



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

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

January 28, 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 05000254/2008005;  
05000265/2008005

Dear Mr. Pardee:

On December 31, 2008, 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 January 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 self-revealed findings of very low safety significance were identified. The findings did not involve violations of NRC requirements but did represent performance deficiencies that were evaluated at more than minor. Additionally, one licensee-identified violation is listed in Section 4OA7 of this report.

If you contest the subject or severity of a Non-Cited Violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Quad Cities Nuclear Power Station.

In 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

C. Pardee

-2-

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  
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 05000254/2008005; 05000265/2008005  
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Quad Cities Nuclear Power Station  
Plant Manager - Quad Cities Nuclear Power Station  
Manager Regulatory Assurance -  
Quad Cities Nuclear Power Station  
Senior Vice President - Midwest Operations  
Senior Vice President - Operations Support  
Vice President - Licensing and Regulatory Affairs  
Director Licensing - Licensing and Regulatory Affairs  
Manager Licensing - Clinton, Dresden and Quad Cities  
Associate General Counsel  
Document Control Desk - Licensing  
Assistant Attorney General  
J. Klinger, State Liaison Officer,  
Illinois Emergency Management Agency  
M. Rasmusson, State Liaison Officer, State of Iowa  
Chairman, Illinois Commerce Commission  
Chief Radiological Emergency Preparedness Section,  
Dept. Of Homeland Security

C. Pardee

-2-

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  
License Nos. DPR-29; DPR-30

Enclosure: Inspection Report 05000254/2008005; 05000265/2008005  
w/Attachment: Supplemental Information

cc w/encl: Site Vice President - Quad Cities Nuclear Power Station  
Plant Manager - Quad Cities Nuclear Power Station  
Manager Regulatory Assurance -  
Quad Cities Nuclear Power Station  
Senior Vice President - Midwest Operations  
Senior Vice President - Operations Support  
Vice President - Licensing and Regulatory Affairs  
Director Licensing - Licensing and Regulatory Affairs  
Manager Licensing - Clinton, Dresden and Quad Cities  
Associate General Counsel  
Document Control Desk - Licensing  
Assistant Attorney General  
J. Klinger, State Liaison Officer,  
Illinois Emergency Management Agency  
M. Rasmusson, State Liaison Officer, State of Iowa  
Chairman, Illinois Commerce Commission  
Chief Radiological Emergency Preparedness Section,  
Dept. Of Homeland Security

DOCUMENT NAME: G:\1-Secy\1-Work In Progress\QUA 2008 005.doc

Publicly Available       Non-Publicly Available       Sensitive       Non-Sensitive

**To receive a copy of this document, indicate in the concurrence box "C" = Copy without attach/encl "E" = Copy with attach/encl "N" = No copy**

OFFICE	RIII		RIII						
NAME	MRing.cms								
DATE	1/28/09								

**OFFICIAL RECORD COPY**

Letter to C. Pardee from M. Ring dated January 28, 2009

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2  
NRC INTEGRATED INSPECTION REPORT 05000254/2008005;  
05000265/2008005

DISTRIBUTION:

Tamara Bloomer

RidsNrrDorLpI3-2

RidsNrrPMQuad Cities

RidsNrrDirslrib Resource

Mark Satorius

Kenneth Obrien

Jared Heck

Carole Ariano

Linda Linn

Cynthia Pederson

DRPIII

DRSIII

Patricia Buckley

Tammy Tomczak

[ROPreports@nrc.gov](mailto:ROPreports@nrc.gov)

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254, 50-265  
License Nos: DPR-29, DPR-30

Report No: 05000254/2008005 and 05000265/2008005

Licensee: Exelon Nuclear

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

Location: Cordova, IL

Dates: October 1 through December 31, 2008

Inspectors: J. McGhee, Senior Resident Inspector  
B. Cushman, Resident Inspector  
B. Palagi, Senior Operations Engineer  
W. Slawinski, Senior Radiation Protection Inspector  
J. Tapp, Reactor Engineer  
R. Orlikowski, Senior Resident Inspector  
R. Baker, Resident Inspector  
R. Winter, Reactor Engineer  
C. Brown, Reactor Engineer  
C. Mathews, Illinois Emergency Management Agency

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

Enclosure

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	1
REPORT DETAILS.....	3
Summary of Plant Status.....	3
1. REACTOR SAFETY .....	4
1R01 Adverse Weather Protection (71111.01) .....	4
1R04 Equipment Alignment (71111.04).....	5
1R05 Fire Protection (71111.05) .....	5
1R11 Licensed Operator Requalification Program (71111.11).....	6
1R12 Maintenance Effectiveness (71111.12).....	7
1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13)..	8
1R15 Operability Evaluations (71111.15) .....	9
1R18 Plant Modifications (71111.18).....	10
1R19 Post-Maintenance Testing (71111.19) .....	10
1R20 Outage Activities (71111.20).....	13
1R22 Surveillance Testing (71111.22) .....	14
4. OTHER ACTIVITIES.....	15
4OA1 Performance Indicator Verification (71151).....	15
4OA2 Identification and Resolution of Problems (71152).....	18
4OA3 Follow-Up of Events and Notices of Enforcement Discretion (71153) .....	20
4OA5 Other Activities.....	26
4OA6 Management Meetings .....	26
4OA7 Licensee-Identified Violations .....	27
SUPPLEMENTAL INFORMATION .....	1
KEY POINTS OF CONTACT .....	1
LIST OF ITEMS OPENED, CLOSED AND DISCUSSED .....	1
LIST OF DOCUMENTS REVIEWED.....	2

## SUMMARY OF FINDINGS

IR 05000254/2008005, 05000265/2008005; 10/01/2008 – 12/31/2008; Quad Cities Nuclear Power Station, Units 1 & 2; Post-Maintenance Testing and Other Activities.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. In addition, an inspection was conducted for Temporary Instruction 2515/176, "Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing." Two Green findings were identified by the inspectors. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

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

#### Cornerstone: Initiating Events

- Green. A self-revealed finding of very low safety significance was identified for inadequate procedures that resulted in an onsite explosion on October 27, 2008. Specifically, operating procedures for the floor drain surge tank did not include appropriate warnings, cautions, or notes to alert operators to potentially hazardous conditions or operating sequences that could result in localized elevated concentrations of methane gas. As a result, waste water transfer activities resulted in an accumulation of methane gas in the floor drain surge tank building vestibule that subsequently ignited, damaging the onsite structure and putting the station in an emergency plan Unusual Event. Corrective actions for the affected tank included purging the tank with nitrogen, repairing the installed tank ventilation, monitoring for methane gas buildup until the tank was cleaned, and processing the waste water stored in the tank. Restrictions on system operation were put in place pending final procedure revisions.

