UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
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April 28, 2016

Mr. Bryan C. Hanson
Senior VP, Exelon Generation Company, LLC
President and CNO, Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2016001;
05000265/2016001

Dear Mr. Hanson:

On March 31, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed report documents the results of this inspection, which were discussed on April 14, 2016, with Mr. K. Ohr and other members of your staff.

Based on the results of this inspection, one self-revealing finding and one NRC-identified finding were evaluated under the risk significance determination process as having very low safety significance (Green). The NRC has also determined that violations are associated with these issues. These violations are being treated as Non-Cited Violations (NCVs), consistent with Section 2.3.2 of the Enforcement Policy. These NCVs are described in the subject inspection report.

If you contest the violations or significance of these NCVs, 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: (1) the Regional Administrator, Region III; (2) the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555–0001; and (3) the NRC Resident Inspector at the Quad Cities Nuclear Power Station.

In addition, if you disagree with the cross-cutting aspect assigned to any finding 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 Regional Administrator, Region III, and the NRC Resident Inspector at the Quad Cities Nuclear Power Station.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, “Public Inspections, Exemptions, Requests for Withholding,” of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC’s Public Document Room or from the Publicly Available Records (PARS) component of the NRC's Agencywide Documents Access and Management System (ADAMS).

ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Karla Stoedter, Chief
Branch 1
Division of Reactor Projects

Docket Nos. 50–254; 50–265
License Nos. DPR–29; DPR–30

Enclosure:
IR 05000254/2016001; 05000265/2016001

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50–254; 50–265
License Nos:	DPR–29, DPR–30
Report No:	05000254/2016001; 05000265/2016001
Licensee:	Exelon Generation Company, LLC
Facility:	Quad Cities Nuclear Power Station, Units 1 and 2
Location:	Cordova, IL
Dates:	January 1 through March 31, 2016
Inspectors:	R. Murray, Senior Resident Inspector K. Carrington, Resident Inspector M. Garza, Emergency Preparedness Inspector G. Hausman, Senior Reactor Inspector M. Holmberg, Reactor Engineer M. Jeffers, Reactor Inspector I. Khan, Reactor Inspector C. Norton, Senior Resident Inspector C. Mathews, Illinois Emergency Management
Approved by:	K. Stoedter, Chief Branch 1 Division of Reactor Projects

Enclosure

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SUMMARY

Inspection Report 05000254/2016001, 05000265/2016001; 01/01/2016–03/31/2016; Quad Cities Nuclear Power Station, Units 1 and 2; Operability Evaluations and Functionality Assessments and Follow-Up of Events and Notices of Enforcement Discretion.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. One Green finding was self-revealed and one Green finding was identified by the inspectors. The findings involved non-cited violations of the U.S. Nuclear Regulatory Commission (NRC) requirements. The significance of inspection findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated April 29, 2015. Cross-cutting aspects are determined using IMC 0310, "Aspects within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated February 4, 2015. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG–1649, "Reactor Oversight Process," Revision 5, dated February 2014.

Cornerstone: Barrier Integrity

Green. A finding of very low safety significance and an associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," was self-revealed on February 2, 2016, when the operators received an alarm due to a steam leak in the Unit 1 main steam isolation valve room which resulted in the limit switch compartment for Unit 1 reactor core isolation cooling (RCIC) system motor-operated valve (MOV), MO 1–1301–17 (outboard primary containment steam isolation valve), becoming submerged with water. Specifically, the licensee failed to ensure that deviations from design standard, "Environmental Qualification Standard 74Q (EQ–74Q)," were controlled during original installation of MO 1–1301–17 such that the valve would not be subjected to a spray or submergence environment. The licensee documented the issue in their corrective action program under Issue Report 2625523. Corrective actions included a temporary repair of the steam leak, removal of water from the limit switch compartment, and compensatory measures that included daily monitoring for steam leaks in the Unit 1 main steam isolation valve room. In addition, the licensee performed an extent of condition review of other valves in the main steam isolation valve room. Planned corrective actions included installing t-drains or weep holes in MOVs that the licensee deemed susceptible to spray or submergence.

The performance deficiency was determined to be more than minor and a finding because it was associated with the Barrier Integrity Cornerstone attribute of Design Control and affected the cornerstone objective to provide reasonable assurance that physical design barriers (containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to control any environmental qualification design deviations had the potential to impact the ability of MO 1–1301–17 to close on an isolation signal and prevent radioactive releases to the environment. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process for Findings at Power," issued June 19, 2012. The inspectors determined the finding to be of very low safety significance (Green) in accordance with Exhibit 3, "Barrier Integrity Screening Questions," because the inspectors answered "No" to all questions in Section B of Exhibit 3. This finding did not have a cross-cutting aspect

because the performance deficiency was not indicative of current performance. (Section 1R15)

Green. A finding of very low safety significance and an associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance," was identified by the inspectors for the licensee's failure to identify the structures, systems, and components to be covered by the quality assurance program, in that they did not properly classify a component of the control room emergency ventilation system as safety-related. The licensee documented the issue in their corrective action program under Issue Report 2596725. Immediate corrective actions included replacing Differential Pressure Switch (DPS) 0–5795–50 and revising the control room ventilation procedure to allow operators to disable the interlock between the 'A' and 'B' trains of the control room emergency ventilation system. The procedure change eliminated the need for the DPS to be classified as safety-related (and therefore corrected the violation) because in the event of a failure of the DPS, the system would still be able to perform its safety function.

The performance deficiency was determined to be more than minor and a finding because it was associated with the Barrier Integrity Cornerstone attribute of Design Control and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the 'B' train of the control room emergency ventilation system is a habitability system that is provided to ensure control room operators are able to remain in the control room and operate the plant safely and to maintain the plant in a safe condition under accident conditions. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process for Findings at Power," issued June 19, 2012. The inspectors determined the finding to be of very low safety significance (Green) in accordance with Exhibit 3, "Barrier Integrity Screening Questions," because the finding only represented a degradation of the radiological barrier function provided for the control room and did not represent a degradation of the barrier function of the control room against smoke or toxic atmosphere. This finding did not have a cross-cutting aspect because the performance deficiency was not indicative of current performance. (Section 4OA3.1.b(1))

REPORT DETAILS

Summary of Plant Status

Unit 1

The unit operated at or near full power for the entire inspection period, with the exception of planned power reductions for turbine testing and control rod pattern adjustments, in addition to power changes as requested by the transmission system operator.

Unit 2

The unit remained at or near full power from January 1 to March 20, 2016, with the exception of planned power reductions for turbine testing, control rod pattern adjustments, and requests by the transmission system operator. On March 21, 2016, the unit shut down for a planned refueling outage, Q2R23, and remained shut down through the end of the inspection period.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Winter Seasonal Readiness Preparations

a. Inspection Scope

The inspectors conducted a review of the licensee's preparations for winter conditions to verify that the plant's design features and implementation of procedures were sufficient to protect mitigating systems from the effects of adverse weather. Documentation for selected risk-significant systems was reviewed to ensure that these systems would remain functional when challenged by inclement weather. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to mitigate or respond to adverse weather conditions. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. Cold weather protection, such as heat tracing and area heaters, was verified to be in operation where applicable. The inspectors also reviewed corrective action program (CAP) items to verify that the licensee was identifying adverse weather issues at an appropriate threshold and entering them into their CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment to this report. The inspectors' reviews focused specifically on the following plant systems due to their risk significance or susceptibility to cold weather issues:

- contaminated condensate storage tanks and standby liquid control systems due to their risk significance and susceptibility to cold weather related-issues.

This inspection constituted one winter seasonal readiness preparations sample as defined in Inspection Procedure (IP) 71111.01–05.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Condition—Extreme Cold Conditions

a. Inspection Scope

Since extreme cold conditions were forecast in the vicinity of the facility for the week of January 10, 2016, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On January 13, the inspectors walked down the Unit 1 and Unit 2 station blackout diesel generators and the station blackout battery rooms because their safety functions could be affected or required as a result of the extreme cold conditions forecast for the facility. The inspectors observed insulation, heat trace circuits, space heater operation, and weatherized enclosures to ensure operability of affected systems. The inspectors reviewed licensee procedures and discussed potential compensatory measures with control room personnel. The inspectors focused on plant management's actions for implementing the station's procedures for ensuring adequate personnel for safe plant operation and emergency response would be available. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

.3 Readiness for Impending Adverse Weather Condition—Severe Thunderstorm Watch

a. Inspection Scope

Since severe weather with the potential for tornados and high winds was forecast in the vicinity of the facility for March 15 and 16, 2016, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On March 15 and 16, 2016, the inspectors walked down the licensee's emergency alternating current power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors evaluated the licensee staff's preparations against the site's procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant-specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the UFSAR and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of CAP items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one readiness for impending adverse weather condition sample as defined in IP 71111.01–05.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

The inspectors performed partial system walkdowns of the following risk-significant systems:

- Unit 1 high pressure coolant injection (HPCI) system during Unit 1 reactor core isolation cooling (RCIC) system planned maintenance;
- Unit 1 RCIC system during Unit 1 HPCI system planned maintenance; and
- Unit 2 fuel pool cooling and reactor building closed cooling water systems during Unit 2 refueling outage Q2R23.

