



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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May 3, 2010

Mr. Charles G. Pardee
Senior Vice President, Exelon Generation Company, LLC
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 05000254/2010002;
05000265/2010002

Dear Mr. Pardee:

On March 31, 2010, 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 inspection results, which were discussed on April 6, 2010, with Mr. T. Tulon 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, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the

C. Pardee

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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

Enclosure: Inspection Report 05000254/2010002; 05000265/2010002
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: 05000254/2010002 and 05000265/2010002

Licensee: Exelon Nuclear

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

Location: Cordova, IL

Dates: January 1 through March 31, 2010

Inspectors: J. McGhee, Senior Resident Inspector
B. Cushman, Resident Inspector
E. Coffman, Reactor Engineer
D. Jones, Inspector, DRS
C. Mathews, Illinois Emergency Management Agency

Approved by: M. Ring, Chief
Branch 1
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

IR 05000254/2010002, 05000265/2010002; 01/01/10 - 03/31/10; Quad Cities Nuclear Power Station, Units 1 & 2; Routine Integrated Inspection Report.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. 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

No findings of significance were identified.

B. Licensee-Identified Violations

No violations of significance were identified.

REPORT DETAILS

Summary of Plant Status

Unit 1

Unit 1 operated at 100 percent thermal power throughout the evaluated period from January 1 through March 15, 2010, with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers.

On March 16, 2010, a single control inserted automatically (scrammed) on Unit 1 during weekly reactor protection system test switch surveillance testing resulting in a 4 percent power reduction. The rod was appropriately isolated, and thermal power was returned to 100 percent while troubleshooting and repair were performed on the control rod. Power was lowered to 84 percent at 10:00 p.m. on March 20, 2010, to recover the control rod. Following rod repair, recovery and scram time testing, the unit was returned to 100 percent at 1:00 a.m. on March 21. The unit remained at 100 percent thermal power through March 31, 2010.

Unit 2

Unit 2 operated at full power with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers. Unit 2 operated at 100 percent thermal power throughout the evaluated period from January 1 through February 24, 2010, when the unit began to coast down in power to the refueling outage that began on March 14, 2010. At 12:00 a.m. on March 15, 2010, the unit was shut down for refueling. Refueling outage Q2R20 continued through March 31, 2010.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

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 with the Unit 1 reactor core isolation cooling system (RCIC) out-of-service for maintenance;
- Unit 2 RCIC with Unit 2 HPCI out-of-service for maintenance;
- 1/2 'B' standby gas treatment system (SBGTS) while relied upon as protected equipment; and
- 1/2 emergency diesel generator while relied upon as protected equipment.

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, Updated Final Safety Analysis Report (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 corrective action program (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 Inspection Procedure (IP) 71111.04-05.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

During the time period of March 1, 2010, to March 12, 2010, the inspectors performed a complete system alignment inspection of the Unit 2 HPCI 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 line-ups, electrical power availability, system pressure and temperature indications, component labeling, component lubrication, component and equipment cooling, hangers and supports, and operability of support systems. Inspectors also verified that ancillary equipment, scaffold erection 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 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 of significance were identified.

.3 System Walkdown Associated with Temporary Instruction 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

a. Inspection Scope and Documentation

During the time period from March 1, 2010, to March 12, 2010, the inspectors conducted a walkdown of the Unit 2 HPCI system in sufficient detail to reasonably assure the acceptability of the licensee's walkdowns (Temporary Instruction [TI] 2515/177, Section 04.02.d). The inspectors also verified that the information obtained during the licensee's walkdown was consistent with the items identified during the inspectors' independent walkdown (TI 2515/177, Section 04.02.c.3).

In addition, the inspectors verified that the licensee had isometric drawings that describe the Unit 2 HPCI system configuration and had acceptably confirmed the accuracy of the drawings (TI 2515/177, Section 04.02.a). The inspectors verified the following related to the isometric drawings:

- high point vents were identified;
- high points that do not have vents were acceptably recognizable;
- other areas where gas can accumulate and potentially impact subject system operability such as at orifices in horizontal pipes, isolated branch lines, heat exchangers, improperly sloped piping, and under closed valves, were acceptably described in the drawings or in referenced documentation;
- horizontal pipe centerline elevation deviations and pipe slopes in nominally horizontal lines that exceed specified criteria were identified;
- all pipes and fittings were clearly shown; and
- the drawings were up-to-date with respect to recent hardware changes and that any discrepancies between as-built configurations and the drawings were documented and entered into the CAP for resolution.

The inspectors verified that piping and instrumentation diagrams (P&IDs) accurately described the subject system, that they were up-to-date with respect to recent hardware changes, and any discrepancies between as-built configurations, the isometric drawings, and the P&IDs were documented and entered into the CAP for resolution (TI 2515/177, Section 04.02.b).

Documents reviewed are listed in the Attachment to this report.

This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later inspection report.

b. Findings

No findings of significance 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:

- Service Building Elevation 623'0", Control Room, Fire Zone 2.0;
- Service Building Elevation 595'0", Computer Room in Auxiliary Electric Room, Fire Zone 4.0;
- Service Building Elevation 595'0", Auxiliary Electric Room, Fire Zone 6.3;
- Service Building Elevation 609'0", Cable Spreading Room, Fire Zone 3.0; and
- Unit 2 Reactor Building Elevation 554'0", Torus Area and Top of Torus, Fire Zone 1.1.2.1.

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 five quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings of significance were identified.

