



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
2443 WARRENVILLE ROAD, SUITE 210  
LISLE, IL 60532-4352

April 27, 2011

Mr. Michael J. Pacilio  
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President and Chief Nuclear Officer (CNO), Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

**SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2  
NRC INTEGRATED INSPECTION REPORT 05000254/2011002;  
05000265/2011002**

Dear Mr. Pacilio:

On March 31, 2011, 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 5, 2011, with Mr. R. Gideon, and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

Based on the results of this inspection, one NRC-identified finding and one self-revealed finding of very low safety significance were identified. Both findings involved a violation of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as non-cited violations (NCVs) in accordance with Section 2.3.2 of the NRC Enforcement Policy. Additionally, a licensee-identified violation is listed in Section 4OA7 of this report.

If you contest the subject or severity 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 a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office 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.

M. Pacilio

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In accordance with 10 CFR 2.390 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 Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Mark A. Ring, Chief  
Branch 1  
Division of Reactor Projects

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

Enclosure: Inspection Report 05000254/2011002; 05000265/2011002  
w/Attachment: Supplemental Information

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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: 05000254/2011002 and 05000265/2011002

Licensee: Exelon Nuclear

Facility: Quad Cities Nuclear Power Station, Units 1 and 2

Location: Cordova, IL

Dates: January 1 through March 31, 2011

Inspectors: J. McGhee, Senior Resident Inspector  
B. Cushman, Resident Inspector  
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Approved by: M. Ring, Chief  
Branch 1  
Division of Reactor Projects

Enclosure

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## SUMMARY OF FINDINGS

IR 05000254/2011002, 05000265/2011002; 01/01/11 - 03/31/11; Quad Cities Nuclear Power Station, Units 1 & 2; Surveillance Testing.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were identified by the inspectors. The findings were considered non-cited violations (NCVs) of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

### A. NRC-Identified and Self-Revealed Findings

#### Cornerstone: Mitigating Systems

- Green. The NRC inspectors identified a finding of very low safety significance (Green) and an associated NCV of 10 CFR 50, Appendix B, Criterion V on December 21, 2010. While observing performance of QCOS 0250-01, "MSIV [Main Steam Isolation Valve] Scram Sensor Channel Functional Test," inspectors identified that the licensee's surveillance procedure unacceptably preconditioned the reactor protection system (RPS) 'B' limit switches during testing of the RPS 'A' switches, in that, the 'A' switch testing also moved the 'B' switches. The licensee had not previously evaluated the pre-conditioning to determine potential impact to the test and subsequently validated the inspectors' assessment that the test methodology did unacceptably precondition the 'B' RPS limit switches. The issue was documented in the corrective action program as Issue Report 1155212. The procedure was revised and subsequent retesting on March 26 and 27, 2011, demonstrated that all MSIV RPS limit switches were operable.

This issue was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern in that preconditioning could mask a condition which would prevent an automatic actuation of RPS on MSIV closure. Inspectors performed the SDP phase 1 screening using IMC 0609, Attachment 4, Table 4a, Mitigating Systems Cornerstone column, and answered all questions "No." Therefore, this finding is Green, or very low safety significance. The issue was considered a legacy issue and no cross-cutting aspect was assigned. (Section 1R22.1)

- Green: A self-revealed finding of very low safety significance (Green) and associated NCV of Technical Specification 5.4.1.a was identified on March 7, 2011, when a broken wire lug prevented closure of the 1/2 emergency diesel generator (EDG) output supply breaker to Unit 2 during core spray system logic testing. The failure to identify or correct wire routing deficiencies during cubicle inspections was a performance deficiency and a finding. The inspectors identified that work instructions did not contain sufficient detail to ensure that breaker wiring was configured correctly and the ability to perform safety functions was not adversely impacted. The broken lug was repaired and the 1/2 EDG was declared operable to Unit 2 on March 8, 2011. The issue was documented in the corrective action program as Issue Report 1184304.

This issue was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern in that similar failures could result in a loss of safety function. Inspectors performed the SDP phase 1 screening using IMC 0609, Attachment 4, Table 4a, Mitigating Systems Cornerstone column, and answered all questions “No.” Therefore, this finding screens as Green, or very low safety significance. The inspectors identified that this finding has a cross-cutting aspect in the Problem Identification and Resolution - Operating Experience Component. Specifically, the licensee failed to implement and institutionalize internal operating experience concerning the improper routing of cubicle wiring through appropriate changes to the station preventative maintenance program (P.2(b)). (Section 1R22.2)

**B. Licensee-Identified Violations**

Violations of very low safety significance that were identified by the licensee have been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee’s corrective action program. These violations and corrective action tracking numbers are listed in Section 4OA7 of this report.

## **REPORT DETAILS**

### **Summary of Plant Status**

#### **Unit 1**

Unit 1 operated at 100 percent thermal power from January 1 through February 11, 2011, with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers. On February 11, operators reduced power to 79 percent power as part of a planned downpower in order to replace a pressure switch on turbine control valve no. 1, replace a leaking seal on the 1A condensate booster pump, clean the 1D generator hydrogen cooler, conduct turbine testing, and conduct power suppression testing. The power suppression testing was part of a planned troubleshooting activity to identify a potential leaking fuel pin. Activities were completed on February 13, and power was increased to 100 percent that same day with no leaking fuel pin identified.

Unit 1 operated at 100 percent thermal power for the remainder of the inspection period with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers.

#### **Unit 2**

Unit 2 operated at 100 percent thermal power from January 1 through January 29, 2011, when operators began lowering reactor power from 100 percent to 25 percent power as part of a planned activity to remove the 2B reactor recirculation pump from service to replace a failed electronic controller in the adjustable speed drive unit (power supply to the pump). The pump was turned off at 05:00 a.m. on January 29, and the unit remained in single loop operations until repairs were completed on the affected adjustable speed drive. The 1B reactor recirculation pump was restarted January 30, and the unit returned to 100 percent power that same day. Routine control rod and turbine testing were performed during the evolution.

Unit 2 operated at 100 percent thermal power for the remainder of the inspection period with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers.

### **1. REACTOR SAFETY**

#### **Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity**

##### **1R01 Adverse Weather Protection (71111.01)**

##### **.1 External Flooding**

##### **a. Inspection Scope**

The inspectors evaluated the design, material condition, and procedures for coping with the design basis probable maximum flood. The evaluation included a review to check for deviations from the descriptions provided in the Updated Final Safety Analysis Report (UFSAR) for features intended to mitigate the potential for flooding from external factors. As part of this evaluation, the inspectors checked for obstructions that could prevent draining, checked that the roofs did not contain obvious loose items that could clog drains in the event of heavy precipitation, and determined that barriers required to

mitigate the flood were in place and operable. Additionally, the inspectors performed a walkdown of the protected area to identify any modification to the site which would inhibit site drainage during a probable maximum precipitation event or allow water ingress past a barrier. The inspectors also reviewed the station abnormal operating procedure for mitigating the design basis flood to ensure it could be implemented as written. In addition, the inspectors reviewed emergency preparedness procedures to ensure that event classification and notifications would occur in a timely manner.