The inspectors selected these systems based on their risk significance relative to the Reactor Safety Cornerstones at the time they were inspected. The inspectors attempted to identify any discrepancies that could impact the function of the system and, therefore, potentially increase risk. The inspectors reviewed applicable operating procedures, system diagrams, UFSAR, Technical Specification (TS) requirements, outstanding work orders (WOs), condition reports, and the impact of ongoing work activities on redundant trains of equipment in order to identify conditions that could have rendered the systems incapable of performing their intended functions. The inspectors also walked down accessible portions of the systems to verify system components and support equipment were aligned correctly and operable. The inspectors examined the material condition of the components and observed operating parameters of equipment to verify that there were no obvious deficiencies. The inspectors also verified that the licensee had properly identified and resolved equipment alignment problems that could cause initiating events or impact the capability of mitigating systems or barriers and entered them into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

These activities constituted three partial system walkdown samples as defined in IP 71111.04–05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

From February 1–20, 2016, the inspectors performed a complete system alignment inspection of the Unit 2 RCIC system to verify the functional capability of the system.

This system was selected because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment lineups; electrical power availability; system pressure and temperature indications, as appropriate; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

These activities constituted one complete system walkdown sample as defined in IP 71111.04–05.

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

The inspectors conducted fire protection walkdowns which were focused on availability, accessibility, and the condition of firefighting equipment in the following risk-significant plant areas:

- Fire Zone (FZ) 7.2, Unit 2 Turbine Building (TB), Elevation 628'–6", 250 V Battery Room;
- FZ 8.2.6.D, Unit 2 TB, Elevation 595'–0", Low Pressure Heater Bay and FZ 8.2.7.D, Unit 2 TB, Elevation 608'–6", Low Pressure Heater Bay (West);
- FZ 1.2.2, Unit 2 Reactor Building, Elevation 544'–0"/666'–6", Drywell & Drywell Expansion Gap; and
- FZ 8.2.10, Unit 2 TB, Elevation 626'–6", Fan Floor/Steam Jet Air Ejectors.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan.
The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event.
Using the documents listed in the Attachment to this report, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed; that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor

issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These activities constituted four quarterly fire protection inspection samples as defined in IP 71111.05–05.

b. Findings

No findings were identified.

1R06 Flooding (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety-related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant areas to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- Units 1 and 2 torus bay areas and emergency core cooling system corner rooms.

Documents reviewed during this inspection are listed in the Attachment to this report. This inspection constituted one internal flooding sample as defined in IP 71111.06–05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

From March 21–25, 2016, the inspectors conducted a review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the Unit 2 reactor coolant system, risk-significant piping and components, and containment systems.

The inspections described in Sections 1R08.1 and 1R08.5 below constituted one sample as defined in IP 71111.08–05.

.1 Piping Systems Inservice Inspection

a. Inspection Scope

The inspectors either observed or reviewed the following Non-Destructive Examinations (NDE) mandated by the American Society of Mechanical Engineers (ASME), Section XI Code to evaluate compliance with the ASME Code Section XI and Section V requirements, and if any indications and defects were detected to determine if these were dispositioned in accordance with the ASME Code or a U.S. Nuclear Regulatory Commission (NRC)-approved alternative requirement:

- Ultrasonic test (UT) examination of an elbow-to-pipe weld (30A–S10) in the main steam system;
- UT of a pipe-to-sweepolet weld (30A–S11) in the main steam system;
- Visual VT–3 examination of a main steam line support (2304–M–209); and
- Dye penetrant examination and magnetic particle examination of welded pipe lugs (1024A–W–201A) in the residual heat removal system.

The inspectors observed the following NDE conducted as part of the licensee's Industry Initiative Inspection Programs for managing vessel internals cracking to determine whether the examinations were conducted in accordance with the licensee's Augmented Inspection Program, industry guidance documents and associated licensee examination procedures, and if any indications and defects were detected to determine whether these were dispositioned in accordance with approved procedures and NRC requirements:

- UT examination of a tee-to-valve weld (02BS–F6) in the reactor recirculation system to meet inspection requirements for Category D welds in accordance with BWRVIP–75a "BWR Vessel and Internals Project, Technical Basis for Revisions to Generic Letter 88–01 Inspection Schedules," and
- In-vessel remote underwater visual EVT–1 examination of Jet Pump No. 10 Welds AD–2 and DF–2 to meet the reactor pressure vessel, Internals Examination Guidelines – Electric Power Research Institute Report TR–105696 (BWRVIP–03 "BWR Vessel and Internals Project, Reactor Pressure Vessel and Internals Examination Guidelines").

During NDE performed since the previous refueling outage, the licensee had not identified any recordable indications. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors reviewed records for the following pressure boundary weld repairs completed for risk-significant systems during the last outage to determine whether the licensee applied the pre-service NDE and acceptance criteria required by the Construction Code, and/or the NRC-approved Code relief request. Additionally, the inspectors reviewed the welding procedure specifications and supporting weld procedure qualification records to determine whether the weld procedures were qualified in accordance with the requirements of the Construction Code and the ASME Code, Section IX:

- Installation of a 2-to-1 fillet weld at socket welds 1 through 21 on the Unit 2 reactor head vent line 2–0215–2"–B (WO No. 01636434).

b. Findings

No findings were identified.

.2 Reactor Pressure Vessel Upper Head Penetration Inspection Activities (Not Applicable)

.3 Boric Acid Corrosion Control (Not Applicable)

.4 Steam Generator Tube Inspection Activities (Not Applicable)

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI-related problems entered into the licensee's CAP, and conducted interviews with licensee staff to determine if:

- the licensee had established an appropriate threshold for identifying ISI-related problems;
- the licensee had performed a root cause (if applicable), and taken appropriate corrective actions; and
- the licensee had evaluated operating experience, and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Requalification (71111.11Q)

a. Inspection Scope

On February 25, 2016, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification training. The inspectors verified that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and

- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

The crew's performance in these areas was compared to pre-established operator action expectations and successful critical task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator requalification program simulator sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation During Periods of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On March 20 and 21, 2016, the inspectors observed licensed operators conduct a controlled shutdown on Unit 2 for refueling outage Q2R23. This was an activity that required heightened awareness or was related to increased risk. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of procedures;
- control board (or equipment) manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions.

The performance in these areas was compared to pre-established operator action expectations, procedural compliance and task completion requirements. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one quarterly licensed operator heightened activity/risk sample as defined in IP 71111.11–05.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations

a. Inspection Scope

The inspectors evaluated degraded performance issues involving the following risk-significant systems:

- fire protection system—diesel driven fire pumps; and
- control room emergency ventilation system.

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12–05.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors reviewed the licensee's evaluation and management of plant risk for the maintenance and emergent work activities affecting risk-significant and safety-related equipment listed below to verify that the appropriate risk assessments were performed prior to removing equipment for work:

- Work week 16–02–05: Emergent work associated with Units 1 and 2 reactor building ventilation exhaust;
- Work week 16–04–07: Units 1 and 2 online risks change to yellow due to secondary containment breach in addition to Unit 1 emergency diesel generator (EDG) planned maintenance; Unit 1/2 EDG load test, and Unit 1 ‘A’ residual heat removal service water pump room cooler header planned maintenance;
- Work week 16–08–11: Unit 1 online risk change to yellow for planned HPCI maintenance, Unit 2 online risk change to yellow due to RCIC planned maintenance, and both units risk change to yellow due to planned secondary

containment breaches and 125 Volts direct current (Vdc) planned maintenance, and anticipated high winds;

- Work week 16–11–01: Both units online risk yellow due to 'B' Loop residual heat removal service water cross-tie valve work, safe shutdown makeup pump emergent work, and high winds/severe weather;
- Work week 16–12–02: Unit 1 online risk yellow due to outage electrical work on Unit 2 and shutdown safety risk for Unit 2 during Q2R23; and
- Work week 16–13–03: Online risk for Unit 1 and shutdown safety risk for Unit 2 during Q2R23.

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

Documents reviewed during this inspection are listed in the Attachment to this report. These maintenance risk assessments and emergent work control activities constituted six samples as defined in IP 71111.13–05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Issue Report (IR) 2605486: Containment Atmosphere Monitors (CAM) Pressure Switch 1–2540–16A and Pressure Switch 1–2540–17A out of tolerance;
- IR 2620481: Unexpected Alarm 901–8 A–9, 125 Vdc Battery Charger 1 Trip;
- IR 2625262: RCIC MO 1–1301–17 Breaker Tripped Following Troubleshooting and IR 2625523: Suspected Backseat Overthrust of RCIC Steam Line Outboard Primary Containment Isolation Valve;
- IR 2612976: QCOS 5750–16 Test Methodology Issue; and
- IR 2639451: 901–3 F–14 HPCI Lo Flow and Motor Gear Unit (MGU) Not at High Speed Stop Alarm Unexpected and IR 2641889: Unexpected Results from Trouble Shooting U1 HPCI MGU.