1R07 Annual Heat Sink Performance (71111.07)

.1 Heat Sink Performance

a. Inspection Scope

The inspectors reviewed the licensee's inspection and post-inspection testing of the Unit 2 emergency diesel generator 2A and 2B cooling water heat exchangers 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 inspection included independent inspection of the heat exchangers immediately after they were opened for inspection. The inspectors reviewed the licensee's observations as compared against acceptance criteria. 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 of significance were identified.

1R08 Inservice Inspection Activities (71111.08G)

From March 8, 2010, through March 12, 2010, the inspectors conducted a review of the implementation of the licensee's inservice inspection (ISI) program for monitoring degradation of the reactor coolant system, risk-significant piping and components, and containment systems.

The inservice inspections described in Sections 1R08.1 and 1R08.2 below constituted one inspection sample as defined in IP 71111.08-05.

.1 Piping Systems Inservice Inspection

a. Inspection Scope

The inspectors observed the following non-destructive examinations 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 an NRC-approved alternative requirement.

- Ultrasonic Examination of the Residual Heat Removal (RHR) Pipe to Elbow Weld, 1008B-7, Report No. Q2R20-012;
- Ultrasonic Examination of the RHR Elbow To Tee Weld, 1016D-5, Report No. Q2R20-014;
- Visual Examination of the RHR Variable Spring Can 1009B-W-202, Report No. Q2R20-013;
- Visual Examination of the RHR Rigid Struts 1015B-M-202 A and B, Report No. Q2R20-015; and
- Magnetic Particle Examination of the Emergency Core Cooling System (ECCS) 8 Lugs Welded to Pipe 1025-W-212 A, Report No. Q2R20-023.

During the prior outage non-destructive surface and volumetric examinations, the licensee did not identify any relevant/recordable indications. Therefore, no NRC review was completed for this inspection procedure attribute.

The inspectors reviewed the following pressure boundary weld completed for a risk-significant system since the beginning of the last refueling outage to determine if the licensee applied the pre-service non-destructive examinations and acceptance criteria required by ASME Code Section XI. Additionally, the inspectors reviewed the welding procedure specification and supporting weld procedure qualification records to determine if the weld procedure was qualified in accordance with the requirements of Construction Code and the ASME Code Section IX:

- 2A RHR pump suction header relief valve replacement, Work Order No. 00949152.

b. Findings

No findings of significance were identified.

.2 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI-related problems entered into the licensee's corrective action program 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 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 of significance were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On February 12, 2009, 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 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 sample as defined in IP 71111.11.

b. Findings

No findings of significance were identified. An observation involving compensatory actions and associated training is discussed in Section 4OA2 of this report.

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:

- Z0202; Recirculation System; and
- Z5704; Reactor Building Heating, Ventilation, and Air Conditioning.

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 of significance 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 02 (online unit risk evaluation) - 2B service water pump, 1/2 emergency diesel generator (EDG), 1/2 diesel generator cooling water pump rotating element replacement and alignment tolerance issues;
- Work Week 12 (online unit risk evaluation) - Unit 2 electrical bus outages, Unit 2 EDG, Transformer T22 outage, 1/2 'A' standby gas treatment;
- Unit 2 outage schedule shutdown risk for first 72 hours - unit shutdown, reduced water inventory operations, operation with a potential to drain the reactor vessel (OPDRVs), multiple electrical bus outages, Unit 2 EDG;
- Unit 2 outage schedule shutdown risk for first weekend of outage (March 17-21, 2010) - reactor cavity flooded, fuel shuffle, OPDRVs, multiple electrical bus outages, T22 outage, U2 EDG, 1/2 'A' standby gas treatment system, 2C/2D residual heat removal pumps, 2C/2D residual heat removal service water pumps;
- Work Week 13 (online unit risk evaluation) and associated schedule changes - Unit 2 electrical bus outages, Unit 2 EDG, T22 outage, U2 250 Vdc Battery; and
- Work Week 14 (online unit risk evaluation) and associated schedule changes - abnormal electrical lineup, Unit 2 EDG outage extension, and motor control center 28-1A outage.

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 when questions were identified, 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 six samples as defined in IP 71111.13-05.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Issue Report 1010239: Broken phenolic pieces identified to secondary contacts of 2D residual heat removal service water pump supply breaker;
- IR 1021963: Voltage spikes identified for 4kV safety bus supply during troubleshooting activities;
- IR 1018379: Incorrect torque sequence given in work package;
- IR 1029824: HPCI cooling water pump check valve;
- IR 1041420: Safe shutdown makeup pump controller oscillations; and
- IR 1049056: Minor cavitation pitting inside 2-1402-38B.

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 of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification(s):

- TCCP/TIC-2498, Unit 2 Vdc Battery Swap for Foam Replacement.

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system(s). The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance. Documents reviewed in the course of this inspection are listed in the Attachment to this report.

This inspection constituted one temporary modification samples as defined in IP 71111.18-05.

b. Findings

No findings of significance were identified.

.2 Permanent Plant Modifications

a. Inspection Scope

The following engineering design package was reviewed, and selected aspects were discussed with engineering personnel:

- EC 374439, Install Cameron LEFM CheckPlus System.

This document and related documentation were reviewed for adequacy of the associated 10 CFR 50.59 safety evaluation screening, consideration of design parameters, and installation of the field equipment associated with this modification. The inspectors observed ongoing and completed work activities to verify that installation was consistent with the design control documents. The modification installed ultrasonic feedwater flow instrumentation with improved accuracy for input to the unit heat balance for determination of plant thermal power. The new system includes a flow meter spool piece in each of the three feedwater pump discharge headers. Each spool piece contained 16 ultrasonic flow transducers, a pressure tap, and a temperature sensor.