This inspection constituted one external flooding sample as defined in Inspection Procedure (IP) 71111.01-05.

b. Findings

No findings were identified.

.2 Readiness for Impending Adverse Weather Condition - Heavy Snowfall Conditions

a. Inspection Scope

On January 31, 2011, a blizzard advisory was issued for expected snowfall and high winds for the period from January 31 through February 2, 2011. The inspectors observed the licensee's preparations and planning for the significant winter weather potential. 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. Since the storm had been forecast for several days prior to the issuance of the advisory, the inspectors reviewed the licensee actions to manage personnel to ensure compliance with work hour rules prior to and after the event. The inspectors conducted a site walkdown including walkdowns of various plant structures and systems to check for maintenance or other apparent deficiencies that could affect system operations during the predicted significant weather. 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.

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 - Extreme Cold Conditions

a. Inspection Scope

Since extreme cold conditions were forecast in the vicinity of the facility for February 3, 2011, the inspectors reviewed the licensee's overall preparations/protection for the expected weather conditions. On January 31 and February 1, the inspectors walked down Units 1 and 2 reserve auxiliary transformers because their safety-related functions could be affected as a result of the extreme cold conditions forecast for the

facility. The inspectors also walked down heating steam because of the support function served to safety-related equipment in extreme cold weather conditions. 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.

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 2 Division II electrical 4160/480 Vac busses during and after electrical transient on January 12, 2011;
- Unit 2 station blackout diesel generator during Unit 1 station blackout diesel unavailability on February 9, 2011;
- Unit 2 high pressure coolant injection system with Unit 2 reactor core isolation cooling system out-of-service for maintenance on March 1, 2011; and
- Unit 1 core spray 'A' system with 'B' core spray out-of-service for maintenance on March 10, 2011.

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 four partial system walkdown samples 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 1.1.1.6, Unit 1/2 Reactor Building, Elevation 609'-6", Refuel Floor;
- Fire Zone 8.2.7.E, Unit 2 Turbine Building, Elevation 615'-6", North Mezzanine Floor;
- Fire Zone 8.2.6.A, Unit 1 Turbine Building, Elevation 595'-0", 4kV Switchgear, Unit 1 Hallway & Unit 1 Trackway; and
- Fire Zone 11.3.4, Unit 2 Reactor Building, Elevation 544'-0", NE Corner Room - 2A RHR Room.

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, circulating water, or service water systems. The inspectors performed a walkdown of the following plant area(s) 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:

- reactor building closed cooling water system or service water system break in reactor building flooding into residual heat removal corner rooms, and
- reactor building closed cooling water system or service water system break in reactor building flooding into torus rooms.

This inspection constituted two internal flooding samples as defined in IP 71111.06-05.

b. Findings

No findings were identified.

1R07 Annual Heat Sink Performance (71111.07)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's testing of the 1A residual heat removal heat exchanger to verify that potential deficiencies did not mask the licensee's ability to detect degraded performance, to identify any common cause issues that had the potential to increase risk, and to ensure that the licensee was adequately addressing problems that could result in initiating events that would cause an increase in risk. The inspectors reviewed the licensee's observations as compared against acceptance criteria, the correlation of scheduled testing and the frequency of testing, and the impact of instrument inaccuracies on test results. Inspectors also verified that test acceptance criteria considered differences between test conditions, design conditions, and testing conditions. Documents reviewed for this inspection are listed in the Attachment to this report.

This annual heat sink performance inspection constituted one sample as defined in IP 71111.07-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On January 22, 2011, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and 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 predetermined 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 sample as defined in IP 71111.11.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- Z0020: Reactor Building;
- Z0201-02: Reactor Vessel Internals - Fuel;
- Z0010: Primary Containment; and
- Z6600: Diesel Generator 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 (SSCs)/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 four 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 (11-02-03) - 1B electro-hydraulic control system accumulator surveillance, emergent 2A recirculation pump adjustable speed drive (ASD) card failure, 2A EHC pump troubleshooting, 1A service air compressor maintenance, and 1/2 service water strainer maintenance;
- Risk assessment and management associated with January 30, 2011, Unit 2 downpower - Unit 2 single loop operations and recovery, Unit 2 ASD maintenance, 2C condensate pump seal replacement and alignment of 2A steam jet air ejector for service after prolonged outage;

- Work Week (11-07-08) - Unit 2 high pressure coolant injection (HPCI) out-of-service, Unit 1 station blackout diesel work and testing, emergent impact of extreme cold weather and grid alert requiring rescheduling of work week activities, emergent Unit 1 digital turbine control card failure, and Unit 1 downpower for power suppression testing, 1A condensate booster pump seal replacement and cleaning of 1D generator hydrogen cooler water box;
- Work Week (11-08-09) - Unit 2 125 Vdc battery replacement, Unit 1 HPCI logic test, Unit 1 'B' loop residual heat removal (RHR) logic test, control room envelope ventilation system cooling water supply work, Unit 1 'B' RHR heat exchanger thermal performance test, emergent failure of the 1B main steam isolation valve (MSIV) reactor protection system relay troubleshooting; and
- Work Week (11-14-02) - 2B RHR room submarine door maintenance, Unit 1 downpower for rod pattern adjustment and power suppression testing, 2C RHR service water pump maintenance, 2B RHR loop valve and room cooler maintenance, Unit 2 emergency diesel generator loaded endurance run, and Unit 2 HPCI logic test.

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.

These maintenance risk assessments and emergent work control activities constituted five samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Control rod drive accumulator (1-0305-107-26-11 and 58-39) vent valve seat leakage;
- 2C RHR service water (RHRSW) pump did not start promptly;
- Unit 2 HPCI piping wall thickness below work package acceptance criteria;
- 2A containment atmosphere monitor torus sample line isolation valve leakage;
- Drywell electrical penetration X104B could not be pressurized above 30 psig; and

- Equipment failures during Unit 1 MSIV testing of 2B and 2D MSIVs.

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 six samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

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:

- Work Order (WO) 1362208: Operations Perform QCOS 6700-02 MCC 28/29-5 Auto-transfer Logic Operability;
- WO 1329566: Place 2A SJAE In-service per QCOP 5400-16 Off Gas SJAE Train Operation;
- WO 25207501: Unit 1 HPCI Pump Performance Test Following HPCI Logic Testing; and
- WO 01393927: Troubleshoot 2B ASD NXG 'A' Controller.

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 TS, 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.