The inspectors selected these potential operability issues based on the risk significance of the associated components and systems. The inspectors evaluated the technical adequacy of the evaluations to ensure that TS operability was properly justified and the

subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors compared the operability and design criteria in the appropriate sections of the TS and UFSAR to the licensee's evaluations to determine whether the components or systems were operable. Where compensatory measures were required to maintain operability, the inspectors determined whether the measures in place would function as intended and were properly controlled. The inspectors determined, where appropriate, compliance with bounding limitations associated with the evaluations. Additionally, the inspectors reviewed a sampling of corrective action documents to verify that the licensee was identifying and correcting any deficiencies associated with operability evaluations. Documents reviewed are listed in the Attachment to this report.

This operability inspection constituted five samples as defined in IP 71111.15–05.

b. Findings

(1) Failure to Control Deviation from Environmental Qualification Standard Resulted in Limit Switch Submergence

Introduction: A finding of very low safety significance and an associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion III, "Design Control," was self-revealed on February 2, 2016, when the control room received an alarm due to a steam leak in the Unit 1 main steam isolation valve (MSIV) room which resulted in the limit switch compartment for the Unit 1 RCIC system motor-operated valve (MOV), MO 1–1301–17 (outboard primary containment steam isolation valve), becoming submerged with water. Specifically, the licensee failed to ensure that deviations from design standard, "Environmental Qualification (EQ) Standard 74Q (EQ–74Q)," were controlled during original installation of MO 1–1301–17 such that the valve would not be subjected to a spray or submergence environment.

Description: On February 2, 2016, Unit 2 received an unexpected level III ground alarm for the Unit 2 250 Vdc system that supplies power to various Unit 1, Division II, 250 Vdc loads. Following receipt of the alarm, the licensee entered its procedures to troubleshoot and isolate the ground on the 250 Vdc system. The licensee's troubleshooting identified a ground existed in the control circuit for MO 1–1301–17, the outboard primary containment steam isolation valve. The licensee entered the Unit 1 MSIV room to inspect MO 1–1301–17 and identified a steam leak from a through-wall hole in a main steam line drain pipe. The licensee noted that the steam leak was being condensed by the MSIV room cooler and spraying onto MO 1–1301–17. The licensee repaired the steam leak on February 5, 2016. On February 4, 2016, the licensee declared MO 1–1301–17 inoperable and performed a Megger test on the valve circuitry in an attempt to eliminate the ground and remove any moisture potentially contributing to the fault in the circuit. However, the licensee's attempts to eliminate the ground were unsuccessful and the fault remained on the system.

Following their attempts to eliminate the ground, the licensee performed post-maintenance testing on MO 1–1307–17 by stroking it in the closed and open directions. The licensee was able to successfully stroke the valve to the closed position. However, during the stroke test in the open direction, the valve over-traveled into its backseat until the valve's motor tripped on thermal overload. The licensee performed an investigation and discovered water had accumulated in the valve's limit switch compartment, submerged the components inside, and generated a fault in the open

circuit of the valve. The water was removed from the compartment and the components allowed to dry. The valve was stroked again in the open and closed directions with no issues; in addition, the fault alarm associated with the ground on the Unit 2 250 Vdc system cleared. The licensee declared the MOV and RCIC system operable following the successful test. The licensee concluded that operability of MO 1–1301–17 had not been previously impacted since the normally open valve demonstrated it was capable of performing its primary containment isolation safety function to close when it was successfully stroked in the closed direction.

The inspectors reviewed the licensee's EQ documents, EQ–74Q, and noted that MO 1–1301–17 was not required to have drains or weep holes installed based on not being in an environment that would subject it to spray or submergence. Valve MO 1–1301–17 was installed in a location in the MSIV room that subjected it to spray and condensation from an area room cooler during normal operation of the plant. The steam leak in the room was not recognized by the licensee until after they investigated the ground alarm on the 250 Vdc system. The inability to identify this steam leak in a timely manner allowed the steam leak to condense and spray onto MO 1–1301–17 for a period long enough to fill up the limit switch compartment and submerge the components inside. The inspectors determined the licensee failed to control deviations from EQ–74Q when it was installed in a location outside of containment that was susceptible to spray and submergence because MO 1–1301–17 was not designed to be in a spray environment, or designed for submergence.

Analysis: The inspectors determined that the licensee's failure to assure that any deviations from EQ–74Q were properly controlled such that the valve would not be subject to a spray or submergence environment was contrary to the requirements of 10 CFR Appendix B, Criterion III, and was a performance deficiency.

The performance deficiency was determined to be more than minor and a finding because it was associated with the Barrier Integrity Cornerstone attribute of Design Control and affected the cornerstone objective to provide reasonable assurance that physical design barriers (fuel cladding, reactor coolant system, and containment) protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to control any EQ design deviations had the potential to impact the ability of MO 1–1301–17 primary containment isolation valve to close on an isolation signal and prevent radioactive releases to the environment.

The inspectors determined the finding could be evaluated using the Significance Determination Process in accordance with Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process for Findings at Power," issued June 19, 2012. The inspectors determined the finding to be of very low safety significance (Green) in accordance with Exhibit 3, "Barrier Integrity Screening Questions," because the inspectors answered "No" to all questions in Section B of Exhibit 3.

This finding did not have a cross-cutting aspect because the performance deficiency was not indicative of current performance.

Enforcement: Title 10 CFR Part 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. It further requires, in part, that these measures include provisions to

assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

Updated Final Safety Analysis Report, Section 3.11, discusses the EQ of electrical equipment. Section 3.11.3 states, in part, "The EQ Binders provide documentation of evaluations, analyses, and test results to show that pertinent electrical equipment is environmentally qualified to perform intended functions for its qualified life plus post-design basis event exposure."

Binder EQ–74Q, Section 17.5, states, "The limitorque operators installed outside containment are not subjected to spray. Therefore, spray qualification is not required."

Contrary to the above, during the original installation of Unit 1 RCIC MO 1–1301–17 until February 2, 2016, the licensee failed to establish provisions to assure deviations from EQ–74Q were controlled such that the valve would not be subject to a spray or submergence environment. Specifically, MO 1–1301–17 was installed beneath an area room cooler and in the vicinity of main steam piping such that when a steam leak developed in the area, the room cooler condensed the steam and sprayed onto the valve, resulting in submergence of components inside the valve's limit switch compartment.

As part of their corrective actions, the licensee performed a temporary repair of the steam leak and implemented compensatory measures to perform daily monitoring for steam leaks in the Unit 1 MSIV room. In addition, the licensee performed an extent-of-condition review of other valves in the MSIV room. Planned corrective actions included installing t-drains or weep holes in MOVs that the licensee deemed susceptible to spray or submergence. This violation is being treated as an NCV, consistent with Section 2.3.2 of the Enforcement Policy. The violation was entered into the licensee's CAP as IR 2625523. **(NCV 05000254/2016001–01; 05000265/2016001–01, Failure to Control Deviation from EQ Standard Resulted in Limit Switch Submergence)**

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

The inspectors reviewed the following post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- Safe shutdown makeup pump flow rate test following system planned maintenance;
- WO 1653510: Motor Contactor Replacement for 1B Core Spray Suction Valve;
- 'A' Standby Gas Treatment (SBGT) system operational test following 'A' SBGT cable inspection; and
- Calibration and system functional testing following HPCI MGU signal converter replacement.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate

for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion); and test documentation was properly evaluated. The inspectors evaluated the activities against TSs, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to ensure that the test results adequately ensured that the equipment met the licensing basis and design requirements. In addition, the inspectors reviewed corrective action documents associated with post-maintenance tests to determine whether the licensee was identifying problems and entering them in the CAP and that the problems were being corrected commensurate with their importance to safety. Documents reviewed are listed in the Attachment to this report.

This inspection constituted four post-maintenance testing samples as defined in IP 71111.19–05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the Outage Safety Plan (OSP) and contingency plans for the Unit 2 refueling outage (RFO) Q2R23, which began on March 21, 2016, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the RFO, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below:

- licensee configuration management, including maintenance of defense-in-depth commensurate with the OSP for key safety functions and compliance with the applicable TS when taking equipment out of service;
- implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing;
- installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error;
- controls over the status and configuration of electrical systems to ensure that TS and OSP requirements were met, and controls over switchyard activities;
- monitoring of decay heat removal processes, systems, and components;
- controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system;
- reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss;
- controls over activities that could affect reactivity;

- maintenance of secondary containment as required by TS;
- licensee fatigue management, as required by 10 CFR 26, Subpart I;
- refueling activities, including fuel handling; and
- licensee identification and resolution of problems related to RFO activities.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted a partial sample.

