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

November 9, 2009

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 05000254/2009004;
05000265/2009004

Dear Mr. Pardee:

On September 30, 2009, 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 findings, which were discussed on October 6, 2009, 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, two findings of very low safety significance, one NRC-identified and one self-revealed, were identified. The findings involved violations 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 VI.A.1 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 an NCV, 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. If you disagree with the characterization of 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 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; and the Resident Inspector Office at the Quad Cities Nuclear Power Station. The information you provide will be considered in accordance with Inspection Manual Chapter 0305.

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 NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site 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; 72-053
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 05000254/2009004; 05000265/2009004
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-254, 50-265, 72-053
License Nos:	DPR-29, DPR-30
Report No:	05000254/2009004 and 05000265/2009004
Licensee:	Exelon Nuclear
Facility:	Quad Cities Nuclear Power Station, Units 1 and 2
Location:	Cordova, IL
Dates:	July 1 through September 30, 2009
Inspectors:	J. McGhee, Senior Resident Inspector B. Cushman, Resident Inspector J. Benjamin, Project Engineer W. Slawinski, Senior Radiation Protection Inspector 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 05000254/2009004, 05000265/2009004; 07/01/09 - 09/30/09; Quad Cities Nuclear Power Station, Units 1 & 2; Operability Evaluations and Other Activities.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors and an independent fuel storage installation inspection. Two Green findings were identified during the inspection period. 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 inspectors identified a finding of very low safety significance for the failure to declare a system, structure, or component inoperable when a required support system was inoperable on August 12, 2009, when the Unit 1 reactor core isolation cooling (RCIC) and core spray (CS) room watertight door was breached for maintenance. Because this room was only separated from the Unit 2 RCIC and CS room by a non-watertight door, the Unit 2 RCIC and CS systems were also affected. This finding was also an NCV of 10 CFR 50 Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to provide a procedure appropriate to the circumstances for an activity affecting quality. Specifically, the licensee failed to properly translate the Technical Specification (TS) Operable-Operability definition into procedures to establish operability of systems affected by a hazard barrier that had been disabled for maintenance. This resulted in the operators disabling an internal flooding barrier without identifying that the affected systems were inoperable. Corrective action included immediate restoration of the barrier and the issue was entered into the licensee's corrective action program. Subsequently, the procedure was revised to require operators to identify the system as inoperable or employ appropriate compensatory measures to maintain operability when a flooding barrier is impaired.

  This issue is more than minor because, if left uncorrected, it could become a more significant safety concern, in that the unit could continue to operate at power for longer than allowed by TS with more than one required emergency core cooling system (ECCS) system exposed to internal flooding from a single failure of a non-Class 1 system and challenging safe shutdown assumptions. The inspectors performed a Phase 1 SDP evaluation and answered "No" to all of the Mitigating Systems questions in IMC 0609, Attachment 4, Table 4a. The issue, therefore, screened as Green or very low safety significance. The incorrect procedural guidance was the principal contributor to the operator's failure to identify that the affected systems were inoperable, and the inspectors determined that the event is cross-cutting in Human Performance, Resources, Procedures (H.2(c)). (Section 1R15)

Cornerstone: Barrier Integrity

- Green. A finding of very low safety significance and an NCV of TS 5.4.1.a were self-revealed by the failure of the Unit 1 reactor core isolation cooling (RCIC) steam exhaust check valve that resulted in a trip of the RCIC system and created a condition where both containment isolation valves in the RCIC steam exhaust line would not have performed their primary containment isolation function. The finding involved the licensee's failure to effectively monitor the condition of the check valve. Periodic non-destructive examination of the check valve had been discontinued in 1996 in favor of a reliance on local leak rate testing, which was insufficient to detect degradation prior to this failure. The licensee performed a normal shutdown of Unit 1 when this condition was identified, and the inboard and outboard primary containment isolation valves were repaired prior to restart. Corrective actions included a revision of the preventive maintenance for the valve to require periodic replacement of the valve internals.

  This finding is more than minor because it challenged the Barrier Integrity Cornerstone attribute for Containment Isolation functionality. The inspectors performed a Phase 1 SDP screening and the IMC 0609, Attachment 4, Table 4a, Containment Barrier questions were all answered, "No." Therefore, the issue screened as Green or very low safety significance. The inspectors determined that this finding did not have a cross-cutting aspect because the licensee's decision to discontinue periodic inspections of the RCIC steam exhaust check valves in 1996 was not subject to the program review that the licensee currently employs; therefore, this performance deficiency is not indicative of current licensee performance. (Section 4OA3)

B. Licensee-Identified Violations

A violation of very low safety significance that was identified by the licensee has been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's corrective action program. This violation 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 July 1 until beginning power reduction for forced outage Q1F60 at 8:10 p.m. on September 8, 2009. Operators shut down Unit 1 as directed by TS 3.6.1.1, "Primary Containment," when primary containment was determined to be inoperable after discovery and investigation of a pinhole leak in piping that forms part of the containment boundary. The licensee reported this event in Event Notification 42333 as a plant shutdown required by TS (10 CFR 50.72(b)(2)(i)). Startup from the forced outage began at 3:42 p.m. on September 11, and the unit reached 100 percent thermal power at 08:02 a.m. on September 13, 2009. Power remained at that power level for the remainder of the reporting period.

Unit 2

Unit 2 operated at or near 100 percent thermal power from July 1 until September 30 with the exception of planned power reductions for routine surveillances and control rod maneuvers. On September 19, 2009, the planned downpower included testing for control rod channel distortion. This testing extended the downpower by several hours, but no degraded control rod channel issues were identified.

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 observed the first time performance of the new procedure for testing the portable flood mitigation pump (Darley pump). 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 abnormal operating procedure for mitigating the design basis flood to ensure it could be implemented as written.

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

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- Unit 1 Standby Liquid Control System;
- Unit 1 Control Rod Drive System;
- Unit 2 High Pressure Coolant Injection System;
- Unit 1 Reactor Core Isolation Cooling System; and
- 2A Core Spray System (Gas Accumulation Walkdown).

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, 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 five partial system walkdown samples as defined in IP 71111.04-05. Also, additional activities were performed during this system walkdown 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 item 2 of this section.

b. Findings

No findings of significance were identified.

.2 System Walkdown Associated with Temporary Instruction (TI) 2515/177, "Managing gas accumulation in emergency core cooling, decay heat removal, and containment spray systems"

a. Inspection Scope

The inspectors conducted a walkdown of the 2A core spray system in sufficient detail to reasonably assure the acceptability of the licensee's walkdowns (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 described the 2A core spray system configurations 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 accurately described the subject systems, that they were up-to-date with respect to recent hardware changes, and any discrepancies between as-built configurations, the isometric drawings, and the piping and instrumentation diagrams 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:

- Unit 2 Reactor Bldg. El. 595'-0", Ground Floor, Fire Zone 1.1.2.2;
- Unit 2 Reactor Bldg. El. 623'-0", Mezzanine Level, Fire Zone 1.1.2.3;
- Unit 2 Reactor Bldg. El. 554'-0", Fire Zone 11.1.4;
- Unit 2 Reactor Bldg. El. 666'-6", Fire Zone 1.1.2.5;
- Unit 2 Reactor Bldg. El. 647'-6", Fire Zone 1.1.2.4; and
- Unit 1 Reactor Bldg. El. 666'-6", Fire Zone 1.1.1.5.

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

b. Findings

No findings of significance were identified.

.2 Annual Fire Protection Drill Observation (71111.05A)

a. Inspection Scope

On July 15, 2009, the inspectors observed fire brigade activation for the simulated fire in the Unit 1 reactor feed pump room. Based on this observation, the inspectors evaluated the readiness of the plant fire brigade to fight fires. The inspectors verified that the licensee staff identified deficiencies, openly discussed them in a self-critical manner at the drill debrief, and took appropriate corrective actions. Specific attributes evaluated

were: (1) proper wearing of turnout gear and self-contained breathing apparatus; (2) proper use and layout of fire hoses; (3) employment of appropriate fire fighting techniques; (4) sufficient firefighting equipment brought to the scene; (5) effectiveness of fire brigade leader communications, command, and control; (6) search for victims and propagation of the fire into other plant areas; (7) smoke removal operations; (8) utilization of pre planned strategies; (9) adherence to the pre planned drill scenario; and (10) drill objectives. Documents reviewed are listed in the Attachment to this report.