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:

- QCOS 1600-07, Reactor Coolant Leakage in the Drywell (RCS);
- QCOS 1400-01, Quarterly Core Spray System Flow Rate Test (IST);
- QCOS 1400-08, Core Spray System Power Operated Valve Test (IST);
- QCOS 6600-20, Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test (Routine);
- QCOS 2300-29, U1 HPCI System Logic Functional Test (Routine);
- QCOS 2300-13, HPCI System Manual Initiation Test (Routine);
- CY-QC-110-635, Sodium Pentaborate Sample (Routine); and
- QCOS 0250-01, MSIV Closure Scram Sensor Functional Test (IST).

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

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and 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 USAR, 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 four routine surveillance testing samples, three inservice testing samples, and one reactor coolant system leak detection inspection sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

(1) Pre-conditioning of Main Steam Isolation Valve (MSIV) Reactor Protection System Limit Switches During Surveillance Testing

Introduction: NRC inspectors identified a finding of very low safety significance (Green) and associated non-cited violation (NCV) of 10 CFR 50, Appendix B, Criterion V on December 21, 2010, while observing performance of QCOS 0250-01, "MSIV Scram Sensor Channel Functional Test." The inspectors identified that the licensee's surveillance procedure unacceptably preconditioned the reactor protection system (RPS) 'B' limit switches during testing of the RPS 'A' switches.

Description: On December 21, 2010, the inspectors were observing the licensee performing QCOS 0250-01, "MSIV Scram Sensor Channel Functional Test." The inspectors observed that the licensee performed a partial stroke of the MSIV twice during the performance of the surveillance test. Each MSIV has two RPS limit switches associated with the open seat. These limit switches change state at approximately 10 percent from fully open to provide an anticipatory RPS actuation should a main steam line isolate. One limit switch is associated with the 'A' side of RPS; the other switch is associated with the 'B' side of RPS. Both RPS limit switches change state when an MSIV moves. The 'B' RPS limit switch was allowed to be exercised during the first partial stroke before being tested for a TS surveillance.

In accordance with the procedure, the licensee would place jumpers on the 'A' side of RPS to prevent receiving a ½ scram on RPS 'A', then partially stroke the MSIV and verify the 'A' RPS relay dropped out. The licensee would then move the jumpers to the 'B' side of RPS and partially stroke the MSIV a second time while verifying the 'B' RPS relay dropped out. The licensee had not previously evaluated the pre-conditioning to determine potential impact to the test and validated the inspectors' assessment that the test methodology did unacceptably precondition the 'B' RPS limit switches. The licensee entered the issue into the CAP as Issue Report (IR) 1155212.

The licensee revised QCOS 0250-01 in order to check both RPS limit switches per MSIV in a single partial stroke of the MSIV. This procedure was performed on Unit 1 on February 17, 2011, and on Unit 2 on March 21, 2011. The result was three limit switch failures. These channels were placed in trip in accordance with Technical Specifications.

The licensee performed an engineering review of the MSIV RPS limit switch failures and determined that the MSIV RPS limit switches had not been appropriately challenged during the revised test, and the test circuit was re-opening the MSIV prior to actuating the MSIV RPS limit switches. The licensee revised QCOS 0250-01 with a different testing methodology. The surveillance was performed on Unit 1 and Unit 2 on March 26 and 27, and all MSIV limit switches were verified operable. Inspectors reviewed the revised testing methodology and determined that it met the TS-required surveillance requirements.

Analysis: NRC Technical Guidance 9900 states that in the absence of an engineering evaluation, any pre-conditioning is unacceptable. The licensee had not previously evaluated the pre-conditioning to determine potential impact to the MSIV limit switch testing. The inspectors determined the unacceptable preconditioning of components before performing TS-required surveillances was a performance deficiency and a finding.

This performance deficiency was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern because preconditioning could mask a condition which would prevent an automatic actuation of RPS on MSIV closure. The SDP phase 1 screening was performed using IMC 0609, Attachment 4, Table 4a, Mitigating Systems Cornerstone column, and all questions were answered, "No." Therefore, this finding screens as Green, or very low safety significance.

The licensee has been using this methodology for almost 10 years with no identified need for a major revision. The issue is considered a legacy issue and no cross-cutting aspect is assigned.

Enforcement: Title 10 CFR 50, Appendix B, Criterion V required, in part, that activities affecting quality shall have prescribed procedures appropriate to circumstances.

Contrary to the above, the surveillance test procedure performed on December 21, 2010, was not appropriate in that the procedure unacceptably preconditioned the 'B' RPS limit switches and could have inappropriately influenced the outcome of the test. Because this violation was determined to be of very low safety significance, and it was entered into the licensee's corrective action program as IR 1155212, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy

**(NCV 05000254/2011002-01; 05000265/2011002-01, “MSIV RPS Limit Switch Preconditioning”).**

Immediate corrective actions included the revision and re-performance of the MSIV surveillance test procedure without preconditioning and a review for preconditioning in similar surveillance procedures.

(2) Failure of the 1/2 EDG Output Breaker to Close to Unit 2 During Logic Testing

Introduction: A self-revealed finding of very low safety significance (Green) and associated NCV of TS 5.4.1 was identified on March 7, 2011, when a wiring fault resulted in the failure of the 1/2 emergency diesel generator (EDG) output breaker to close to Unit 2 during core spray system logic testing. The failure of plant maintenance personnel to identify and correct the wire routing deficiency during cubicle inspections of the associated switchgear before the wiring fault occurred was a performance deficiency.

Description: On March 7, 2011, during the performance of core spray system logic testing, the 1/2 EDG output breaker failed to close to Unit 2. This failure was caused by a broken terminal lug on a relay associated with the 1/2 EDG automatic starting circuit. This relay is mounted on the inside of the cubicle door. The wiring lug broke from fatigue stress of being pulled whenever the cubicle door was opened. The stress was caused by the wiring harness fasteners being too close to the wire bend, resulting in a tight condition on the wire to the terminal connection. As a result, the wire did not have enough slack to flex as needed without pulling on the wire when the door was opened. This condition had apparently existed for an extended period of time as evidenced by the fatigue failure of the lug. In addition, the tie wraps used to tie back the wiring harness were not original equipment and had apparently been replaced at some point in the maintenance history of the cubicle.

This wiring failure would have prevented the 1/2 EDG from automatically responding as designed to a loss of power or undervoltage condition to the 23-1 safety-related buses. This wiring failure would also have prevented remote closure of the 1/2 EDG output breaker to Bus 23-1 when paralleling the 1/2 EDG with normal station loads. The ability to locally close the 1/2 EDG output breaker was still maintained, which would allow a dead bus transfer of the 1/2 EDG to load to Unit 2. The length of time this condition existed was minimal. A monthly load test that exercised the continuity of this relay was performed on February 3, 2011. A review of work orders for inspections, walkdowns, or any other tasks was performed for this breaker cubicle. There was no operation or maintenance activity identified that would require opening the breaker cubicle door from February 3, 2011, and the commencement of core spray system logic testing on March 7, 2011. On the morning of March 7, 2011, the 1/2 EDG was declared inoperable to Unit 1 and Unit 2 as the 1/2 EDG output breaker was racked out to the ‘test’ position and the cubicle door was opened to pull fuses to set conditions to start the core spray logic test. There is a reasonable assurance based on work history of the cubicle, satisfactory completion of the previous monthly load test, and no operational need to open the cubicle door, that the wiring lug actually broke when Operations opened the cubicle door to remove fuses on the morning of the core spray logic testing.