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

The inspectors reviewed the test results for the following activities to determine whether risk-significant systems and equipment were capable of performing their intended safety function and to verify testing was conducted in accordance with applicable procedural and TS requirements:

- Calibration and Functional Testing of Unit 1 Reactor Core Isolation Cooling System Flow Controller in accordance with QCIPM 0100–25: Yokogawa Controller Model 271/281 Programming/Calibration/Functional Testing (Routine);
- QCIS 0200–94(96): Unit 2 Anticipated Transient Without SCRAM (ATWS) Reactor Pressure Loop B(D) Transmitter Calibration and Functional Test (Routine);
- QCOS 6600–42: Unit 2 Emergency Diesel Generator Load Test (Routine);
- Relay testing for Bus 14–1 to 24–1 Cross-Tie Breakers in accordance with MA–MW–772–706: Calibration of Differential Protective Relays, and MA–QC–773-511: Quad Cities Nuclear Operational Analysis 4kV Unit 1 Bus Cross Tie Breakers Relay Routine (Routine);
- QCOS 0202–22: Online Testing of Unit 2 Division II ATWS Recirculation Pump Trip and Alternate Rod Insertion Logic (Routine); and
- QCTS 0600–05/ 06: Main Steam Isolation Valve/ Main Steam Line Drain Valve Local Leak Rate Testing (Containment Isolation Valve).

The inspectors observed in-plant activities and reviewed procedures and associated records to determine the following:

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and were consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the UFSAR, procedures, and applicable commitments;

- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;
- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted five routine surveillance testing samples and one containment isolation valve sample as defined in IP 71111.22, Sections–02 and–05.

b. Findings

No findings were identified.

1EP4 Emergency Action Level and Emergency Plan Changes (71114.04)

a. Inspection Scope

The inspectors reviewed the licensee's root cause investigation, conducted interviews with licensee staff, and reviewed related documents to evaluate the licensee's Emergency Action Levels (EALs) associated with the minimum steam cooling reactor pressure vessel water level (MSCRWL). The inspectors also consulted with NRC regional operator licensing staff to assist in the review of the licensee's assessment and calculations. The inspectors' review focused on an issue of concern with the licensee not maintaining the EALs, which appeared to result in an over-classification of a General Emergency and unnecessary Protective Action Recommendations. The issue of concern was documented as an Unresolved Item in NRC Inspection Report 05000254/2015004; 05000265/2015004, pending additional information to determine whether a performance deficiency that is more than minor exists and if a violation of

Title 10 CFR Part 50.54(q)(2), which requires a licensee to develop and maintain an emergency plan that meets the requirements of 10 CFR Part 50.47(b), and 10 CFR Part 50, Appendix E, had occurred.

Documents reviewed are listed in the Attachment to this report.

The review of the licensee's evaluation counted as a partial inspection sample. The entire inspection sample required by IP 71114.04 will be completed by the end of calendar year 2016.

b. Findings

(1) (Closed) Unresolved Item 05000254/2015004–01; 05000265/2015004–01: Emergency Action Level Threshold Values Were Not Revised

Introduction: A licensee-identified finding of minor significance and an associated minor violation of 10 CFR 50.54 (q)(2) was identified on April 29, 2015. While reviewing the Action Tracking System, the licensee determined that the Quad Cities General Abnormal (QGA) procedures were revised without revising the corresponding EALs.

Description: On March 12, 2015, the QGAs were revised with a new value for MSCRWL. However, the site EALs that should have used the revised QGA value as an EAL threshold value were not revised. The licensee scheduled the revisions of the QGAs to support implementation of changes that were associated with the diverse and flexible coping strategies implementation and the site's transition to new Optima2 fuel. These changes were scheduled to be implemented in March 2015 during the Quad Cities Unit 1 RFO as part of a revision package. Because of the new fuel, the MSCRWL value changed from –166 inches to –190 inches. On April 29, 2015, the licensee reviewed the action tracking documents to determine if an extension for revising their EALs was necessary. During this review, the licensee identified that the EALs were not changed to correspond with the new MSCRWL values incorporated in the QGAs. The licensee's EALs MG2 and FG1, which determine if a General Emergency should be declared based on the MSCRWL value, were affected by the change. Since the value in the EALs remained at –166 inches, the licensee concluded that the issue could have potentially caused, under certain conditions, the site to declare a General Emergency earlier than needed and to issue an unnecessary Protective Action Recommendation (PAR) to the public. Following identification of the issue, the licensee implemented the appropriate changes to EALs MG2 and FG1 on April 30, 2015.

Since there was a discrepancy between the QGAs and the EAL threshold values that could have affected the timely and accurate classification of a General Emergency, additional information was needed to complete the inspector's assessment and the unresolved item (URI) was opened in fourth Quarter 2015.

The licensee revised the original root cause evaluation, which was completed on February 18, 2016. The licensee conducted calculations to determine the amount of time it would take MSCRWL to decrease from –166 inches to –190 inches for a postulated accident scenario. The results were that it would take approximately 3 minutes for reactor vessel water level to reach –190 inches. During the time the EALs and QGAs did not have the same MSCRWL value and under these accident conditions, if the licensee had declared a General Emergency and issued PARs, the calculations show that it would only be a few minutes until the actual EAL threshold value would

have been reached. According to the evaluation, for this type of accident, the water level would not be able to be restored and would decrease to –190 inches in a short amount of time; therefore, the General Emergency declaration would be timely and accurate and the PARs would be necessary.

The licensee determined the root cause of this issue to be the QGA procedure change process. The licensee's corrective action to prevent recurrence was a change to the procedure to include Emergency Preparedness staff review of emergency operating procedure changes.

Analysis: In accordance with Inspection Manual Chapter 0612, Appendix B, "Issue Screening," the inspectors reviewed the More than Minor questions to determine if the performance deficiency was more than minor. The inspectors determined that the performance deficiency was associated with the Emergency Preparedness Cornerstone; however, it did not adversely affect the cornerstone objective. Specifically, the deficiency would not result in an unnecessary or untimely declaration of an emergency. Therefore, the performance deficiency is minor.

Enforcement: Title 10 CFR 50.54(q)(2) requires the licensee to develop and maintain an emergency plan that meets the requirements of 10 CFR 50.47(b), and 10 CFR Part 50, Appendix E. Between March 12, 2015, and April 30, 2015, the licensee failed to maintain its emergency plan, in that, it did not make changes to their EALs when the QGAs were revised with a new MSCRWL level. Upon discovery, the licensee promptly changed the EAL MSCRWL value and implemented corrective actions to prevent recurrence. The failure to comply with 10 CFR 50.54(q)(2) constitutes a minor violation that is not subject to enforcement action in accordance with the NRC's Enforcement Policy. As a result of the inspectors' conclusion, this URI is closed.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on February 10, 2016, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Technical Support Center and Operations Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weakness with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This emergency preparedness drill inspection constituted one sample as defined in IP 71114.06–06.

b. Findings

No findings were identified.

4. OTHER ACTIVITIES

Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Security

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours performance indicator (PI) for Quad Cities Nuclear Station, Units 1 and 2, for the period from the first quarter of 2015 through the fourth quarter of 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports, and NRC integrated inspection reports for the period of January 1, 2015, through December 31, 2015, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams per 7000 critical hours samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications PI for Quad Cities Nuclear Station, Units 1 and 2, for the period from the first quarter of 2015 through the fourth quarter of 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, event reports, and NRC integrated inspection reports for the period of January 1, 2015, through December 31, 2015, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned scrams with complications samples as defined in IP 71151–05.

b. Findings

No findings were identified.

.3 Unplanned Power Changes per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Power Changes per 7000 Critical Hours performance indicator for Quad Cities Nuclear Station, Units 1 and 2, for the period from the first quarter of 2015 through the fourth quarter of 2015. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99–02, "Regulatory Assessment Performance Indicator Guideline," Revision 7, dated August 31, 2013, were used. The inspectors reviewed the licensee's operator narrative logs, IRs, maintenance rule records, event reports, and NRC integrated inspection reports for the period of January 1, 2015, through December 31, 2015, to validate the accuracy of the submittals. The inspectors also reviewed the licensee's IR database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two unplanned power changes per 7000 critical hours samples as defined in IP 71151–05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Items Entered into the Corrective Action Program

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify they were being entered into the licensee's CAP at an appropriate threshold, that adequate attention was being given to timely corrective actions, and that adverse trends were identified and addressed. Attributes reviewed included: identification of the problem was complete and accurate; timeliness was commensurate with the safety significance; evaluation and disposition of performance issues, generic implications, common causes, contributing factors, root causes, extent-of-condition reviews, and previous occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the Attachment to this report.

These routine reviews for the identification and resolution of problems did not constitute any additional inspection samples. Instead, by procedure they were considered an integral part of the inspections performed during the quarter and documented in Section 1 of this report.

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

In order to assist with the identification of repetitive equipment failures and specific human performance issues for follow-up, the inspectors performed a daily screening of items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

These daily reviews were performed by procedure as part of the inspectors' daily plant status monitoring activities and, as such, did not constitute any separate inspection samples.

b. Findings

No findings were identified.