The finding is more than minor because if left uncorrected this finding would become a more significant safety concern. In addition, it affected the Reactor Safety Initiating Events Cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the finding affected the Reactor Safety Initiating Events Cornerstone attribute of protection against external factors relating to production and control of hazardous gasses. The finding is of very low safety significance (Green) because the finding does not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. Additionally, the finding does not increase the likelihood of a fire affecting mitigating systems or a fire of significant duration. Inspectors determined that the finding had a cross-cutting aspect in the area of Problem Identification and Resolution. Specifically, the inspectors determined that the licensee was aware of industry events involving the anaerobic production of methane gas in radwaste systems and had opportunities to incorporate relevant industry operating experience into recent revisions of radwaste operating procedures, but failed to implement this operating experience into station processes, procedures, and training programs for radwaste operations (P.2 (b)). The failure to establish and implement effective radwaste operating procedures to prevent the

production of combustible gasses is not an activity affecting quality subject to 10 CFR Part 50, Appendix B, Criterion V. Therefore, while a performance deficiency was identified, no violation of NRC regulatory requirements occurred. (Section 4OA3)

### **Cornerstone: Mitigating Systems**

- Green. A self-revealed finding of very low safety significance was identified for failure to remove a foreign material exclusion device from the thrust bearing oil supply line of a feed pump during maintenance on November 3, 2008. The pump was returned to service with increased monitoring following the work activity on November 5 and was shut down for repair on November 7 after the control room received a bearing high temperature alarm. Immediate corrective actions for the equipment condition included lowering power to get flow within the capacity of two feedwater pumps, shutdown of the 1B pump, removal of the plug, correct reassembly of the oil line, and pump restart. Corrective action following the site investigation included retraining provided to Maintenance staff for documentation requirements and expectations for thorough post-maintenance inspections.

The inspectors determined that failure to remove the foreign material exclusion plug was more than minor because if left uncorrected, this behavior could lead to damage of safety-related or risk-significant equipment and thus become a more significant safety concern. The issue impacted the Mitigating Systems Cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences. The finding is of very low safety significance (Green) because the problems with a single feedwater pump did not impact the function, reliability or capability of the other two and the issue did not affect other mitigating systems. The inspectors determined that this finding was cross-cutting in the area of Human Performance Work Practices in that error prevention techniques such as self/peer checking and proper documentation of activities were not utilized commensurate with the risk of the assigned task (H.4 (a)). Failure to remove the plug in non-safety related equipment is not an activity affecting quality subject to 10 CFR Part 50, Appendix B, Criterion V. Therefore, while a performance deficiency was identified, no violation of NRC regulatory requirements occurred. (Section 1R19)

### **B. Licensee-Identified Violations**

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

## REPORT DETAILS

### Summary of Plant Status

#### **Unit 1**

The unit began the reporting period at 97 percent power, which is the normal full power operating configuration.

At 9:00 p.m. on October 31, 2008, operators lowered power to 22 percent to begin a planned maintenance sequence. Power was reduced to facilitate drywell entry to add oil to a recirculation pump motor bearing and for main condenser tube plugging. On November 2 operators raised power to 37 percent. Reactor feed pump seal failures required operators to hold power ascension for approximately 12 hours before raising power to 77 percent awaiting the return to service of the third feedwater pump. Prior to returning to full power, technicians performed testing on the turbine digital electro-hydraulic control system. The unit returned to full power on November 6 at 01:31 a.m.

At 8:00 p.m. on November 7, 2008, operators lowered power to 84 percent power to remove the 1B reactor feed pump from service to investigate a rising trend in thrust bearing temperature. Mechanics found a foreign material exclusion plug in the oil line to the thrust bearing that had been left installed during reassembly after the pump seal maintenance discussed in the previous paragraph of this report. The unit returned to full power at 02:25 a.m. on November 8.

At 7:00 p.m. on December 14, 2008, operators reduced load to perform a rod pattern adjustment, control rod scram timing and turbine testing. The unit returned to full power at 06:00 a.m. on December 15.

#### **Unit 2**

The unit began the reporting period at 96% power which is the normal full power operating configuration.

At 12:29 a.m. on October 2, 2008, with the unit at 96 percent power, the 2B reactor recirculation pump tripped when a relay technician inadvertently actuated a relay while installing a cover during surveillance manipulations. Operators adjusted recirculation flow and inserted control rods in accordance with the operating procedures to stabilize power at 47 percent. At 09:48 a.m. that same day the pump was restarted, and at 12:15 p.m. operators began raising power. The unit returned to full power at 4:00 p.m. that same day.

On October 8, 2008, the fourth in a series of power ascensions was conducted as a post-maintenance test for the generator rewind work that was conducted during the last refueling outage. Power was raised to 100 percent in a series of steps beginning at 08:00 a.m. Power was returned to 96 percent (912 MWe) at 10:05 p.m. that same day.

At 9:00 p.m. on December 5, 2008, operators began lowering power for a planned maintenance outage. The unit was taken offline to support output breaker upgrade, feedwater regulating valve repair, and drywell floor drain sump pump discharge check valve replacement. The unit restarted at 04:11 a.m. on December 7 and reached full power at 10:00 a.m. on December 8 after completion of rod scram timing and main turbine testing activities.

At 10:30 p.m. on December 11, 2008, an extraction steam bellows supplying the high pressure feedwater heater failed causing a slight increase in power (power did not exceed 100 percent of rated). The bellows is located inside the main condenser. Operators took immediate action to reduce power to the previous operating value of 96 percent and then lowered power to below 95 percent when they identified the heater problem. Management decided to start the downpower for the planned electrical breaker maintenance window two hours early that same day. At 5:00 p.m. on December 12 operators began lowering power. The maintenance scope changed to include taking the unit to cold shutdown to allow investigation and repair of the feedwater extraction heating line. The unit was returned to full power at 11:51 am on December 22.

At 04:00 a.m. on December 29, 2008, operators lowered power from the normal operating level of 96 percent to 85 percent for rod pattern adjustment. The operators returned the unit to 96 percent (912 MWe) 2 hours later.

## 1. REACTOR SAFETY

### Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

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

##### .1 Winter Seasonal Readiness Preparations

##### a. Inspection Scope

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

- Station Heating Steam, and
- Keep Warm Valve for Circulating Water System.

This inspection constituted one winter seasonal readiness preparations sample as defined in Inspection Procedure 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 1/2 'A' Standby Gas Treatment System,
- Unit 1 Control Rod Drive Systems, and
- Unit 2 'A' and 'D' Residual Heat Removal Service Water System.

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

These activities constituted three partial system walk-down samples as defined in Inspection Procedure 71111.04-05.

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:

- Fire Zone 9.2, Unit 2 Turbine Building, Elevation 595', Diesel Generator;
- Fire Zone 9.3, Unit 1/2 Reactor Building, Elevation 595', Diesel Generator;
- Fire Zone 11.1.4, Unit 2 Reactor Building, Elevation 554', HPCI Pump Room; and
- Fire Zone 11.3.1, Unit 2 Reactor Building, Elevation 554', 2B Core Spray.