The pressure and temperature sensors in the spool piece provide for density compensation of the flow measurement. The sensors are divided into two channels powered from different electrical power supplies to provide redundancy and reliability.

Documents reviewed in the course of this inspection are listed in the Attachment to this report.

Because the installation and acceptance testing of this modification continued into the next inspection period, the inspections performed to date constitute a partial performance of a permanent plant modification sample as defined in IP 71111.18-05. Documentation of the completed sample will be included in a later inspection report.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- Work Order (WO) 1210011: Replace existing 1/2 diesel generator cooling water pump rotating element;
- WO 1306126: 1A RHRSW high pressure pump leak;
- WO 1314050: Replace VPRO Module 'X' in 1-1901-31-7 (digital electro-hydraulic control system card replacement); and
- WO 1314563: Unit 2 diesel generator load test.

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, 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 of significance were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the shutdown safety management plan (SSMP) and contingency plans for the Unit 2 refueling outage conducted March 15 - 31, 2010, 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. Additionally, inspectors confirmed planned work schedules conformed to work hour rules put forth in 10 CFR 26 for covered workers. During the refueling outage, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below. Documents reviewed during the inspection are listed in the Attachment to this report.

- Work schedules were reviewed for selected workers in operations, fire brigade, and maintenance covered positions;
- Licensee configuration management, including maintenance of defense-in-depth commensurate with the SSMP 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 and accounting for instrument error;
- Controls over the status and configuration of electrical systems to ensure that TS and SSMP 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, 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;
- Refueling activities, including fuel handling and sipping to detect fuel assembly leakage; and
- Licensee identification and resolution of problems related to refueling outage activities.

Since the outage was still in progress at the close of the inspection period, the inspection activities performed during this period constitute a partial completion of one sample for IP 71111.20. Additional inspection activities and document reviews performed to complete the sample will be documented in a later inspection report.

b. Findings

No findings of significance 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:

- RCIC System Power Operated Valve Test (IST);
- Fill and Vent Verification Procedures for ECCS Systems (Routine);
- Reactor Coolant Leakage in the Drywell (RCS);
- Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test (Routine);
- Unit 1 Reactor Recirculation Pump Runout Limits Determination and Setting (Routine);
- Secondary Containment Capability Test (Routine); and
- RHR Containment Spray Line Isolation 'B' Valve (CIV).

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 TS, 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, ASME code, and reference values were consistent with the system design basis;
- 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.

Also, additional activities were performed during the review of Fill and Vent Verification Procedures for ECCS Systems that were associated with TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems." These activities are described in bullet .2 of this section.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted four routine surveillance testing samples, one inservice testing sample, one reactor coolant system leak detection inspection sample, and one containment isolation valve sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings of significance were identified.

.2 Fill and Vent Verification Procedures Associated with Temporary Instruction 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems."

a. Inspection Scope

The inspectors verified that procedures were acceptable for the following systems:

- Units 1&2 HPCI;
- Units 1&2 CS; and
- Units 1&2 LPCI mode of RHR.

The inspectors reviewed procedures used for conducting surveillances and determination of void volumes to ensure that the void criteria was satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (TI 2515/177, Section 04.03.a). Also, the inspectors reviewed procedures used for filling and venting the following conditions which may have introduced voids into the subject systems to verify that the procedures acceptably addressed testing for such voids and provided acceptable processes for their reduction or elimination (TI 2515/177, Section 04.03.b). Specifically, the inspectors verified that:

- Gas intrusion prevention, refill, venting, monitoring, trending, evaluation, and void correction activities were acceptably controlled by approved operating procedures (TI 2515/177, Section 04.03.c.1);
- Procedures ensured the system did not contain voids that may jeopardize operability (TI 2515/177, Section 04.03.c.2);
- Procedures established that void criteria were satisfied and will be reasonably ensured to be satisfied until the next scheduled void surveillance (TI 2515/177, Section 04.03.c.3);

- The licensee entered changes into the CAP as needed to ensure acceptable response to issues (TI 2515/177, Section 04.03.c.5); and
- Procedures included independent verification that critical steps were completed (TI 2515/177, Section 04.03.c.6).

The inspectors verified the following with respect to surveillance and void detection:

- Specified surveillance frequencies were consistent with TS SR requirements (TI 2515/177, Section 04.03.d.1);
- Surveillance frequency determination was described (TI 2515/177, Section 04.03.d.2);
- Surveillance methods were acceptably established to achieve the needed accuracy (TI 2515/177, Section 04.03.d.3);
- Surveillance procedures included up-to-date acceptance criteria (TI 2515/177, Section 04.03.d.4);
- Procedures included effective follow-up actions when acceptance criteria are exceeded or when trending indicated that criteria may be approached before the next scheduled surveillance (TI 2515/177, Section 04.03.d.5);
- Measured void volume uncertainty was considered when test data was compared to acceptance criteria (TI 2515/177, Section 04.03.d.6);
- Venting procedures and practices utilized criteria such as adequate venting durations and observation of a steady stream of water (TI 2515/177, Section 04.03.d.7);
- An effective sequencing of void removal steps was followed to ensure that gas does not move into previously filled system volumes (TI 2515/177, Section 04.03.d.8);
- Qualitative void assessment methods included expectations that the void will be significantly less than allowed by acceptance criteria (TI 2515/177, Section 04.03.d.9);
- Venting results were trended periodically to confirm that the systems are sufficiently full of water and that the venting frequencies are adequate. The inspectors also verified that records on the quantity of gas at each location are maintained and trended as a means of preemptively identifying degrading gas accumulations (TI 2515/177, Section 04.03.d.10);
- Surveillances were conducted at locations where a void could form, including high points, dead legs, and locations under closed valves in vertical pipes (TI 2515/177, Section 04.03.d.11);
- Systems were not pre-conditioned by other procedures that may cause a system to be filled, such as by testing, prior to the void surveillance (TI 2515/177, Section 04.03.d.12); and
- Procedures included gas sampling for unexpected void increases if the source of the void is unknown and sampling is needed to assist in determining the source (TI 2515/177, Section 04.03.d.13).