Upon failure of the 1/2 EDG output breaker to close during the logic test on March 7, 2011, the licensee suspended the logic test and commenced troubleshooting of the

breaker. The licensee discovered the broken wire, performed repairs, and returned the system to the Operations department for post-maintenance testing on March 8, 2011. The licensee resumed the logic testing, and the acceptance criteria were met as described by the logic test for the 1/2 EDG output breaker. The breaker was then racked into the "operate" position. The EDG was started and loaded to Unit 2 to verify operability on March 8, 2011.

Analysis: The failure to identify or correct wire routing deficiencies during cubicle inspections was a performance deficiency and a finding. The inspectors identified that work instructions did not contain sufficient detail to ensure that equipment was configured correctly and the ability to perform safety functions was not adversely impacted. While licensee procedures contained instructions to identify potential wire pinch points during inspection as a result of corrective actions from a previous issue, the inspection procedures did not address the identification of wire routing that may lead to binding or stress when other components of the breaker cubicle are manipulated.

This performance deficiency was more than minor because, if left uncorrected, the performance deficiency would have the potential to lead to a more significant safety concern in that similar failures could result in a loss of safety function. The SDP phase 1 screening was performed using IMC 0609, Attachment 4, Table 4a, Mitigating Systems Cornerstone column, and all questions were answered, "No." Therefore, this finding screens as Green, or very low safety significance.

The inspectors identified that this finding has a cross-cutting aspect in the Problem Identification and Resolution Component of Operating Experience. During installation of the ASD system on Unit 1, the licensee identified a condition where a wire was pinched in a cabinet door because the wire was improperly routed. Licensee action limited the extent of condition applicability to plant modifications and provided training to contract personnel for properly routing wiring. Failure to look beyond the scope of plant design modification installation and address potential weaknesses in maintenance procedures or processes allowed this event to occur. The licensee failed to implement and institutionalize internal operating experience concerning wiring routing deficiencies through changes to station processes, procedures, and training programs (P.2(b)).

Enforcement: Technical Specification 5.4.1.a requires that the licensee establish, implement, and maintain written procedures covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Appendix A of Regulatory Guide 1.33 requires, in part, maintenance that can affect the performance of safety-related equipment should be performed in accordance with written procedures appropriate to the circumstances.

Contrary to the above, the licensee did not provide a maintenance procedure that would ensure the deficient condition was identified prior to failure on March 7, 2011. Because this violation was determined to be of very low safety significance, and these issues have been entered into the licensee's corrective action program as IR 1184304, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000265/2011002-02, "Unit 1/2 EDG Output Breaker Failure to Unit 2"**).

Immediate corrective actions included the repair of the broken lug and a walkdown of all other diesel generator output breaker cubicles to identify if similar conditions existed.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of routine licensee emergency drills on February 1, 2011, and again on March 15, 2011, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the control room simulator and the technical 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 corrective action program. 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 two samples as defined in IP 71114.06-05.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

**Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, and Emergency Preparedness**

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 Units 1 and 2 for the period from the 1<sup>st</sup> quarter 2010 through the 4<sup>th</sup> quarter 2010. 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 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC inspection reports for the period of January 2010 through December 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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 Performance Indicator for Quad Cities Units 1 and 2 for the period from the 1<sup>st</sup> quarter 2010 through the 4<sup>th</sup> quarter 2010. 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 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC integrated inspection reports for the period of January 2010 through December 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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

b. Findings

No findings were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours performance indicator for Quad Cities Units 1 and 2 for the period from the 1<sup>st</sup> quarter 2010 through the 4<sup>th</sup> quarter 2010. 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 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, maintenance rule records, event reports, and NRC Integrated Inspection Reports for the period of January 2010 through December 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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

b. Findings

No findings were identified.

## 4OA2 Identification and Resolution of Problems (71152)

### **Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity, Emergency Preparedness, Public Radiation Safety, Occupational Radiation Safety, and Physical Protection**

#### .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 that 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 followup, 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 Semi-Annual Trend Review

#### a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the 6-month period of September 15, 2010, through March 15, 2011, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues that were documented outside the normal CAP in major equipment problem lists, repetitive and/or rework maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy.

This review constituted a single semi-annual trend inspection sample as defined in IP 71152-05.

#### b. Findings/Observations

No findings were identified. However, inspectors identified examples that indicated plant personnel were not always complying with site-wide procedure use and adherence expectations and first line supervisors across the site had a high tolerance for procedure deficiencies when those deficiencies did not prevent the completion of the task. Each of these examples was evaluated individually within the ROP and determined to be not more than minor; however, they did result in the activities taking longer than planned, in potential overexposure of personnel, and in one case an unexpected half-scream condition. Some plant personnel were able to rationalize ways to allow the activity to continue without stopping to fix the procedure. In other examples such as the licensee identified violation discussed in Section 4OA7 of this report, personnel did not use appropriate rigor in implementing error reduction tools, such as questioning attitude and procedure place keeping, to identify potential traps and weaknesses in existing procedures before a human performance error occurred. In this case, the latent deficiency had existed for years and only caused a problem when a new person was assigned to the task. Additional examples are discussed below:

- On September 30, 2010, during replacement of a sample line from the main plant chimney to an outside building, mechanics cut and removed the return line instead of the sample line. The work package contained minimal instructions and no drawings to assist the mechanics in identifying the line to be cut. Workers were briefed to cut the line with the blanket insulation (both lines had blanket insulation) and were so confident that they were on the right line that they cut it without tracing the pipe or otherwise attempting to verify they were on the right line. Instead of stopping work after recognizing the wrong line was cut, the

supervisor directed work to continue until senior management became aware of the problem and stopped work. This event was documented in IR 1120271.

