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

December 20, 2023

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

SUBJECT: QUAD CITIES NUCLEAR POWER STATION – COMPREHENSIVE ENGINEERING TEAM INSPECTION REPORT 05000254/2023010 AND 05000265/2023010

Dear David P. Rhoades:

On November 16, 2023, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Quad Cities Nuclear Power Station and discussed the results of this inspection with Brian Wake, Site Vice President, and other members of your staff. The results of this inspection are documented in the enclosed report.

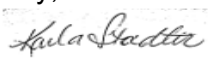
Four findings of very low safety significance (Green) are documented in this report. Three of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance or severity of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region 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 Stoedter, Karla
on 12/20/23

Karla K. Stoedter, Chief
Engineering Branch 1
Division of Operating Reactor Safety

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

Enclosure:
As stated

cc w/ encl: Distribution via LISTSERV

Letter to David P. Rhoades from Karla K. Stoedter dated December 20, 2023.

SUBJECT: QUAD CITIES NUCLEAR POWER STATION – COMPREHENSIVE ENGINEERING TEAM INSPECTION REPORT 05000254/2023010 AND 05000265/2023010

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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:	05000254/2023010 and 05000265/2023010
Enterprise Identifier:	I-2023-010-0055
Licensee:	Constellation Nuclear
Facility:	Quad Cities Nuclear Power Station
Location:	Cordova, IL
Inspection Dates:	October 16, 2023 to November 03, 2023
Inspectors:	K. Barclay, Senior Reactor Inspector J. Bozga, Senior Reactor Inspector A. Dahbur, Senior Reactor Inspector M. Gangewere, Reactor Inspector I. Hafeez, Senior Reactor Inspector L. Rodriguez, Senior Reactor Inspector M. Siddiqui, Reactor Inspector
Approved By:	Karla K. Stoedter, Chief Engineering Branch 1 Division of Operating Reactor Safety

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting a Comprehensive Engineering Team 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 Determine and Document Operability Associated with Technical Specification 3.2 Power Distribution Limits Following a Failure of the HPCI Flow Controller			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000254,05000265/2023010-01 Open/Closed	[P.2] - Evaluation	71111.21M
The inspectors identified a finding of very low safety significance (Green) for the licensee's failure to determine and document operability associated with Technical Specification (TS) 3.2, "Power Distribution Limits," following a failure of the high pressure coolant injection (HPCI) flow controller on September 15, 2023, as required by steps 4.1.5 and 4.1.6 of Procedure OP-AA-108-115, "Operability Determinations (CM-1)." Specifically, the licensee did not evaluate whether the limits in the core operating limits report incorporated in TS 3.2 and the assumptions of the inadvertent HPCI initiation transient analysis continued to be met after the flow controller failure.			

Discrepancies Between 250 VDC Calculations and Design Basis Acceptance Criteria Used in Test Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000254,05000265/2023010-02 Open/Closed	[H.14] - Conservative Bias	71111.21M
The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," for the licensee's failure to ensure that values used in battery calculations were consistent with the design values specified in the updated final safety analysis report (UFSAR) and test procedures. Specifically, the licensee failed to: (1) incorporate the measured armature current values of direct current (DC) motors used in design basis Calculation QDC-8350-E-2348 into work orders and test procedures, and (2) use the design basis minimum required voltage value of 210 volts DC (VDC) specified in the UFSAR to perform the voltage drop calculation for the 250 VDC motor operated valves (MOVs) in Calculation QDC-8350-E-0717.			

Failure to Follow Procedural Instructions for Battery Installation			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000254,05000265/2023010-03 Open/Closed	[H.5] - Work Management	71111.21M
The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for the licensee’s failure to correctly install safety-related 125/250 VDC batteries in accordance with prescribed work instructions and drawings. Specifically, the licensee failed to: (1) install foam spacers for the unit 2 250 VDC battery as prescribed in work instructions when installing the battery to ensure the battery's seismic qualifications were maintained, and (2) install jumper cables for the unit 1 125 VDC battery as prescribed in a drawing to ensure the cable bend radii were greater than the minimum required to prevent damage to the cables over time.			

Non-conservative Valve Factor Used to Demonstrate Motor Operated Valve 1-1001-23A Continued to be Capable of Performing its Design Basis Safety Functions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000254,05000265/2023010-04 Open/Closed	[P.5] - Operating Experience	71111.21M
The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.55a(b)(3)(ii) for the licensee's failure to establish a program that ensured MOVs continued to be capable of performing their design basis safety functions. Specifically, the licensee incorrectly used a non-conservative valve factor from industry testing as a design input to size and set-up MOV 1-1001-23A instead of using the bounding valve-specific, empirically determined valve factor.			

Additional Tracking Items

None.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.21M - Comprehensive Engineering Team Inspection

Structures, Systems, and Components (SSCs) (IP section 03.01) (9 Samples)

For each SSC sample, the inspectors reviewed the licensing and design bases including: (1) the updated final safety analysis report (UFSAR), (2) the technical specifications (TS) (where applicable), and (3) the technical requirements manual (where applicable). The inspectors also reviewed overall SSC health (including condition reports and operability evaluations, if any). The inspectors performed visual inspections of the accessible SSCs to identify potential hazards or signs of degradation. Additional SSC specific design attributes reviewed by the inspectors are listed below:

(1) Unit 2 Reactor Core Isolation Cooling (RCIC) Pump/Turbine (2-1302/2-1303)

- operating procedures
- environmental qualification
- mechanical design calculations and considerations
  - flow capacity
  - minimum flow
  - required submergence
  - hydraulic transients
  - gas intrusion and accumulation
  - pump cooling
  - steam supply admission
  - suppression pool water source temperature and level
  - turbine trip setpoints
  - room heat up and cooling
- test and inspection procedures, acceptance criteria, and recent results
  - pump in-service testing (IST)
  - TS instrument surveillance for RCIC high area temperature isolation
  - full of water verification at suction piping and discharge pipe venting
- electrical design calculations and considerations
  - minimum voltage for RCIC condensate pump

(2) Unit 2 RCIC Turbine Steam Supply Motor Operated Valve (MOV) (2-1301-61)

- operating procedures
- environmental qualification
- mechanical design calculations and considerations

    - weak link analysis
    - required thrust and torque
    - stroke time
    - maximum differential pressure
- test and inspection procedures, acceptance criteria, and recent results
    - IST
    - TS required surveillance
- motor power requirements
    - required minimum voltage
    - emergency power (battery)
    - breaker coordination

(3) 250 VDC Battery 2 (2-8350)

- modifications
- test and inspection procedures, acceptance criteria, and recent results
    - TS required surveillance
    - terminal corrosion resistance
- electrical design calculations and considerations
    - battery sizing
    - battery loading
    - short circuit calculation
    - minimum voltage

(4) Safe Shutdown Makeup Pump (SSMP) (0-2901)

- operating procedures
- maintenance effectiveness
- mechanical design calculations and considerations
    - flow capacity
    - minimum flow
    - required net positive suction head
    - pump cooling
    - room heat up and cooling
- test and inspection procedures, acceptance criteria, and recent results
    - IST
    - flow capacity test
- electrical design calculations and considerations
    - protective devices
    - cable ampacity
    - minimum voltage
    - control logic

(5) SSMP Unit 2 Reactor Injection MOV (2-2901-8)

- operating procedures
- maintenance effectiveness
- mechanical design calculations and considerations
    - weak link analysis
    - required thrust and torque
    - stroke time
    - maximum differential pressure

- test and inspection procedures, acceptance criteria, and recent results
  - IST
- motor power requirements
  - control logic
  - required minimum voltage
  - protective devices

(6) 125 VDC Turbine Building Reserve Bus 2B-1 (2-8301-2B1)

- modifications
- translation of vendor specifications
- test and inspection procedures, acceptance criteria, and recent results
  - relay calibration
- electrical design calculations and considerations
  - breaker coordination calculations
  - bus capacity
  - overcurrent protection
  - cable ampacity

(7) Emergency Diesel Generator (EDG) 2 (2-6601)

- maintenance effectiveness
- modifications
- mechanical design calculations and considerations
  - fuel oil available volume and consumption
  - fuel oil transfer design
    - flow capacity
    - net positive suction head
  - starting air system capacity
- test and inspection procedures, acceptance criteria, and recent results
  - TS 184 day fast start surveillance
  - fuel oil day tank level switch functionality
  - fuel oil transfer pump IST
  - starting air check valve IST
- electrical design calculations and considerations
  - fuel oil transfer pump circuitry
  - starting air circuitry

(8) Bus 24-1 (2-6706-24-1)