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 had 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, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

These activities constituted four quarterly fire protection inspection samples as defined in Inspection Procedure 71111.05-05.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On November 4, 2008 (during the licensed operator requalification training annual exam), 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 Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

.2 Annual Operating Test Results (71111.11B)

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the individual Job Performance Measure operating tests, and the simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee from November 2008 through December 2008 as part of the licensee's operator licensing requalification cycle. These results were compared to the thresholds established in IMC 0609, Appendix I, "Licensed Operator Requalification Significance Determination Process (SDP)." The evaluations were also performed to determine if the licensee effectively implemented operator requalification guidelines established in NUREG 1021, "Operator Licensing Examination Standards for Power Reactors," and Inspection Procedure 71111.11, "Licensed Operator Requalification Program." The documents reviewed during this inspection are listed in the Attachment.

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:

- Service Water System,
- Units 1 & 2 Reactor Core Isolation Cooling Systems, and
- 345 kV Switchyard.

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 three quarterly maintenance effectiveness samples as defined in Inspection Procedure 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:

- Emergent replacement of failed 2 'B' loop low pressure coolant injection 5 minute time delay relay, 10A-K48B;
- Emergent failure of 1/2 emergency diesel generator cooling water pump and auto function of transformer 22 load tap changer during work week 43;
- Emergent failure of Unit 2 diesel generator cooling water pump with Unit 2 high pressure coolant injection room cooler inoperable and the Unit 1 station blackout diesel generator unavailable due to planned maintenance; and
- Emergent analog trip inverter replacement for Level III ground.

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 four samples as defined in Inspection Procedure 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:

- EC 372322, Seismic Installation of Unit 1 & Unit 2 250 Vdc, Unit 1 Normal and Unit 2 Alt 125 Vdc Batteries;
- EC 373132, Diesel Generator Cooling Water System;
- IR 832789, 1/2 DGCW Pump Continued to Indicate Running with Pump Off;
- IR 849245, 1B Residual Heat Removal Room Cooler Heat Exchanger has Tube Sheet Pitting; and
- IR 860569, Level III Ground on Unit 2 125 Vdc System.

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.

These operability inspections constituted five samples as defined in Inspection Procedure 71111.15-05.

b. Findings

No findings of significance were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modification(s):

- EC 370480, Disconnect Actuator & Gag Open Damper 2-5772-24C and EC 369474, Disconnect & Gag Open Damper 1-5772-24C.

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

This inspection constituted one temporary modification sample as defined in Inspection Procedure 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:

- Unit 1/2 Emergency Diesel Generator Load Test and Diesel Cooling Water Pump Operational Checks;
- Unit 2 Emergency Diesel Generator Load Test;
- Unit 2 Diesel Generator Cooling Water Pump Overhaul Operational Checks; and
- 1B Reactor Feedwater Pump Seal Replacement.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable):

the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion), and test documentation was properly evaluated. The inspectors evaluated the activities against 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.

These inspections constituted four post-maintenance testing samples as defined in Inspection Procedure 71111.19-05.

b. Findings

Introduction: Inspectors identified a self-revealed finding of very low safety significance (Green) for failure to remove a foreign material exclusion device from the thrust bearing oil supply line of a feed pump during maintenance work to replace a failed feed pump seal. The pump was returned to service and operated until the control room received a bearing high temperature alarm.

Description: On November 3, 2008, maintenance was charged with replacing the mechanical seal for the 1B reactor feed pump using Work Order 1095880. That afternoon mechanics partially disassembled the 1B inboard and outboard bearing ends. The oil supply line was disassembled at the flange connection directly attached to the lower bearing housing and a foreign material exclusion (FME) bag was placed over the supply line. Another flange upstream of the disassembled flange was loosened to allow residual oil to drain out of the line.

The next day mechanics disassembled the upstream (previously loosened) flange to facilitate removing the outboard bearing housing. Due to the amount of oil coming out of the line and the amount of oil already in the catch bucket, the mechanics decided to insert a plastic plug-type FME device into the upstream flange to prevent oil from draining so quickly and to prevent foreign material intrusion. At some later time, an FME bag was placed over the flange.

MA-AA-716-008, "Foreign Material Exclusion Program," defines FME devices as "An internal device (such as temporary dams and covers, pipe plugs, etc.) or external opening cover installed to prevent foreign material intrusion." Attachment 1 of MA-AA-716-008, "Tools and Devices," states, "When FME devices are used, the WGS [*work group supervisor*]/Lead Worker shall document on Attachment 3, Page 2." The plug inserted into the oil supply line was not documented in the work package. When the pump was reassembled, the FME bags were removed and the oil supply line was reattached. MA-AA-716-008 also states, "The Lead Worker shall visually inspect affected areas prior to installation of components which would impair later inspections."

The workers' visual inspection after the bags were removed did not identify the presence of the plug still inside the flange.

The post-maintenance test was performed after the clearance order was lifted and the auxiliary oil pump was started. Initially, the oil pump cycled on and off even after operators attempted to adjust pressure. Instruments and switches were vented by maintenance and the system relief valve, RV 1-3202-B5, was replaced before the pump was restarted. The mechanics signed off the post-maintenance test after verifying proper oil flow to the bearings with the auxiliary pump in operation.

When the 1B reactor feed pump was started at 4:46 p.m. on November 5, operators noted that the oil pressure indicator was pegged high with the attached oil pump running, but this was resolved by lowering oil pressure using the adjustable pressure regulating valve. Operators recognized that more adjustment was required than was normal and raised a question with the rotating equipment specialist who was at the pump at the time. The specialist explained that the new pressure regulating valve probably needed adjustment. Operators then completed their start checks by verifying that oil flow appeared adequate and that local temperature indications were satisfactory (thrust bearing temperature stabilized at 175 degrees Fahrenheit). However, operators continued to closely monitor the pump because the temperature was higher than it had been before the pump seal replacement.

On November 6, 2008, the main control room received a computer alarm on point M125, "RFP 1B Thrust Bearing" high temperature (180 degrees). The thrust bearing temperature was trending upward and Issue Report 841493 was initiated by the operating crew. Operators verified that the oil system lineup was correct.

The 1B reactor feed pump was shut down at 8:25 p.m. on November 7. Work Order 1184020 was developed to verify that the oil path was clear. Upon disassembly of the outboard bearing oil supply line at the upstream flange, the plastic plug was found stuck halfway through the connection's flexitallic gasket. The plug was removed, the oil line reassembled correctly, and the pump was restarted without incident.

Analysis: The inspectors determined that failure to remove the FME plug was a performance deficiency and was more than minor because if left uncorrected, this behavior could lead to damage of safety-related or risk-significant equipment and thus become a more significant safety concern. In addition, the FME plug left in the feedwater pump was associated with the equipment performance attribute of the Mitigating Systems Cornerstone. The issue impacted the cornerstone objective of ensuring the availability, reliability and capability of systems that respond to initiating events to prevent undesirable consequences.