- On February 3, 2011, an unexpected half-scam occurred while operators were performing QCOS 0300-20, "Scram Discharge Volume Level Switch Functional Test." An apparent cause evaluation indicated an error occurred during implementation of a test box. Specific steps for connecting and actuating a test box to prevent the half-scam were not included in the body of the procedure. Similar events had occurred twice before during maintenance and QCOS 0300-20 had been identified as having this vulnerability as part of an extent of condition review for IR 1052838. However, no actions were created to correct this procedure before this event occurred. This half-scam was documented in IR 1170717.
- On February 16, 2011, mechanical maintenance technicians were tasked with removing a floor plug for the radwaste floor drain filter (FDF) to support Task 01 of Work Order 1359010. The work instructions for Task 01 required the floor plug be removed prior to erecting the handrail scaffolding. The scaffold task was documented as Task 14 in the work order. The supervisor did not have the work package containing Task 01 for the work activity, instead the supervisor used the scaffold request, barrier impairment, and an uncontrolled floor plan drawing (as was common practice in shop) for scaffold activities, since no specific work steps were outlined in the work task. The scaffold request incorrectly identified the spare floor drain filter (SFDF) floor plug as the area where the scaffold was to be erected. The supervisor briefed the crew on removal of the SFDF floor plug. The crew then removed the SFDF floor plug and erected the handrail. The supervisor's failure to use the appropriate work document coupled with the error on the scaffolding request led to removal of the wrong floor plug. This event was documented in IR 1175763.
- On February 18, 2011, the operator performing QCOS 2300-29, "Unit 1 HPCI System Logic Functional Test," progressed to step D.3 which required aligning the emergency core cooling system keep fill system to reactor core isolation cooling per QCOP 1400-03. The operator recognized that the wrong procedure was referenced and since he could use QCOP procedures at any time, proceeded to use the correct procedure (QCOP 1300-01) to accomplish the task. However, the operator did not stop and correct QCOS 2300-29 to reference the correct procedure. Instead, he signed the step as completed with a note indicating that it was performed using QCOP 1300-01. Shift management approved this action at the time and IR 1177184 was written when NRC inspectors and senior plant management questioned the decision to proceed without revising the procedure.
- On March 3, 2011, inspectors followed up on a log entry that stated plant personnel had attempted unsuccessfully to adjust reactor recirculation pump seal injection flow back to within limits. The flow had been outside the operator rounds since September 13, 2009, with two issue reports (IRs 964361 and 1165666) written to correct the condition. The out-of-specification condition had existed for 16 months before a lower limit on this flow was established by the engineering staff in response to the issue reports. While operators identified the

initial condition, they tolerated the condition without establishing the point where the pump should be shut down, and at the time of the question, were still outside the procedural control band with no procedure changes in process.

These examples indicate a potential adverse trend in procedure quality and in procedure use and adherence which require additional management attention to ensure that plant personnel stop and fix procedures that are not correct before the work activity is allowed to continue.

#### .4 Annual Sample: Review of Operator Workarounds

##### a. Inspection Scope

The inspectors evaluated the licensee's implementation of their process used to identify, document, track, and resolve operational challenges. Inspection activities included, but were not limited to, a review of the cumulative effects of the operator workarounds on system availability and the potential for improper operation of the system, for potential impacts on multiple systems, and on the ability of operators to respond to plant transients or accidents.

The inspectors performed a review of the cumulative effects of operator workarounds. The documents listed in the Attachment to this report were reviewed to accomplish the objectives of the inspection procedure. The inspectors reviewed both current and historical operational challenge records to determine whether the licensee was identifying operator challenges at an appropriate threshold, had entered them into their CAP, and proposed or implemented appropriate and timely corrective actions which addressed each issue. Reviews were conducted to determine if any operator challenge could increase the possibility of an Initiating Event, if the challenge was contrary to training, required a change from long-standing operational practices, or created the potential for inappropriate compensatory actions. Additionally, all temporary modifications were reviewed to identify any potential effect on the functionality of Mitigating Systems, impaired access to equipment, or required equipment uses for which the equipment was not designed. Daily plant and equipment status logs, degraded instrument logs, and operator aids or tools being used to compensate for material deficiencies were also assessed to identify any potential sources of unidentified operator workarounds.

This review constituted one operator workaround annual inspection sample as defined in IP 71152-05.

##### b. Findings

No findings were identified.

#### .5 Selected Issue Followup Inspection: Possible Unit 1 Fuel Defect

##### a. Inspection Scope

During a review of items entered into the licensee's CAP, the inspectors recognized a corrective action item documenting increased likelihood of a fuel defect on Unit 1. Issue Report 1161921, written on January 12, 2011, reported chemistry analysis and an engineering evaluation of offgas and coolant activity that indicated a potential failure

existed. Inspectors reviewed the chemistry analysis and the Failed Fuel Monitoring Team meeting results. Inspectors also reviewed the station operating and technical decision making document prepared, approved and presented to the Station Oversight Review Committee. The action plan was reviewed as part of that document. The station performed power suppression testing, and in March 2011 suppressed the identified leaking bundle. The licensee put actions in place to ensure the bundle with the defect is removed during the next refueling outage.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings were identified.

.6 Selected Issue Followup Inspection: Scram Solenoid Pilot Valve Diaphragm Replacements not per Equipment Qualification Program Requirements.

a. Inspection Scope

During a review of items entered into the licensee's CAP, the inspectors recognized a corrective action item documenting a decision that delayed replacement of the scram solenoid pilot valve diaphragms at the end of their 9.3 year qualified life as required by Equipment Qualification binder EQ-82Q. Inspectors reviewed engineering documents supporting the change in qualified life from 9.3 years to 14.06 years and verified that the evaluation had been performed before any of the valves exceeded required maintenance dates. Inspectors also reviewed the scheduled replacement dates and available work documents to ensure that the diaphragm replacement is scheduled correctly to meet the Equipment Qualification requirements.

This review constituted one in-depth problem identification and resolution sample as defined in IP 71152-05.

b. Findings

No findings were identified.

4OA3 Followup of Events and Notices of Enforcement Discretion (71153)

.1 (Closed) Licensee Event Report (LER) 05000265/2011-001-00: Loss of Unit 2 Essential Service 480V Bus

This event, which began at 10:20 a.m. on January 12, 2011, started when a maintenance technician fell while descending a ladder and inadvertently bumped the local trip pushbutton for the supply breaker to Essential Service Bus 29 at Bus 24-1. When the breaker opened, Bus 29 lost power, causing a loss of power to the Unit 2 Division II core spray (CS) and low pressure coolant injection (LPCI) systems, Unit 2 EDG cooling water pump, 1/2A standby gas treatment, containment group 3 isolation of reactor water cleanup valves. A coincident failure of the auto transfer logic for Motor Control Center 28/29-5 resulted in a loss of power to system injection valves for both subsystems of LPCI on Unit 2 and is the subject of this LER. The simultaneous loss of Division II of CS and both subsystems of LPCI resulted in entry into TS 3.0.3, placing the

unit into a 13-hour time clock and a loss of the LPCI safety function. Power to Bus 29 was restored within 6 minutes after operators understood the initiator and could determine that there was no electrical fault on the bus. At that time operators exited TS 3.0.3 actions with restoration of CS, but remained in a 72-hour action requirement to restore one loop of the LPCI system by restoring operability to the power transfer scheme for Bus 28/29-5. Inspectors reviewed the operators' response to the event and did not identify any performance deficiencies.