- operating procedures
- modifications
- protection against seismic event
- test and inspection procedures, acceptance criteria, and recent results
  - TS surveillance
  - relay calibration
- electrical design calculations and considerations
  - breaker settings and ratings to prevent spurious tripping
  - breaker control voltage and logic
  - fast bus transfer scheme
  - protective devices and trip set points
  - voltage regulation
  - bus capacity

- surge suppression

(9) Contaminated Condensate Storage Tank (CCST) A/B (0-3303-A/B)
- operating procedures
- maintenance effectiveness
- modifications
- protection against seismic event
- mechanical design calculations and considerations
  - available and required volume for a station blackout event
  - level set points
  - design pressure
  - overpressure protection
  - vacuum protection
  - temperature limits
  - heat tracing
- test and inspection procedures, acceptance criteria, and recent results
  - chemistry requirements
  - temperature
  - heat tracing
  - volume
  - TS surveillances

Modifications (IP section 03.02) (4 Samples)

(1) Engineering Change (EC) 621167, "RCIC Flow Indicating Controllers 1(2)-1340-1 Upgrade," Revision 0
(2) EC 627233, "EOC U-1 Replacement of Merlin Gerin Breakers in Bus 13," Revision 0
(3) EC 630019, "Appendix J Local Leak Rate Testing Scope Reduction for Core Spray, Residual Heat Removal, and Standby Liquid Control Systems - Owner's Acceptance Review," Revision 0
(4) EC 635312, "Minor Revision to QC-429-P-021 for Longer Flex Hose," Revision 0

10 CFR 50.59 Evaluations/Screening (IP section 03.03) (15 Samples)

(1) Evaluation QC-E-2021-001, "Modification to Install Alternate HPCI Signal Converter to Replace Functions of FY 1(2)-2386-A with FY 1(2)-2386-B," Revision 1
(2) Evaluation QC-E-2023-003, "Temporarily Install Alternative Pressure Control Valve Model on U2 EDG Starting Air," Revision 0
(3) Screening QC-S-2017-0081, "Installation and Use of Test Switches in the RCIC Primary Containment Isolation Valve Logic," Revision 0
(4) Screening QC-S-2019-0019, "Install Bypass Switches for -59" Group 1 Main Steam Isolation Valve Isolation," Revision 0
(5) Screening QC-S-2019-0024, "Revise TRM 3.7.b Discussion to Allow Option to Perform Analysis," Revision 0
(6) Screening QC-S-2019-0039, "Remove HPCI Signal Converter Local Meter Relay M1 Output to Main Control Room Annunciator," Revision 0
(7) Screening QC-S-2019-0049, "Install Closed Torque Switch Bypass (CTSB) and Motor Pinion Gear Change for MO 1-1001-23A to Increase S1 and S6 Margin," Revision 0
(8) Screening QC-S-2019-0055, "Temporary Power for the Unit 2 Alternate 125 VDC Charger," Revision 1

(9) Screening QC-S-2019-0060, "Temporary Power for Fuel Oil Level Indicators 0-5241-13A/B," Revision 1
(10) Screening QC-S-2020-0015, "125VDC and 250VDC Conversion Calculations from ELMS-DC to DC-ETAP," Revision 0
(11) Screening QC-S-2020-0057, "Revise Bases B 3.8.4 to Clarify the 250 VDC Battery Sizing Methodology," Revision 0
(12) Screening QC-S-2021-0020, "CCST Floor Replacement," Revision 0
(13) Screening QC-S-2021-0033, "U-2 Add Isolation Valve to the U-2 TO 1/2 Diesel Generator Cooling Water Piping Crosstie to the Emergency Core Cooling System Room Coolers," Revision 0
(14) Screening QC-S-2022-0014, "U-1 and U-1/2 Diesel Generator Cooling Water Piping Crosstie to the Emergency Core Cooling System Room Coolers with Isolation Valve," Revision 0
(15) Screening QC-S-2023-0008, "QCOP and QCOS 2300 Series Procedure Changes to Leave the HPCI Turning Gear in PULL TO STOP," Revision 1

Operating Experience Samples (IP section 03.04) (3 Samples)

(1) Information Notice (IN) 2018-07, "Pump/Turbine Bearing Oil Sight Glass Problems"
(2) IN 2021-01, "Lessons Learned From U.S Nuclear Regulatory Commission Inspections of Design-Basis Capability of Power-Operated Valves at Nuclear Power Plants"
(3) Regulatory Issue Summary (RIS) 2022-02, "Operational Leakage"

INSPECTION RESULTS

Failure to Determine and Document Operability Associated with Technical Specification 3.2 Power Distribution Limits Following a Failure of the HPCI Flow Controller			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green FIN 05000254,05000265/2023010-01 Open/Closed	[P.2] - Evaluation	71111.21M
The inspectors identified a finding of very low safety significance (Green) for the licensee's failure to determine and document operability associated with Technical Specification (TS) 3.2, "Power Distribution Limits," following a failure of the high pressure coolant injection (HPCI) flow controller on September 15, 2023, as required by steps 4.1.5 and 4.1.6 of Procedure OP-AA-108-115, "Operability Determinations (CM-1)." Specifically, the licensee did not evaluate whether the limits in the core operating limits report incorporated in TS 3.2 and the assumptions of the inadvertent HPCI initiation transient analysis continued to be met after the flow controller failure.			
Description: The HPCI system at Quad Cities was an emergency core cooling system (ECCS) designed to pump 5,600 gallons per minute (gpm) of water into the reactor vessel under loss of coolant accident conditions which did not result in rapid depressurization of the pressure vessel. The system had a safety function to automatically start on either a low-low reactor vessel water level or high drywell pressure signal. TS Limiting Condition for Operation (LCO) 3.5.1, "ECCS-Operating," required the system to be operable in Mode 1 and Modes 2 and 3 when reactor steam dome pressure was greater than 150 psig.			

UFSAR section 15.5.1, "Inadvertent Initiation of High Pressure Coolant Injection During Power Operation," analyzed an inadvertent HPCI startup event to ensure the minimum critical power ratio fuel cladding integrity safety limit was not violated during the occurrence of the transient. The inadvertent initiation of the HPCI system (IHPCI) was a potentially limiting event which was analyzed on a cycle-specific basis in the reload safety analysis report. UFSAR section 15.5.1.3, "Core and System Performance," had a historical information section for the initial core which assumed a 5,600 gpm flow rate from the HPCI system during the IHPCI event. The current reload safety analysis report for Cycle 28 also assumed a 5,600 gpm flow rate from the HPCI system as documented in TODI NF220577, "Quad Cities Unit 1 Cycle 28 Completed OPL-3 Form," Revision 0. The results of the IHPCI documented in Global Nuclear Fuel Document 006N9309, "Supplemental Reload Licensing Report for Quad Cities Unit 1 Reload 27 Cycle 28," Revision 0, were an input to the core operating limits report (COLR) for Quad Cities Unit 1 Cycle 28. The limits in the COLR were referenced in TS 3.2, "Power Distribution Limits," TS 3.2.1, "Average Planar Linear Heat Generation Rate (APLHGR)," TS 3.2.2, "Minimum Critical Power Ratio (MCPR)," and TS 3.2.3, "Linear Heat Generation Rate (LHGR)," to ensure the fuel was adequately protected during plant operation at or above 25 percent rated thermal power.

On September 15, 2023, during performance of QCOS 2300-05, "HPCI Pump Operability Test," the HPCI flow controller (1-2340-1) failed to control HPCI flow as documented in Action Request (AR) 4702971, "HPCI MGU did not Respond as Expected During QCOS 2300-05." Although the controller was set to automatic with a setpoint of 5,600 gpm, HPCI flow was observed to be approximately 6,950 gpm. No response in system flow was observed when the automatic setpoint was lowered or when the controller was cycled between automatic and manual. Field operators verified the motor gear unit (MGU) was at the high speed stop (HSS). When the MGU control switch was taken to the "slow lower" position, the MGU came off its HSS and flow lowered, but the MGU returned to the HSS and flow returned to 6,950 gpm once the control switch was released. The test was then aborted and the HPCI system was placed in a standby lineup. The operable basis of AR 4702971 stated the following:

> The Signal Converter failed in a manner that prevented automatic flow control but would not prevent HPCI from initiating and ramping to full flow (i.e., the turbine high speed stop). In this condition, HPCI would have met corresponding Technical Specifications flow requirements and Accident Analysis requirements. HPCI would have performed its safety function. Therefore, with the Motor Gear Unit at the High Speed Stop HPCI remains operable.