The inspectors verified the following with respect to filling and venting:

- Revisions to fill and vent procedures to address new vents or different venting sequences were acceptably accomplished (TI 2515/177, Section 04.03.e.1);

- Fill and vent procedures provided instructions to modify restoration guidance to address changes in maintenance work scope or to reflect different boundaries from those assumed in the procedure (TI 2515/177, Section 04.03.e.2); and
- Void removal methods were acceptably addressed by approved procedures (TI 2515/177, Section 04.03.f.1).

Documents reviewed are listed in the Attachment to this report.

This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later inspection report.

b. Findings

No findings of significance were identified.

Cornerstone: Emergency Preparedness

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 18, 2010, 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 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 one sample as defined in IP 71114.06-05.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

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 1st quarter 2009 through the 4th quarter 2009. 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 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC Inspection Reports for the period of January 2009 through December 2009 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 of significance 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 1st quarter 2009 through the 4th quarter 2009. 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 5, 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 2009 through December 2009 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 of significance 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 1st quarter 2009 through the 4th quarter 2009. 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 5, 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 2009 through December 2009 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 of significance 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: the complete and accurate identification of the problem; that timeliness was commensurate with the safety significance; that 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 attached List of Documents Reviewed.

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/Observations

No findings of significance were identified. However, the inspectors identified examples of insufficient rigor in implementation of interim corrective actions or compensatory measures for degraded plant equipment that occurred in 2009 and in February and March of 2010. Although these examples did not individually result in sufficient impact to prevent the accomplishment of the required activity, the lack of rigor in implementing the action could very well have delayed personnel from taking the required actions or have otherwise challenged emergency response. Specific examples are discussed below:

- On August 12, 2009, the NRC inspectors raised questions concerning operability of systems where in-progress work activities had defeated a flood protection barrier (documented in Inspection Report 05000254/2009004). The licensee provided interim guidance to the operating staff in the form of a standing order that identified actions necessary to maintain system operability with an impaired flood barrier. While the on-shift crew took appropriately conservative actions, a different crew later that day did not correctly apply the standing order and failed to implement the compensatory actions required to maintain operability of the affected system. Subsequent revision of the implementing procedure and just-in-time training provided clarification of the issue.
- Issue Report 1014848, "PA, EMER SIREN, FIRE SIREN ISSUES FROM QCOS 9000-03," written in January 2010 identified degraded public address system speakers. Operations Department issued Standing Order 10-02 on January 11, 2010, to implement compensatory actions to ensure personnel are promptly notified of a hazardous plant condition in the affected areas. Weaknesses in implementation of the standing order were identified by licensee staff and subsequently entered into the CAP on January 22, 2010, and again on February 10, 2010. Weaknesses included failure to notify Security or Emergency Response personnel who could have been responsible for accomplishing the actions of the standing order when the order was issued.
- As a follow up to the weaknesses identified in the standing order implementation discussed in the first bullet, NRC inspectors observed a training evaluation of operator performance in the simulator on February 12, 2010. As part of this observation, inspectors identified that the crew did not reference the standing order to otherwise indicate that compensatory measures were implemented when simulated area and site evacuations were announced over the public address system in the simulator. This performance deficiency was not identified by the training evaluators or discussed with the crew after the scenario until the NRC inspector raised the issue. This oversight was documented in the licensee's CAP. Further discussion with Operations and Training personnel revealed that the standing order had not been incorporated into the training cycle for reinforcement and practice even though the order was expected to remain in place for up to a year while repairs were made to the public address system.
- On March 2, 2010, an inspector identified that tarps, put in place to protect Bus 23-1 and Bus 24-1 switchgear from ventilation heating coil leakage, obstructed Appendix R emergency lighting. Two emergency light fixtures,

ELP 81A and 81B, were blocked from their designated targets by the tarps. The station fire marshal then implemented the appropriate impairment documentation, entered the issue into the CAP, and contacted Operations to arrange for the tarps to be moved. The tarps were subsequently removed since the leak was no longer impacting the switchgear and the lights were verified to be properly aligned.

Each of these examples was evaluated under the appropriate guidance in Inspection Manual Chapter 0612 and determined to have minor risk significance. However, the combination of issues over a short period of time warrants additional evaluation for potential programmatic weaknesses in implementation of interim corrective action or compensatory measures. Following discussions, the licensee entered the observations into the CAP for resolution as IR 1054341, "NRC Observation Regarding Implementation of Comp Measures."

.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 of significance 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 concerns of possible preconditioning for infrequently scheduled maintenance activities occurring prior to and in conjunction with planned InService Test (IST) data collection for risk-significant valve stroke times. The inspectors' considered the 4-year period of January 2006 through January 2010.