.3 Annual Follow-up of Selected Issues: Review of Enforcement Discretion Non-Cited Violations Identified During the Quad Cities 2013 Cyber-Security Inspection 2013408 and Associated Corrective Action Documents

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents, specifically:

- IR 1552033, "Cyber-Security Lessons Learned: Milestone 2";
- IR 1577638, "Cyber-Security—Data Diode Bypass Identified";
- IR 1576023, "Cyber-Security Lessons Learned: Milestone 3 Data Diode KVM [Keyboard, Video and Mouse]";
- IR 1552034, "Cyber-Security Lessons Learned: Milestone 3"; IR 1582784, "Cyber-Security—DTE [Digital Test Equipment] Scanning Guidance Inadequate";
- IR 1587829, "Cyber-Security—Interim Resolution for DTE Scan Exemption"; and
- IR 1552042, "Cyber-Security Lessons Learned: Milestone 7."

The inspectors interviewed personnel, verified the completion of and assessed the adequacy of the corrective actions taken in response to two NRC identified NCVs and five licensee-identified NCVs given enforcement discretion.

The inspectors' review and evaluation was focused on the NRC and licensee-identified cyber-security NCVs to ensure corrective actions were: complete, accurate, and timely; considered extent of condition; provided appropriate classification and prioritization; provided identification of root and contributing causes; appropriately focused; action taken resulted in the correction of the identified problem; identified negative trends; operating experience was adequately evaluated for applicability; and applicable lessons learned were communicated to appropriate organizations.

Documents reviewed are listed in the Attachment. This review constituted one annual follow-up of selected issues sample as defined in IP 71152–05.

b. Background

In accordance with Title 10 CFR Part 73, Section 54, "Protection of Digital Computer and Communication Systems and Networks (i.e., the Cyber-Security Rule)," each nuclear power plant licensee was required to submit to the NRC for review and approval a cyber-security plan (CSP) and an associated implementation schedule by November 23, 2009. Temporary Instruction 2201/004, "Inspection of Implementation of Interim Cyber Security Milestones 1–7," was developed to evaluate and verify each nuclear power plant licensee's ability to meet the interim milestone requirements of the Cyber-Security Rule. On November 22, 2013, the NRC completed an inspection at the Quad Cities Nuclear Power Station, Units 1 and 2, which evaluated the interim cyber-security Milestones 1–7. During performance of the temporary instruction, seven NCVs were identified and incorporated into the licensee's CAP. These seven NCVs were subsequently given enforcement discretion following the security issues forum (SIF) meeting conducted on December 18, 2013. During the week of March 7, 2016, the inspectors reviewed the cyber-security Milestones 1–7 Inspection NCVs as a PI&R sample. The CAP documents were evaluated to determine the effectiveness of the licensee's corrective actions.

c. Observations

As discussed in the "Inspection Scope" section above, the inspectors' review was focused on the licensee's actions to ensure the NCVs corrective actions were appropriately focused to correct the identified problems. In addition, during the inspectors' review of the cyber-security inspection's corrective action documents, the following three observations were identified:

- The inspectors' review of IR 1576023, "Cyber-Security Lessons Learned: Milestone 3 Data Diode KVM"; dated October 24, 2013, revealed the KVM scope of work was not scheduled to be completed until March 31, 2017, during installation of Engineering Change 393740, "Cyber-Security Defensive Architecture Enhancement."
- The inspectors' review of IR 1552042, "Cyber-Security Lessons Learned: Milestone 7," dated August 29, 2013, showed the IR status as complete. However, IR 2616614, "Cyber Security—Plan Element Not Addressed," revealed a review of CC–AA–600, "Nuclear Cyber-Security Program," was required to be completed by the licensee to ensure all elements of the CSP, Section 4.4.3.1, "Effectiveness Requirements," and CSP Section 4.4.3.2, "Vulnerability Scans," were addressed related to Milestone 7.
- The inspectors' review of IR 1552033, "Cyber-Security Lessons Learned: Milestone 2," dated August 29, 2013, and IR 1552034, "Cyber Security Lessons Learned: Milestone 3," dated August 29, 2013, showed that both IRs were closed to the Byron IR 1522309, "Cyber Security: Scoping of Physical Security Digital Assets," dated June 6, 2013, where the status shown was open. Since the status of this issue remained open, the inspectors discussed the issue during a SIF meeting conducted on March 16, 2016, to determine the path forward. During the SIF discussions, the inspectors became aware of ongoing interactions between the NRC headquarters staff, the NEI, and the industry to resolve generic

issues associated with the Milestone 1–7 inspections. These issues included the access authorization process, Personnel Access Data System, access control for portable and mobile devices, one-way deterministic devices placed at the data diode boundary, maintenance and test equipment, hybrid communication pathways, and moving data or software between security levels. Since these issues are in the process of being resolved through the Security Frequently Asked Question process, the review and evaluation of the licensee's corrective actions will be conducted during a subsequent PI&R sample or during the Milestone 8, full implementation inspection.

d. Findings

No findings were identified.

.4 Annual Follow-up of Selected Issues: 250 Vdc Cubicle Replacement

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized several corrective action items documenting deficiencies during the replacement of safety-related 250 Vdc cubicles. Specifically, the inspectors reviewed IRs 1488476, 1488497, 1483844, 1484182, 1484699, and 1489499. During refueling outage Q1R22 the licensee replaced safety related 250 Vdc cubicles as part of a planned maintenance activity. During the replacement of these cubicles degraded wiring was found in the existing cubicles. In addition, deficiencies were found in the replacement cubicles such as mis-wiring, loose connections, and non-conforming auxiliary contacts.

The inspectors assessed the following attributes while reviewing the licensee's corrective actions associated with the issue:

- the identified problem was documented in the CAP in a complete, accurate, and timely manner;
- operability and reportability issues were evaluated and dispositioned in a timely manner;
- extent of condition, generic implications, and previous occurrences were considered;
- corrective actions were appropriately focused to correct the problem;
- corrective actions were completed in a timely manner commensurate with the safety significance of the issue;
- action taken resulted in the correction of the identified problem;
- operating experience was adequately evaluated for applicability; and
- applicable lessons learned were communicated to appropriate organizations and implemented.

This review constituted one annual follow-up of selected issues sample as defined in IP 71152–05.

b. Findings

No findings were identified.

.5 Annual Follow-up of Selected Issues: HFA Relay Material Discrepancies Identified

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized several corrective action items documenting deficiencies of safety-related HFA relays that were found during periodic inspections performed as part of Unit 2 RFO Q2R23. Specifically, there were five, normally energized, reactor protection system relays that appeared to have coils that were made of lexan or nylon.

The inspectors assessed the following attributes while reviewing the licensee's corrective actions associated with the issue:

- the identified problem was documented in the CAP in a complete, accurate, and timely manner;
- operability and reportability issues were evaluated and dispositioned in a timely manner;
- extent of condition, generic implications, and previous occurrences were considered;
- corrective actions were appropriately focused to correct the problem;
- corrective actions were completed in a timely manner commensurate with the safety significance of the issue;
- action taken resulted in the correction of the identified problem;
- operating experience was adequately evaluated for applicability; and
- applicable lessons learned were communicated to appropriate organizations and implemented.

The inspectors noted that the licensee's evaluation of the issue stated that according to licensee procedure QCEPM 0700–03, "HFA Relay Inspection," the coils should be replaced regardless of condition at the next available opportunity for coils that are normally energized. The licensee determined that these relays could be replaced during the next refueling outage (scheduled for 2018). The inspectors were aware that there was a historical issue with HFA relay coil material and investigated further. The inspectors questioned the licensee on their response to NRC Bulletin 84–02, "Failures of General Electric Type HFA Relays in Use in Class 1E Safety Systems." The licensee stated that as part of their response to the bulletin, the station replaced all HFA relays that were made of lexan or nylon with newer Century Series relays that were not susceptible to the failures identified in Bulletin 84–02. The inspectors questioned the licensee on the age of the relays identified in the issue reports, whether they should have been identified during the station response to the bulletin, and what justification they had to wait an additional 2 years to replace the relays (based on the failure rate information identified in the bulletin). In response to the inspectors' questions, the licensee directed engineering to walk down the identified relays and conduct a visual inspection. Engineering reviews and walkdowns determined that the identified relays were, in fact, the newer style Century Series relays and had been replaced according to their preventative maintenance template. The licensee planned a procedure change to QCEPM 0700–03 in order to make it clear how to identify lexan and/ or nylon relay coils versus Century Series relays and coils.

Documents reviewed during this inspection are included in the Attachment. This review constituted one annual follow-up of selected issues sample as defined in IP 71152–05.

b. Findings

No findings were identified.

.6 Annual Follow-up of Selected Issues: 250 Vdc Grounds

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized several IRs documenting repetitive, and eventually continuous, grounds on the safety-related 250 Vdc system on Unit 2. Ground troubleshooting and investigation by the licensee determined the ground was on the Unit 1 (Division II) RCIC MO 1–1301–17 valve open circuitry.

The inspectors assessed the following attributes while reviewing the licensee's corrective actions associated with the issue:

- the identified problem was documented in the CAP in a complete, accurate, and timely manner;
- operability and reportability issues were evaluated and dispositioned in a timely manner;
- extent of condition, generic implications, and previous occurrences were considered;
- corrective actions were appropriately focused to correct the problem;
- corrective actions were completed in a timely manner commensurate with the safety significance of the issue;
- action taken resulted in the correction of the identified problem;
- operating experience was adequately evaluated for applicability; and
- applicable lessons learned were communicated to appropriate organizations and implemented.