The inspectors discussed with the licensee the operable basis provided in AR 4702971, and confirmed it only considered the HPCI system's capability to supply the minimum required flow in the accident analysis and TS 3.5.1. However, it did not consider compliance with the TS 3.2 LCO limits. The inspectors reviewed EC 639997, "Technical Evaluation for Quad Cities HPCI Elevated Flow Rate," Revision 0, which was completed approximately one month after the failure and interviewed licensee staff to understand the impacts of the HPCI flow controller failure on the TS 3.2 LCO limits. The EC concluded that during the period while the HPCI flow controller was unable to control HPCI flow, no adverse consequences to the nuclear fuel resulting from an IHPCI would have occurred. The time period evaluated was from discovery of the HPCI flow controller failure on September 15, 2023, to September 19, 2023, when repairs were completed.

The inspectors reviewed licensee Procedure OP-AA-108-115, "Operability Determinations

(CM-1)," Revision 26, and determined the licensee failed to follow steps 4.1.5 and 4.1.6 when they failed to document compliance with TS 3.2 LCO limits in the corrective action program (CAP). The steps state the following:

> Step 4.1.5 DETERMINE and DOCUMENT the as-found and current operability status of the affected SSC in accordance with the CAP. This includes documenting the Operable Yes / No attribute in the CAP database based on AS-FOUND condition. Attachment 4, Part A, may be used as guidance for how to document operability within CAP. LOG this information as specified in OP-AA-111-101¸ "Operating Narrative Logs and Records," section 4.3.5. The focus of operability is foremost on the capability to ensure safety. (Operations Shift Management)
>
> Step 4.1.6 Immediately DETERMINE operability from a detailed examination of the deficient condition affecting an SSC. Operability should be determined immediately upon discovery that an SSC subject to TS is impacted by a condition which results in a substantive functional impact on the SSC that may affect its ability to perform its specified safety function. The determination should be made without delay and in a controlled manner using the best available information. The SRO should not postpone the determination until receiving the results of detailed evaluations. In most cases the decision can be made immediately and appropriately documented in the IR. (Operations Shift Management)

Contrary to Procedure OP-AA-108-115, on September 15, 2023, the licensee failed to determine and document operability associated with TS 3.2 LCO limits when the HPCI flow controller was unable to control HPCI flow at the rate assumed in the reload safety analysis report for the cycle. Specifically, since the HPCI flow rate during an IHPCI would have been 6,950 gpm versus the 5,600 gpm assumed in the transient analysis, the limits in the COLR for demonstrating compliance with TS 3.2 LCO were called into question.

Corrective Actions: The licensee entered the issue into their corrective action program (CAP) and planned to update the operability basis in AR 4702971 to document compliance with the TS 3.2 LCO limits for the HPCI flow controller failure. The licensee also planned to update procedures and lesson plans related to the HPCI system to ensure operability associated with TS 3.2 was addressed for HPCI flow controller failures.

Corrective Action References: AR 4711737
AR 4714113
AR 4714858

Performance Assessment:

Performance Deficiency: The licensee failed to determine and document operability associated with TS 3.2 following a failure of the HPCI flow controller on September 15, 2023, as required by steps 4.1.5 and 4.1.6 of OP-AA-108-115. Specifically, the licensee did not evaluate whether the limits in the COLR incorporated in TS 3.2 and the assumptions of the IHPCI transient analysis continued to be met after the flow controller failure.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control 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 determine and document operability associated with TS 3.2, "Power Distribution Limits," following a failure of the HPCI flow controller adversely affected the cornerstone objective to provide reasonable assurance the fuel cladding barrier would 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 finding screened to Green because the inspectors answered "No" to all the exhibit 3, "Barrier Integrity Screening Questions," section A, "Fuel Cladding Integrity," screening questions.

Cross-Cutting Aspect: P.2 - Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, when the HPCI flow controller failed, the organization did not thoroughly evaluate the issue to ensure compliance with all applicable TSs.

Enforcement:

The inspectors did not identify a violation of regulatory requirements associated with this finding since the operability process is not required by any NRC regulation.

Discrepancies Between 250 VDC Calculations and Design Basis Acceptance Criteria Used in Test Procedures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000254,05000265/2023010-02 Open/Closed	[H.14] - Conservative Bias	71111.21M

The inspectors identified a finding of very low safety significance (Green) and an associated non-cited violation (NCV) of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion III, "Design Control," for the licensee’s failure to ensure that values used in battery calculations were consistent with the design values specified in the updated final safety analysis report (UFSAR) and test procedures. Specifically, the licensee failed to: (1) incorporate the measured armature current values of direct current (DC) motors used in design basis Calculation QDC-8350-E-2348 into work orders and test procedures, and (2) use the design basis minimum required voltage value of 210 volts DC (VDC) specified in the UFSAR to perform the voltage drop calculation for the 250 VDC motor operated valves (MOVs) in Calculation QDC-8350-E-0717.

Description:

During the inspectors’ review of the unit 2 250 VDC battery calculations, work orders, and surveillance tests, the inspectors identified two discrepancies between the values used in the direct current (DC) calculations and the acceptance criteria used in work orders and surveillance tests.

First, the inspectors reviewed Calculation QDC-8350-E-2348, "250 VDC System Analysis Using DC ETAP," Revision 0A, which analyzed the loading of the safety-related 250 VDC batteries. The inspectors noted the ETAP calculation used measured armature current values instead of the nameplate current values to model the DC motors in the analysis. Although

motor currents were checked periodically during routine motor preventative maintenance activities, the testing incorrectly used the nameplate current values of the DC motors as the acceptance criteria instead of the armature current values used in the calculation. Therefore, the acceptance criteria for the periodic testing did not validate the inputs used in the design calculation.

A review of previous work orders identified two loads on the 250 VDC batteries that had higher tested currents than the armature current values used in Calculation QDC-8350-E-2348. The loads affected were the RCIC vacuum pumps and the RCIC condensate pumps. The RCIC vacuum pumps were modeled with a current value of 5.6 amps, but the running current measured during testing was 5.7 amps. Similarly, the RCIC condensate pumps were modeled with a current value of 5.5 amps, but the running current measured during testing was 7.8 amps. Since the testing contained incorrect acceptance criteria, the impacts of the higher tested current values on Calculation QDC-8350-E-2348 were never evaluated.

Second, the inspectors reviewed UFSAR section 8.3.2.1 and noted the design basis minimum required voltage at the battery terminals was 210 VDC. The inspectors confirmed battery surveillance tests used this value as the acceptance criteria during testing. However, the inspectors reviewed Calculation QDC-8350-E-0717, "DC MOV Voltage Drop Calculation," Revision 3, and noted it had not used the design basis 210 VDC value at the battery terminals to perform the voltage drop analysis for the 250 VDC MOVs. The calculation instead assumed a minimum voltage of 205 VDC at 250 VDC safety-related buses 1A, 1B, 2A, and 2B. A minimum voltage of 205 VDC at the safety-related buses translated to a voltage higher than the minimum design basis 210 VDC voltage at the battery terminals (~213 VDC) since there was a voltage drop of approximately 8 VDC between the batteries and the safety-related buses as analyzed in the ETAP calculation. Therefore, the inspectors concluded the assumed minimum voltage at the safety-related buses of 205 VDC in Calculation QDC-8350-E-0717 was incorrect because it was higher than the available voltage (~202 VDC) at the buses had the design basis minimum battery terminal voltage of 210 VDC and the approximately 8 VDC voltage drop between the batteries and safety-related buses been accounted for.

Corrective Actions: The licensee entered these issues into their CAP and assigned actions to their design engineering department to update the affected calculations and design basis documents. The licensee reviewed recent battery surveillance test results and determined the 250 VDC system remained capable of performing its safety function given the deficiencies identified due to the additional margins available.

Corrective Action References: AR 04711853
AR 04714548

Performance Assessment:

Performance Deficiency: The licensee's failure to ensure that values used in battery calculations were consistent with the design values specified in UFSAR and test procedures was a performance deficiency and a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." Specifically, the licensee failed to: (1) incorporate the measured armature current values of DC motors used in design basis calculations into work orders and test procedures, and (2) the licensee failed to use the design basis minimum required voltage value of 210 VDC specified in the UFSAR to perform the voltage drop calculation for the 250 VDC MOVs.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to ensure values used in battery calculations were consistent with design values specified in the UFSAR and test procedures adversely affected the cornerstone objective of ensuring the capability of the 250 VDC system to respond to initiating events to prevent undesirable consequences.

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 this finding was of very low safety significance (Green) because although the finding was a deficiency affecting the design or qualification of a mitigating SSC, the SSC maintained its operability and PRA functionality.

Cross-Cutting Aspect: H.14 - Conservative Bias: Individuals use decision making-practices that emphasize prudent choices over those that are simply allowable. A proposed action is determined to be safe in order to proceed, rather than unsafe in order to stop. Specifically, the licensee incorrectly assumed the values used in design basis calculations were conservative without validating that was the case.