These activities constituted one annual fire protection inspection sample as defined in IP 71111.05-05.

b. Findings

No findings of significance 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 design and vendor documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. 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:

- Residual Heat Removal (RHR) Service Water Pump 1A Vault.

This inspection constituted one internal flooding sample as defined in IP 71111.06-05.

b. Findings

No findings of significance were identified.

.2 Underground Vaults

a. Inspection Scope

The inspectors selected underground bunkers/manholes subject to flooding that contained cables whose failure could disable risk-significant equipment. The inspectors determined that the cables were not submerged, that splices were intact, and that appropriate cable support structures were in place. In those areas where dewatering

devices were used, such as a sump pump, the device was operable and level alarm circuits were set appropriately to ensure that the cables would not be submerged. In those areas without dewatering devices, the inspectors verified that drainage of the area was available, or that the cables were qualified for submergence conditions. The inspectors also reviewed the licensee's corrective action documents with respect to past submerged cable issues identified in the corrective action program to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following underground bunkers/manholes subject to flooding:

- Switchyard Control Power Cable Tunnel.

This inspection constituted one underground vault sample as defined in IP 71111.06-05.

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 August 10, 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.

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:

- Z7500: Standby Gas Treatment, and
- Z0940: Process Computer.

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 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:

- Week of July 20 - 24, 2009: Room cooler work for 1A core spray and Unit 1 RCIC causing 1A core spray loop and Unit 1 RCIC to be inoperable;
- Unit 2 RCIC/2B core spray submarine door work (impacting Unit 1 RCIC and 1A core spray) concurrent with Unit 1 HPCI system inoperable;
- Work week schedule August 30 to September 5: Unit 2 RCIC, 1/2 emergency diesel generator (EDG), Unit 2 EDG, 2A and 2B core spray systems impacted;
- Work week schedule September 6 to September 12: Unit 2 station blackout (SBO) diesel generator with emergent through-wall leakage of the 1B core spray minimum flow line, containment inoperability, and Unit 1 shutdown; and
- Work week schedule September 13 to September 19: Unit 2A residual heat removal (RHR) pump, 2A RHR room cooler and emergent work window extension, 2A RHR service water pump and room cooler, emergent repair of 2B control rod drive pump bearings, and 2A turbine building component cooling water pump maintenance.

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 of significance were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- IR 941331: Cable Tray 669T, 672T and 675T Loading Discrepancies;
- EC 376394: Response to QDC NOS NIRB of 6/18/09 on 1-0203-3E ERV Leakage and RHR SPC (Suppression Pool Cooling) Operation in OTDM 925804;
- IR 944186: Unit 2 Service Water Rad Monitor Spiking Downscale Occasionally;
- IR 946407: Unit 2 EDG Vent Fan Tripped;
- IR 952507: Questions by NRC Resident on Basis of QCAP 0250-06 (RCIC and Core Spray operability evaluation with defeated flood barrier);
- EC 376550: Operability Evaluation for Multi-purpose Canisters (MPC) that have not been Helium Leak Tested;

- IR 961590: Received Alarm for HPCI Controller Signal Failure; and
- EC 371224: NRC GL08-01 Venting and Gas Accumulation Evaluation for Core Spray.

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 also 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 eight samples as defined in IP 71111.15-05.

b. Findings

Introduction: A finding of very low safety significance for the failure to declare a system, structure, or component inoperable when a required support system was inoperable and an NCV for failure to provide a procedure appropriate to the circumstances for an activity affecting quality as required by 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," were identified by NRC inspectors. Specifically, the licensee failed to properly translate the TS Operable-Operability definition into procedures to correctly establish operability of the systems affected by a hazard barrier that had been disabled for maintenance.

Discussion: At Quad Cities, submarine doors were located on each of the ECCS pump compartments: the RHR pumps, the high pressure coolant injection (HPCI) rooms and CS rooms. These doors formed part of the internal flood control measures at Quad Cities and prevent water in the torus room area from leaking into the pump room and likewise prevented an internal flooding concern in one room from impacting more than one ECCS system. Other component examples of the internal flood control measures included floor drain ball valves and associated piping, walls, and penetration seals.

On August 12, 2009, the Quad Cities Unit 2 HPCI system was inoperable due to in-progress surveillance testing. Unit 2 RCIC, the safe shutdown makeup pump, and transformer 22 were protected under these conditions to manage the associated risk with maintenance activities as required by 10 CFR 50.65 a(4). Unit 2 had also entered TS 3.5.1, ECCS Operating, Condition F that required operability of the Unit 2 RCIC system to be verified immediately and requires HPCI be returned to an operable condition within 14 days. Technical Specification 3.5.1, Condition H further provided that if the time frame of Condition F could not be met, the unit must be in Mode 3 within 12 hours and reactor steam dome pressure must be reduced to less than or equal to 150 psig within 36 hours. Additionally, Condition I of TS 3.5.1 specified that if HPCI and

one low pressure ECCS injection/spray system is inoperable, the unit must enter TS 3.0.3 immediately.

Maintenance personnel breached the Unit 1 watertight door to the room containing the Unit 1 RCIC system and the 1A CS system intending to perform maintenance on that door. This room is separated from the Unit 2 RCIC/2B CS by a non-watertight door, and thus the Unit 1 door also affected the Unit 2 systems. Although the potential impact was recognized, the licensee had a procedure that used a previous engineering assessment to provide a basis to consider the affected systems operable if only one submarine door was open. The resident inspectors questioned the operability of the systems impacted by the watertight door and the operating crew's assessment of TS 3.5.1.

The operations' shift manager identified procedure QCOP 0250-06, "Control of In-Plant Flood Barriers and Watertight 'Submarine' Doors," as the basis for his determination that the affected systems remained operable. The NOTE preceding step D.2 stated in part:

> **IF** a flood-protection barrier is breached for any individual ECCS Pump Room or between RHRSW Vaults, **THEN** equipment in the room is considered operable.
>
> **IF** a flood-protection barrier is breached for any two or more ECCS pump rooms on a unit **AND** the flood-protection barrier for all but one of the rooms has **NOT** been restored within 4 hours, **THEN** equipment in those rooms shall be considered INOPERABLE.
>
> > **IF** the two breached flood-protection barriers are to any two ECCS Pump Rooms that share a non-watertight door with the opposite unit (HPCI, 1A/2B, Core Spray **OR** 1A/2B RHR) **AND** the flood-protection barrier for at least one of the rooms has **NOT** been restored within 4 hours, **THEN** equipment in the opposite units affected ECCS Pump Rooms must also be considered INOPERABLE.

The resident inspectors challenged the procedural statements and associated engineering evaluation, indicating that the internal flood protection measures provided a safety function supporting system operability under the TS definition of OPERABLE/OPERABILITY and were therefore required to be in place for the system to be fully operable. In addition, the inspectors pointed out that the procedure as written assumed all ECCS systems were otherwise operable, which was not the case on Unit 2 with HPCI inoperable and did not address the additional risk imposed by this condition. The shift manager verified that HPCI was in a physical condition to be considered fully operable even though it was being tracked as administratively inoperable at the time. He then stopped the surveillance activity until he could verify that the submarine door was closed and placed in an operable condition. The shift manager then stopped the maintenance on the door and verified the barrier was restored to operable before allowing the HPCI surveillance to continue. The submarine door maintenance was completed on the following day with compensatory actions in place to maintain Units 1 and 2 RCIC and 1A/2B core spray degraded but operable. In addition, all other ECCS systems were operable when the maintenance was performed. The shift manager wrote Issue Report 952507 to have the procedure questions addressed. As an interim measure pending final resolution of the questions, a standing order was used to provide amplifying instruction to the shift to describe appropriate compensatory measures to be used to maintain ECCS system operability with door maintenance in progress.

On September 17, 2009, a water leak was identified on RHR service water piping in the Unit 1 'A' RHR corner room, and the floor drain ball valve was opened by the night shift operating crew to drain the corner room. The crew referenced QCAP 0250-06 and considered the system operable with no compensatory measures in place while the valve was open. After the inspectors raised the concern regarding the additional non-compliance issue, the licensee changed the procedure to require the affected systems be declared inoperable unless appropriate compensatory actions that met regulatory guidelines were put in place to allow the system to be considered operable but degraded.

