaces and Class CC Liners	13
ER-QC-330-1001		Inservice Inspection (ISI) Program Plan	0	
71111.12	Corrective Action Documents	AR 1056285	U2 HPCI Gland Seal Condenser Hotwell Pump Will Not Start	04/14/2010
		AR 1324066	U2 HPCI Gland Seal Hotwell Pump Overload During QCOS 2300-05	02/07/2012
		AR 4005139	U1 SBO Failed to Start, QCOS 6620-01	05/01/2017
		AR 4432710	Hydraulic Leak on 2A FRV	07/01/2021
		AR 4433019	4.0 Critique 2A FRV Hydraulic Leak	07/01/2021
		AR 4464185	U1 HPCI Gland Exhauster Tripped	12/01/2021
		AR 4513893	U1 SBO Failed to Start	07/30/2022
AR 4513893	SBO 6620-01: Provide an Alternate AC Power Source as a Backup to the EDGS. (HSS)	05/01/2017		

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		CAPE 4005139	U1 SBO Failed to Start for QCOS 6620-01	06/08/2017
		IRIS 531827	Feed Regulating Valve Failed to Close Causing Manual Scram	09/28/2022
	Corrective Action Documents Resulting from Inspection	04522744	Trend in Maintenance Rule Screening Quality	09/15/2022
		AR 4518182	NRC Identified: IR 04432710 Not Screened as MRule PLE	08/22/2022
		AR 4519042	NRC Identified: IR 04464185 Not Screened as MRFF	08/26/2022
	Engineering Changes	EC 353595	On-line HPCI Room Cooler Maintenance and HPCI System Availability	1
	Engineering Evaluations	AR 4464185	(a)(1) Determination - U1 HPCI Gland Exhauster Tripped	
	Miscellaneous		10 CFR 50.65 (a)(3) Periodic Evaluation Assessment Period: 05/01/2020 - 05/01/2022	07/28/2022
	Procedures	ER-AA-320-1004	Maintenance Rule 18-10 - Performance Monitoring and Dispositioning Between (a)(1) and (a)(2)	1
		NO-AA-300-1001	Nuclear Oversight Independent Inspection Plan	15
		OP-AA-102-104	2A FRV Failure Results in U2 SCRAM (Rev 1)	4
		OP-QC-102-106	Operator Response Time Program at Quad Cities	14
		QCOS 6620-01	SBO DG 1(2) Quarterly Load Test	54
	Work Orders	WO 4761761	Replace 14" Line From 2C RHRSW Pump to 24"x14" Reducer	04/05/2022
		WO 4859990	MM HPCI Turbine Overhaul for 10 Year PM Inspection	03/21/2022
		WO 5046667	Feedwater Skid EHC Balance of Plant	04/10/2022
		WO 5157552	Relocate 1/2 EDGCW Piping Crosstie to ECCS Room Cooler 631231	03/27/2022
		WO 5254327	During QCOP 6500-15 Bus 61 Volt Indicated Low	08/03/2022
		WO 5256314	(LR) SBO DG Load Test	08/11/2022
		WO 5282970	Repair Leak in ECCS Room Cooler Line	09/16/2022
71111.15	Corrective Action Documents	AR 4514602	EOID: U2 HPCI Room Temp Greater Than 100 Degrees F	08/03/2022
		AR 4515301	Rod F-9 Shows Red Double Dashes	08/06/2022
		AR 4515811	EOID: 30 DPM Leak in U1 RB Basement Overhead	08/09/2022
		AR 4516538	EOC Inspections for ECCS Leak for N-513-4	08/12/2022
		AR 4519722	CR HVAC TRN 'B' Compressor Area Noise Elevated	08/30/2022
Drawings	M-1568	Control Room HVAC Piping Arrangement Refrigeration Tubing	003	
Engineering	EC 382992	U2 PPC Update for RWM, FCL, and R* Time Corrections	24	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
	Changes	EC 637081	SBGT Surveillance Flowrate Noted Below Expected Values	00
		EC 637278	N-513-4 Evaluation for DGCW Line 1-3958-6" Through Wall Leak	08/12/2022
		EC 637280	Piping Line 1-3958-6" Through Wall Leak	08/12/2022
	Procedures	ER-AA-335-004	Ultrasonic Thickness Calibration Sheet	9
		QCOS 0005-05	Unit 2 - Increased Parameter Monitoring	9
		QCOS 0300-01	CRD Exercise	54
		SR 3.1.3	Surveillance Requirement, Control Rod Operability 3.1.3	4
71111.18	Corrective Action Documents	AR 4151971	Project Plan: QGA Revision 4	06/30/2018
	Corrective Action Documents Resulting from Inspection	AR 4516571	NRC ID: AT Item Closed Without Adequate Completion Notes	08/12/2022
		AR 4518925	IR 4516571 EOC - ATs Closed w/o Adequate Completion Notes	08/26/2022
	Procedures	QCAP 0200-31	Control of Severe Accident Management Guidelines and Technical Support Guidelines	8
71111.19	Procedures	QCOS 1000-04	RHR Service Water Pump Operability Test	66
		QCOS 1400-01	Core Spray System Flow Test	52
		QCOS 1400-05	Core Spray Motor Operated Valve Local Controller Test	16
		QCOS 2300-05	HPCI Pump Operability Test	89
		QCOS 6600-42	Unit 2 Emergency Diesel Generator Load Test	58
		QCOS 6600-45	Unit 2 Diesel Generator Timed Start Test	29
		QCOS 7500-05	SBGTS Operability Test	32
	Work Orders	WO 5068048	IMD to Replace PS 2-2368-A, HPCI Turbine 2-2303 Exhaust to Torus	09/13/2022
		WO 5263854	RHR Service Water Pump 'B' Flow (IST)	08/24/2022
71111.22	Procedures	QCOS 7500-05	SBGTS Operability Test	33
	Work Orders	WO 5162341	(FLEX) 480 VAC Annual Inspection and Load Test (DG-1)	07/21/2022
71124.05	Calibration Records		Calibration of the ACCUSCAN II WBC System at the Exelon Quad Cities Nuclear Generating Station	07/22/2021
			Calibration of the FASTSCAN WBC System at the Exelon Quad Cities Nuclear Generating Station	07/21/2021
			Calibration of the FASTSCAN WBC System at the Exelon	07/19/2022