Enforcement:

Violation: Title 10 CFR 50, Appendix B, Criterion III, “Design Control,” requires, in part, that measures be established to assure that applicable regulatory requirements and the design basis are correctly translated into specifications, drawings, procedures, and instructions.

Design Calculation QDC-8350-E-2348, "250 VDC System Analysis Using DC ETAP," Revision 0A, which analyzed the loading of the safety-related 250 VDC batteries used measured armature current values instead of the nameplate current values to model the DC motors in the analysis.

UFSAR section 8.3.2.1, "250-V System," stated, in part, the capacity of each unit battery is adequate to supply expected essential loads following station trip and loss of all ac power without battery terminal voltage falling below the minimum discharge level (i.e., 210-V).

Contrary to the above, as of October 2023, the licensee failed to establish measures to assure that applicable regulatory requirements and the design basis were correctly translated into specifications, drawings, procedures, and instructions. Specifically, the licensee failed to: (1) incorporate the measured armature current values of DC motors used in design basis Calculation QDC-8350-E-2348 into work orders and test procedures, and (2) use the design basis minimum required voltage value of 210 VDC specified in the UFSAR to perform the voltage drop calculation for the 250 VDC MOVs in Calculation QDC-8350-E-0717.

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

Failure to Follow Procedural Instructions for Battery Installation			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000254,05000265/2023010-03 Open/Closed	[H.5] - Work Management	71111.21M

The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” for the licensee’s failure to correctly install safety-related 125/250 VDC batteries in accordance with prescribed work instructions and drawings. Specifically, the licensee failed to: (1) install foam spacers for the unit 2 250 VDC battery as prescribed in work instructions when installing the battery to ensure the battery's seismic qualifications were maintained, and (2) install jumper cables for the unit 1 125 VDC battery as prescribed in a drawing to ensure the cable bend radii were greater than the minimum required to prevent damage to the cables over time.

Description:

The inspectors reviewed information associated with, and performed walkdowns of, the 125 VDC and 250 VDC batteries. The inspectors identified two deficiencies associated with the installation of the safety-related station batteries.

First, the inspectors reviewed QDC-8300-S-0673, "Review of Aged Battery Seismic Qualification Report," Revision 1, and noted the seismically tested and qualified configuration of the 125 VDC and 250 VDC battery cells was to have a gap no greater than 1/8 inch between the battery cells and the battery rack side or end support, with snug fitting crush-resistant foam spacers used as necessary. The inspectors also reviewed Procedure QCEM 0100-03, "125/250 VDC Battery Replacement (Out-of-Service)," Revision 19, and noted section 4.12.2 required gaps to be snug tight, which was defined as a gap less than or equal to 1/8 inch. The inspectors reviewed Work Order 05231566 for the unit 2 250 VDC replacement battery and noted the requirements of Procedure QCEM 0100-03 applied to the installation of the batteries.

During a walkdown of the unit 2 battery room, the inspectors identified a missing foam spacer on the unit 2 250 VDC battery between cell 66 and the steel partition plate adjacent to cell 67. The inspectors also identified a foam spacer on the unit 2 125 VDC battery between cell 35 and the battery rack that was incorrectly installed. Specifically, the top of the foam spacer was wedged snug against the battery rack, but the bottom of the foam spacer was loose and not properly wedged. Based on the inspectors' observations, the licensee performed extent of condition walkdowns of the unit 1 and unit 2 125 VDC and 250 VDC batteries. The walkdowns identified additional deficiencies associated with the foam spacer installation on the batteries. The deficiencies included missing and loose foam spacers either between cells or between cells and the battery rack, with some instances where the gap was greater than the 1/8 inch acceptance criteria specified in Procedure QCEM 0100-03.

Second, the inspectors noted the unit 1 125 VDC battery was required to be installed in accordance with Drawing 4E-1067F, "Connection Layout 125V DC and 250V DC Battery Cells," Revision J, and Standard N-EM-0035, "Cable Standards," Revision 6. The standard specified a minimum static bend radius of four times the outside cable diameter for 350 MCM cables. The purpose of specifying a minimum required bend radius is to prevent damage over time to the cable jacket and insulation due to a tight bend of the cable.
During a walkdown of the unit 1 battery room, the inspectors observed tight bends on the

inter-tier jumper cables of the 125 VDC and 250 VDC batteries. The inspectors questioned whether these bends met the minimum required bend radii for the cables. As a follow-up, the licensee performed field measurements of the bend radii on all the jumper cables and identified four cables with a bend radius below their minimum required. Specifically, the four paralleled 350 MCM cables at the north end of the unit 1 125 VDC battery had a 2.75 inch bend radius, which was below the minimum required bend radius for the cables specified in Standard N-EM-0035. These jumper cables connected the upper and lower tiers of the battery rack and were not in contact with anything other than the connections to the battery. Preliminary inspection of the cables by the licensee did not indicate any signs of stress or cracking of the cable jacket or insulation.

Corrective Actions: The licensee entered these issues into their corrective action program and evaluated the as found condition of the batteries to ensure they remained capable of performing their safety function. The licensee planned to correct the foam deficiencies identified and to evaluate options to better secure the foam spacers in place. The licensee also planned to inspect the unit 1 125 VDC cables and replace them during the upcoming battery replacement.

Corrective Action References: AR 4710719
AR 4710720
AR 4711901
AR 4712437
AR 4712444
AR 4712448
AR 4712450
AR 4711264

Performance Assessment:

Performance Deficiency: The licensee's failure to ensure that 125/250 VDC station safety-related batteries were correctly installed as prescribed in work instructions and drawings was a performance deficiency and a violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings." Specifically, the licensee failed to: (1) install foam spacers for the unit 2 250 VDC battery as prescribed in work instructions when installing the battery to ensure the battery's seismic qualifications were maintained, and (2) install jumper cables for the unit 1 125 VDC battery as prescribed in a drawing to ensure the cable bend radii were greater than the minimum required to prevent damage to the cables over time.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Design Control attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to correctly install safety-related 125/250 VDC batteries to ensure design requirements were met adversely affected the cornerstone objective of ensuring the availability, reliability, and capability of the batteries to respond to initiating events to prevent undesirable consequences.

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 this finding was of very low safety significance (Green) because

although the finding was a deficiency affecting the design or qualification of a mitigating SSC, the SSC maintained its operability and PRA functionality.

Cross-Cutting Aspect: H.5 - Work Management: The organization implements a process of planning, controlling, and executing work activities such that nuclear safety is the overriding priority. The work process includes the identification and management of risk commensurate to the work and the need for coordination with different groups or job activities. Specifically, the licensee failed to control and execute the 125/250 VDC battery installation activities to ensure the risk of installation errors was appropriately precluded.

Enforcement:

Violation: Title 10 CFR 50, Appendix B, Criterion V, “Instructions, Procedures, and Drawings,” requires, in part, that activities affecting quality be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and be accomplished in accordance with those instructions, procedures, or drawings.

The licensee established Work Order 05231566 as the implementing instruction for installing the unit 2 250 VDC battery. Work Order 05231566 steps 3.45, 3.82, and 3.117 required Ethafoam material spacers to be installed in accordance with QCEM 0100-03.

QCEM 0100-03, step 4.12.2, required, in part, that battery cells not be in contact with the rack steel (i.e., cells be restrained front and rear by "snug fitting" Ethafoam material) and that cells also be restrained sideways by "snug fitting" Ethafoam material. The note in step 4.12.2 defined snug tight as being a gap less than or equal to 1/8 inch.

The licensee established Drawing 4E-1067F as the implementing drawing for the 125 VDC battery connection layout. Drawing 4E-1067F referenced Standard N-EM-0035 for cable requirements. Standard N-EM-0035 required the minimum static bend radius of 350 MCM cable to be four times the outside cable diameter.

Contrary to the above, as of October 2023, the licensee failed to accomplish activities affecting quality as prescribed in work instructions and drawings. Specifically, the licensee failed to: (1) install foam spacers for the unit 2 250 VDC battery snug tight with a gap less than or equal to 1/8 inch as prescribed in Work Order 05231566 and QCEM 0100-03 to ensure the battery's seismic qualifications were maintained, and (2) install 350 MCM jumper cables for the unit 1 125 VDC battery as prescribed in Drawing 4E-1067F and Standard N-EM-0035 with a minimum bend radius of four times the outside cable diameter to prevent damage to the cables over time.