Analysis: Failure to declare a system, structure or component inoperable when a required support system is inoperable is a performance deficiency. This performance deficiency is more than minor because, if left uncorrected, it could become a more significant safety concern, in that, the unit could continue to operate at power for longer than allowed by TS with more than one required ECCS system exposed to internal flooding from a single failure of a non-Class 1 system and challenging safe shutdown assumptions. Hazard barriers are associated with protecting equipment, which mitigate accidents and thus are associated with the Mitigating Systems Cornerstone. The inspectors also determined that the principle contributor to the failure to correctly identify that RCIC and the CS systems would be inoperable with the impaired hazard barrier was the inadequate procedure that failed to correctly translate the TS definition of Operable - Operability. Even though the procedure had existed in this format for several years, the inspectors determined that the issue was indicative of current performance based on the September 17 non-compliance issue described in the last paragraph of the discussion section above and identified the issue to be cross-cutting in Human Performance, Resources, Procedures (H.2(c)).

The inspectors performed a Phase 1 SDP evaluation and answered "No" to all questions in Manual Chapter 0609, Attachment 4, Table 4a. The time period that the door was open (without compensatory actions in place) concurrent with HPCI being considered inoperable did not result in exceeding TS allowed times or required actions. The issue, therefore, screened as having very low safety significance (Green).

Enforcement: Title 10 CFR 50, Appendix B, Criterion V, "Instruction, Procedures, and Drawings," requires, in part, that activities affecting quality shall be prescribed by documented instructions of a type appropriate to the circumstances.

Contrary to the above, on August 12, 2009, when an internal flood barrier was removed for maintenance, licensee procedure QCOP 0250-06 did not correctly incorporate the hazard barrier's required support function when applying the TS definition of Operable-Operability such that operators would implement the appropriate compensatory actions or declare affected systems inoperable. Because this finding is of very low safety significance and because this issue has been entered into the CAP as Issue Report 952507, this violation is being treated as an NCV consistent with Section IV.A.1 of the Enforcement Policy **(NCV 05000254/2009004-01, 00500265/2009004-01).**

Corrective actions for this issue included immediate restoration of compliance with the TS and revision of the procedure to ensure ongoing compliance with the TS.

.2 Operability Evaluations 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 reviewed the following issues associated with the scope of Generic Letter 2008-01, "Managing Gas Accumulation in Emergency Core Cooling, Decay Heat Removal, and Containment Spray Systems":

- EC 371224: NRC GL08-01 Venting and Gas Accumulation Evaluation for Core Spray.

The inspectors verified that the licensee has acceptably identified the gas intrusion mechanisms that apply to the licensee's plant.

In addition, the inspectors verified that the licensee's void acceptance criteria were consistent with the Office of Nuclear Reactor Regulations' void acceptance criteria. Also, the inspectors confirmed that: (1) the licensee addressed the effect of pressure changes during system startup and operation since such changes could significantly affect the void fraction from the initial value; and (2) the range of flow conditions evaluated by the licensee was consistent with the full range of design basis and expected flow rates for various break sizes and locations (TI 2515/177, Section 04.02.f). 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.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification(s):

- QOP 6900-10, Crosstieing Unit 24/48 Volt Batteries; and
- EC 376075, Removal of High Temperature Alarm Function for 3E ERV.

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 systems. 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 and engineering 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 two temporary modification samples as defined in IP 71111.18-05.

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 post-maintenance activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- WO 01189469, MK-476 Penetration has High Leakage;
- WO 01257253, Unit 1 1A 24/48 Battery Charger Card Replacement;
- WO 01159070, Diesel Fire Pump 'A' Capacity Test;
- WO 01092064, Inspect/Replace Check Valve;
- WO 01264741, Received Alarm for HPCI Controller Signal Failure;
- WO 01880534, Unit 2 SBO Diesel Generator Planned Overhaul; and
- WO 01210003, Replace Unit 1 DGCWP Rotating Element.

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 seven 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 Other Outage Activities

a. Inspection Scope

The inspectors evaluated outage activities for an unscheduled outage that began on September 8, 2009, and continued through September 13, 2009. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule.

The inspectors observed or reviewed the reactor shutdown and cooldown, outage equipment configuration and risk management, electrical lineups, selected clearances, control and monitoring of decay heat removal, control of containment activities, startup and heatup activities, and identification and resolution of problems associated with the outage. In addition, the inspectors performed an as-found drywell inspection after the drywell was opened and performed a drywell closeout inspection prior to unit restart.

This inspection constituted one other outage sample as defined in IP 71111.20-05.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

.2 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); and
- WO 01-241514, Core Spray Valve Timing Test (Loop B) (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 were in accordance with TSs, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy, applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures, jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers (AMSE) 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.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted one inservice testing sample and one reactor coolant system leak detection inspection sample as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings of significance were identified.

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 July 16, 2009, 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 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.

2. RADIATION SAFETY

Cornerstone: Public Radiation Safety

2PS2 Radioactive Material Processing and Transportation (71122.02)

.1 Radioactive Waste System

a. Inspection Scope

The inspectors reviewed the liquid and solid radioactive waste system description in the UFSAR for information on the types and amounts of radioactive waste (radwaste) generated and disposed. The inspectors reviewed the scope of the licensee's audit program with regard to radioactive material processing and transportation programs to verify that it met the requirements of 10 CFR 20.1101(c).

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.2 Radioactive Waste System Walkdowns

a. Inspection Scope

The inspectors performed walkdowns of the liquid and solid radwaste processing systems to verify that the systems agreed with the descriptions in the UFSAR and the process control program and to assess the material condition and operability of the systems. The inspectors also walked down the interim radwaste storage facility (IRSF) and reviewed the safety evaluation for the facility to determine if waste was stored consistent with the facility design basis. The inspectors reviewed the status of radwaste processing equipment that was not operational and/or was abandoned in place. The inspectors reviewed the licensee's administrative and physical controls to ensure that the equipment would not contribute to an unmonitored release path or be a source of unnecessary personnel exposure.

The inspectors reviewed changes to the waste processing system to verify that the changes were reviewed and documented in accordance with 10 CFR 50.59 and to assess the impact of the changes on radiation dose to members of the public. The inspectors reviewed the current processes for transferring waste resin into shipping containers to determine if appropriate waste stream mixing and/or sampling procedures were utilized. The inspectors also reviewed the licensee's methods for waste

concentration averaging to determine if representative samples of the waste product were provided for the purposes of waste classification, as required by 10 CFR 61.55.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

Introduction: The inspectors identified that the licensee stored radioactive waste (radwaste) in its IRSF in forms other than as evaluated in the current facility Fire Hazard Analysis Report. The fire hazard analysis provided the fire protection assessment for the IRSF as part of the licensee's 10 CFR 50.59 evaluation for the facility. As a result, the inspectors identified an unresolved item (URI) for the apparent failure to complete a 10 CFR 50.59 evaluation to assess the radiological consequences of a design basis fire consistent with the manner in which processed waste was currently stored in the IRSF.

Discussion: The IRSF was constructed in the 1980s to store processed radioactive waste for short time periods incident to disposal at a low-level waste repository or for extended storage should disposal sites be unavailable. Capacity of the IRSF allows for over 400 liners (195 cubic feet/liner) containing an approximate aggregate 20,000 curies of radioactive waste to be stored. Since the 1990s, waste storage in the Quad Cities IRSF was limited, as low-level waste disposal sites were available and routinely utilized. Typically, no more than approximately ten liners of processed radwaste were stored at any given time in the IRSF. In mid-2008, the South Carolina Barnwell disposal site ceased accepting waste from most waste generators so options for disposal of Class B and C waste no longer existed for the Quad Cities station. In September 2009, the Quad Cities IRSF stored more than 50 liners of processed radwaste in the form of dewatered resin housed in polyethylene high integrity containers (poly HICs).