The inspectors conducted a Phase 1 SDP screening and concluded that the issue was of very low safety significance (Green) because the problems with a single feedwater pump did not impact the function, reliability or capability of the other two feed pumps and the issue did not affect other mitigating systems. The inspectors determined that this finding was cross-cutting in the area of Human Performance Work Practices in that error prevention techniques such as self/peer checking and proper documentation of activities were not utilized commensurate with the risk of the assigned task (H.4 (a)).

Enforcement: Failure to remove the plug before returning the equipment to service is considered a finding of very low safety significance (**FIN 05000254/2008005-01**) and was documented in the CAP as Issue Reports 842168 and 841493. Corrective actions included removing the plug, reassembling the oil line correctly, and returning the pump to service. Post-maintenance testing verified the pump was operating correctly. Additional actions were taken to reinforce the procedural requirements and the importance of foreign material exclusion for equipment reliability.

Failure to remove the plug in non-safety related equipment is not an activity affecting quality subject to 10 CFR Part 50, Appendix B. Therefore, while a performance deficiency was identified, no violation of NRC regulatory requirements occurred.

1R20 Outage Activities (71111.20)

.1 Other Outage Activities

a. Inspection Scope

The inspectors evaluated outage activities for a planned maintenance outage for Unit 2 that began on December 5, 2008, and continued through December 7, 2008. Significant outage activities included breaker replacement in the 345 kV switchyard and repair of the drywell floor drain sump pump discharge check valve.

The inspectors evaluated outage activities for a second planned maintenance outage that began on December 12, 2008, and continued through December 21, 2008. The outage was originally planned to reduce power to take the generator offline for switchyard breaker replacement while keeping the reactor in Mode 1. The scope and duration of the outage changed significantly on the morning of December 12 when a feedwater heater bellows failure was identified and the decision was made to start power maneuvering for the shutdown early. The outage activities changed to take the unit beyond the original unit-offline-at-power schedule to cold shutdown conditions. Since the outage window expanded, the licensee added outage-required work activities to the scope.

The inspectors reviewed activities for both outages 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. Inspectors performed drywell closeout walkdowns and walked down steam affected areas that are not normally accessible at power.

This inspection constituted two other outage samples as defined in Inspection Procedure 71111.20-05.

b. Findings

No findings of significance were identified.

## 1R22 Surveillance Testing (71111.22)

### .1 Surveillance Testing

#### a. Inspection Scope

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

- Unit 2 Station Blackout Emergency Diesel Generator Quarterly Load Test (Routine);
- Measurement of Unit 2 Drywell Reactor Coolant Leakage (RCS Leakage); and
- Unit 2 Main Steam Drain Line Valve Stroke Times (IST).

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

- did preconditioning occur;
- were the effects of the testing adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- were acceptance criteria clearly stated, demonstrated operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges, and the calibration frequency was in accordance with TS, the UFSAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy, applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability, tests were performed in accordance with the test procedures and other applicable procedures, jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test; and
- equipment was returned to a position or status required to support the performance of its safety functions.

Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES**

4OA1 Performance Indicator Verification (71151)

.1 Mitigating Systems Performance Index - Emergency Alternating Current Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency Alternating Current (AC) Power System performance indicator for Quad Cities Units 1 and 2 for the period from the 4<sup>th</sup> quarter 2007 through the 3<sup>rd</sup> quarter 2008. To determine the accuracy of the performance indicator (PI) data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC integrated inspection reports for the period of October 1, 2007 through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. 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. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI emergency AC power system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.2 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - High Pressure Injection Systems performance indicator for Quad Cities Units 1 and 2 for the period from the 4<sup>th</sup> quarter 2007 through the 3<sup>rd</sup> quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in

accordance with applicable NEI guidance. 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. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI high pressure injection system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.3 Mitigating Systems Performance Index - Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Heat Removal System performance indicator for Quad Cities Units 1 and 2 for the period from the 4<sup>th</sup> quarter 2007 through the 3<sup>rd</sup> quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, MSPI derivation reports, and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. 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. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI heat removal system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.4 Mitigating Systems Performance Index - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Residual Heat Removal System performance indicator for Quad Cities Units 1 and 2 for the period from the 4<sup>th</sup> quarter 2007 through the 3<sup>rd</sup> quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 1, 2007, through

September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. 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. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI residual heat removal system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.5 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index - Cooling Water Systems performance indicator for Quad Cities Units 1 and 2 for the period from the 4<sup>th</sup> quarter 2007 through the 3<sup>rd</sup> quarter 2008. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 1, 2007, through September 30, 2008, to validate the accuracy of the submittals. The inspectors reviewed the MSPI component risk coefficient to determine if it had changed by more than 25 percent in value since the previous inspection, and if so, that the change was in accordance with applicable NEI guidance. 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. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two MSPI cooling water system samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

.6 Radiological Effluent Technical Specification/Offsite Dose Calculation Manual  
Radiological Effluent Occurrences

a. Inspection Scope

The inspectors sampled licensee submittals for the Radiological Effluent Technical Specification (RETS)/Offsite Dose Calculation Manual (ODCM) Radiological Effluent Occurrences performance indicator for the period of July 2007 through November 2008. The inspectors used PI definitions and guidance contained in the NEI Document 99-02,

“Regulatory Assessment Performance Indicator Guideline,” Revision 5 to determine the accuracy of the PI data reported during those periods. The inspectors reviewed the licensee’s issue report database and selected individual reports generated since this indicator was last reviewed to identify any potential occurrences such as unmonitored, uncontrolled, or improperly calculated effluent releases that may have impacted offsite dose. The inspectors reviewed gaseous and liquid effluent summary data and the results of associated offsite dose calculations for selected dates between July 2007 and November 2008 to determine if indicator results were accurately reported. The inspectors also reviewed the licensee’s methods for quantifying gaseous and liquid effluents and determining effluent dose. Documents reviewed are listed in the Attachment to this report.

This inspection constituted one RETS/ODCM radiological effluent occurrences sample as defined in Inspection Procedure 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 CAP

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 occurrences reviews were proper and adequate; and that the classification, prioritization, focus, and timeliness of corrective actions were commensurate with safety and sufficient to prevent recurrence of the issue. Minor issues entered into the licensee’s CAP as a result of the inspectors’ observations are included in the attached List of Documents Reviewed.

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

b. Findings

No findings of significance were identified.

## .2 Daily CAP 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 Semi-Annual Trend Review

### a. Scope

The inspectors performed a review of the licensee's CAP, engineering backlog and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results with a focus on timely correction of equipment issues. The inspectors' review nominally considered the time frame covered by outstanding engineering products in the backlog.

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

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

### b. Findings

No findings of significance were identified.

.4 Selected Issue Follow-Up Inspection: Inspection Report 845855, Fire Protection Alarm Test Causes Actual System Deluges

a. Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting fire protection system actuations that occurred during surveillance testing. Inspection Report 845855 documented actuation of the deluge for Main Turbine Bearings 2 and 3 during performance of QCOS 4100-30, "Quarterly Essential Fire Protection," on November 17, 2008. The inspectors reviewed the procedures and performed a CAP review for the past four years. The investigation revealed two previous occurrences of system actuation during surveillance where the system had actuated. Corrective actions to perform additional troubleshooting of the second event were later cancelled by the site.