Documents reviewed are listed in the Attachment to this report. This review constituted one annual follow-up of selected issues sample as defined in IP 71152–05.

b. Findings

No findings were identified.

4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report 05000254/2015–010: Loss of Control Room Emergency Ventilation System Due to Differential Pressure Switch (DPS) Failure

a. Inspection Scope

On December 7, 2015, Operations attempted to start the safety-related 'B' train of the control room emergency ventilation (CREV) system when it failed to start. The licensee declared the 'B' CREV system inoperable and started the nonsafety-related 'A' train of the control room heating, ventilation, and air conditioning (HVAC) system. The

licensee's apparent cause evaluation (ACE) determined that the differential pressure switch, DPS 0–5795–50, which interlocks the 'A' control room HVAC and the 'B' CREV system, had failed and prevented the 'B' CREV system from performing its function. The licensee reported this event to the NRC (see Event Notification 51589) as an event or condition that could have prevented the fulfillment of a safety function. The inspectors reviewed the licensee's apparent cause evaluation and identified a finding and violation as documented below. Documents reviewed are listed in the Attachment to this report. This licensee event report (LER) is closed.

This event follow-up review constituted one sample as defined in IP 71153–05.

b. Findings

(1) Failure to Identify Structures, Systems, and Components as Safety-Related

Introduction: A finding of very low safety significance and an associated NCV of 10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance," was identified by the inspectors for the licensee's failure to identify the structures, systems, and components to be covered by the quality assurance program, in that they did not properly classify a component of the CREV system as safety-related.

Description: On December 7, 2015, Operations personnel performed testing of the CREV system. When attempting to start the 'B' or safety-related train of the system, it failed to start. The licensee immediately declared the 'B' CREV system inoperable and started the nonsafety-related 'A' train of the control room HVAC system. The licensee documented this issue in their CAP under IR 2596725 and performed an ACE. The apparent cause determined that DPS 0–5795–50, which interlocked the 'A' control room HVAC and the 'B' CREV system to prevent both starting simultaneously, had failed and prevented the 'B' CREV system from performing its safety function.

Title 10 CFR 50.2, "Definitions," states, in part, "Safety-related structures, systems, and components means those structures, systems, and components that are relied upon to remain functional during and following design basis events to assure… the capability to shut down the reactor and maintain it in a safe shutdown condition, or to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to the applicable guideline exposures set forth in § 50.34(a)(1) or § 100.11 of this chapter, as applicable."

Quad Cities UFSAR Section 3.2.7, "Identification of Safety-Related Components of Systems or Structures," states:

> Generic Letter 83–28, "Required Actions Based on Generic Implications of Salem ATWS Events," defines safety-related systems and components as those necessary to assure… the capability to shut down the reactor and maintain it in a safe shutdown condition, or the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in 10 CFR 100.11 (or 10 CFR 50.67 as applicable)… [And] detailed application of safety-related classification is identified in the station's work control system data base. The station's work control system data base complies with Generic Letter 83–28 for safety-related equipment classification identification.

Licensee procedure CC–AA–304, “Component Classification,” is used to provide criteria and methodology used in developing classification of components, including their safety class. Procedure CC–AA–304, Attachment 1, “Component Classification Methodology Flowchart,” shows that a component with any safety-related and nonsafety-related interface, or if its failure would prevent any safety-related function, then the component safety class is safety-related. Procedure CC–AA–304, Attachment 3, “Safety-Related and Non-Safety-Related Systems Interface Criteria,” states, in part, that the safety-related boundaries of electrical systems include electrical items in safety-related circuits that do not perform a safety-related function but whose failure could prevent the capability of accomplishing any safety-related function.

Based on the above discussion, the inspectors determined that DPS 0–5795–50 should have been classified as safety-related because its failure prevented the fulfillment of the safety function of ‘B’ CREVS. Following the event in December, the licensee generated two IRs that captured a concern of the nonsafety-related ‘A’ control room HVAC component impacting the safety-related ‘B’ CREV system (IR 2597119, “Requesting MOD for CREV to Increase Reliability,” and IR 2597768, “DPS 0–5795–50 for ‘A’ CREVS Could Lock Out ‘B’ CREVS”). Each of these IRs were closed to the ACE conducted under IR 2596725. The inspectors noted that the licensee addressed this concern in the ACE under “Other Issues” section. The licensee acknowledged that the nonsafety-related component prevented the safety function of ‘B’ CREVS and assigned an action tracking item (ACIT) for Engineering to research the viability of installing a DPS bypass with a due date of May 27, 2016.

Exelon procedure PI–AA–125, “Corrective Action Program (CAP) Procedure,” defined an ACIT as, “Action items that are completed to improve performance, or correct minor problems that do not represent Conditions Adverse to Quality (CAQ).” Procedure PI–AA–125 defined a CAQ as, “An all-inclusive term used in reference to any of the following: failures, malfunctions, deficiencies, defective items, and non-conformances.” The licensee identified the failure of the DPS as a CAQ, corrected the failure with the use of a corrective action item, and replaced the switch [like for like]; however, the licensee failed to identify that the improper classification of the DPS was a CAQ that needed to be promptly corrected (with a corrective action item versus an ACIT). The inspectors determined that the failure to classify this issue as a CAQ represented a minor performance deficiency because it was administrative in nature.

The inspectors informed the licensee of their concern regarding the DPS safety classification on February 12, 2016, and the licensee subsequently implemented a procedure change (Revision 57) to QCOP 5750–09, “Control Room Ventilation System,” on February 19, 2016. The revision added steps to the procedure which directed the operators to identify and lift terminal wires for DPS 0–5795–50 in order to defeat the interlock and allow operation of the safety-related ‘B’ train of CREV. The procedure change eliminated the need for the DPS to be classified as safety-related because in the event of a failure of the DPS, the system would still be able to perform its safety function.

Analysis: The inspectors determined that the licensee’s failure to classify DPS 0–5795–50 as safety-related as required by 10 CFR 50, Appendix B, Criterion II, “Quality Assurance,” and defined in UFSAR Section 3.2.7 and Procedure CC–AA–304 was a performance deficiency.

The finding was determined to be more than minor because the finding was associated with the Barrier Integrity Cornerstone attribute of Design Control and adversely affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the 'B' train of CREVs is a habitability system that is provided to ensure control room operators are able to remain in the control room and operate the plant safely and to maintain the plant in a safe condition under accident conditions.

The inspectors determined the finding could be evaluated using the Significance Determination Process in accordance with Inspection Manual Chapter 0609, "Significance Determination Process," Appendix A, "The Significance Determination Process for Findings at Power," issued June 19, 2012. The inspectors determined the finding to be of very low safety significance (Green) in accordance with Exhibit 3, "Barrier Integrity Screening Questions," because the finding only represented a degradation of the radiological barrier function provided for the control room and did not represent a degradation of the barrier function of the control room against smoke or toxic atmosphere.

The inspectors did not identify a cross-cutting aspect associated with this finding because it does not reflect current licensee performance.

Enforcement: Title10 CFR Part 50, Appendix B, Criterion II, "Quality Assurance," requires, in part, that licensees shall identify the structures, systems, and components to be covered by the quality assurance program.

Licensee procedure CC–AA–304, "Component Classification," is used to provide criteria and methodology used in developing classification of components, including their safety class. Procedure CC–AA–304, Attachment 3, "Safety-Related and Non-Safety-Related Systems Interface Criteria," states, in part, that the safety-related boundaries of electrical systems include electrical items in safety-related circuits that do not perform a safety-related function but whose failure could prevent the capability of accomplishing any safety-related function.

Contrary to the above, prior to December 7, 2015, the licensee failed to identify the structures, systems, and components to be covered by the quality assurance program. Specifically, the differential pressure switch, DPS 0–5795–50, for the air handling unit on the 'A' train of control room HVAC is essential to the safety-related function of the 'B' CREV system and was not designated or installed as safety-related. The failure of nonsafety-related DPS 0–5795–50 prevented the safety-related 'B' train of CREV system from performing its safety function.

Immediate corrective actions included replacing DPS 0–5795–50 and revising the control room ventilation procedure to allow operators to disable the interlock between the 'A' and 'B' trains of control room HVAC. The procedure change eliminated the need for the DPS to be classified as safety-related (and therefore corrected the violation) because in the event of a failure of the DPS, the system would still be able to perform its safety function. Because this violation is of very low safety significance and was entered into the licensee's CAP as IR 2596725, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy. **(NCV 05000254/2016001–02; 05000265/2016001–02, Failure to Identify Structures, Systems, and Components as Safety-Related)**

.2 (Closed) Licensee Event Report 05000254/2016–001: Secondary Containment Differential Pressure Momentarily Lost Due to Air Line Failure (Reactor Water Cleanup Heat Exchanger Room)

On January 12, 2016, the main control room received alarms indicating a low differential pressure in the reactor building. The alarms occurred during an entry into the Unit 2 reactor water cleanup (RWCU) heat exchanger room. Reactor building pressure went positive for approximately 1 minute and impacted both Units 1 and 2 secondary containments since they share a common reactor building. The licensee was able to restore secondary containment negative pressure within 1-2 minutes of pressure going positive by securing a reactor building supply fan. The cause was determined to be a sheared air-line in the Unit 1 reactor building exhaust plenum, which depressurized the air header supplying operating air to all three Unit 1 reactor building exhaust fan isolation dampers, which caused them to fail open, including the standby fan (which contributed to a slow response time of the system due to recirculation through the standby fan exhaust). The licensee's corrective actions included replacing the failed air-line and the addition of planning work to replace similar piping on all equivalent air-lines on both unit supply and exhaust fan dampers. The inspectors reviewed the licensee's significance evaluation as documented in Engineering Change (EC) 404605, "Review of Loss of Secondary Containment Differential Pressure, Revision 0," which determined that secondary containment maintained its safety function during this event. The inspectors determined the safety significance of the event to be minor. Documents reviewed are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153–05.