The review also included documents outside the normal CAP in work control documentation, system health reports, quality assurance audit/surveillance reports, and IST program documentation. 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 one semi-annual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings of significance were identified.

.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 of significance were identified.

.5 Selected Issue Follow-Up Inspection: Clearance Order Released to Operations with Switch Electrically Disconnected

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting the failure of the 2-2001-171B valve in the radwaste system to open. The 2-2001-171B is the discharge header isolation valve for the 2B phase separator tank. The control switch was to be replaced per WO 306230. The

technicians performing the job discovered that the new control switch was defective and backed out of the activity. The technicians properly documented in the work package that the old control switch was still installed with leads lifted. The supervisor did not review the work package prior to signing off the clearance order without clarifying notes to inform Operations that work would recommence at a later date and the control switch would be left out-of-service. Operations cleared the tags and attempted to use the control switch for AO 2-2001-171B, which failed to operate since the control switch was electrically disconnected.

Inspectors reviewed this issue per the licensee programs for clearance and tagging, configuration control, and for initiation of prompt investigations. Although a procedural performance deficiency did exist in compliance with documentation and notification of equipment status, inspectors determined the equipment status was properly documented in the work package and would have been restored in accordance with the work process. Inability to operate the valve was an operational inconvenience only with very little risk significance. The issue was entered into the CAP as Issue Report 1031403, "2-2001-171B Valve Not Opening." Thus, the issue had no safety consequences and was evaluated as minor in accordance with the examples in Inspection Manual Chapter 0609, Appendix E.

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

b. Findings

No findings of significance were identified.

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

.1 (Closed) Licensee Event Report 05000254/2009-004-00: "Pinhole Leak in Core Spray Piping Results in Loss of Containment Integrity and Plant Shutdown for Repairs."

On September 8, 2009, during the performance of a quarterly 1A core spray (CS) system flow test, a pinhole leak was identified in the 1B CS minimum flow line just downstream of the 1B CS minimum flow valve. As a result, primary containment was declared inoperable and Quad Cities Unit 1 commenced a normal shutdown as required by Technical Specifications. Unit 1 was shut down during the morning of September 9, 2009.

The affected CS piping was removed and inspected. The inspection confirmed that an area of the pipe had severe wall thinning consistent with indications for cavitation erosion. The affected piping upstream and downstream of the 1B CS minimum flow valve was replaced. Ultrasonic testing was performed on all the other ECCS minimum flow lines on Unit 1. The testing verified that the wall thickness in all other Unit 1 ECCS minimum flow lines was acceptable. Unit 1 commenced a normal startup on September 10, 2009.

A review of the licensee's flow accelerated corrosion (FAC) and cavitation corrosion programs was conducted. No regulatory compliance deficiencies were identified. The licensee's programs are structured and administered in accordance with endorsed regulatory guidance and industry best practices. The 1B CS minimum flow piping was

appropriately excluded from the scope of the FAC and cavitation corrosion programs as recommended by endorsed regulatory guidance and industry best practices. The licensee has added to the scope of their FAC and cavitation corrosion programs all ECCS minimum flow piping and other identified areas of piping in risk significant systems where the likelihood of a similar failure exist. These areas would include areas downstream of a flow orifice or where low temperature single phase fluid velocity is exceptionally high.

Corrective actions include the requirement to perform an ultrasonic testing following operation of the 1B core spray system for early detection of wall thinning until the slope of the piping can be modified during the next refueling outage. Documents reviewed as part of this inspection 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.

4OA5 Other Activities

.1 (Open) NRC TI 2515/177, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems (NRC Generic Letter 2008-01)."

As documented in Sections 1R04 and 1R22, the inspectors confirmed the acceptability of the described licensee's actions in response to potential gas accumulation issues as described in Generic Letter 2008-01. This inspection effort counts towards the completion of TI 2515/177, which will be closed in a later inspection report.

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 6, 2010, the inspectors presented the inspection results to Mr. T. Tulon, 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:

- The results of the inservice inspection with Plant Manager, R. Gideon, on March 12, 2010.

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

T. Tulon, Site Vice President
W. Beck, Regulatory Assurance Manager
D. Bowman, Operations Services Manager
D. Collins, Radiation Protection Manager
D. Craddick, Maintenance Director
R. Dammann, Business Manager
S. Darin, Engineering Director
R. Gaylord, Training Support Manager
J. Hansen, Licensing Manager
V. Neels, Chemistry/Environ/Radwaste Manager
D. Thompson, Security Manager

Nuclear Regulatory Commission

M. Ring, Chief, Reactor Projects Branch 1
S. Campbell, Branch Chief, NRR/Division of Reactor Licensing
C. Gratton, NRR/Division of Reactor Licensing
A. Howe, NRR/Division of Reactor Licensing

Illinois Emergency Management Agency

C. Settles, Section Head

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

2515/177	TI	Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray System (NRC Generic Letter 2008-01)
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Closed

05000254/2009-004-00	LER	Pinhole Leak in Core Spray Piping Results in Loss of Containment Integrity and Plant Shutdown for Repairs
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LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors 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 1R04