Prompt action by the technicians and operators involved in the November 17 event prevented an equipment impact; however, additional investigation by the licensee during the cause evaluation report revealed procedure changes that would prevent deluge of components. No similar weaknesses were found in the 10 CFR 50, Appendix B applicable portions of the fire system. The inspectors also reviewed the associated corrective action plan generated in response to the issue.

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

b. Findings

No findings of significance were identified.

40A3 Follow-Up of Events and Notices of Enforcement Discretion (71153)

.1 Inadvertent Trip of the 2B Recirculation Pump Motor Generator Set

a. Inspection Scope

The inspectors reviewed the plant's response to a trip of the 2B recirculation pump. On October 2, 2008, electricians were replacing a relay cover following the completion of low pressure core injection logic testing, when they inadvertently contacted the relay paddle and actuated the relay. The actuation of the relay resulted in the 2B recirculation pump discharge valve going shut, causing the 2B recirculation pump to trip. Documents reviewed in this inspection are listed in the Attachment.

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

b. Findings

No findings of significance were identified.

## .2 Explosion of the Floor Drain Surge Tank Vestibule

### a. Inspection Scope

The inspectors reviewed the plant's response to an explosion in the vestibule for the floor drain surge tank building (FDSgT). On October 27, 2008, a buildup of methane gas in the FDSgT caused an explosion which destroyed the vestibule of the FDSgT. This event resulted in the licensee declaring an Unusual Event for a, "Report by plant personnel of an unanticipated EXPLOSION within the PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment (HU6)." There were no injuries. There was no structural damage to the pump and valve room or to the tank. There was no release of activity. The licensee initiated a nitrogen purge of the tank to remove any residual methane gas and provided temporary ventilation. The licensee verified no other tanks on site contained measurable quantities of methane gas. Normal ventilation was restored to the FDSgT on November 24, 2008.

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

### b. Findings

Introduction: The inspectors identified a finding of very low safety significance (Green) for inadequate procedures. Specifically, radwaste operating procedures for the FDSgT did not include appropriate warnings, cautions or notes to alert operators of potentially hazardous conditions or operating sequences that may result in hazardous concentrations of methane gas. Warnings, cautions or notes could direct the operator to verify that proper ventilation was in operation prior to initiating a water transfer involving the FDSgT. These warnings, cautions or notes could also be used to warn operators of the negative effects of transferring water with high organic content into a tank for possible long-term storage.

Description: On October 27, 2008, at 00:58 a.m., the radwaste operator began to line up the radwaste transfer system to support a water transfer from the waste collector tank to the FDSgT using the waste collector pump in accordance with QCOP 2000-39, "Pumping the Waste Collector Tank to the Floor Drain Surge Tank Using the Waste Collector Pump."

At 01:30 a.m., an operator and a radiation technician entered the FDSgT pump and valve room to continue the valve lineup. After the valve manipulations were complete, they exited the building. Shortly after the valve lineup was reported complete, the radwaste operator began transferring water from the waste collector tank to the FDSgT. The initial level of the FDSgT was 78 percent.

At 02:42 a.m., security personnel reported an explosion near the crib house. The radwaste operator stopped the water transfer. The final level of the FDSgT was 85 percent.

At 03:03 a.m., the licensee declared an Unusual Event under Emergency Procedure EP-AA-1006, "Radiological Emergency Planning Annex for Quad Cities," criteria HU6, "Fire not extinguished within 15 minutes of detection, or unanticipated EXPLOSION,

within the PROTECTED AREA boundary resulting in VISIBLE DAMAGE to permanent structure or equipment.”

First responders to the scene reported that the vestibule area in front of the FDSgT was essentially destroyed. The door leading to the pump and valve room was still intact and was closed until radiological conditions could be assessed and controlled. Initial gas samples taken at the scene indicated 10 percent of the lower explosive limit for combustible gasses. At 11:05 a.m., an air sample was taken from inside the FDSgT vent line vacuum breaker. The air sample at the screen of the vacuum breaker was measured at 100 percent of the lower explosive limit and analyzed by chemistry technicians to be 6.0 percent methane gas. A sample that was sent to an off site lab showed 6.5 percent methane gas and verified that no other combustible gasses were present. The lower explosive limit for methane gas is 5 percent methane gas concentration in air.

At 11:15 a.m., a water sample was taken from a grab sample point off the FDSgT transfer piping just before it enters the tank. The dose rate on the sample was 250 mr/hr on contact. Significant solids were observed in the sample. The solids were noted to be light and fluffy, consistent with powdered resin and/or filter media. Gas bubbles were later observed forming within the sample.

During the morning of October 29, 2008, the licensee initiated a nitrogen purge of the tank and started temporary ventilation with a filtered, monitored exhaust. The Unusual Event was terminated at 3:15 p.m. on October 29, 2008. The licensee placed a clearance order to prevent water transfer to or from the FDSgT.

A prompt investigation was completed on October 29, 2008. A root cause investigation team was formed and the root cause report was completed on December 1, 2008. On December 4, 2008, the licensee approved the plan for processing and treating the water in the FDSgT. The licensee also removed the clearance order that was hanging for the FDSgT. Inspectors determined that the appropriate precautions with regards to methane gas production were in place for the presence of high organic solids present in the tank and operation of the tank heaters.

Contributing factors were identified related to this event. The most significant contributing factor was the increased waste water being introduced into the radwaste system for processing. This extra waste water was present due to a couple of degraded material conditions present at the station. The first source of extra waste water was from leakage past the inner fuel pool gates on both units. Water would leak past the inner fuel pool gate and would collect in the cavity between the outer and inner fuel pool gates. The drain valve between the fuel pool gates was left open to continually drain the water leaking past the inner fuel pool gate. While first identified in the 2<sup>nd</sup> quarter of 2008, an interim fix was not in place until early-December 2008. The licensee planned to perform work on the fuel pool gates during the next refueling outage. As an interim fix, the licensee placed pumps in between the fuel pool gates that are controlled by float switches. These pumps would pump water leaking past the inner fuel pool gate back into the spent fuel pool.

The second source of water was increased waste water due to the need to backwash and precoat condensate demineralizers on an accelerated schedule because of condenser tube leaks on both operating units. The powdered resin used in the

condensate demineralizers was exhausting ahead of schedule due to the cleanup of chlorides. In order to extend the cycle time of each condensate demineralizer, eight bags of resin were used vice the normal two bags. Not only did the high turnover of the condensate demineralizers contribute to a higher quantity of water entering the radwaste system, but that the same water was much higher in total organic content. Prior to the summer of 2008, as routine practice, only processed water was sent to the FDSgT. However, because of the increased input to radwaste, the FDSgT was being used as an extra storage tank for water waiting processing when the inventory in radwaste was unable to provide sufficient storage volume. This unprocessed water provided a food source for the bacteria in the FDSgT. A planned downpower of Unit 1 on November 1 for a condenser tube plugging campaign corrected the condenser tube leak on Unit 1. Administrative controls were put in place on Unit 2 to control the direction, frequency and duration of condenser flow reversals to minimize the impact of the tube leaks on Unit 2. As of the end of the reporting period, both units were less than minimum detectable for chlorides in reactor feed water (<.25 parts per billion), and both were returned to a normal schedule for processing condensate demineralizers with two bags of resin.