The Fire Hazard Analysis Report for the IRSF completed in July 1992 assumed the facility housed 200 containers of processed radwaste that was solidified or encapsulated in concrete and stored in poly HICs. The radiological consequences of a catastrophic facility fire was calculated on the basis that dose at the exclusion area boundary resulted from heat induced fracture of the concrete inside the HICs, generating airborne radioactive particulates. The dose calculated on that basis determined that the dose to the public was about 1.2 percent of the 10 CFR 100 limit. A fire suppression system was not installed in the IRSF based, in part, on the results of that calculation. The bases for the 1992 calculation, however, has been inconsistent with the licensee's radwaste processing practices since the early to mid-1990s, when the licensee discontinued solidifying its processed waste.

A bounding calculation performed by the licensee following the identification of this issue during this inspection determined that the radiological consequence of a catastrophic fire in the IRSF (using the actual radioactive source term present in the facility in September 2009, and conservatively assuming 100 percent release to the environment) was approximately 6 percent of the 10 CFR 100 dose guideline. The bounding calculation yielded a dose approximately five times greater than the dose calculated assuming partial release of radwaste to the environment from concrete fracture yet was based on a smaller radiological source term.

The issue remains under review by the NRC pending completion of the licensee's revised 10 CFR 50.59 evaluation and associated 10 CFR 100 catastrophic fire dose

consequence assessments, consistent with current waste forms/storage methods. The issue is categorized as a URI pending completion of that revised evaluation and the subsequent NRC review **(URI 05000254/2009004-02, 05000265/2009004-02).**

.3 Waste Characterization and Classification

a. Inspection Scope

The inspectors reviewed the licensee's radiochemical sample analysis methods and results for each of the licensee's waste streams, including dry active waste, spent resins, and filters. The inspectors also reviewed the licensee's use of scaling factors to quantify difficult-to-measure radionuclides (e.g., pure alpha or beta emitting radionuclides). The reviews were conducted to verify that the licensee's program assured compliance with 10 CFR 61.55 and 10 CFR 61.56, as required by Appendix G of 10 CFR Part 20. The inspectors also reviewed the licensee's waste characterization and classification program to ensure that the waste stream composition data accounted for changing operational parameters and thus remained valid between the annual sample analysis updates.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.4 Shipment Preparation and Shipment Manifests

a. Inspection Scope

The inspectors reviewed the documentation of shipment packaging, radiation surveys, package labeling and marking, vehicle inspections and placarding, emergency instructions, determination of waste classification/isotopic identification, and licensee verification of shipment readiness for seven non-excepted material and radwaste shipments made in 2007, 2008 and 2009. The shipment documentation reviewed consisted of:

- Two Condensate Resin Shipments to Waste Processors;
- Torus Filter Shipment to Waste Processor;
- Contaminated Equipment Shipment to Vendor;
- Control Road Drive Mechanisms to Vendor;
- Irradiated Hardware Shipment to Low-Level Waste Burial Site; and
- Dry Active Waste Shipment to Processor.

For each shipment, the inspectors determined if the requirements of 10 CFR Parts 20 and 61 and those of the Department of Transportation (DOT) in 49 CFR Parts 170-189 were met. Specifically, records were reviewed and staff involved in shipment activities were interviewed to determine if packages were labeled and marked properly, if package and transport vehicle surveys were performed with appropriate instrumentation, if radiation survey results satisfied DOT requirements, and if the quantity and type of radionuclides in each shipment were determined accurately. The inspectors also determined whether shipment manifests were completed in accordance with DOT and

NRC requirements, if they included the required emergency response information, if the recipient was authorized to receive the shipment, and if shipments were tracked as required by 10 CFR Part 20, Appendix G.

This inspection constituted one sample as defined in IP 71122.02-5.

Selected staff involved in shipment activities were interviewed by the inspectors to determine if they had adequate skills to accomplish shipment related tasks and to determine if the shippers were knowledgeable of the applicable regulations to satisfy package preparation requirements for public transport with respect to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," and 49 CFR Part 172 Subpart H. Also, lesson plans for safety training and function specific training for radiation protection technicians, laborers and for warehouse/storeroom (hazardous material (hazmat) level two employees) were reviewed for compliance with the hazardous material training requirements of 49 CFR 172.704. Additionally, the training test results for selected hazmat level two employees were reviewed by the inspectors for adequacy.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors reviewed condition reports, audits, and self-assessments that addressed radioactive waste and radioactive materials shipping program deficiencies since the last inspection to verify that the licensee had effectively implemented the corrective action program and that problems were identified, characterized, prioritized and corrected. The inspectors also verified that the licensee's self-assessment program was capable of identifying repetitive deficiencies or significant individual deficiencies in problem identification and resolution.

The inspectors reviewed corrective action reports from the radioactive material and shipping programs since the previous inspection, interviewed staff and reviewed documents to determine if the following activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk:

- Initial problem identification, characterization, and tracking;
- Disposition of operability/reportability issues;
- Evaluation of safety significance/risk and priority for resolution;
- Identification of repetitive problems;
- Identification of contributing causes;
- Identification and implementation of effective corrective actions;
- Resolution of NCVs tracked in the corrective action system; and
- Implementation/consideration of risk-significant operational experience feedback.

This inspection constituted one sample as defined in IP 71122.02-5.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Cornerstone: Mitigating Systems

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the Safety System Functional Failures performance indicator for Units 1 and 2 for the period from the first quarter 2008 through the second quarter of 2009. To determine the accuracy of the PI data reported during those periods, Performance Indicator definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports, and NRC integrated inspection reports for the period of January 2008 through June 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 safety system functional failure samples (one per unit) as defined in IP 71151-05.

b. Findings

No findings of significance were identified.

Cornerstone: Barrier Integrity

.2 Reactor Coolant System (RCS) Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity performance indicator for Units 1 and 2 for the period from the second quarter 2008 through August 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 RCS chemistry samples (reactor coolant system isotopic analyses), TS requirements, issue reports, event reports and NRC integrated inspection reports for the period of May 2008 through August 2009 to validate the accuracy of the submittals. The inspectors also reviewed selected dose equivalent iodine calculations including the accuracy of dose conversion factors used in the

licensee's calculation. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two (one per unit) reactor coolant system specific activity 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. 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 occurrence 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

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. 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 Selected Issue Follow-up Inspection: Issue Report 965579, "Non-Safety Residual Heat Removal Corrosion Coupon Leaking Water"

a. Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting a through-wall leak in the residual heat removal service water (RHRSW) piping.

On September 16, 2009, Issue Report 965579 was written by operators to identify a through-wall leak in RHRSW piping that cross-connects the two units. Inspectors verified that the leak was on a portion of the piping that was non-safety and non-ASME Section XI piping and posed no immediate threat to the safety-related sections of the RHRSW or residual heat removal equipment in the room. The licensee performed an ultrasonic test to measure the wall thickness around the hole and performed a structural evaluation to validate that the piping met minimum requirements. The licensee added a clamp to the pipe and sealed the leak.

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 Inoperable Unit 1 Primary Containment and Shutdown Required by Technical Specifications

a. Inspection Scope

The inspectors reviewed the plant's response to development of a pinhole leak in the Unit 1 'B' core spray minimum flow line (ASME Class 2 piping that formed a part of the primary containment boundary). On September 8, 2009, an engineer performing a leakage surveillance on the 1A core spray line identified a leak on the 1-1/2 inch, 1B core spray minimum flow line immediately downstream of the minimum flow control valve, 1-1402-38B. The 1A and 1B core spray minimum flow lines entered a common 8-inch pipe that allowed the 1B core spray line to be pressurized up to the minimum flow valve when the 1A system was running. The open end of the 8-inch header terminated

below the torus water level in the suppression chamber and the water seal formed a penetration isolation barrier for the line, therefore, no containment air path was opened by the leak. The licensee initiated prompt actions to perform additional inspections on the pipe to fully characterize the problem and identify the appropriate repair strategy. Ultrasonic testing of the piping revealed more extensive erosion of the piping wall in the vicinity of the leak and engineering determined that the structural integrity of the piping could not be assured with the amount of torus movement anticipated during a design basis event. Upon this determination, the shift manager was notified and primary containment was declared inoperable. With no repair option available other than piping replacement, the operators began a unit shutdown at 8:10 p.m. on September 8.