- QCOS 2300-10; HPCI Monthly Valve Position Verification; Revision 8
- QCOP 2300-01; HPCI Preparation for Standby Operation; Revision 54
- M-46; Diagram of HPCI Piping; Revision CA and R
- USFAR 6.3; Emergency Core Cooling Systems; Revision 10
- TS 3.5.1.; Emergency Core Cooling Systems (ECCS) and Reactor Core Isolation Cooling (RCIC) System; Amendment 223/218
- M-89 Sheet 1; Diagram of Reactor Core Isolation Cooling System (RCIC) Piping; Revision BB
- M-89 Sheet 2; Diagram of Reactor Core Isolation Cooling Turbine Lubrication and Pump Seal Cooler Piping; Revision C
- QCOP 1300-01; RCIC System Preparation for Standby Operation; Revision 36
- QOM 2-2300-01; Unit 2 HPCI Valve Checklist; Revision 12
- Equipment Apparent Cause Evaluation (EACE) – Engineering – U-2 HPCI Trip During QCOS 2300-05 Surveillance
- QCOP 6600-04; Diesel Generator 1/2 Preparation for Standby Operation; Revision 29
- AR 01043573; 1/2 EDG Fuel Level Indication Bubbler Found Pegged High
- QCOP 7500-01; Standby Gas Treatment System (SBGTS) Standby Operation and Start-Up; Revision 19
- QOM 0-7500-01; U1/2 Standby Gas Treatment Valve Checklist; Revision 7
- M-44; Diagram of Standby Gas Treatment System; Revision AP

Section 1R05

- OP-AA-201-008; Pre-fire Plan Manual Index - Pre-Plan RB-16; Revision 2
- Pre-plan SB-31; Service Building Elevation 623'0" Control Room; Fire Zone 2.0
- Pre-plan SB-28; Service Building Elevation 595'0" Computer Room in Auxiliary Electric Room; Fire Zone 4.0; Revision 25
- Pre-plan SB-27; Service Building Elevation 595'0" Auxiliary Electric Room; Fire Zone 6.3
- Pre-plan SB-30; Service Building Elevation 609'0" Cable Spreading Room; Fire Zone 3.0
- Pre-plan RB-13; Unit 2 Reactor Building Elevation 554'0" Torus Area and Top of Torus; Fire Zone 1.1.2.1; Revision 24

Section 1R07

- WO 1142844; 2A Heat Exchanger Open/Inspect/Clean; 3/19/2010
- WO 1142845; 2B Heat Exchanger Open/Inspect/Clean; 3/19/2010
- IR 1045213; U2 DG HX Flange Faces Have Moderate Crevice Corrosion; 3/19/2010
- QCOS 6600-06; Diesel Generator Cooling Water pump Flow Rate Test; Revision 36
- QCOS 6600-42; Unit 2 Emergency Diesel Generator Load Test; Revision 32

Section 1R08

- M-1806-02; RHR Support Detail Line No. 2-1015-24"; Sheet 1
- AR 01039453; NDE Reports Not Included in Work Packages; 03/06/2010
- AR 00745095; Missing Stud and Nut for ASME Exam; 03/05/2008
- AR 01040992; Q2R20 ISI Hanger Condition Acceptable; 03/10/2010
- AR 01041257; Q2R20 ISI Hanger Needs New Scale; 03/11/2010
- GE-ADM-1002; Procedure for Nondestructive Examination Data Review and Analysis of Recorded Indications; 12/15/2008
- GE-PDI-UT-1; PDI Generic Procedure for the Ultrasonic Examination of Ferritic Pipe Welds; 10/27/2008
- GE-MT-100; Procedure for Magnetic Particle Examination (Dry Particle, Color Contrast or Wet Particle, Fluorescent); 01/30/2006
- ER-AA-335-016; VT-3 Visual Examination of Component Supports, Attachments, and Interiors of Reactor Vessels; Revision 5
- Work Order Package 00949152; MM 2-1001-125D Relief Valve Sample Replacement/Testing

Section 1R11

- OP-AA-101-113-1006; 4.0 Crew Critique Guidelines; Revision 1
- IR 01038332; Incomplete Critique Following Simulator Evaluation; 03/03/2010
- IR 01032606; LORT Simulator Conduct and Critique Deficiencies; 02/18/10

Section 1R12

- Evaluation of System Performance Report for the Z0202 Functions (Recirculation Systems) from 01/01/08 to 01/01/10
- IR 756644; 2A RR Motor Lower Guide Bearing Oil Cooler RBCCW Leak; 03/30/08
- IR 757504; 1B Recirculation Pump Speed Began Drifting Down; 04/01/08
- IR 825425; Inadvertent Trip of 2B Recirculation MG Set; 10/02/08
- IR 834239; MRULE; RHR (1000-01) PLPC Criteria Exceeded; 10/22/08
- IR 912506; PSU – 1-0202-5B Did Not Stroke Closed; 04/28/09
- Evaluation of System Performance Report for the Z5704 Functions (Reactor Building Heating, Ventilation and Air Conditioning) from 02/04/08 to 02/04/10

Section 1R13

- WO 1210011; Replace Existing ½ DGCWP Rotating Element
- WO 1165003; ½ Diesel Generator Periodic Inspection
- WO 121001102; OP PMT ½ Diesel Generator Cooling Water Pump
- WO 116500303; OP PMT ½ Diesel Generator Following 2-year PM
- IR 1013063; U-0 DG Cooling WTR Pump Alignment Slightly Out of Tolerance
- IR 1044571; Shutdown Safety Program RHR Pumps Wrongly Credited; 03/18/2010
- EC 378400; Engineering document the review of the pump alignment on the 0-3903 Diesel Generator Cooling Water Pump (DGCWP) performed under WO 1210011 as acceptable

Section 1R15

- IR 1010239; FME – Found Broken Phenolic Pieces to Secondary Contacts; 12/29/09
- IR 1021963; K-T Problem Analysis Results for 4KV Voltage Spikes; 01/27/10
- IR 1029824; Check Valve 2-2301-51 Leaking By; 02/12/10