Another contributing factor was that the licensee was unable to verify if the floor drain surge tank installed ventilation system was running prior to the event. After power was returned to the FDSgT, the ventilation blower would not start, and the fan damper was found in the closed position and would not open. The condition of this equipment prior to the event was not known and was not able to be determined. There was no remote indication of air flow, blower operation or damper position. There was no direction in operator rounds to check the tank ventilation, and there were also no steps included in radwaste procedures to verify the tank ventilation in operation prior to initiating a water transfer.

Relating to the contributing factor of the tank's ventilation was a clearance order on the Heating, Ventilation, and Air Conditioning (HVAC) system for the max recycle building. The ventilation for the FDSgT exhausts into the max recycle building, which then exhausts to the station stack as the monitored release point. The max recycle building HVAC had been tagged out of service for 24 months prior to this event, thereby closing off the exhaust path for the FDSgT. The Operations Department performs quarterly reviews of clearance orders that have been in place longer than a quarter. While these reviews did verify if the clearance orders were still needed from a maintenance viewpoint, the review did not examine other systems that the clearance order may affect indirectly. As a result, an analysis was not performed to determine the extent the ventilation of the FDSgT would be affected by having the ventilation of the max recycle building taken out of service. The Operations Department performed appropriate extent of condition reviews for all other clearance orders older than one quarter.

Analysis: The inspectors determined that the licensee's failure to provide operating procedures that would adequately prevent a buildup of methane gas is a performance deficiency and a finding. The finding was determined to be more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because if left uncorrected this finding would become a more significant safety concern. In addition, it affected the Reactor Safety Initiating Events Cornerstone objective to limit the likelihood of those events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the

finding affected the Reactor Safety Initiating Events Cornerstone attribute of protection against external factors relating to production and control of hazardous gasses.

The inspectors evaluated the finding in accordance with IMC 0609.04, "Phase 1 - Initial Screening and Characterization of Findings." The inspectors answered "No" that the finding did not contribute to both the likelihood of a reactor trip and the likelihood that mitigation equipment or functions would not be available. The inspectors also answered "No" that the finding did not increase the likelihood of a fire or internal/external event affecting safety related equipment. Therefore, the finding screened as having very low safety significance (Green).

Additionally, the inspectors determined that the finding had a cross-cutting aspect in the area of Problem Identification and Resolution. Specifically, the inspectors determined that the licensee was aware of industry events involving the anaerobic production of methane gas in radwaste systems. The licensee had opportunities to incorporate relevant industry operating experience into recent revisions of radwaste operating procedures. However, the licensee failed to implement and institutionalize this operating experience into station processes, procedures, and training programs for radwaste operations (P.2(b)).

**Enforcement:** The failure to establish and implement effective radwaste operating procedures to prevent the production of combustible gasses was not an activity affecting quality subject to 10 CFR Part 50, Appendix B. Therefore, while a performance deficiency was identified, no violation of NRC regulatory requirements occurred. This is considered a finding of very low safety significance (**FIN 05000254/2008005-02, 05000265/2008005-02**).

The licensee implemented corrective actions following the discovery of methane gas production in the FDSgT. The licensee was aggressively correcting radwaste equipment issues that contributed to this event. The licensee implemented a plan to process the water currently in the FDSgT by April, 2009. The licensee initiated Issue Report 836178 to track the corrective actions. The licensee also implemented standing orders for radwaste transfer operations that require checks for proper ventilation, recognizing total organic content of tank contents, and limitations for the operation of tank heaters until procedure revisions are complete.

.3 (Closed) Licensee Event Report (LER) 05000254/265-2008-001-00; Past Operation of Safe Shutdown Pump Outside Technical Specifications Surveillance Requirements

This event, which occurred on July 10, 2008, identified an error in the calculation that determines the required discharge pressure for the safe shutdown makeup pump to meet its applicable TS surveillance requirement. Specifically, station engineers identified that hydraulic resistance values used in the calculation for the pump discharge valves were not correct, resulting in a non-conservative pump discharge pressure requirement. The same values had been used in the original calculations performed in 1989 and were carried over into later revisions without validation. The calculation error resulted in two periods where the pump's discharge pressure was degraded and would not have passed the surveillance test if the correct hydraulic resistance values had been used.

The safe shutdown makeup pump TS 3.7.9 requires that while in Mode 1, 2, and 3 with reactor pressure greater than 150 psig, the system is provided a Limiting Condition for Operation completion time of 14 days. Technical Specification Surveillance 3.7.9.2 requires that the pump be capable of delivering a 400 gpm flow against a reactor pressure greater than 1120 psig. However, during the two periods identified in the LER, the pump was not capable of performing this action, but could, after further analysis, meet the required flow to satisfy the safety function.

Licensee corrective actions included correcting the calculation, performing an extent of condition review of hydraulic calculations used to support TS surveillances and reviewing current procedural requirements to verify that design data is appropriately verified when calculations are revised. The failure to translate design information accurately into the appropriate calculations is a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." However, since the error did not result in a condition where the system was unable to meet the safety function and the issue was entered into the CAP and corrected, this performance deficiency is determined to minor. Documents reviewed as part of this inspection are listed in the Attachment. This LER is closed.

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

.4 (Closed) Licensee Event Report (LER) 05000254/2007-002-00; Turbine First Stage Pressure Switch Failures

On November 16, 2007, surveillance testing confirmed that both of the switches comprising the 'A' trip channel had as-found values that exceeded TS allowable values and the LER was initiated. All four of the Unit 1 turbine first stage pressure switches were replaced by a plant modification installed in May 2007. The new pressure switches were procured as safety-related components from a commercial dedicator. The LER identified that the safety-related turbine first stage pressure switches were damaged during testing performed at the commercial grade dedicator when the switches were tested at the manufacturer's proof pressure of 2400 psig (significantly above the highest expected environmental pressure of 1000 psig that the switches would see in the design application). This damage was not obvious and was not identified during the acceptance testing or calibration of the switches after they arrived on site.

The licensee identified incorrect manufacturer's nameplate data as the root cause for this event in Issue Report 700455, 'Turbine First Stage Pressure Switches Out of Tolerance Cause Tech Spec Violation.' Corrective actions included replacement of all four of the affected switches. The licensee revised the acceptance test pressure to be used for any future procurement of the four affected turbine first stage pressure switches to a maximum of 1000 psig.