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

Non-conservative Valve Factor Used to Demonstrate Motor Operated Valve 1-1001-23A Continued to be Capable of Performing its Design Basis Safety Functions			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Barrier Integrity	Green NCV 05000254,05000265/2023010-04 Open/Closed	[P.5] - Operating Experience	71111.21M

The inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50.55a(b)(3)(ii) for the licensee's failure to establish a program that ensured MOVs continued to be capable of performing their design basis safety functions. Specifically, the licensee incorrectly used a non-conservative valve factor from industry testing as a design input to size and set-up MOV 1-1001-23A instead of using the bounding valve-specific, empirically determined valve factor.

Description:

The inspectors reviewed 50.59 Screening QC-S-2019-0049, which installed a closed torque switch bypass (CTSB) and performed a gearing change on the residual heat removal (RHR) A loop drywell spray outboard primary containment isolation valve (1-1001-23A) to increase the available performance margin of the valve. The 1-1001-23A MOV was a normally closed valve and had a safety function to open to provide a flow path from the RHR system to the drywell to allow operation of the drywell spray subsystem. The valve also had a safety function to close to isolate containment from the RHR system and to terminate drywell spray operation when required.

The inspectors also reviewed IN 2021-01, “Lessons Learned from US Nuclear Regulatory Commission Inspections of Design-Basis Capability of Power-Operated Valves at Nuclear Power Plants.” The IN stated, “the valve friction coefficients determined for MOVs as part of the Joint Owners’ Group (JOG) MOV Program do not represent a database of valve friction coefficients that can be applied in general to calculate the thrust and torque required to operate various MOVs under design-basis conditions.”

As part of the 50.59 screening review, the inspectors reviewed Calculation QUA-1-1001-23A, “MIDACALC Results QUA-1-1001-23A (QUA-1),” Revision 10, which was updated after the CTSB modification. The calculation was used by the licensee to perform MOV sizing and set-up window evaluations of the 1-1001-23A MOV to ensure the valve had sufficient thrust and torque to perform its design basis safety functions. The inspectors noted the reference provided for the valve factors used in the calculation came from licensee Procedure ER-AA-302-1009, “Final JOG MOV Periodic Verification Program Implementation.” The inspectors requested the basis for the valve factors used in the calculation since the procedure only captured the results of the JOG valve factor degradation study and was not an appropriate source for selecting design basis valve factors.

In response to the inspectors’ questions, the licensee determined they were incorrectly using non-conservative valve factors from the JOG study in the calculation. Procedure ER-AA-302-1001, “MOV Rising Stem Motor Operated Valve Thrust and Torque Sizing and Set-Up Window Determination Methodology,” Revision 14, was the licensee procedure established to properly size and set-up MOVs to ensure they were capable of performing their design basis safety functions. Step 4.1.5.2.B stated, in part, “where possible it is expected MOV program valve calculations will use the highest applicable GL 89-10, JOG, or valve specific, empirically determined, stable valve factor." It also stated, "at no time is it acceptable to utilize a valve factor determined via grouping or industry data if valid, valve-specific test data or current qualifying basis (i.e. GL 89-10 closeout) demonstrate a higher valve factor is applicable.”

The licensee determined a higher valve-specific valve factor was applicable to the 1-1001-23A MOV, as described in NES-MS-06.6, “MOV Valve Factors,” which was a licensee Generic Letter (GL) 89-10, "Safety-Related MOV Testing and Surveillance," closeout document. Therefore, since the licensee used a non-conservative valve factor to size and

set-up the 1-1001-23A MOV, the licensee failed to establish a program that ensured the MOV continued to be capable of performing its design basis safety function.

In December 2022, the licensee was made aware of the use of non-conservative valve factors at another fleet site. The issue was entered into the CAP at that time, and actions were assigned to review the applicability of the operating experience to Quad Cities (AR 4540308 action items 2 through 6). As part of the review, the licensee had only sampled 44 percent of the valves in the MOV program, which did not include the 1-1001-23A MOV.

Corrective Actions: The licensee entered this issue into their CAP and re-analyzed the design basis capability of the 1-1001-23A MOV using the higher bounding valve factor. Although appreciable margin in the closed direction was lost, the licensee was able to demonstrate the valve was still capable of performing its design basis functions by removing conservatism in the MOV calculation. The licensee planned to perform an extent of condition review of the remaining MOV program valves to ensure appropriate valve factors were used in calculations.

Corrective Action References: AR 4714457
AR 4715113

Performance Assessment:

Performance Deficiency: The failure to ensure the 1-1001-23A MOV continued to be capable of performing its design basis safety function was contrary to 10 CFR 50.55a(b)(3)(ii) and was a performance deficiency. Specifically, the licensee incorrectly used a non-conservative valve factor from industry testing as a design input to size and set-up the 1-1001-23A MOV, instead of using the bounding valve-specific, empirically determined valve factor.

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 ensure the 1-1001-23A MOV was capable of closing during a design basis event adversely affected the objective of the containment barrier to protect the public from radionuclide releases caused by accidents or events. Similar to example 3.I of IMC 0612 Appendix E, "Examples of Minor Issues," this issue was also more than minor because licensee had to re-analyze the design basis capability of the MOV and they were procedurally required to perform additional testing and maintenance on the valve due to the loss in MOV performance margin.

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 they answered "No" to all exhibit 3, "Barrier Integrity Screening Questions," section C, "Reactor Containment," screening questions.

Cross-Cutting Aspect: P.5 - Operating Experience: The organization systematically and effectively collects, evaluates, and implements relevant internal and external operating experience in a timely manner. Specifically, the licensee was aware of recent operating experience related to the use of non-conservative valve factors in design basis calculations but failed to review all the valves in their MOV program when addressing the operating experience.

Enforcement:

Violation: Title 10 CFR 50.55a(b)(3)(ii) states, in part, the licensees must establish a program to ensure that MOVs continue to be capable of performing their design basis safety functions.

Procedure ER-AA-302-1001, “MOV Rising Stem Motor Operated Valve Thrust and Torque Sizing and Set-Up Window Determination Methodology,” Revision 14, is a licensee procedure established to properly size and set-up MOVs to ensure the valves are capable of performing their design basis safety function. Step 4.1.5.2.B states, in part, “Where possible, it is expected MOV program valve calculations will use the highest applicable GL 89-10, JOG, or valve specific, empirically determined, stable valve factor." The procedure step also states, "At no time is it acceptable to utilize a valve factor determined via grouping or industry data if valid, valve-specific test data or current qualifying basis (i.e. GL 89-10 closeout) demonstrate a higher valve factor is applicable.”

Contrary to the above, as of November 1, 2023**,** the licensee failed to establish a program that ensured MOVs continued to be capable of performing their design basis safety functions. Specifically, the licensee failed to use the highest applicable GL 89-10, JOG, or valve-specific, empirically determined, stable valve factor as a design input to properly size and set-up the 1-1001-23A valve. The licensee incorrectly used a non-conservative valve factor to size and set-up the MOV, which failed to ensure the MOV continued to be capable of performing its design basis safety function.

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

Very Low Safety Significance Issue Resolution Process: Removal of 10 CFR 50, Appendix J, Leak Rate Testing Requirements from Containment Isolation Valves	71111.21 M

This issue is a current licensing basis question and inspection effort is being discontinued in accordance with the Very Low Safety Significance Issue Resolution (VLSSIR) process. No further evaluation is required.

Description: Quad Cities was required to have a TS 5.5.12, “Primary Containment Leakage Rate Testing Program,” to meet the requirements of 10 CFR 50, Appendix J, “Primary Reactor Containment Leakage Testing For Water-Cooled Power Reactors.” This program was required to follow the guidelines contained in NEI 94-01, “Industry Guideline for Implementing Performance-Based Option of 10 CFR 50, Appendix J,” Revision 3-A, and the conditions and limitations specified in NEI 94-01, Revision 2-A. The site-specific program implementing procedure was QCTP 0130-01, “Primary Containment Leakrate Testing Program,” Revision 31.

As a modification sample, the inspectors reviewed EC 630019, “Appendix J Local Leak Rate Testing Scope Reduction for CS, RHR, and SBLC Systems – Owner’s Acceptance Review,” Revision 0. This EC approved a vendor report that identified potential components for exclusion from the local leak rate test (LLRT) requirements of TS 5.5.12 and Appendix J. The EC evaluated the core spray (CS) and residual heat removal (RHR) systems against the criteria described in ANSI/ANS 56.2-1984, “Containment Isolation Provisions for Fluid Systems after a LOCA,” section 3.6.7, “Criteria for Closed Systems Outside Containment.” The evaluation concluded the systems met the closed system outside containment criteria, and therefore did not constitute a potential primary containment atmospheric pathway during and following a design basis accident (DBA). Since section 6, “General Requirements,” of

NEI 94-01, Revision 3-A, did not require an LLRT for boundaries that did not constitute a potential atmospheric pathway, the evaluation excluded CS valves MO (1)-1402-25A/B and MO (1)-1402-24A/B, and RHR valves MO 1(2)-1001-34A/B, from the LLRT requirements of TS 5.5.12 and Appendix J.