- IR 1018379; Incorrect Torque Sequence Given in Work Package; 1/19/2010
- WO 835123; Open and Eddy Current Test 1A RHR HX
- IR 1041420; SSMP Controller Not Controlling; 3/11/10
- QCOP 2900-02; Safe Shutdown Makeup Pump System Start Up; Revision 21
- QCOS 2900-01; Safe Shutdown Makeup Pump Flow Rate Test; Revision 31

Section 1R18

- EC 374439; Install Cameron LEFM CheckPlus System; Revision 1
- Engineering Report ER-756; "Operating Event Reports"; Revision 0
- EC 377684; Unit 02 250 VDC Battery Spacer Replacement using a Procedurally Controlled Temporary Configuration Change (TIC-2498); Revision 00
- TIC 2498; U-2 250 VDC Battery Swap for Foam Replacement
- 50.59 Evaluation for TIC-2498 ; Revision 000
- IR 01032027; Resistance Reading Above the Baseline on the U1 125 ALT; 02/17/10
- TIC 2520; Quad Cities Unit 2 Power Ascension Procedure to Maximum Thermal Power Post Turbine Retrofit; Revision 0

Section 1R19

- WO 01306126; 1A RHRSW HP Pump Leak
- WO 1210011, Replace Existing 1/2 DGCW PP Rotating Element
- Power Labs Report QDC-83763; Failure Evaluation of the 1A RHRSW HP Pump Discharge Reducing Elbow Lower Weld Component; 02/25/2010
- IR 1013063; U-0 Cooling Wtr Pump Alignment Slightly Out of Tolerance; 01/06/10
- EC 378400; Review of Pump Alignment on the 0-3903 Diesel Generator Cooling Water Pump (DGCWP) Performed under WO 1210011; Revision 00
- MA-QC-MM-4-0001; Pump and Motor Alignment/Tolerance Tables; Revision 2
- QCOS 6600-06; Diesel Generator Cooling Water Pump Flow Rate Test; Revision 35
- TS 3.7.1; Diesel Generator Cooling Water (DGCW) System
- IR 1025452; Flange Face Requires Evaluation; 02/03/10
- IR 1026579; 1A RHRSW 8GT As Found and As Left Alignment Out of Tolerance; 02/05/10
- ECR 393853; Engineering Evaluation of 1A RHRSW Pump Alignment; 02/05/10
- CC-AA-407; Maintenance Specification: Evaluation and Repair of Piping and Equipment Flanges; Revision 2
- QCOS 1000-04; RHR Service Water Pump Operability Test; Revision 48
- WO 1314050; FNI Replace VPRO Module X in 1-901-31-7
- QCOS 6600-06; Diesel Generator Cooling Water pump Flow Rate Test; Revision 36
- QCOS 6600-42; Unit 2 Emergency Diesel Generator Load Test; Revision 32
- WO 1314563; Diesel Generator Load Test; 3/23/2010

Section 1R20

- EC 377776; Heavy Loads Evaluation for Unit Two Turbine Retrofit
- Q2R20 Shutdown Risk Contingency Plan & Related Work Evaluation; Revision 1
- Q2R20 Schedule; Protected Equipment Windows; Run Date 02/14/2010
- Q2R20 Refuel Outage Shutdown Safety Management Plan (SSMP) Review; Revision 1; 02/25/2010
- QCOP 0300-08; CRD Hydraulic Control Module Isolation; Revision 17

Section 1R22

- QCOS 1600-07; Reactor Coolant Leakage in the Drywell; Revision 27
- QCTS 2000-01; Drywell Leakage Troubleshooting; Revision 1
- QCOS 1300-06; RCIC System Power Operated Valve Test; Revision 26
- WO #01278506; OP Perform QCOS 1300-06 RCIC Valve Timing Test; 1/18/10
- IR 728092; NRC Generic Letter 2008-01 Managing Gas Accumulation; 01/28/08
- IR 722091; REGCOR – NRC Generic Letter 2008-01: Managing Gas Accumulation; 01/14/08
- IR 811225; NRC GL 2008-01 Tech Evals – Fleet Wide Gaps; 08/26/08
- IR 801914; Core Spray Vents Not at Absolute High Point on Discharge; 07/30/08
- Letter from Keith R. Jury dated October 14, 2008; Subject: Nine-Month Response to Generic Letter 2008-01
- Letter from Patrick R. Simpson dated July 7, 2009; Subject: Supplemental Response to Generic Letter 2008-01
- QDC 1400-M-1170; Determination of Acceptance Criteria for RCIC and Core Spray System Monthly Vent Verifications; Revision 2B
- EC 371614; Generic Letter 2008-01 System Evaluation Template Quad Cities Station – Core Spray Systems; Revision 1
- QCOP 1000-01; RHR Fill and Vent; Revision 19
- QCOP 1400-01; Core Spray System Preparation for Standby Operation; Revision 20
- QCOS 1400-10; Core Spray Operability Verification; Revision 20
- EC 371224; GL 08-01 Venting and Gas Accumulation Evaluation for Core Spray; Revision 0
- EC 371835; Venting and Gas Accumulation Evaluation for Core Spray Discharge Lines; Revision 0 (Dresden)
- EC 371911; Acceptance Criteria for Venting of the LPCI and Core Spray Systems; Revision 0 (Dresden)
- EC 371440; Generic Letter 2008-01 System Evaluation Template Quad Cities Station – HPCI Systems; Revision 1
- EC 371223; NRC GL 08-01 Venting and Gas Accumulation Evaluation for HPCI, Revision 0
- QCOP 2300-01; HPCI Preparation for Standby Operation, Revision 53
- QCOS 2300-09; HPCI Vent Verification; Revision 21
- QCOS 6600-20; Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test; Revision 57
- QCOS 0202-23; Unit 1 Reactor Recirculation Pump Runout Limits Determination and Setting; Revision 0
- WO #1283199; Recirculation Pump Runout Limits Determination and Setting
- WO #1165720; Secondary Containment Capability Test; 3/11/10
- QCOS 1600-54; Secondary Containment Capability Test; Revision 0
- WO #1143967; DW Spray 26B Local Leak Rate Test (IST)
- QCTS 0600-17; RHR Containment Spray Line Isolation Valve Local Leak Rate Test MO-1(2)-1001-26A/B