.3 (Closed) Licensee Event Report 05000254/2016–002: Secondary Containment Differential Pressure Momentarily Lost Due to Air Line Failure (Reactor Water Cleanup Pump Room)

On January 15, 2016, the main control room received alarms indicating a low differential pressure in the reactor building. The alarms occurred during an entry into the Unit 2 RWCU pump room. Reactor building pressure went positive for approximately 2 minutes without operator action. This event impacted both Units 1 and 2 secondary containments since they share a common reactor building. Secondary containment negative pressure was restored with no operator action within 2–3 minutes of pressure going positive. The cause was determined to be a sheared air-line in the Unit 1 reactor building exhaust plenum, which depressurized the air header supplying operating air to all three Unit 1 reactor building exhaust fan isolation dampers, which caused them to fail open, including the standby fan (which contributed to a slow response time of the system due to recirculation through the standby fan exhaust). This was the same cause (i.e. same failed air-line) as identified in Section 4OA3.2. At the time of this event, the licensee was in their troubleshooting and monitoring phase from the event on January 12, 2016. The licensee's corrective actions included replacing the failed air-line and the addition of preventive maintenance to replace similar piping on all equivalent air-lines on both unit supply and exhaust fan dampers. The inspectors determined the safety significance of this event to be minor based on the licensee's evaluation in engineering document EC 404605. Documents reviewed are listed in the Attachment to this report. This LER is closed.

This event follow-up review constituted one sample as defined in IP 71153–05.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 14, 2016, the inspectors presented the inspection results to Mr. K. Ohr, Plant Manager, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- On February 23, 2016, the inspectors presented the results of the Emergency Preparedness follow-up inspection with Mr. G. Buckley, Emergency Preparedness Manager.
- On March 25, 2016, the inspectors presented the ISI results to S. Darin, Site Vice President, and other members of the licensee staff.

The inspectors confirmed that none of the potential report input discussed was considered proprietary. Proprietary material received during the inspection was returned to the licensee.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Ohr, Plant Manager
T. Bell, Engineering Director
D. Collins, Radiation Protection Manager
H. Dodd, Operations Director
R. Earley, Work Control Outage Manager
T. Kelley, Deputy Maintenance Director
T. Petersen, Regulatory Assurance Lead
T. Wojick, Engineering Manager
J. Wooldridge, Chemistry Manager

NRC

K. Stoedter, Chief, Reactor Projects Branch 1
R. Murray, Senior Resident Inspector
K. Carrington, Resident Inspector

Illinois Emergency Management Agency (IEMA)

C. Mathews, IEMA

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000254/2016001–01; 05000265/2016001–01	NCV	Failure to Control Deviation from EQ Standard Results in Limit Switch Submergence (Section 1R15)
05000254/2016001–02; 05000265/2016001–02	NCV	Failure to Identify Structures, Systems, and Components as Safety-Related (Section 4OA3.1.b(1))

Closed

05000254/2016001–01; 05000265/2016001–01	NCV	Failure to Control Deviation from EQ Standard Results in Limit Switch Submergence (Section 1R15)
05000254/2016001–02; 05000265/2016001–02	NCV	Failure to Identify Structures, Systems, and Components as Safety-Related (Section 4OA3.1.b(1))
05000254/2015004–01; 05000265/2015004–01	URI	Emergency Action Level Threshold Values Were Not Revised (Section 1EP4)
05000254/2015–010	LER	Loss of Control Room Emergency Ventilation System Due to Differential Pressure Switch Failure (Section 4OA3.1)
05000254/2016–001	LER	Secondary Containment Differential Pressure Momentarily Lost Due to Air Line Failure (RWCU Heat Exchanger Room) (Section 4OA3.2)
05000254/2016–002	LER	Secondary Containment Differential Pressure Momentarily Lost Due to Air Line Failure (RWCU Pump Room) (Section 4OA3.3)

LIST OF DOCUMENTS REVIEWED

The following is a partial list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspector reviewed the documents in their entirety, but rather that selected sections or portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

Section Number	Document Number	Description or Title	Revision or Date
Section 1R01			
1R01	SY–AA–101–146	Severe Weather Preparation and Response	1
1R01	IR 2612028	3D Corrosion on U1 SBO Battery	01/13/2016
1R01	QCOP 0010–02	Required Cold Weather Routines	45
1R01	IR 01611704	1/2B Fire Diesel Discharge Piping in Unusual Condition	01/23/2014
1R01	QCOP 0010–02, Attachment A	Cold Temperature Area Inspection Checklist (Outside Operator)	45
1R01	SVP–15–076	Quad Cities Station Certification of 2015 Winter Readiness	11/15/2015
1R01		System Engineer System Summary Sheet/Recommendation Form	2
1R01	Drawing M–16	Diagram of Condensate Piping	T
1R01	IEEE Std 622A–1984	IEEE Recommended Practice for the Design and Installation of Electric Pipe Heating Control and Alarm Systems for Power Generating Stations	06/12/1994
1R01	IR 1172793	Potential CCST Fill Line Blockage	02/09/2011
1R01	IR 2482738	Quad Cities Site Winter Readiness Actions for 2015–2016	04/09/2015
1R01	QCOA 0010–21	Loss of Power to Heat Trace Circuits at Panel 2510–1 for CCST Piping	
1R01	QCOP 0010–01	Winterizing Checklist	73
1R01	QCOP 0010–02	Required Cold Weather Routines	45
1R01	WC–AA–107	Season Readiness	16
Section 1R04			
1R04	Drawing M–46	Diagram of High Pressure Coolant Injection—HPCI Piping	CD
1R04	Drawing M–46	Diagram of High Pressure Coolant Injection HPCI Piping	S
1R04	QOM 1–2300–01	U1 HPCI Valve Checklist	13
1R04	QOM 1–2300–02	HPCI System Fuse and Breaker Checklist	6
1R04	QOM 1–6900–11	250 Vdc Reactor Building MCC 1A Breaker Checklist	6
1R04	Drawing M–89, Sheet 1	Diagram of Reactor Core Isolation Cooling RCIC Piping	BE
1R04	GEK–9597	Chapter 27: Reactor Core Isolation Cooling System	

1R04	QOM 2–0201–01	Miscellaneous Reactor Vessel Leak Test Valve Checklist (Outside Drywell)	7
1R04	QOM 2–1300–02	Unit 2 RCIC Valve Checklist (RCIC Room)	11
1R04	QOM 2–1300–03	Unit 2 RCIC Valve Checklist (Not in RCIC Room)	11
1R04	QOM 2–6900–12	250 Vdc Reactor Building MCC 2B Breaker Checklist	7
1R04	QOM 2–1900–01	Unit 2 Fuel Pool Cooling Valve Checklist	7
Section 1R05			
1R05	FZ 8.2.6.D	Unit 2 TB 595'–0" Elev. L.P. Heater Bay	October 2013
1R05	FZ 8.2.7.D	Unit 2 Turbine Bldg. El. 608'–6" LP Heater Bay (West)	July 2009
1R05	FZ 8.2.10	Unit 2 TB 626'–6" Elev. Fan Floor/SJAE	October 2013
1R05	FZ 7.2	Unit 2 Turbine Building (TB), Elevation 628'-6", 250V Battery Room;	October 2013
Section 1R06			
1R06	QCAP 0250–06	Control of In-plant Flood Barriers and Watertight "Submarine" Doors	15
1R06	Drawing B–198	Reactor Building Plumbing Floor Plan El. 554'-0"	N
Section 1R08			
1R08	IR 2645381	NRC Question BWRVIP Revision for IVVI	03/25/2016
1R08	IR 2638488	Incorrect Construction Code Documented	04/10/2016
1R08	IR 1646829	Jet Pump 15 Main Wedge Rod Wear	04/13/2014
1R08	IR 1648000	Jet Pump 14 Main Wedge Wear	04/15/2014
1R08	IR 1648854	Strut in Unit 2 MSIV Room has Cracked Grout	04/17/2014
1R08	IR 1559291	GEH SC 12–20—Error in Method of Characteristics Boundary Conditions Affecting Acoustic Loads Analysis	07/02/2013
1R08	IR 2426557	GEH SC 13–08—Shroud Support Plate to Vessel Evaluation for AC Load	12/17/2014
1R08		ASME Weld and NDE Records for FW–1 Through FW–22 (WO 1636434)	04/10–13/2014
1R08		ASME Section XI Repair Replacement Plan—Weld Buildup to Restore Fitting Hub	06/23/2014
1R08	ER–AA–335–002	Liquid Penetrant (PT) Examination	8
1R08	ER–AA–335–003	Magnetic Particle Examination	7
1R08	ER–AA–335–016	VT–3 Visual Examination of Component Supports, Attachment and Interiors of Reactor Vessels	9
1R08	GEH–PDI–UT–1	PDI Generic Procedure for the Ultrasonic Examination of Ferritic Pipe Welds	9
1R08	GEH–PDI–UT–2	PDI Generic Procedure for the Ultrasonic Examination of Austenitic Pipe Welds	8
1R08	GEH–VT–203	Procedure for In-Vessel Visual Inspection of BWR 3 RPV Internals	22A
1R08		NDE Certification Number 0904	02/02/2016