During the inspection, the inspectors asked questions regarding the application of the criteria contained in NEI 94-01 and ANSI/ANS 56.2-1984. ANSI/ANS 56.2-1984, section 3.6.7, stated, in part, "If a closed system outside containment is used as one of the two containment isolation barriers for an engineered safety feature or engineered safety feature related system, the closed system shall: (8) Be protected against loss of function from missiles." The EC referenced UFSAR, section 3.5.2, "Internally Generated Missiles," which described the segregated component arrangements (separation) and redundant features such that a failure of one engineered safety system would not cause the failure of the other. The inspectors questioned whether the UFSAR statements supported the change because it appeared the licensing basis allowed for failures of the piping systems due to missile impacts, which would not meet the missile protection requirement to credit the closed systems outside of containment as the containment isolation barriers. Prior to the modification, containment isolation occurred at the credited containment isolation valves. Since the EC removed the LLRT requirements of these valves, and the licensing basis appeared to allow for failures of the closed systems outside of containment due to missile impacts, the inspectors questioned whether the change was acceptable from a containment isolation perspective.

The inspectors were also concerned the site removed LLRT requirements from the CS and RHR containment isolation valves without evaluating the impact of an internally generated missile on either system in accordance with the applied industry standards. For example, since the containment isolation function appeared to be extended to the closed system outside of containment for each system, the inspectors questioned whether the CS system could withstand a turbine generated missile from the RCIC turbine. The RCIC turbine shares a common room and is near a portion of the CS system. Given the change to the isolation barrier, it was unclear if the plant's current licensing basis still appropriately accounted for the impact of internally generated missiles on safety related systems.

As described above, the inspectors had an issue of concern that LLRT requirements for the CS and RHR containment isolation valves had been removed without an appropriate evaluation of the CS and RHR closed systems outside of containment against missile hazards.

Licensing Basis: The licensee generated a white paper to respond to the inspectors' concerns. They reviewed the site's licensing basis in UFSAR sections 3.5.3 and 3.1.7.4, and available industry guidance in NEI 94-01 Revision 3A, ANSI/ANS 56.2-1984, and ANSI/ANS 56.8-2002, "Containment System Leakage Testing Requirements." The licensee stated, in part, "the bounding missile outside the drywell is the main turbine," and referenced a missile protection discussion in UFSAR section 3.1.7.4 which states, in part, "Components of the ESF which are required to function after design basis accidents or incidents are designed to withstand the most severe forces and environmental effects, including missiles from plant equipment failures anticipated from the events." Based on these statements, the licensee concluded that additional equipment failures that result in missile generation, in addition to a DBA, are not postulated in the licensing basis. The licensee stated, in part, "As no specific guidelines that constitute protection against missiles are provided in ANSI/ANS 56.2-1984, the site has utilized its existing design and licensing basis for missile protection to demonstrate criterion 8 is met." Upon further review, the inspectors found there

was industry guidance referenced in ANSI/ANS 56.2-1984 that discussed protection against internally generated missiles from non-safety systems. Specifically, ANSI/ANS 56.2-1984 section 4.5.1, “Missile, Pipe Whip, and Jet Force Protection,” referenced ANS 58.1, “Proposed American National Standard for Plant Design Against Missiles,” which was incorporated in ANSI 58.3-1992, “Physical Protection for Nuclear Safety-Related Systems and Components,” and ANSI/ANS 52.1-1983, “Nuclear Safety Criteria for the Design of Stationary Boiling Water Reactor Plants.” Although this guidance was available at the time the EC was performed, without further research, it was unclear to the inspectors whether it was applicable to Quad Cities.

Additionally, the licensee stated, in part, “While the technical evaluation utilized ANSI/ANS 56.2-1984 and interpreted the missile protection required by that standard, it should be noted that the station is not committed to ANSI/ANS 56.2, and any evaluation performed using that standard is being done under the auspices of the station’s program that is committed to NEI-94-01. Neither NEI 94-01 or ANSI/ANS 56.8-2002 require the assumption of an additional missile in addition to a DBA and the requirements for local leak rate testing in NEI 94-01 are clear that it’s concerned with potential atmospheric pathways following a design basis accident.” The inspectors determined that significant additional research into the site’s specific commitments for missile protection would be required to validate the licensee's statements.

Based on the discussion above, at the conclusion of the inspection, the inspectors were unable to determine whether the issue of concern was part of the plant's current licensing basis. As a result, the inspectors determined the issue should be evaluated using the VLSSIR process because the resources required to resolve the current licensing basis question would not effectively and efficiently serve the agency's mission.

Significance: For the purpose of the VLSSIR process, the inspectors screened the issue of concern through IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The inspectors determined the issue of concern would likely be of very low safety significance (Green) had a performance deficiency been identified because they answered “No” to all the exhibit 3, “Barrier Integrity Screening Questions," section C, "Reactor Containment," screening questions.

Corrective Action Reference: AR 4717895, "NRC CETI EC 630019 Has an Incomplete Discussion of Missiles"

EXIT MEETINGS AND DEBRIEFS

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

- On November 16, 2023, the inspectors presented the Comprehensive Engineering Team Inspection results to Brian Wake, Site Vice President, and other members of the licensee staff.
- On November 3, 2023, the inspectors presented the interim inspection results to Drew Griffiths, Plant Manager, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.21M	Calculations	004-E-005-1301	Unit 2 RCIC MOV Terminal Voltage Calculation	7
		0591-171-008	Diesel Fuel Oil Consumption	2, 2A
		0591-215-01	EDG Fuel Oil Transfer Pump NPSH and Return Line Sizing	2
		2-3954-R106 (67)/Q2-DGSW-01B(C)	Pipe Support Qualification	2A
		2020-03-20	125 VDC System Analysis Using DC ETAP	0
		28.0201.0331	RCIC Pump Suction - Computer Output Listing, Math Model Q1.03	2
		3C3-1084-001	RCIC Pump Cubicle Temperature Transient During LOOP and Loss of Cubicle Cooler	1
		BSA-Q-00-01	Quad Cities RHR Room Thermal Behavior in Mode 4/5 Operation with Loss of Room Cooler	0, 0A
		BSA-Q-95-09	Effects of a RCIC Steamline Break on the HPCI Room	0, 0A
		C-8051-4	CCST Tank Analysis	0
		GE-NE-A22-00103-75-02	Project Task Report Dresden and Quad Cities Extended Power Uprate Task T0903 Station Blackout (Quad Cities)	0
		HSBO-03	RCIC Room Average Temperature Following Station Blackout	0
		M-1030D-105/Q2-DGSW-01B(C)	Pipe Support Modification	2A, 2B
		M-1030D-123/Q2-DGSW-01B(C)	Pipe Support Modification	1A, 1B
		M-1030D-205/Q1-DGSW-01B(C)	Pipe Support Modification	2A
		M-1030D-206/Q1-DGSW-01B(C)	Pipe Support Modification	2A
		M-1030D-54/Q2-DGSW-01B(C)	Pipe Support Qualification, Node Point C09A	3A, 3B
		M-1030D-624/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-1030D-624	0, 0A