Section 1EP06

- EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 27

Section 4OA1

- Quad Cities Unit 1 and 2 NRC Performance Indicator Submittal 1st quarter 2009 through 4th quarter 2009
- Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5

Section 4OA2

- Operator Work Around Board Minutes for the following dates in 2009: January 23, February 26, March 16, April 14, April 23, September 25, November 24, and December 30.
- OP-AA-102-103; Operator Work Around Program, Revision 2
- OP-AA-102-103-1001, Operator Burden Impact Assessment Program; Revision 000
- IR 1023400; Vender Identified An ERV That Would Not Open; 01/29/2010
- ER-AA-321-1007; Inservice Testing (IST) Program Corporate Technical Positions; Revision 0
- Exelon IST Program Technical Position on Preconditioning of Motor Operated Valves
- IST Acceptance Criteria and Trending data from January 2006 – January 2010 for the following IST components: 1(2)-2301-3, 1(2)-2301-5, 1(2)-2301-6, 1(2)-1301-17, 1(2)-1301-60, and 1(2)-1301-62.
- IR 828218; IST Adverse Trend: MO 2-1301-60 Step Increase in Stroke Time; 10/08/2008
- IR 811394; IST Adverse Trend: MO 2-1301-17 Closure Stroke Time; 08/27/2008
- IR 850732; MO 2-1301-17 Stroke Time; 12/01/2008
- QCOS 1300-06; RCIC System Power Operated Valve Testing; Revision 26
- QCOS 2300-06; HPCI System Power Operated Valve Testing TIC 2502; Revision 34A
- IR 1031403; Unable to Fill RWMT Due to 2-2001-171B Valve Not Opening; 2/16/2010
- OP-AA-108-112; Plant Status and Configuration; Revision 5
- OP-AA-109-101; Clearance and Tagging; Revision 5
- WO 1306230; The Control Switch for the AO 2-2001-171B is Broken-CCP; 2/17/2010
- IR 1014848; PA, Emergency Siren, Fire Sirens Issues from QCOS 9000-03; 1/11/2010
- IR 1020074; NOS ID Public Address Compensatory Actions Not Known; 1/22/2010
- IR 1028500; NOS ID Standing Order 10-02 Issues; 2/10/2010
- IR 1028507; Inadequate Compensatory Measures Following Discovery of Degraded Public Address System; 2/10/2010
- Standing Order 10-04; Plant Public Address (PA) System Degradation; 3/4/2010
- Standing Order 10-02; Plant PA System Degradation; 1/11/2010
- IR 1032606; NRC ID'd LORT Simulator Conduct/Critique Deficiencies; 02/18/2010
- OP-AA-101-113-1006; 4.0 Crew Critique Guidelines; Revision 1
- IR 1037680; Tarps Covering 23-1, 24-1 Switch Gear Obstructing ELPs; 3/2/2010
- IR 1038332; Incomplete Critique Following Simulator Evaluation; 3/3/2010
- IR 952507; Questions By NRC Resident on Basis of QCAP 0250-06; 8/12/2009
- IR 1054341; NRC Observations Regarding Implementation of Comp Measures; 04/08/2010

Section 4OA3

- IR 962562; 1B Core Spray Min Flow Line Leakage
- RCR 962562-03; 1B Core Spray Min Flow Line Leakage
- LER 254/09-004; Pinhole Leak in Core Spray piping Results in Loss of Containment Integrity and Plant Shutdown for Repairs; 11/6/09
- EPRI TR-112657; Revised Risk-Informed Inservice Inspection Evaluation Procedure; Revision B-A
- NRC SER for EPRI TR-112657 Revision B dated October 28, 1999
- EPRI NSAC-202L-R3; Recommendations for an Effective Flow-Accelerated Corrosion Program

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
ASME	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Core Spray
DRP	Division of Reactor Projects
EDG	Emergency Diesel Generator
ECCS	Emergency Core Cooling System
FAC	Flow Accelerated Corrosion
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
ISI	Inservice Inspection
LER	Licensee Event Report
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	Nuclear Regulatory Commission
OPDRV	Operation with a Potential to Drain the Reactor Vessel
PARS	Publicly Available Records
P&IDs	Piping and Instrumentation Diagrams
PI	Performance Indicator
RCIC	Reactor Core Isolation Cooling
RHR	Residual Heat Removal
SBGTS	Standby Gas Treatment System
SDP	Significance Determination Process
TI	Temporary Instruction
TS	Technical Specifications
Vdc	Voltage - Direct Current
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

C. Pardee

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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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Letter to C. Pardee from M. Ring dated May 3, 2010

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2010002;
05000265/2010002

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