Inspectors performed an initial review of the licensee's root cause evaluation in March of 2008 and had several questions regarding the licensee's commercial grade dedication process and modification testing. As a result of the inspector interaction with the root cause team leader, the licensee revised the root cause report to address standards used for commercial grade dedication and missed opportunities to identify degraded performance of the switches during the various tests prior to and after installation. Additional corrective actions were added to address these ancillary issues. The failure of the commercial grade dedication process or site pre-installation testing to identify the

damaged pressure switches following qualification testing is a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control." This issue is further discussed in Section 4OA7 of this report. Documents reviewed as part of this inspection are listed in the Attachment. This LER is closed.

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

#### 4OA5 Other Activities

##### .1 Implementation of Temporary Instruction 2515/176, "Emergency Diesel Generator Technical Specification Surveillance Requirements Regarding Endurance and Margin Testing"

- a. The objective of Temporary Instruction (TI) 2515/176 was to gather information to assess the adequacy of nuclear power plant emergency diesel generator endurance and margin testing as prescribed in plant-specific TS. The inspectors reviewed the licensee's TS, procedures, and calculations and interviewed licensee personnel to complete the TI. The information gathered for this TI was forwarded to the Office of Nuclear Reactor Regulation for further review and evaluation on December 17, 2008. This TI is complete at Quad Cities Nuclear Power Station; however, this TI 2515/176 will not expire until August 31, 2009. Additional information may be required after review by the Office of Nuclear Reactor Regulation.

##### 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.

#### 4OA6 Management Meetings

##### .1 Exit Meeting Summary

On January 6, 2009, the inspectors presented the inspection results to T. Tulon, Site Vice-President, 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:

- Temporary Instruction 2515/176 with, T. Tulon, Site Vice-President, and other Licensee staff on November 24, 2008.
- Licensed operator requalification training annual operating test results with K. Moser, Training Manager, on December 29, 2008.

The inspectors confirmed that none of the potential report input discussed was considered proprietary.

## 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 a Non-Cited Violation.

### **Unit 1 Turbine First Stage Pressure Switches Damaged During Dedication Testing**

As previously discussed in Section 4OA3.4 of this report, Quad Cities maintenance staff identified during surveillance testing that both of the switches comprising the 'A' trip channel had as-found values that exceeded TS allowable values. The licensee identified that the safety-related turbine first stage pressure switches were damaged during testing performed at the commercial grade dedicator when the switches were tested at the manufacturer's proof pressure of 2400 psig (significantly above the highest expected environmental pressure of 1000 psig that the switches would see in the design application.) This damage was not obvious and was not identified during the acceptance testing or calibration of the switches after they arrived on site. The failure of the commercial grade dedication process or site pre-installation testing to identify the damaged pressure switches following commercial grade dedication testing is a violation of 10 CFR 50, Appendix B, Criterion III, "Design Control," requirements to ensure the testing program was suitable for the actual in service equipment conditions.

The failure of the testing and acceptance inspections to identify the damage to these switches is more than minor because the finding impacted the Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the cornerstone attribute of design control was impacted when the instrument setpoints were found out of tolerance as a result of damage incurred during environmental testing of the switches during commercial grade dedication. The issue was entered into the CAP as Issue Report 700455, "Turbine First Stage Pressure Switches Out of Tolerance Cause Tech Spec Violation." Corrective actions included replacement of all four of the affected switches, revision of the acceptance test pressure to be used for any future procurement of the four affected turbine first stage pressure switches to a maximum of 1000 psig and training for site personnel on establishing design specifications for testing during

commercial dedication. The commercial grade dedication contractor was included in the investigation and corrective action process.

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  
J. Garrity, Work Control Manager  
W. Beck, Regulatory Assurance Manager  
D. Craddick, Maintenance Manager  
J. Burkhead, Nuclear Oversight 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

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

50-254/2008005-01	FIN	Failure to Remove FME Device
50-254/2008005-02; 50-265/2008005-02	FIN	Explosion of the FDSgT Vestibule

#### Closed

50-254/2008005-01	FIN	Failure to Remove FME Device
50-254/2008005-02; 50-265/2008005-02	FIN	Explosion of the FDSgT Vestibule
50-254/2008-001-00 50-265/2008-001-00	LER	Past Operation of Safe Shutdown Pump Outside TS Surveillance Requirements
50-254/2007-002-00	LER	Turbine First Stage Pressure Switch Failures

## 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

- WC-AA-107 Revision 6; Seasonal Readiness
- QCOP 0010-01 Revision 45; Winterizing Checklist
- SA-AA-2114, Revision 001; Winter Safety
- WO 1075974; Operation of De-Ice Valve
- QCOP 4400-06 Revision 13; Circulating Water System Deicing
- QOP 5700-01 Revision 42; Heating Boiler Startup and Operation
- QCOP 5700-17, Revision 004; Plant Ventilation Heating Coils Startup and Operation

### Section 1R04

- QCOP 7500-01; Standby Gas Treatment System (SBGTS) Standby Operation and Start-Up, Revision 19
- QCOP 0300-01; CRD SYSTEM STARTUP, Revision 20
- QOM 2-1000-05; U2 RHR SERVICE WATER CHECKLIST, Revision 17

### Section 1R05

- QCMMS 4100-01; Fire Extinguisher Inspection, Revision 29
- Pre-plan TB-96; Fire Zone 9.2, Unit 2 Turbine Bldg. El. 595'-0", Diesel Generator; Revision 18
- Pre-plan RB-14; Fire Zone 11.1.4, Unit 2 Reactor Bldg. El. 554'-0", HPCI Pump Room; Revision 18
- Pre-plan RB-25; Fire Zone 9.3, Unit 1/2 Reactor Bldg. El. 595'-0", Diesel Generator; Revision 18
- Pre-plan RB-15; Fire zone 11.3.1, Unit 2 Reactor Bldg. El 554'-0" SW Corner Room – 2B Core Spray

### Section 1R11

- Results – Licensed Operator Examination Results – CY 2008

### Section 1R12

- Enterprise Maintenance Rule Production Database for Z9700: 345 KV Switchyard
- Enterprise Maintenance Rule Production Database for Z3900: Service Water/Diesel Cooling Water
- System Engineer Notebook and Accountability Logs for Z3900: Service Water/Diesel Cooling Water

### Section 1R13

- IR 832876; T22 Load Tap Changer Failed to Operate Automatically; 10/19/08
- IR 832879; 1/2 DGCWP Continued to Indicate Running with Pump Off; 10/18/08
- QCOS 1000-44; Unit 2 "B" Loop LPCI and Containment Cooling Modes of RHRSW Non-Outage Logic Test; Revision 10
- AR 00824849; 5 Minute Time Delay Relay Failed (10A-K48B)
- AR 00600638; Failure of Relay 10A-K48B During QCOS-1000-33