Additional ultrasonic tests were conducted on this line and the other systems in a similar configuration on Unit 1 as part of the extent-of-condition evaluation performed prior to unit restart. The degraded piping was cut out and replaced. The licensee chartered a root cause evaluation team to consider the broader implications of the event and potential additional extent-of-condition reviews. Documents reviewed in this inspection are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

.2 (Closed) Licensee Event Report 05000254/2009-001-00: Magnesium Rotor Degradation Causes Failure of Unit 1 Reactor Recirculation Pump Discharge Motor Operated Valve to Close and Results in Loss of Low Pressure Coolant Injection When in Loop Select Function

This event which occurred on April 28, 2009, during refueling outage Q1R20 when operators performing an in-service test procedure for valve stroking while in a cold shutdown condition identified that motor operated valve 1-0202-5B did not close when the control switch was taken to close. Initial indication was that the valve started to stroke before the supply breaker tripped on overload. Initial inspection of the failed motor was performed using a boroscope, and the examination revealed that the motor driver end of the rotor was significantly damaged. Post-mortem inspection revealed the damage to be a result of mechanical interference created as a result of magnesium rotor degradation.

Quad Cities had similar valve actuator failures in the past and had in place a corrective action that evaluated susceptibility of all magnesium rotors in high-risk environments and prioritized inspection and replacement activities. Actuators like this one located in the drywell are particularly susceptible to magnesium rotor degradation due to the high temperature and moist environment in which they operate. The licensee corrective actions required these valves to be inspected every refueling outage. This valve had been inspected in September of 2007 and was scheduled to be replaced during Q1R20. The video of the boroscope inspection performed in 2007 was available and was reviewed by the inspectors evaluating the licensee performance. All high-risk actuators have been replaced in both units. The licensee has scheduled replacement of all risk-significant magnesium rotor actuator motors with an expected completion date of September 2010. The inspection check list and procedure were both upgraded during

the last cycle to provide a more thorough inspection and to ensure more consistency in the evaluation process. Documents reviewed as part of this inspection are listed in the Attachment to this report. This LER is closed.

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

.3 (Closed) Licensee Event Report 05000254/2009-002-00: Inoperable RCIC Primary Containment Isolation Valves for Quad Cities Nuclear Power Station Unit 1

a. Inspection Scope

The inspectors reviewed the licensee event report (LER) in response to the failures of the Unit 1 RCIC steam exhaust primary containment isolation valves (PCIVs) on May 24, 2009. Documents reviewed in this inspection are listed in the Attachment to this report.

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

b. Findings

Introduction: A finding of very low safety significance (Green) and associated NCV was self-revealed during the failure of the Unit 1 RCIC steam exhaust check valve on May 24, 2009.

Discussion: On May 24, 2009, during the RCIC operability surveillance test following refueling outage Q1R20, the RCIC system tripped on high turbine exhaust discharge pressure. In preparation for troubleshooting, operators hanging the clearance order to isolate the RCIC system were not able to turn the handwheel in the close direction on the inboard PCIV. The inboard PCIV in the RCIC steam exhaust line was a stop check valve.

On May 25, 2009, at 0000 (midnight), a shutdown of Unit 1 was initiated to repair the inboard PCIV. The disassembly and inspection of the valve revealed that the disc was being held open by a nut that had become lodged under the disc. The presence and location of the nut explained why the operators were not able to turn the handwheel in the close direction for this valve. Licensee staff decided to perform an inspection of the outboard PCIV to determine the origin of the discovered nut. The outboard PCIV in the RCIC steam exhaust line was a swing check valve.

The disassembly and inspection of the outboard PCIV confirmed that the disc stud (with the retaining nut still attached) had sheared, allowing the valve disc to become detached from the swing arm. The valve disc was found lying in the bottom of the outboard PCIV. These findings confirmed that following the failure of the valve disc stud, the retaining nut traveled downstream to become lodged under the disc in the inboard PCIV, preventing the valve from closing. Also, after separating from the swing arm, the valve disc blocked the steam exhaust path causing the high discharge pressure condition and trip of the RCIC system. All debris from this failure was recovered prior to unit restart.

The failure of the outboard PCIV combined with the stuck open inboard PCIV created a condition where both containment isolation valves in the RCIC steam exhaust line would not have performed their primary containment isolation function. An emergency

notification system phone call was initiated on May 25, 2009, as required by 10 CFR 50.72 for this event. Both valves were repaired and the containment isolation function was restored on May 30, 2009, prior to the restart on Unit 1.

The failure of the swing check valve stud was attributed to high cycle fatigue. The failed swing check valve disc assembly had been installed for 27 years. The disc was replaced following a failed local leak rate test in 1982. Periodic non-destructive evaluation (NDE) on the RCIC exhaust swing check valves for both units was discontinued in 1996 because fatigue cracking had not been observed on the disc stud for either valve during NDE performed in 1994 and 1995. The time in service for the swing check valve disc at the time of the last NDE was 12 years.

Analysis: The failure to consider the effects of increased aging and the limitations of monitoring the condition of a swing check valve with only local leak rate test data prior to discontinuing performance of NDE on the RCIC steam exhaust PCIVs is a performance deficiency and a finding. This finding is more than minor because it challenged the Barrier Integrity Cornerstone attribute for Containment Isolation functionality.

The inspectors performed a Phase 1 SDP screening. Inspection Manual Chapter 0609, Attachment 4, Table 4a, Containment Barrier questions were all answered, "No." Therefore the issue screened as Green or very low safety significance. The safety significance of having both containment isolation valves inoperable in the RCIC steam exhaust line was very low since the time of exposure was less than 24 hours, accident conditions were not present at the time the PCIVs failed, and other high pressure sources of injection were available during the time that RCIC was unavailable. Also, an orderly shutdown of Unit 1 was performed in a timely manner upon discovery of the failure of the containment isolation function of the RCIC steam exhaust line. The inspectors determined that this finding did not have a cross-cutting aspect. The decision to discontinue periodic NDE of the RCIC steam exhaust check valves in 1996 was not subject to the program reviews in effect at the time of the failure. Therefore, this performance deficiency was not indicative of current licensee performance.

Enforcement: Technical Specifications 5.4.1 states in part that written procedures shall be established, implemented, and maintained for the applicable procedures recommended by Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. The Regulatory Guide requires, in part, that maintenance that can affect the performance of safety-related equipment be performed in accordance with procedures appropriate to the circumstances.

Contrary to the above, licensee procedures for maintenance of the RCIC steam exhaust line check valves were not appropriate to the circumstances, in that, periodic inspections of the RCIC outboard PCIV were not implemented at a frequency sufficient to prevent the failure of the containment isolation function of the RCIC steam exhaust PCIVs. The facility inappropriately relied on leak rate indication to determine if valve degradation was occurring in lieu of NDE testing or replacement of component internals.

Because this issue is of very low safety significance, and this issue has been entered into the licensee's corrective action program as Issue Report 923468, this issue is being treated as a NCV consistent with Section VI.A.1 of the NRC Enforcement Policy **(NCV 05000254/2009004-03)**.

Corrective actions for this event included replacement of the disc and hinge arm for the outboard PCIV, the replacement of the disc for the inboard PCIV, and reconditioned disc seats for both valves. Preventative maintenance associated with the outboard PCIV was revised to include a 10 year periodic replacement of valve internals. Also, an internal inspection and replacement was scheduled to be performed for the Unit 2 RCIC outboard PCIV during the next Unit 2 refueling outage.

4OA5 Other Activities

.1 Onsite Fabrication of Components and Construction of an Independent Spent Fuel Storage Installation (60853)

a. Inspection Scope

The inspectors reviewed the licensee's response to an NRC-identified finding related to changes in the vendor testing program for the multi-purpose canister (MPC) which were made without prior NRC approval. This finding is explained in detail in a USNRC letter number EA-09-190, "Exercise of Enforcement Discretion - Holtec International," dated August 06, 2009.

This change in Holtec's testing program resulted in a number of MPCs being fabricated without a helium leak rate test being performed as described in the HI-STORM 100 System FSAR, Revision 3. Quad Cities has loaded 12 of these casks with spent fuel. An operability evaluation was performed for the casks that have already been loaded, and testing was performed onsite for the three remaining MPCs manufactured without a helium leak test being performed at the factory. The inspectors' review of the operability evaluation performed for the loaded MPCs is documented in Section 1R15 of this report.