Investigation into the transfer failure of Bus 28/29-5 revealed that the 5/6 contacts of the auxiliary switch on the power supply contactor, M29, were open when they should have been closed. The auxiliary switch plunger was determined to be stuck in mid stroke. Electricians manually actuated the 5/6 contact assembly by pressing on the plunger to restore availability of one LPCI subsystem while additional repairs were planned. The 5/6 auxiliary contactors for Bus 28 and Bus 29 were replaced and sent offsite for post-mortem testing. The offsite testing indicated that the contactors functioned properly with no evidence of sticking or binding. The licensee reviewed the operating history of the General Electric CR105X300 auxiliary contact and did not identify any similar failures. In addition, the licensee eliminated foreign material, loose parts, and lubrication as potential causes of the binding. The mechanical binding of the plunger was determined to be an intermittent failure as it could not be reproduced while the contactor was installed or after removal. Post-maintenance testing verified that the Bus 28/29-5 power transfer functioned properly. While no evidence of a problem with the M29 main contactor assembly was identified and post-maintenance testing verified that it was working properly, the licensee scheduled replacement and followup analysis to verify that all potential failure mechanisms have been eliminated.

Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On April 5, 2011, the inspectors presented the inspection results to Mr. R. Gideon 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 Regulatory Performance Meeting

On April 5, 2011, the NRC held a meeting with the licensee at the Quad Cities Nuclear Plant to discuss the Quad Cities Unit 1 and Unit 2 annual plant performance assessment. The assessment results were previously documented in Inspection Report 05000254/2011001; 05000265/2011001.

##### .3 Public Meeting

On April 5, 2011, the NRC held a public open house meeting at the Cordova Civic Center to engage interested members of the public on the performance of Quad Cities Nuclear Plant and the role of the NRC in ensuring safe plant operations upon completion of the Quad Cities Nuclear Plant annual plant performance assessment in accordance with Section 09.01 of IMC 0305, "Operating Reactor Assessment Program."

The summary of that meeting is documented in the Publicly Available Records System (PARS) component of NRC's document system (ADAMS) as ML111020037.

#### 40A7 Licensee-Identified Violations

The following violation of very low significance (Green) was identified by the licensee and is a violation of NRC requirements which meets the criteria of the NRC Enforcement Policy for being dispositioned as an NCV.

- Technical Specification 5.4.1.c requires the licensee to establish, implement, and maintain written procedures covering implementation of the fire protection program. Unit 1 Operating License Article 3, Condition F states that the licensee shall implement and maintain in effect all provisions of the approved fire protection program. The program requires, in part, periodic maintenance and testing necessary to maintain system operating condition and functionality. Contrary to the above, the licensee failed to implement written procedures that ensured the fire protection was maintained in accordance with the fire protection program. Specifically, the Unit 1 hydrogen seal oil deluge fire protection system was returned to service with a hose fitting installed in place of one required spray nozzle. A review of the maintenance procedure revealed that the procedure did not contain the number or location of fittings to be replaced after testing the system and relied on the technician to review drawings to determine the correct number and placement of nozzles. Further review of similar procedures used to maintain and test the fire protection system revealed the same vulnerability. Upon discovery, this issue was immediately documented in IR 1168144 and the fitting was replaced with the appropriate nozzle. This issue is more than minor because the performance deficiency, if left uncorrected, would have the potential to lead to a more significant safety concern during future maintenance activities in that the same deficiencies existed in procedures for fire protection systems that were required to support safe shutdown of the unit. The finding is of very low safety significance or Green because the spray nozzles provide overlapping coverage and the deluge system would have been able to perform its function. Therefore, the degradation rating for the deficiency is low; therefore, the finding is screened to Green in accordance with IMC 0609, Appendix F, Task 1.3.1.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

R. Gideon, Site Vice President  
M. Prospero, Plant Manager  
W. Beck, Regulatory Assurance Manager  
D. Collins, Radiation Protection Manager  
J. Garrity, Work Control Director  
R. Gaylord, Training Support Manager  
C. Iben, Acting Nuclear Oversight Manager  
D. Kimler, Station Operations Superintendent  
V. Neels, Chemistry/Environ/Radwaste Manager  
B. Stedman, System Engineering Manager  
P. Summers, Maintenance Director

#### Nuclear Regulatory Commission

M. Ring, Chief, Reactor Projects Branch 1

#### Illinois Emergency Management Agency (IEMA)

R. Zuffa, Supervisor, IEMA Resident Program

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

50-254/2011002-01; 50-265/2011002-01	NCV	MSIV RPS Limit Switch Preconditioning (Section 1R22.1)
50-265/2011002-02	NCV	Unit 1/2 EDG Output Breaker Failure to Unit 2 (Section 1R22.2)

#### Closed

50-254/2011002-01; 50-265/2011002-01	NCV	MSIV RPS Limit Switch Preconditioning (Section 1R22.1)
50-265/2011002-02	NCV	Unit 1/2 EDG Output Breaker Failure to Unit 2 (Section 1R22.2)
50-265/2011001-00	LER	Loss of Unit 2 Essential Service 480V Bus (Section 4OA3.1)

#### Discussed

None

## 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 1R01

- OP-AA-108-111-1001; Severe Weather and Natural Disaster Guidelines; Revision 5
- QCOP 0010-02; Required Cold Weather Routines; Revision 34
- IR 1171954; Security Required WHR Waivers to Support Staffing
- QCOA 0010-16; Flood Emergency Procedure
- Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station; Revision 30
- IR 01191268; Flooding Emergency Action Levels

### Section 1R04

- TS 3.5.1; ECCS - Operating
- TS 3.6.4.3; Standby Gas Treatment (SGT) System
- Electrical Drawings: 4E-2681H, 4E-2681G, and 4E-2373.B
- QCOP 6620-05; SBO DG 1(2) Preparation for Standby Readiness, Revision 14
- QOM 2-6620-01; SBO DG 2 Starting Air Valve Checklist, Revision 4
- QOM 2-6620-02; SBO DG 2 Jacket Water Valve Check List, Revision 5
- QOM 2-6620-03; SBO DG 2 Fuel Oil Valve Checklist, Revision 2
- QOM 2-6620-04; SBO DG 2 Lube Oil Valve Checklist, Revision 2
- QCOS 2300-10; HPCI Monthly Valve Position Verification, Revision 8
- QOM 2-2300-01; Unit 2 HPCI Valve Checklist
- QOM 1-1400-09; Unit 1 A Core Spray Valve Checklist; Revision 005