### Section 1R15

- IR 822508; CDBI – Seismic Issue with 250 Vdc & U2 Alt 125 Vdc Battery; 09/25/08
- IR 824347; CDBI – IR 822508 EOC Incorrectly Eliminated U1 125 Vdc batteries; 09/30/08
- EC 372322; Seismic Installation Issue with U1 and U2 250 Vdc, U1 Normal and U2 ALT 125Vdc Batteries; 09/30/08
- IR 832879; 1/2 DGCWP Continued to Indicate Running with Pump Off; 10/18/08
- IR 848636; 1/2 DG CWP Wear Ring Cross Section Crack; 11/22/08
- EC 373132, DGW – Diesel Generator Cooling Water (DGCW) System; Revision 0
- QDC-21599; PowerLabs Report; Evaluation of a Fractured Impeller Wear Ring from the Quad Cities Unit 2 EDG Cooling Water Pump; 11/20/08
- EC 373114; Acceptance Criteria for Linear Indications Found in the Impeller Casing Rings in the DGCW pumps; Revisions 0 and 1
- IR 847945; U2 EDGCWP Wear Ring Accelerated Degradation; 11/21/08
- IR 849245; 1B RHR Room Cooler Heat Exchanger Has Tube Sheet Pitting; 11/25/08
- IR 860189; Level III Ground on U-2 125 System; 12/26/08
- IR 860569; Level III Ground on U-2 125 System; 12/28/08
- EC 360538; Unit 2 125Vdc System; Revision 1

### Section 1R18

- EC 370480 Revision 1; Disconnect Actuator & Gag Open Damper 2-5772-24C; 6/4/2008
- EC 369474; Disconnect & Gag Open Damper 1-5772-24C; 2/18/2008
- CC-AA-112 Revision 12; Temporary Configuration Changes
- LS-AA-104 Revision 5; Exelon 50.59 Review Process

### Section 1R19

- QCOS 6600-43, Revision 30; Unit 1/2 Emergency Diesel Generator Load Test; 10/21/08
- QCOP 6600-14; Emergency Diesel Generator Cooling Water Pump Manual Operation; Revision 11
- QCOS 6600-42; Unit 2 Emergency Diesel Generator Load Test; Revision 30
- QCOS 6600-08; 1/2 Diesel Generator Cooling Water to Unit 1 and Unit 2 ECCS Room Coolers Flow Test; 11/22/08
- QCOS 6600-06; Diesel Generator Cooling Water Pump Flow Rate Test; 11/22/08
- MA-AA-716-008; Foreign Material Exclusion Program; Revision 3
- IR 842168; FME Left in Thrust Bearing Oil Supply Line; 11/04/08
- IR 840483; 1B RFP Aux Oil Pump Cycling OFF/ON with Normal oil Pressure
- IR 840419; 1B RFP Oil Leak at the Inboard Supply Oil Line during Post-Maintenance Verifications

## Section 1R22

- QCOP 6620-05, Revision 013; SBO DG0 Preparation for Standby Readiness
- QCOP 6620-07, Revision 015; SBO DG0 Preparation for Normal Start
- QCOP 6620-09, Revision 012; SBO DG0 Normal Mode Startup
- QCOP 6620-10, Revision 04; SBO DG0 Normal or Emergency Shutdown
- QCOS 1600-07, Revision 027; Reactor Coolant Leakage in the Drywell

## Section 4OA1

- CY-QC-120-720, Attachments 1 and 2, Effluent Dose Data and Release Calculations for July 2007 through November 2008
- Gaseous and Liquid Effluent Dose Summary Reports for Fourth Quarter 2007 and Second Quarter 2008
- NEI 99-02; Regulatory Assessment Performance Indicator Guideline, Revision 5
- Enterprise Maintenance Rule Production Database for the following systems:
  - Z2300; High Pressure Coolant Injection System
  - Z1000; Residual Heat Removal System
  - Z6600; Diesel Generator System
  - Z1300; Reactor Core Isolation Cooling System
  - Z9700; 345 KV Switchyard
- System Engineer Notebook and Accountability Logs for the following systems:
  - Residual Heat Removal
  - RHR Service Water
  - Reactor Core Isolation Cooling
  - HPCI
  - Emergency Diesel Generators

## Section 4OA3

- QCOP 0202-02; Reactor Recirculation System Startup; Revision 35
- Prompt Investigation Event/Issue Report: Inadvertent Trip of 2B Recirculation MG Set; 10/02/08 12:29 AM
- IR 830012; Trip of Unit 2B Reactor Recirculation Pump During logic Test; 10/02/08
- QCOA 0202-04; Reactor Recirculation Pump Trip – Single Pump; Revision 29
- QCOA 0400-02; Core Instabilities; Revision 18
- QCOS 0202-09; Recirculation Single Loop Operation Outage Report; Revision 15
- QCOP 0202-07; Reactor Recirculation Single Loop Operation Determination of Total Core Flow; Revision 23
- QCOP 3200-05; Reactor Feed Pump Shut Down; Revision 27
- IR 825425; Inadvertent Trip of 2B Recirculation Motor Generator Set
- IR 836178; Explosion in Floor Drain Surge Tank Vestibule Building; 11/26/08
- Recovery Plan for processing and treating water in the Floor Drain Surge Tank; 12/04/08
- QCOP 2000-39, Revision 3; Pumping the Waste Collector Tank to the Floor Drain Surge Tank Using the Waste Collector Pump
- QCOP 2000-37, Revision 1; Pumping the Waste Collector Tank to the Floor Drain Surge Tank Using the Floor Drain Collector Pump

- Quad Cities Nuclear Power Station Procedure Writers Guide For Operations Department (QCPWG Vol 3), Revision 7
- Quad Cities Nuclear Power Station Procedure Writers Guide For Operations Department Administration Procedures (QCPWG Vol 4), Revision 5
- IR 795531; SSMP Discharge Calculation Error – Historical Impact; 07/11/08
- QCOS 2900-01; Safe Shutdown Makeup Pump System Preparation for Standby Operation; Revision 26
- EP-AA-1006; Radiological Emergency Planning Annex for Quad Cities; Revision 26
- CC-AA-309-1002; Calculation Identification and Improvement; Revision 000
- IR 700455; Turbine First Stage Pressure Switches Out of Tolerance Cause Tech Spec Violation; 11/16/07

#### Section 4OA5

- QCOS 6600-20; Diesel Generator Endurance and Margin/Full load Reject Restart Test; Revision 48
- Analysis No. QDC-6700-E-1503; Auxiliary Power Analysis; Revision 001C

## LIST OF ACRONYMS USED

AC	Alternating Current
CAP	Corrective Action Program
CFR	Code of Federal Regulations
DRP	Division of Reactor Projects
FDSgT	Floor Drain Surge Tank
FME	Foreign Material Exclusion
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
kV	Kilovolt
LER	Licensee Event Report
MSPI	Mitigating System Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
ODCM	Offsite Dose Calculation Manual
PI	Performance Indicator
RETS	Radiological Effluent Technical Specification
SDP	Significance Determination Process
SSC	Systems, Structures, and Components
TI	Temporary Instruction
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
Vdc	Volts Direct Current