The inspectors compared the vendor procedure with the procedure implemented at the site to test the three remaining suspect MPCs. The procedures were comparable, and Revision 0 of the field test procedure was qualified prior to use. Vendor-supplied personnel conducted the testing with oversight provided by Quad Cities' reactor services personnel. The inspection included a field walkdown with the test in progress. The acceptance criteria for the test were clearly specified in the procedure and test data was certified by a qualified Non-Destructive Test Level 3 individual (documentation of qualification was included in the work package). All three MPCs passed the test. Documents reviewed are listed in the Attachment to this report.

b. Findings

No findings of significance were identified.

.2 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

During the inspection period, the inspectors conducted observations of security force personnel and activities to ensure that the activities were consistent with licensee security procedures and regulatory requirements relating to nuclear plant security. These observations took place during both normal and off-normal plant working hours.

These quarterly resident inspector observations of security force personnel and activities did not constitute any additional inspection samples. Rather, they were considered an integral part of the inspectors' normal plant status review and inspection activities.

b. Findings

No findings of significance were identified.

.3 (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 Section 1R04 and 1R15, the inspectors confirmed the acceptability of the described licensee's actions. 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 October 6, 2009, 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 Public Radiation Safety radwaste processing and transportation inspection with Mr. R. Gideon and other licensee staff following the onsite inspection effort on September 18, 2009, and with Mr. D. Collins during a meeting on October 1, 2009.

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.

4OA7 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 Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as an NCV.

- Technical Specification 5.2.2.d limits the overtime hours worked by unit staff members performing safety-related work to the hours allowed by to the NRC policy statement on work hours, which is GL 82-12. Contrary to this requirement, on September 10, 2009, two reactor operators and two senior reactor operators were called in to participate in startup refresher training prior to taking the shift following a forced outage. Although the two reactor operators correctly identified that they would exceed the 24 hours in a 48 hour period specified in GL 82-12, the individual in charge incorrectly assumed that training hours did not count toward work hour

rules since training was not safety-related work and directed them to report. After the individuals had assumed the shift, the determination was made that the rules had been misinterpreted and the hours did count since the operators subsequently took the shift (i.e., performed safety-related work.) The operators had, in fact, worked 26 hours in a 48 hour period. The licensee entered the issue into the CAP as Issue Report 963599. Following identification, appropriate procedural actions were taken to return to compliance.

This issue was more than minor because failure to control work hours within limits or to monitor workers that have worked excessive overtime could lead to fatigue induced errors and could be reasonably viewed a precursor to a more significant event. The inspectors performing the Phase 1 SDP review assigned the risk to the Initiating Events Cornerstone. The inspectors then answered "No" to all of the Initiating Events questions in Inspection Manual Chapter 0609, Attachment 4, Table 4a and determined the issues to be of very low safety significance.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Tulon, Site Vice President
R. Gideon, Plant Manager
R. Svaleson, Operations Manager
H. Madronero, Engineering Manager
W. Beck, Regulatory Assurance Manager
J. Burkhead, Nuclear Oversight Manager
J. Garrity, Work Control Manager
K. Moser, Training Manager
V. Neels, Chemistry/Environ/Radwaste Manager
D. Collins, Radiation Protection Manager
D. Thompson, Security Manager

Nuclear Regulatory Commission

M. Ring, Chief, Reactor Projects Branch 1

Illinois Emergency Management Agency

R. Zuffa, Unit Supervisor, Resident Inspector Section

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000254/2009004-01; 05000265/2009004-01	NCV	Failure of Licensee to Properly Translate TS Operable-Operability
05000254/2009004-02; 05000265/2009004-02	URI	Adequacy of 10 CFR 50.59 Evaluation and Dose Consequence Assessment for Catastrophic Fire in the Interim Radwaste Storage Facility
05000254/2009004-03	NCV	Inop RCIC Primary Containment Isolation Valves

Closed

05000254/2009004-01; 05000265/2009004-01	NCV	Failure of Licensee to Properly Translate TS Operable-Operability
05000254/2009004-03	NCV	Inop RCIC Primary Containment Isolation Valves
05000254/2009-001-00	LER	Magnesium Rotor Degradation Causes Failure of Unit 1 Reactor Recirculation Pump Discharge Motor Operated Valve to Close and Results in Loss of Low Pressure Coolant Injection When in Loop Select Function
05000254/2009-002-00	LER	Inoperable RCIC Primary Containment Isolation Valves for Quad Cities Nuclear Power Station Unit 1

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 of 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

- WO 1247374; Perform Darley Pump Baseline Testing; 09/17/09
- QCMMS 1500-12; Portable Emergency Flood Pump Capacity Test; Revision 0
- QCOA 0010-16; Flood Emergency Procedure; Revision 12
- IR 921197; Inappropriate Closure of Darley Pump NCV; 04/27/09
- IR 966501; Darley Pump Leaking Gasoline from Fuel Pump; 09/17/09
- IR 968809; Adequacy of Preventative Maintenance on Darley Pump; 09/22/09
- UFSAR 3.4.1.1; External Flood Protection Measures; Revision 6

Section 1R04

- QOM 1-1100-01; Unit 1 Standby Liquid Control Valve Checklist; Revision 10
- QCOP 1100-01; Standby Operation of Standby Liquid Control System; Revision 12
- QCOP 0300-01; CRD System Startup; Revision 21
- QOM 1-0300-01; Unit 1 Control Rod Valve Checklist (Turbine Building at CRD Pumps); Revision 5
- QOM 1-1300-02; Unit 1 RCIC Valve Checklist; Revision 9
- QOM 2-2300-01; Unit 2 HPCI Valve Checklist; Revision 17
- QCOP 2300-01; HPCI Preparation for Standby Operation; Revision 53
- QCOP 1300-02; RCIC System Preparation for Standby Operation; Revision 35
- 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
- WO 01231534; 1A Core Spray System UT Vent Verification
- WO 01232464; 1B Core Spray System UT Vent Verification
- Predefine 183874-01; 1A Core Spray System UT Vent Verification
- Predefine 183874-02; 1B Core Spray System UT Vent Verification
- 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
- QCOS 1400-10; Core Spray Operability Verification; Revision 20

Section 1R05

- Fire Drill Scenario No: 2009 3rd QTR Scenario #1: Unit 1A Reactor Feed Pump Aux Oil Pump Gasket Fire
- QCOA 0010-12; Fire/Explosion; Revision 33
- Pre-plan TB-73; Fire Zone 8.2.6.A, Unit 1 Turbine Bldg. El. 595'-0", Reactor Feed Pumps; Revision 24
- Pre-plan RB-19; Fire Zone 1.1.2.2, Unit 2 Reactor Building Ground Floor El. 595'-0"; Revision 24
- Pre-plan RB-20; Fire Zone 1.1.2.3, Unit 2 Reactor Bldg. El. 623'-0" Mezzanine Level; Revision 24
- Pre-plan RB-10; Fire Zone 1.1.1.5, Unit 1 Reactor Bldg. El. 666'-6" Stand-by Gas Treatment 4th Floor East; Revision 24
- Pre-Plan RB-14, Fire Zone 11.1.4, Unit 2 Reactor Bldg. El. 554'-0" HPCI Pump Room; Revision 22
- Pre-plan RB-23, Fire Zone 1.1.2.5, Unit 2 Reactor Bldg. El. 666'6" Stand-by Liquid Control 4th Floor West; Revision 24
- Pre-plan RB-21, Fire Zone 1.1.2.4, Unit 2 Reactor Bldg. El 647'6" Third Floor; Revision 24

Section 1R06

- IR 846251; MK-506 Penetration Has High Leakage; 11/17/08
- IR 846253; MK-476 Penetration Has High Leakage; 11/17/08
- QCTS 820-01; Leak Test of the RHR Service Water Vault Flood Protection Penetrations; Revision 9
- IR 926354; Water in Manhole 3 & 4; 06/01/2009
- WO 170931; Manhole #3 North Degraded Cable Supports; 05/07/2009

Section 1R11

- QCOA 1300-01; RCIC Turbine Trip-Isolation Recovery; Revision 15
- QCOA 1300-06; RCIC System Trouble Following an Auto Start; Revision 13
- QCOA 5300-01; Loss of Stator Cooling; Revision 16
- QCOA 7500-02; Standby Gas Treatment Fan Tripped or Failed to Start Automatically; Revision 10
- QGA 100; RPV Control; Revision 9
- QGA 500-1; RPV Blowdown; Revision 13