1R08	NDE Report Q2R23–UT–008	Pipe-Sweepolet Weld 30A–S11	03/23/2016
1R08	NDE Report Q2R23–UT–011	Elbow-to-Pipe Weld 30A–S10	03/22/2016
1R08	NDE Report Q2R23–UT–014	Tee-to-Valve Weld 02BS–F6	03/25/2016
1R08	NDE Report Q2R23–MT–001	VSC W/4 Lugs Welded to Pipe 1024–W–201A	03/18/2016
1R08	NDE Report Q2R23–PT–001	VSC W/4 Lugs Welded to Pipe 1024–W–201A	03/18/2016
1R08	NDE Report Q2R23–VT–015	VT–3 Variable Spring Can Support 2304–M–209	03/23/2016
1R08	NDE Report Q2R22–VT2–022	VT–2 Visual Examination U2 RPV and Class 1 Pipe Leak Test	04/24/0214
1R08	NDE Report Q2R22–UT–003	Elbow-to-Pipe Weld 10BD–S1	04/08/2014
1R08	PQR 4–51A		09/12/1986
1R08	PQR 1–51A		12/28/1983
1R08	PQR A–003		02/08/2000
1R08	PQR A–001		10/19/1998
1R08	PQR A–002		03/09/1999
1R08	PQR 1–50C		01/03/1984
1R08	WPS 1–1–GTSM–PWHT		2
1R08	WPS WP8–8–GTSM		4
1R08	WO 1636434	Upgrade Unit 2 Head Vent Line Socket Welds to EPRI 2–to–1 Weld Legs	04/15/2014
Section 1R11			
1R11	QCGP 2–3	Reactor Scram	84
1R11		Q2R23 Quad Shutdown JITT	02/2016
1R11	QCOP 1000–05	Shutdown Cooling Operation	52
1R11		Q2R23 Start Up JITT	01/2016
1R11	QCGP 2–1	Normal Unit Shutdown	84
Section 1R12			
1R12		Maintenance Rule System Basis Document—FP4100	01/14/2016
1R12	QCOP 4100–03	Diesel Fire Pump Operation	20
1R12	QCOS 4100–17	Fire Protection System Outage Report	10
1R12	WO 01769968–01	Diesel Fire Pump B Capacity Test	08/10/2015
1R12	WO 01789775–01	Diesel Fire Pump A Capacity Test	10/15/2015
1R12	Drawing M–725, sheet 1	Diagram of Control Room HVAC System	Q
1R12	Drawing M–725, sheet 2	Diagram of Control Room HVAC System	Y
1R12	Drawing M–725, sheet 3	Piping and Instrument Diagram, Control Room HVAC	AH
1R12	FASA PI–AA–126–1001–F–01	Assessment of Control Room Habitability Program	0

1R12	FCF 2533523	Failure Classification for 'B' Train CREVS VC5795–01	07/27/2015
1R12	IR 2621294	MRule A1DE Required for Control Rm HVAC VC5795–01	02/03/2016
1R12	IR 2621300	MRule A1DE Required for Control Rm HVAC VC5795–03	02/03/2016
1R12	IR 2635961	Control Room Envelope Pressure Trend Degrading	03/04/2016
Section 1R13			
1R13	IR 2611335	Reactor Building Momentarily Positive Pressure	01/12/2016
1R13	IR 2613279	RB DP Momentarily Positive	01/15/2016
1R13	IR 2613456	Cover for U2 RB Vent Area DP DPT 2–5703–3 Missing	01/16/2016
1R13	IR 2613464	RB Vent 2–5772–1 Actuator Not Connected to the Damper Shaft	01/16/2016
1R13	IR 2613477	RB Vent 1–57772–66B Vortex Damper Degraded	01/16/2016
1R13	IR 2640506	SSMP Room Cooler Compressor #1 Low Freon Head	03/15/2016
1R13		Q2R23 Shutdown Safety Report	03/21–03/26/2016
1R13		Work Week Profile 16–02–05	
1R13		Work Week Profile 16–04–07	
1R13		Work Week Profile 16–08–11	
1R13		Work Week Profile 16–11–01	
1R13	QOM 1–6900–03	125 Vdc Distribution Panel 1B–1 Breaker Checklist	8
Section 1R15			
1R15	IR 2605486	OOT, PS 1–2540–16A and PS 1–2540–17A, Trend Code B3	12/29/2015
1R15	IR 2605488	OOT, PS 1–2540–16B and PS 1–2540–17B, Trend Code B3	12/29/2015
1R15	IR 2611982	NRC ID'd Failed Instruments that Should be MCRD's	01/13/2016
1R15	OP–AA–108–105	Equipment Deficiency Identification and Documentation	11
1R15	OP–AA–108–105–1001	MCR and RWCR Equipment Deficiency Management and Performance Indicator Screening	5
1R15	QCAN 901(2)–55 A–4	Division I Drywell Hi Pressure 29.3 psig	1
1R15	QCOS 1600–05	Post-Accident Monitoring Instrumentation Outage Report	19
1R15	Drawing 4E–1389B	Schematic Diagram 125 Vdc Battery Charger #1	L
1R15	IR 2620481	Unexpected Alarm 901–8 A–9, 125 Vdc Battery Charger 1 Trip	02/02/2016
1R15	EC 365964, Revision 1	Control Room Envelope Maximum Boundary Breach Size	03/31/2011

1R15	EC 376830	Document Control Room Envelope (CRE) DP Surveillance Correction Factor Determination	09/17/2009
1R15	ER–QC–390	Control Room Envelope Habitability Program	1
1R15	ER–QC–390–1001	Control Room Envelope Habitability Program Implementation	1
1R15	IR 2612976	QCOS 5750–16 Test Methodology Issue	01/15/2016
1R15	IR 2605429	Potential Degrading Trend Control Room Envelope (CRE) D/P	12/29/2015
1R15	IR 2622529	Recommend Cancelling EC 365964 CRE Max Breach Size	
1R15	WO 1224672	Periodic DP Test of Control Room Envelope	11/16/2010
1R15	WO 1441783	Periodic DP Test of Control Room Envelope	02/06/2013
1R15	WO 1806454	Periodic DP Test of Control Room Envelope	06/04/2015
1R15	WO 1884929	Periodic DP Test of Control Room Envelope	01/14/2016
1R15		Adverse Condition Monitoring and Contingency Plan: Unit 1 Main Steam Line Drain Steam Leak	02/18/2016
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LIST OF ACRONYMS USED

ACE	Apparent Cause Evaluation
ACIT	Action Tracking Item
ADAMS	Agencywide Document Access Management System
ASME	American Society of Mechanical Engineers
ATWS	Anticipated Transient without SCRAM
CAM	Containment Atmosphere Monitors
CAP	Corrective Action Program
CAQ	Conditioning Adverse to Quality
CFR	Code of Federal Regulations
CREV	Control Room Emergency Ventilation
CSP	Cyber-Security Plan
dc	Direct Current
DPS	Differential Pressure Switch
DRP	Division of Reactor Projects
DTE	Digital Test Equipment
EAL	Emergency Action Level
EC	Engineering Change
EDG	Emergency Diesel Generator
EQ	Environmental Qualification
FZ	Fire Zone
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
ISI	Inservice Inspection
kV	Kilovolt
KVM	Keyboard, Video and Mouse
LER	Licensee Event Report
MGU	Motor Gear Unit
MOV	Motor-Operated Valve
MSCRWL	Minimum Steam Cooling Reactor Pressure Vessel Water Level
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NDE	Non-Destructive Examinations
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OSP	Outage Safety Plan
PAR	Protective Action Recommended
PARS	Publicly Available Records System
PI	Performance Indicator
QGA	Quad Cities General Abnormal
RCIC	Reactor Core Isolation Cooling
RFO	Refueling Outage
RWCU	Reactor Water Cleanup
SBGT	Standby Gas Treatment
SDP	Significance Determination Process
SIF	Security Issue Forum
TB	Turbine Building

TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
UT	Ultrasonic Test
Vdc	Volts Direct Current
WO	Work Order

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Sincerely,

/RA/

Karla Stoedter, Chief
Branch 1
Division of Reactor Projects

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