### Section 1R05

- Pre-Fire Plan, Fire Zone 11.3.4, Unit 2 RB 544'-0" Elev. NE Corner Room - 2A RHR Room
- Fire Hazard Analysis for Fire Zone 11.3.4
- Pre-Fire Plan, Fire Zone 1.1.1.6, Unit ½ RB 609'-6" Elev. Refuel Floor
- Pre-Fire Plan, Fire Zone 8.2.7.E, Unit 2 TB 615'-6" Elev. North Mezzanine Floor
- Fire Hazard Analysis for Fire Zone 1.1.1.6
- Fire Hazard Analysis for Fire Zone 8.2.7.E
- Fire Hazard Analysis for Fire Zone 8.2.6.A
- Pre-Fire Plan, Fire Zone 8.2.6.A, Unit 1 Turbine Bldg. El. 595'-0" Hallway
- Pre-Fire Plan, Fire Zone 8.2.6.A, Unit 1 Turbine Bldg. El. 595'-0" 4kV Switchgear & U-1 Trackway

### Section 1R06

- QCTP 0130-11; Internal Flood Protection Program, Revision 5
- QOA 900-4 C-18; 900-4 C-18 Annunciator, Revision 4
- QOA 900-4 D-18; 900-4 D-18 Annunciator, Revision 4
- QGA 300; Secondary Containment Control, Revision 11
- QC-PSA-012; Quad Cities Internal Flood Evaluation Summary and Notebook, May 2010

### Section 1R07

- QCOS 1000-29; RHR Heat Exchanger Thermal Performance Test; Revision 13
- WO 1264291-01; OPS QCOS 1000-29 RHR HX Thermal Performance Test

### Section 1R11

- Simulator Scenario; "ASD Cell Failure/Degraded Feed Pump, Bus 13 Fire/Loss of Vacuum/Unisolable Leak Outside Containment

### Section 1R12

- IR 1163898; MRULE: Performance Criteria Exceeded (0201-02, Fuel); 1/12/2011
- Enterprise Maintenance Rule Production Database for the following systems:
  - Z0020: Reactor Building
  - Z02010 02: Reactor Vessel Internals - Fuel
  - Z0010: Primary Containment
  - Z6600: Emergency Diesel Generators
- IR 1161921; Increased Likelihood of a Fuel Defect on Unit 1; 1/12/2011
- UFSAR 6.2.3; Secondary Containment Functional Design
- EC 347977; Engineering Evaluation of Secondary Containment Breaches
- IR 1103426; Breach of Secondary Containment via HPCI Fire Protection System
- QCOS 5750-09; ECCS Room and DGCWP Cubicle Cooler Monthly Surveillance; Revision 34
- QCOS 6600-04; Diesel Generator Heat Exchanger Flow Reversal; Revision 19
- QCOS 6600-06; Diesel Generator Cooling Water Pump Flow Rate Test; Revision 38
- IR 1097759; Evaluate Need for PM to Flush DGCW Flow Instruments
- IR 0969849; U1 EDG CWP Tripped while Running on Alternate Feed
- IR 1108859; 1/2 DGCWP Lost MCR Light Pump when Pump was Secured
- IR 1094488; U1 EDG Cooling Water Low Flow after Start
- IR 1094310; U2 DGCWP to EDG HX Flow Rate Low
- IR 1129089; Heavy Corrosion on U2 DCGW Pump Suction Piping
- IR 1149259; Adverse Trend: U1 EDG Cooling Water Pump Differential Pressure
- IR 1097678; Low Flow from U2 EDG CWP to U2 EDH HX During QCOS 5750-09
- IR 1113392; MRULE: U2 EDG Performance (MSPI) is Near White

### Section 1R13

- Work Week 11-02-03 Safety Profile
- Safety Profile for Unit 2 downpower and single loop operation with condensate booster pump seal work on the weekend of 1/29/2011
- Work Week 11-07-08 Safety Profile
- Work Week 11-08-09 Safety Profile
- Work Week 11-14-02 Safety Profile

### Section 1R15

- IR 1160407; CRD Accumulator 1-0305-107-26-11 Vent Seat Leakage
- IR 1160604; U2 CRD Accumulator 58-39 Vent Seat Leakage
- Engineering Analysis and White Paper in Support of CRD Accumulator Operability
- QCOS 0300-23; Control Rod Scram Timing in the Hot Condition; Revision 7
- QCOS 0300-18; CRD Accumulator Pressure Check Test, Revision 7

- IR 1172248; 2C RHRSW Pump Did Not Start Promptly,
- TS 3.7.1; Residual Heat Removal Service Water System
- WO 1408732; 2CRHRSW Pump Did Not Start Promptly
- IR 1172084; U2 HPCI Ultrasonic Test Reading Below the Work Order Acceptance Criteria
- GEK 26923; Penetration Seals, Revision 1
- GEK 26944A; Section III, Maintenance of Penetration Seals
- EQ Binder 15Qi; GE F-01 Electrical Penetrations
- QCOS 1600-16; Primary Containment Electrical Penetration Pressures; Revision 12
- IR 1141883; U1 2B Outboard MSIV Dual Indication
- IR 1176690; Relay Failed to Activate During MSIV Testing
- IR 1183696; 2B MSIV Dual Indication
- IR 1163727; MSIV Test Switch Did Not Work
- IR 1191922; U2 MSIV Failed RPS Functional Test

### Section 1R19

- WO 01362208; Operations Perform QCOS 6700-02 MCC 28/29-5 Auto-transfer Logic Operation
- WO 01384930; Contingency Troubleshooting PKG for U-1, U-2 or U-1/2
- QCOS 6700-02; MCC 28/29-5 Auto-transfer Logic Operability Surveillance; Revision 13
- IR 1161948; Time Delay Relay As-Found Time Out of Band MCC 28/29-5
- IR 1057843; 2-3099-29 Valve Body Seating Surface is Steam Cut
- QCOP 5400-16; Off Gas SJAЕ Train Operation; Revision 8
- WO 01329566; 2A SJAЕ PCV Does Not Control
- WO 01252075; HPCI Pump Performance Test
- QCOS 2300-27 HPCI Pump Comprehensive Performance Test, Revision 25
- WO 859729; Rebuild Actuator and Rebuild/Replace Positioner/Regulator
- QCOP 5400-15; Off Gas Recombiner Train Operation; Revision 12
- QCOP 5400-16; Off Gas SJAЕ Train Operation; Revision 8
- WO 01393927; Troubleshoot 2B ASD NXG 'A' Controller
- QCOP 0202-43; Reactor Recirculation System Startup; Revision 3
- QCOP 0202-20; Unit 2 Reactor Recirculation System Post-Maintenance Startup, Revision 15