Section 1R12

- Enterprise Maintenance Rule Production Database for Z0940 – Process Computer
- Enterprise Maintenance Rule Production Database for Z7500 – Standby Gas Treatment
- QCOS 7500-05; SBGTS Monthly Operability Test; Revision 30

Section 1R13

- QC-PSA-005.07; Quad Cities RCIC System Notebook
- BSA-Q-97-04; Quad Cities ECCS Pump Room Thermal Response to a Loss of Room Cooler under Appendix R Assumptions; Revision 4A
- QCAN 901(2)-3 C-3; Core Spray Pump 1(2)A or 1(2)B Area Cooler Fan Trip; Revision 10 QCAP 0230-19; Equipment Operability; Revision 16
- WO 01-084863-01; Operations Change Oil 1A Core Spray Motor Lower Bearing
- QCOS 1300-18; RCIC Drain Pot Level Switch and Drain Valve Operational Test; Revision 014

Section 1R15

- IR 941331; Cable Tray 669T, 672T and 675T Loading Discrepancies; 07/13/09
- Design Analysis No# 7220-30-EE-S; Reassessment of Cable Tray and Tray Supports for Determination of Allowable Cable Loads (Vols. I & II); Revision 15D
- EC 360129; Replacement of MSIV Room Coolers
- Sargent & Lundy Interactive Cable Engineering (SLICE) database Report S109; Cable Weight Loading Exception
- Design Information Transmittal S040-QDC-8008; Structural Approval for Cable Tray Loading Violations Associated with Unit 1 MSIV Room Coolers Project; 04/23/08
- IR 933472; SW Effluent Rad Monitor inoperable; 06/20/09
- CY-QC-120-729; Liquid Effluent Monitor Alarm Setpoints; Revision 3
- ODCM 12.2.1; Radioactive Liquid Effluent Monitoring Instrumentation; Revision 9
- EC Sys Eval 376394; Response to QDC NOS NIRB of 6/18/09 on 1-0203-3E ERV leakage and RHR SPC operation in OTDM 925804; Revision 0
- OTDM 925804; Elevated Tailpipe Temperature of 3E ERV; Revision 01
- ACMP 925804; U-1 ERV 1-0203-3E Tailpipe Temperature
- IR 925804; 3E Relief Valve high Temperature (Approx 290 Deg F)
- IR 933944; NOS ID NIRB Challenges for 3E ERV OTDM 925804; 06/22/09
- IR 943095; NOS ID Unacceptable Site Response to NIRB Identified Gaps
- IR 932817-01; PRA Risk Analysis of Increased Run Times of Torus Cooling; 06/26/09
- EC 376550: Operability Evaluation for Multi-purpose Canister (MPC) that have not been Helium Leak Tested; 08/11/09
- TS 3.1.1; Multi-purpose Canister
- Holtec 72.48 Evaluation #762; Revision 2; 08/04/09
- IR 946407; Unit 2 EDG Vent Fan Tripped; 07/27/09
- EC 376428; Evaluate the Operation of the Unit 2 DG Vent Fan Motor Circuit; 07/28/09
- Drawing 4E-2350B, Schematic Diagram Diesel Generator 2 Auxiliaries and Start Relays; Revision AJ, Sheet 2
- IR 944186; Unit 2 Service Water Rad Monitor Spiking Downscale Occasionally; 07/21/09
- VETI Manual 169;
- IR 952507; Questions by NRC Resident on Basis of QCAP 0250-06; 08/12/09
- QCAP 0250-06; Control of In-plant Flood Barriers and Watertight “Submarine” Doors; Revision10
- TIC #2436; QCAP 0250-06; Control of In-plant Flood Barriers and Watertight “Submarine” Doors; 09/18/09
- EC 351529; Need to Evaluate Effect of Removing Sub Door From 2A RHRSW Vault; 03/04/2005
- Regulatory Issue Summary (RIS) 2001-09, “Control of Hazard Barriers”; 04/02/2001
- IR 961590; Received Alarm for HPCI Controller Signal Failure; 09/03/09
- USAR 3.4.1.2; Internal Flood Protection Measures; Revision 6

- EC 352027; ENS Notification Retraction Justification - Unit 1 HPCI Signal Converter Trouble Alarm During IST HPCI Run; 10/26/04
- QCOP 2300-06; HPCI System Manual Startup (Injection-Pressure Control); Revision 28
- QCOP 2300-08; HPCI Local Manual Operation; Revision 23
- 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)
- UFSAR 3.4.1.2; Internal Flood Protection Measures; Revision 6

Section 1R18

- EC 376075; Removal of High Temperature Alarm Function for 3E Electrostatic Relief Valve input to temperature recorder (TR) 1-0260-20
- LS-AA-104-1001; 50.59 Review Coversheet for EC 376075; Revision 3
- LS-AA-104/1003; 50.59 Screening Form for QC-S-2009-0081; Revision 2
- QCOS 0203-02; Safety and Relief Valve Temperature Surveillance; Revision 25
- IR 933944; NOS ID NIRB Challenges for 3E ERV OTDM 925804; 06/22/09
- IR 932817-01; PRA Risk Analysis of Increased Run Times of Torus Cooling; 06/26/09
- OTDM 925804; Elevated Tailpipe Temperature of 3E ERV; Revision 01
- Drawing 4E-1687
- QOP 6900-10; Crosstieing Unit 24/48 Volt Batteries; Revision 16
- UFSAR Section 8.3.2; dc Power Systems; Revision 8
- EC 355983; Verify Capacity of the 24/48 Vdc Batteries During the Performance of Procedure QOP 6900-10; 07/07/06
- Drawing 4E-1687; Wiring diagram 48-24 Vdc System for Neutron Monitors; Revision T

Section 1R19

- WO 01189469; MK-476 Penetration Has High Leakage; 08/04/09
- WO 01257253; 1A 24/48 BATT CHGR DEENERGIZED RCVD 901-5 G1 CKT FAIL
- IR 949731; 1A 24/48 BATT CHGR DEENERGIZED RCVD 901-5 G1 CKT FAIL; 08/07/09
- MA-AA-716-004; Troubleshooting Log Attachment 1 for WO 01257253; Revision 7
- WO 1159070; Diesel Fire Pump ‘A’ Capacity Test; 08/13/09
- QCMMS 4100-32; 1/2 -4101A Diesel Driven Fire Pump Annual Capacity Test; Revision 24
- QCOS 4100-01; Monthly Diesel Fire Pump Test; Revision 28
- QCOP 4100-03; Diesel Fire Pump Operation; Revision 17
- QCOP 4100-01; Fire Water System Lineup for Standby Operation; Revision 4
- WO 01092064; Inspect/Replace Check Valve; 08/26/09
- QCOS 1000-06; RHR Pump/Loop Operability Test; Revision 46
- WO 01264741; Received Alarm for HPCI Controller Signal Failure; 09/04/09
- QCOS 2300-01; Periodic HPCI Pump Operability Test; Revision 47
- WO 01231003; MM Replace U1 DGCW PP Install New Rotating Element; 09/22/09
- IR 969495; 1A RHRSW Loop Suction Header Vent Line Is Plugged; 09/23/09
- QCOP 6600-20; Emergency Diesel Generator Cooling Water Pump Venting; Revision 1

Section 1R22

- QCOS 1600-07; Revision 027; Reactor Coolant Leakage in the Drywell
- WO 01-241514; Core Spray Valve Timing Test (Loop B) (IST); 09/03/09
- QCOS 1400-08; Core Spray Valve Timing Test (Loop B); Revision 22

Section 1EP6

- Quad Cities 3Q09 PI Drill, dated 07/16/09
- SY-AA-101-132; Assessment and Response to Suspicious Activity and Security Threats; Revision 14
- QCOA 0010-20; Security Event; Revision 25
- EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 27