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Quad Cities Nuclear Generating Station	
		RP-AA-700-1216 Attachment 1 RADeCO Serial Number 060	RADECO H-809V, H-809V-1, H-809V-II Calibration Data Sheet	08/08/2022
		RP-AA-700-1231 Attachment 2 LAM-11 Serial Number 1	LAM Calibration Data Sheet	03/10/2022
		RP-AA-700-1235 Attachment 3 PM-12 Serial Number 12047	PM-12 Calibration Data Sheet	08/10/2022
		RP-AA-700-1239 Attachment 2 SAM-12 Serial #12233	SAM-12 Calibration Data Sheet	08/19/2022
		RP-AA-700-1240 Attachment 1 Monitor Number 1512-223	ARGOS-5 Calibration Data Sheet	02/07/2022
		RP-AA-700-1401 Attachment 3 Portal Monitor Instrument # PM-10	Calibration Data Sheet PM-7 Portal Monitor	02/02/2022
		RP-QC-700-1215 Attachment 1 Sampler Serial Number 323	RAS-1/F&J Air Sampler Calibration Record	08/29/2022
	Corrective Action Documents	AR 4498038	1A Refuel Floor Rad Monitor Erratic Indication	05/06/2022
		AR 4513429	Fuel Pool Rad Monitor 1-1705-16A Erratic Indication	07/28/2022
		AR 4517997	1-1705-16A Fuel Pool Rad Monitor Trending Upward	08/21/2022
	Miscellaneous	RCT-8220	Final Report - Calibration of Eberline SA-9 High Range Noble	12/31/1982

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
			Gas Monitors at Dresden and Quad Cities Power Stations	
		RP-AA-700 Attachment 4	Annual Portable Radiological Instrument Calibration Review	03/22/2022
		RP-AA-700 Attachment 4	Annual Portable Radiological Instrument Calibration Review	03/27/2021
	Procedures	RP-AA-700	Controls for Radiation Protection Instrumentation	9
		RP-AA-700-1231	Operation and Calibration of the Model LAM-11 Large Articles Monitor	3
		RP-AA-700-1306	Operation of MDH/RADCAL 2025/2026C Series X-Ray Monitor	3
	Self-Assessments	AR 4201130	Exelon Power Labs Instruments (EPL)	06/26/2019
		AR 4456144	NRC SA: RP Monitoring Instrument Inspection IP 71124.05	08/09/2022
	Work Orders	WO 4940172	Radwaste Effluent Gross Activity Monitor Cal/Functional Test	01/06/2021
		WO 4959574	Main Chimney High Range Noble Gas Monitor Calibration	08/27/2020
		WO 4984196	Reactor Building Vent/Fuel Pool Rad Monitor Calibration	05/21/2021
		WO 4984261	Primary Containment Rad Monitor Cal/Func Test Activity	10/13/2021
		WO 5279917	Fuel Pool Rad Monitor 1-1705-16A Erratic Indication	08/11/2022
	71151	Miscellaneous	MSPI Report - UAI	MSPI Derivation Report, MSPI Emergency AC Power System, Unavailability Index (UAI)
MSPI Report, URI			MSPI Derivation Report, MSPI Emergency AC Power System, Unreliability Index (URI)	June 2022
71152A	Procedures	CC-QC-118	Site Implementation of Diverse and Flexible Coping Strategies (FLEX), Spent Fuel Pool Instrumentation, and Hardened Containment Vent System (HCVS) Program	12
		OP-QC-102-106	Operator Response Time Program at Quad Cities	13