71111.21M	Calculations	M-1030D-625/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-1030D-625	0, 0A
		M-1030D-626/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-1030D-626	0, 0A
		M-1030D-627/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-1030D-627	0, 0A
		M-1030D-629/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-1030D-629	1
		M-1030D-69/Q2-DGSW-01B	Pipe Support Modification	2A, 2B
		M-3144-S7/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-3144-S7	0, 0A
		M-998D-596/Q1-DGSW-01B(C)	Pipe Support Modification	0A
		M-998D-636/Q2-DGSW-01B(C)	Evaluation of Pipe Support M-998D-636	0, 0A
		M-998D-PEN/Q1-DGSW-02B(C)	Evaluation of H-Wall Penetration Anchor M-998D-PEN	0
		NED-I-EIC-0048	RCIC Turbine Area High Temperature Isolation Setpoint Error at Normal Operating Conditions	2
		NED-I-EIC-0139	Reactor Core Isolation Cooling (RCIC) System Pump Discharge Flow Setpoint Error Analysis	3
		NED-I-EIC-0227	RCIC Steam Line Flow Setpoint Error Analysis at Normal Operating Conditions	2
		OTC-328	Crane-Aloyco Valve Report	1
		Q1-DGSW-02B(C)/ANALYSIS	Diesel Generator Service Water Piping Analysis	12C
		Q1-S-B655/Q1-DGSW-01B(C)	Pipe Support Qualification	1A
		Q1-S-B660/Q1-DGSW-01B(C)	Pipe Support Qualification, Node Point 163	1A, 1B
		Q2-DGSW-01B(C)/ANALYSIS	Piping Analysis for System Q2-DGSW-01B(C)	11D
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		QC-429-P-021	Stress Analysis for Diesel Fuel Oil Line Nos. 1-5206-2";-1";-¾"-G	1, 1A
		QC-716-M-001	Maximum Room Temperature For Core Spray and RHR Corner Pump Rooms Following a Postulated Event Outside These Rooms and Verification of Adequacy of Room Coolers in These Rooms	3, 3A, 3B
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		QDC-1000-M-0592	RHR/CS Vortexing and NPSH Analysis for Suction from CCSTs	3A
		QDC-1000-M-0627	Safe Shutdown NPSH Evaluation for RCIC and RHR Pumps	0B, 0C
		QDC-1300-M-0589	RCIC NPSH Limits for EOPs	1
		QDC-1300-M-0800	Pressure Drop Through RCIC Discharge Piping to Reactor Vessel	1
		QDC-1300-M-1320	Reactor Core Isolation Cooling System Combined DBD and DP Calculation	0, 0B
		QDC-2300-I-0964	HPCI / RCIC CCST Level Switch Setpoint Error Analysis	0, 0A
		QDC-2900-I-0329	Safe Shutdown Makeup Pump (SSMP) Discharge Flow Indicator Error Analysis	0, 0A
		QDC-2900-M-0341	Torque Required to Close the Safe Shutdown Makeup Pump (SSMP) MOVs 1/2-2901-7, 1-2901-8, and 2-2901-8	0, 0A
		QDC-2900-M-0472	Determination of Pressure Required at PI-1/2-2941-8 for Safe Shutdown Makeup Pump System Injection Under Safe Shutdown Conditions	1, 1A,1B
		QDC-2900-M-0721	NPSH Analysis for Safe Shutdown Make-Up Pump	0A
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		QDC-3300-M-0484	Design Basis Analysis of CCST Standpipe Line Nos. 1/2-3345, 6, 8, 9 - 10" for HPCI Level Switches 1/2-2350A, B, C and D	1A
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		QDC-3300-M-1763	Evaluation of Instrument PI 2-1360-20 as a Means of Establishing the Level in the CCST Tanks	0
		QDC-3300-S-1830	Structural Evaluations Associated With the CCST Piping Re-Route	0
		QDC-3900-M-2380	Seismic Qualification of Velan 6 Inch Gate Valve	0
		QDC-3900-S-2113	Evaluation of New Support for Unit 2 DGSW Piping Associated with RCIC Room Ventilation FLEX Modification	1A, 1B
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		QDC-5700-M-0806	Emergency Core Cooling System (ECCS) Room Cooler Performance Calculation Under Design Basis and Degraded Conditions	1, 1H
		QDC-8300-E-2347	125 VDC System Analysis Using DC ETAP	0
		QDC-8300-S-0673	Review of Aged Battery Seismic Qualification Report	0
		QDC-8350-E-0196	HMCP Breaker Sizing and Setting for Unit 2 DC Motors	0
		QDC-8350-E-0717	DC MOV Voltage Drop Calculation	3
		QUA-1-1001-23A	MIDACALC Results QUA-1001-23A (QUA-1)	9A
		QUA-1-1001-23A	MIDACALC Results QUA-1001-23A (QUA-1)	10
		QUA-2-1301-61	DC Motor Operated GL96-05 Globe Valve	10
		QUA-2-2901-8	MIDAS Calculation: MOV 2-2901-8	1
		RAL-7336	Limiting Component Analysis; MOV-2-2901-8	0
		VT-03	Safe Shutdown Makeup Pump (SSMP) Room HVAC Cooling Load Calculation	3B
	Calibration Records	TS 2-5703-175	Instrument Calibration Data	11/24/2014

	Corrective Action Documents	367859	Tank Bolts on the 1/2 A CCST are Bent	08/29/2005
		367861	Tank Bolts on the 1/2 B CCST are Bent	08/29/2005
		370284-04	Review of 1(2)-2901-10 Valve Performance and Impact on HPCI Operability	10/27/2005
		4074482	OPEX Review 4061005 Finds IN 2017-06 is Applicable to Quad	11/14/2017
		4156632	NRC IN 2018-07: Pump/Turbine Bearing Oil Sight-glass Problems	06/13/2018
		4232272	TRM 3.7.B, DGCW System - Shutdown Requires Revision	03/23/2019
		4423071	NRC IN 2021-01: Design Bases LLed Power Operated Valves	05/11/2021
		4472779	1B RHRSW Pump Low Oil Level on Start	01/19/2022
		4523962	U2 EDG Failed to Start	09/22/2022
		4524461	EO ID: U2 E2 RCIC Turbine Oil Sight Glass Leak	09/25/2022
		4536886	NRC RIS 2022-02 Op Leakage inconsistent with Op Eval Proc	11/14/2022
		4539894	2-1301-81, U2 ECCS Keep Fill to U2 RCIC is Broken	11/30/2022
		4558106	HPCI Signal Converter MGU Drive Signal (Auto)	02/28/2023
		4669589	Q1R27 HPCI Servo Amplifier Noise Troubleshooting	04/12/2023
		4687507	High Running Current on MOV 2-2901-8	06/29/2023
		4696801	U2 250 VDC Battery Below Minimum Required Voltage	08/16/2023
		4702971	HPCI MGU Did Not Response as Expected During QCOS 2300-05	09/15/2023
	Corrective Action Documents Resulting from Inspection	4709969	NRC CETI- UFSAR Contains Incorrect 250 VDC Load Shed Time	10/16/2023
		4710371	NRC CETI - U2 EDG Exhaust Insulation Blanket	10/17/2023
		4710383	NRC CETI: SSMP Room Cooler Loose Screws and Panel Ajar	10/17/2023
		4710385	NRC CETI: Oil Underneath Safe Shutdown Makeup Pump	10/17/2023
		4710389	NRC CETI: Inactive Oil Leak on U2 EDG Fuel Prime Pump Outlet	10/17/2023
		4710694	NRC CETI: Grease on RCIC Discharge Line 2-1305-4"	10/18/2023
		4710696	NRC CETI: Hanging Drops on 2-1301-43	10/18/2023
		4710698	NRC CETI: 2B CS Motor Lower Oil Level	10/18/2023
		4710700	NRC CETI: Scaffold Clamp on U2 RCIC Room Cooler	10/18/2023

			Support	
		4710718	NRC CETI: U1 & U2 Battery Room Housekeeping Items	10/18/2023
		4710719	NRC CETI: U2 SR 250VDC Battery Cell Foam Spacer Missing	10/18/2023
		4710720	NRC CETI: U2 SR 125VDC Battery Cell Foam Spacer	10/18/2023
		4710868	NRC CETI: U2 EDG Gap Underneath Bolt	10/19/2023
		4711264	NRC CETI 2023 - U1 125 VDC Battery Jumper Bend Radius	10/20/2023
		4711300	NRC CETI: U1 Battery Room Paint Flakes	10/20/2023
		4711737	NRC CETI: Discrepancy in HPCI Lesson Plan	10/23/2023
		4711809	NRC CETI Incorrect Test Instructions During Diagnostic Test	10/23/2023
		4711853	NRC CETI - 250 VDC Battery Loading	10/23/2023
		4711901	NRC CETI: Unit 1 and 2 125 and 250 VDC Battery Foam Spacers	10/23/2023
		4712437	NRC CETI: WR - U1 125 VDC Alternate Battery Rack Foam Spacer	10/25/2023
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		4712457	NRC CETI: NED-I-EIC-0048 Incorrect Design Inputs	10/25/2023
		4712794	NRC CETI Surface Cracking on CCST Pipe Flange Rubber Washers	10/26/2023
		4713731	NRC CETI ID: Editorial Error in IST Program Plan	10/30/2023
		4713953	NRC CETI ID: Vendor Oil Sample Silicon Levels Discrepancy	10/31/2023
		4714008	NRC CETI ID: U2 EDG 9-7-2023 Oil Sample in 'Alert'	10/31/2023
		4714088	NRC CETI: NED-I-EIC-0227 Outdated Design Input	10/31/2023
		4714113	NRC CETI: Discrepancy Identified in HPCI Procedures	10/31/2023
		4714408	NRC CETI ID: Discrepancy Between QCIS 1300-03 and TS 3.3.6.1	11/01/2023
		4714417	NRC CETI ID: Motor Terminal Voltage Discrepancy	11/01/2023
		4714457	NRC CETI: MOV Valve Factor Below Basis Value	11/01/2023
		4714523	NRC CETI: UFSAR Section 5.4.6.3 Phrasing	11/01/2023