Section 2PS2

- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-07-137; Torus Filters; dated December 17, 2007
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-08-050; Condensate Resin; dated May 28, 2008
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-08-393; Contaminated Equipment; dated June 30, 2008
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-09-365; Control Rod Drives; dated May 17, 2009
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-07-115; Condensate Resin; dated August 28, 2007
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. 08-003; Irradiated Hardware; dated June 26, 2008
- Shipment Manifest and Characterization Information, Radiological Surveys and Associated Documentation for Shipment No. QC-09-119; DAW; dated June 4, 2009
- Teledyne Brown Engineering, Inc. Waste Stream Analysis Report; Fuel Pool Particulate Sample No. L34838-1; dated May 2, 2008
- Teledyne Brown Engineering, Inc. Waste Stream Analysis Report; Reactor Water Particulate Sample No. L37923-2; dated April 1, 2009
- Teledyne Brown Engineering, Inc. Waste Stream Analysis Report; Condensate Resin Sample No. L37923-3; dated April 1, 2009
- Teledyne Brown Engineering, Inc. Waste Stream Analysis Report; Dry Active Waste Sample No. L37923-4; dated April 1, 2009
- RP-QC-605-1001; 10 CFR 61 Waste Stream Sampling and Analysis; Revision 1
- RW-AA-100; Process Control Program for radioactive Wastes; Revision 7
- RP-AA-602; Packaging of Radioactive Material Shipments; Revision 12
- RP-AA-601; Surveying Radioactive Material Shipments; Revision 10
- Focused Area Self-Assessment Report; Transportation and Radwaste; dated July 14, 2009
- Nuclear Oversight Assessment Report; Readiness for NRC Material Processing/Transportation Inspection; dated August 5, 2009
- Nuclear Oversight Assessment Report; Shipping Documentation; dated April 11, 2008
- Nuclear Oversight Assessment Report; Waste Classification and Characteristics; dated April 11, 2008
- Nuclear Oversight Assessment Report; 10 CFR 61 Program for Radwaste Shipments; dated August 26, 2009
- CC-AA-109; Equipment Abandoned Via Operational Configuration Change; Revision 4

- AR 00761001; Improperly Abandoned Radwaste Equipment; dated April 8, 2008
- Hazmet Training Lesson Plan (Code HAZSEC); DOT Security Awareness and Transportation Security; Revision 00
- Hazmet Training Lesson Plan (Code NISP0404); Hazardous Materials Transport; Revision 06c
- Hazmet Training Lesson Plan (Code HAZTSP - RM); Hazardous Material Transportation Security Plan Training; Revision 01
- Hazmet Training Lesson Plan (Code 04TRNST); Low Level Waste Processing; Revision 05
- Hazmet Training Lesson Plan (Code 04TRNST); High Radwaste Processing; Revision 04
- Hazmet Training Lesson Plan (Code NISP0404A); Hazardous Materials Transport for Warehouse Personnel; Revision 002
- AR 00785505; Contamination Found During Release of Exclusive Use Trailer; dated June 11, 2008
- AR 00946898; Notification of Shipment Over IDOT Weight Limit; dated July 28, 2009
- AR 00953196; Survey Not Completed within Required Time; dated August 13, 2009
- Infrequently Accessed LHRA Inspection Surveillance Records; dated March 2006 - March 2008
- Appendix 10, Fire Hazard Analysis Report for Interim Radwaste Storage Facility at Quad Cities Nuclear Station; dated July 1992
- Attachment B, Licensing and Safety Issues Relating to 10 CFR 50.59 Review for Commonwealth Edison Company Quad Cities Nuclear Station Interim Radwaste Storage Facility; dated July 1992
- AR 00966781; Original IRSF 50.59 Out of Date Based on Current Practices; dated September 18, 2009

Section 4OA1

- CY-QC-120-503; Reactor Water Iodine Analysis; Revision 0
- CY-QC-110-608; Reactor/Turbine Building Sample Panel Sample Collection; Revision 13
- Gamma Isotopic Reports and Dose Equivalent Iodine Calculation Data for Selected Periods in June 2008 - August 2009

Section 4OA2

- IR 965579; Non-safety RHRSW Corrosion Coupon Leaking Water; 09/16/09
- EC 376978; Structural Evaluation of RHRSW Corrosion Coupon Holders; 09/18/09

Section 4OA3

- IR 962562; Pinhole Leak Identified in Piping Downstream of 1-1402-38B; 09/08/09
- EN (Event Notice) 45333; Quad Cities report of Reactor Shutdown Required by TS due to Unisolable Leak in a Core Spray Minimum Flow Line; 09/08/09
- IR 963608; UT Min Wall Issues Identified During EOC (extent-of-condition) Inspections; 09/10/09
- IR 963668; Replace 1-1402-38B Valve in Q!R21; 09/11/09
- IR 912506; 1-0202-5B Did Not Stroke Closed; 04/28/09
- Licensee Event Report 254/09-001; Magnesium Rotor Degradation Causes Failure of Unit 1 Reactor Recirculation Pump Discharge Motor Operated Valve to Close and Results in Loss of LPCI When in Loop Select Function; 06/26/09
- ER-AA-302-1006; Generic Letter 96-05 Program Motor Operated Valve Maintenance and Testing Guidelines; Revision 7
- IR 935674; Follow-up to 1-0202-5B MOV Failure; 06/26/09

- PowerLabs Failure Analysis #QDC-46944; Field inspection of Two Recirculation Pump Discharge Isolation Valve Motors from Quad Cities MOVs 1-0202-5A and 1-0202-5B; 06/24/09
- IR 914345; Results of Boroscope Inspection of Failed Motor MO 1-0202-5B; 05/01/09
- IR 678340; NER NC-07-039 Yellow – MOV Motor Magnesium Rotor Degradation; 10/01/07
- IR 667490; HPCI Steam Supply Breaker Tripped When C/S Taken to Closed; 09/04/07
- IR 673998; Follow-up to Corporate IR #673729 on MOV Motor Rotor Issues; 09/21/07
- IR 670697; 3-2301-4 Valve Thermal Overloads Tripped; 09/12/2007 (Dresden)
- IR 922112; NOS ID MOV Magnesium Rotor Op Eval Criteria Issues; 05/20/09
- IR 923557; RCIC Stop Check Valve 1-1301-64 Will Not Close; 05/24/09
- IR 923468; RCIC Turbine Trip During Performance of QCOS 1300-05; 05/24/09
- IR 923849; Q1R20-Dissassembled 1-1301-41 Valve Seat Evidences Nicks; 05/26/09
- Apparent Cause Report (ACE) 923468; RCIC Turbine Exhaust Check Valve Failure Due to High Cycle Fatigue
- Licensee Event Report 254/09-002, “Inoperable RCIC Primary Containment Isolation Valves”; 07/23/09

Section 4OA5

- WO 01204516; 2009 Dry Cask Storage Campaign Cask #4; 09/02/09
- WO 01204517; 2009 Dry Cask Storage Campaign Cask #5; 09/14/09
- WO 01204513; 2009 Dry Cask Storage Campaign Cask #3; 08/24/09
- MSLT-MPC-HOLTEC; Helium Mass Spectrometer Leak Test Procedure; Revision MPC-Field-LT-01
- ISFSI Technical Specification 3.1.1; Multi-purpose Canister (MPC)
- USNRC letter EA-09-190; “Exercise of Enforcement Discretion – Holtec International”; 08/06/09

Section 4OA7

- IR 963599; 82-12 Work Hour Rules Violated for Two NSOs; 09/10/09

LIST OF ACRONYMS USED

ADAMS	Agency-wide Document Access Management System
AMSE	American Society of Mechanical Engineers
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Core Spray
DOT	Department of Transportation
DRP	Division of Reactor Projects
ECCS	Emergency Core Cooling System
EDG	Emergency Diesel Generator
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IRSF	Interim Radwaste Storage Facility
LER	Licensee Event Report
MOV	Motor-Operated Valve
MPC	Multi-Purpose Canister
NCV	Non-Cited Violation
NDE	Non-destructive Evaluation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
PARS	Publicly Available Records
PCIV	Primary Containment Isolation Valves
PI	Performance Indicator
RCIC	Reactor Core Isolation Cooling
RCS	Reactor Coolant System
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
SBO	Station Blackout
SDP	Significance Determination Process
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Orders

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Sincerely,

/RA/

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

Docket Nos. 50-254; 50-265; 72-053
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 05000254/2009004; 05000265/2009004
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Letter to C. Pardee from M. Ring dated November 9, 2009

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2009004;
05000265/2009004

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