### Section 1R22

- QCOS 1600-07; Reactor Coolant Leakage in the Drywell; Revision 28
- QCOS 1400-01; Quarterly Core Spray System Flow Rate Test; Revision 39
- WO 01378232; Core Spray Pump A Flow Rate (IST)
- QCOS 1400-08; Core Spray System Power Operated Valve Test; Revision 23
- WO 01378570; Core Spray Valve Timing Test (Loop A) (IST)
- QCOS 6600-20; Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test; Revision 59
- QCOS 2300-29; U1 HPCI System Logic Functional Test; Revision 20
- QCOS 2300-13; HPCI System Manual Initiation Test; Revision 39
- CY-QC-110-635; Sodium Pentaborate Sample; Revision 3
- IR 1155212; Preconditioning During QCOS 0250-01
- IR 1176690; Relay Failed to Actuate During MSIV Testing
- IR 1183696; 2B MSIV Dual Indication
- IR 1183727; MSIV Test Switch Did Not Work
- QCOS 0250-01; MSIV Closure Scram Sensor Functional Test; Revision 28

## Section 1EP6

- Quad Cities 1Q11 PI Drill Package
- Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station; Revision 29

## Section 4OA1

- Nuclear Energy Institute (NEI) Document 99-02; Regulatory Assessment Performance Indicator Guideline, Revision 6
- Licensee 2010 Performance Indicator Submittals

## Section 4OA2

- IR 1161921; Increased Likelihood of a Fuel Defect on Unit 1
- NF-AA-430; Failed Fuel Action Plan; Revision 11
- EC 380162; Radiochemistry Evaluations of Quad Cities Unit 1 Cycle 21; Revision 0
- IR 1049458; Nuclear Fuels Review of Quad Cities Unit 1 Radiochemistry
- Fourth Quarter 2010 System Health Report dated February 4, 2010
- Operator Burden/Degraded Equipment Aggregate Assessment dated 9/9/2010
- Operator Burden/Degraded Equipment Aggregate Assessment dated 12/30/2010
- Aging Clearance Log dated 2/18/2011
- Operator Work Around Board Meeting Minutes dated January 26, 2011
- Operator Work Around Board Meeting Minutes dated November 18, 2010
- Operator Work Around Board Meeting Minutes dated October 28, 2010
- Operator Work Around Board Meeting Minutes dated September 30, 2010
- Operator Work Around Board Meeting Minutes dated September 3, 2010
- Operator Work Around Board Meeting Minutes dated June 24, 2010
- Operator Work Around Board Meeting Minutes dated May 21, 2010
- OP-AA-102-103; Operator Work-Around Program; Revision 3
- IR 1174555; U1 IRM#17 Output Fluctuations
- IR 1168144; Deluge System Spray Nozzle Not Re-installed After Surveillance as Required
- IR 1174398; QOS 5600-01 Performed CV #1 Failed to Pass RPS Signal
- IR 1075079; QOS 5600-01 Performed CV #1 Failed to Pass RPS Signal
- IR 1046303; Pressure Switch 2-5641-122 Out of Tolerance
- IR 1172084; U2 HPCI UT Reading Below the Work Order Acceptance Criteria
- P&ID M-87; Diagram of High Pressure Coolant Injection (HPCI) Piping
- NES-MS-03.1; Piping Minimum Wall Thickness Calculation
- IR 1103426; Breach of Secondary Containment Via HPCI Fire Protection System
- IR 1186311; Response to HPCI Secondary Containment IR 1103426
- EC 347977; Engineering Evaluation of Secondary Containment Breaches
- UFSAR 6.2.3; Secondary Containment Functional Design
- IR 1168235; SSPV Diaphragm Replacements Not Per EQ Requirements
- EC 359300; Evaluation of Extension of Qualified Life of VITON 515AB Diaphragm of ASCO SSPVs; Revision 000
- IR 1083445; OPEX: Control Rod Performance Issues Found During Testing
- EC 379031; [Dresden] Evaluation of Extension of Qualified Life of VITON 515AB Diaphragm of ASCO SSPVs; Revision 000
- ECR 398672; SSPV Diaphragm Qualified Life is Required to be Extended; 01/27/2011
- ECR 367893; Extend ASCO SSPV Cycle Life to have the Limiting Factor Be the Diaphragm Life (EQ Related); 12/02/2008

- EC 373233; EQ 2008: Extend ASCO SSPV Cycle Life to Have the Limiting Factor Be the Diaphragm Life (EQ Related); 12/16/2008
- IR 964361; 1B Recirc Pump Seal Inj Flow Regulator Can't Adjust Flow
- IR 1165666; Update on 1B Recirc Seal Injection Flow
- IR 1177184; QCOS 2300-29, HPCI Logic Testing Procedure Enhancements
- IR 1167551; PORC Action Items for Fuel Leak Testing
- IR 1170717; Unexpected 1/2 Scram from QCOS 0300-20
- QCOS 0300-20; Unit 1 HPCI System Logic Functional Test, Revision 20
- IR 1175763; Wrong Floor Plug Removed to Support Maintenance
- IR 1120271; Wrong Line was Cut During Performance of WO 1341322-01

#### Section 4OA3

- IR 1161795; BUS 29 De-Energized From Inadvertent Trip of MF Breaker
- IR 1161800; Loss of Bus 29 Due to Inadvertent Contact
- IR 1161803; Fatigue Assessment
- IR 1161821; Failure of MCC 28/29-5 to Auto Transfer
- NRC Event Notification #46535; Loss of Unit 2 Essential Service 480V Bus
- Letter from Richard J. Barrett, NRC to Thomas Kovach, Commonwealth Edison Nuclear Licensing Manager, dated December 7, 1990 SUBJECT: "Exemption from the Technical Requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50 for the Quad Cities LPCI Swing Bus Design (TAC NOS. 69420 and 69421)
- IR 1186892; Equipment Autopsy and Analysis Results Concern
- Licensee Event Report 265/2011-001-00; Loss of Unit 2 Essential Service 480V Bus
- IR 1187385; Additional Info Requested By Ops on MCC 28/29-5 Failure

#### Section 4OA7

- IR 1168144; System Returned to Service with Chicago Hose Cap Installed
- QCMMS 4100-24; Deluge System Functional Test (Grinnel 2 Inch Flooding Valve)

## LIST OF ACRONYMS USED

ASD	Adjustable Speed Drive
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Core Spray
EDG	Emergency Diesel Generator
FDF	Floor Drain Filter
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IR	Issue Report
LER	Licensee Event Report
LPCI	Low Pressure Coolant Injection
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records System
PI	Performance Indicator
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
ROP	Reactor Oversight Process
RPS	Reactor Protection System
SDP	Significance Determination Process
SFDF	Spare Floor Drain Filter
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
Vac	Voltage Alternating Current
Vdc	Voltage Direct Current
WO	Work Order

M. Pacilio

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Sincerely,

**/RA/**

Mark A. Ring, Chief  
Branch 1  
Division of Reactor Projects

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

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SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2  
NRC INTEGRATED INSPECTION REPORT 05000254/2011002;  
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