		4714548	NRC CETI 250 VDC Voltage Drop Calculation	11/01/2023
		4714568	NRC CETI ID: Coating Absent on Fuel Oil Piping	11/01/2023
		4714785	NRC CETI Question on Previous Op Eval Statement	11/02/2023
		4714858	NRC CETI ID: IR 04702971 Missing Operability Discussion	11/02/2023
		4714913	NRC CETI ID: Lube Oil Analysis AMP Not Followed	11/02/2023
		4714916	NRC CETI: IR Not Initiated for WO 04892430 As-Left Results	11/02/2023
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		4715140	NRC CETI ID: HPCI Steam Line Break UFSAR Basis	11/03/2023
		4715983	NRC CETI ID U2 RCIC/Core Spray Operability w/ 2-1301-81 Open	11/07/2023
		4716467	NRC CETI: Drawing M-78 Line Continuation Discrepancy	11/09/2023
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		365384	HPCI Turning Gear Performance on HPCI System Operability	0
		381655	Evaluation of Gouges on CCST Walls	0
		627233	EOC U-1 Replacement of Merlin Gerin Breakers in Bus 13	0
		630019	Appendix J Local Leak Rate Testing Scope Reduction for CS, RHR, and SBLC Systems - Owner's Acceptance Review	0
		631230	U-1 and U 1-2 DGCW Piping Crosstie to the Piping to the ECCS Room Coolers with Isolation Valve	0
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		633788	CCST Floor Replacement	0
		638169	2-1301-81 Evaluation of Alternate Valve Operating Method	0
		639997	Technical Evaluation for Quad Cities HPCI Elevated Flow Rate	0
	Miscellaneous		SSMP - System Health Report	10/06/2023
			U2 EDG (2-6601CR) Oil Sample Result Summary (2019-2023)	10/02/2023
		19-R16-012	Changes due to Appendix J Local Leak Rate Testing Scope Reduction for CS, RHR, and SBLC Systems	03/09/2020
		ES1800018	Engineering Safety Analysis Transmittal of Design Information - Quad Cities Unit 1 Cycle 26 Plant Parameters Document	0
		IST-QDC-BDOC-27	Quad Cities - Inservice Testing Basis Document	03/05/2019
		IST-QDC-PLAN	Quad Cities Station Units 1 & 2, Inservice Testing Program Plan Sixth Ten-Year Interval	0
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		QC-S-2020-0048	Add EDG Overload Ratings to UFSAR Table 8.3-1 and Revised Bases B3.8.1	0
		QC-S-2020-0057	50.59 Evaluation to Revise Bases B 3.8.4 to Clarify the 250 VDC Battery Sizing Methodology	0
		QC-S-2021-0019	50.59 Evaluation for TMOD to Crosstie the Non-ESS 250 VDC Batteries to Support U1 and U2 Battery Replacements	3
		QC-S-2023-0008	QCOP and QCOS 2300 Series Procedure Changes to Leave the HPCI Turning Gear in PULL TO STOP	1
		QC-TRM-19-006	Technical Requirements Manual QC-TRM-19-006 Change Package - New TS 3.5.2 Implemented Under Amendment 273 and 268 Requires a Single ECCS Pump to Be Operable in Modes 4 and 5	03/23/2019
		QR-017002-6	Qualification Report GNB N-Series Flooded Stationary Battery Cells	1
		Quad Cities Inservice Testing Program	5th Interval Valve Basis Report	04/26/2023
		Specification R-2379	Specification for Miscellaneous Erected Tanks	09/25/1967
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	Operability Evaluations	639697	U2 EDG - Pressure Control Valve	0
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		MA-AA-723-300	Diagnostic Testing of Motor Operated Valves	14
		MA-AA-734-400	Constant Level Oiler and Sight-Glass Maintenance	2
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		QCOS 1300-11	RCIC Valve Position Verification	11
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		01700989-01	Adjust Limits On 2-2901-8 After Valve Manually Torqued	06/03/2014
		01714376	(LR) B CCST External Inspection	08/16/2015
		01714377	(LR) A CCST External Inspection	08/16/2015
		01956964	RCIC Turbine Area High Temp Isolation Cal/Func Test	12/11/2017

		01960064	RCIC LP Flow Rate Test	04/07/2018
		01960181	RCIC Man Init / Auto Injection (IST)	04/08/2018
		04759622	Prog Mechanical Inspection and Stem Lube (MOV)	12/23/2019
		04778347-01	(LR) Inspect EDG Start Air Flex Hoses	11/02/2020
		04798543	RCIC Turbine Area High Temp Isolation Cal/Func Test	12/18/2019
		04798931	RCIC LP Flow Rate Test	04/14/2020
		04846830	Attachment 1 HX Inspection Report - 2B Core Spray Room Cooler	06/09/2020
		04846830-01	2B Core Spray Air/Water Side Room CLR CLN/INSP	06/05/2020
		04888780	(LR) B CCST External Inspection	09/15/2020
		04888781	(LR) A CCST External Inspection	09/15/2020
		04892430	Install Close Torque Switch Bypass and Change Gearing EC 404721	02/18/2021
		04919053-01	(LR) Replace EDG Lube Oil Flex Hoses	11/04/2021
		04970364	RCIC Flow Controller FIC 2-1340-1 Upgrade EC 621167	05/07/2020
		04970694-01	(LR) Replace EDG Fuel Oil Flex Hoses	11/02/2020
		05047372-01	SSMP Flow Rate Test Comprehensive Test (IST)	11/24/2021
		05073932	250 VDC Battery Modified Performance Service Test	03/30/2022
		05073932-03	Intercell Resistance Readings	03/27/2022
		05075199	Prog Stem Lube Only (MOV)	12/12/2021
		05075202	RCIC Turbine Area High Temp Isolation Cal/Func Test	03/26/2022
		05079887	RCIC Flow Rate Test Comprehensive Test (IST)	12/14/2021
		05146149	MM Replace A CCST External Weather Sealant	10/29/2021
		05152377-01	DG Fuel Oil Transfer Pump Comprehensive Test IST	11/03/2022
		05158752-01	Safe Shutdown Make-Up Pump Performance Test	02/23/2023
		05162263-01	EM Perform Diagnostic Test On MOV-2-2901-8 IST 10Y	01/30/2023
		05231566	EM Replacement for U2 250V SR Battery	06/16/2023
		05238566	RCIC Vent Verification	09/07/2022
		05238571	RCIC System UT Vent Verification	09/06/2022
		05249745-01	Diesel Generator Timed Start (IST)	09/23/2022
		05252397	RCIC Flow Rate Test Comprehensive Test (IST)	04/23/2022
		05254370-01	(LR) Diesel Generator Load Test (IST)	05/04/2022
		05269381	RCIC Valve Timing Test (IST)	09/06/2022
		05289768-01	SSMP Valve Operability (IST)	11/23/2022
		05289769	SSMP Flow Rate Test (IST)	11/23/2022

		05290894	RCIC System UT Vent Verification	03/06/2023
		05291250	RCIC Vent Verification	03/07/2023
		05292140	(IST) (NEIL) RCIC Pump Operability	12/16/2022
		05292142	RCIC Valve Timing Test (IST)	12/09/2022
		05299284	MM Replace Caulk 0-3303-A Foundation	10/21/2022
		05300175-01	Diesel Generator Timed Start (IST)	03/27/2023
		05301267-02	Clean Corrosion from Safety-Related Batteries	11/14/2022
		05308154-01	Diesel Generator Air Compressor Operability (IST)	01/30/2023
		05309405-01	DG Fuel Oil Transfer Pump Flow Rate	01/30/2023
		05315322-01	SSMP Flow Rate Test (IST)	02/23/2023
		05315323-01	SSMP Valve Operability (IST)	02/23/2023
		05320903	RCIC Valve Timing Test (IST)	03/06/2023
		05324503	(IST) (NEIL) RCIC Pump Operability	03/07/2023
		05342544	RCIC System UT Vent Verification	09/18/2023
		05342876	RCIC Vent Verification	09/06/2023
		05372764	CCST/Torus Level Switch Functional Test	09/13/2023
		05372765	CCST/Torus Level Switch Functional Test	09/13/2023
		05375541	(IST) (NEIL) RCIC Pump Operability	09/08/2023
		05393546	ECCS Room and DGCWP Cubicle CLR DP Test	09/07/2023
		05399737	ECCS Room and DGCWP Cubicle CLR DP Test	10/12/2023
		05400461	HPCI MGU Did Not Respond as Expected During QCOS 2300-05	09/19/2023
		05407837	Operations Department Summary of Daily Surveillance	10/14/2023