



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION III  
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LISLE, IL 60532-4352

February 3, 2011

Mr. Michael J. Pacilio  
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 05000254/2010005;  
05000265/2010005

Dear Mr. Pacilio:

On December 31, 2010, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed report documents the results of this inspection, which were discussed on January 11, 2011, with Mr. R. Gideon, and other members of your staff.

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

Based on the results of this inspection, one NRC-identified Severity Level IV violation was identified. The violation had an accompanying finding of very low safety significance. However, because of the very low safety significance, and because the issue was entered into your corrective action program, the NRC is treating the issue as a non-cited violation (NCV) in accordance with Section 2.3.2 of the NRC Enforcement Policy. Additionally, one licensee-identified violation is listed in Section 4OA7 of this report.

If you contest the subject or severity of these NCVs, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001; and the Resident Inspector Office at the Quad Cities Nuclear Power Station. In addition, if you disagree with the cross-cutting aspect assigned to any finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region III, and the NRC Resident Inspector at the Quad Cities Nuclear Power Station.

M. Pacilio

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records System (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000254/2010005; 05000265/2010005  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-254, 50-265, 72-053  
License Nos: DPR-29, DPR-30

Report No: 05000254/2010005 and 05000265/2010005

Licensee: Exelon Nuclear

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

Location: Cordova, IL

Dates: October 1 through December 31, 2010

Inspectors: J. McGhee, Senior Resident Inspector  
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Division of Reactor Projects

Enclosure

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## SUMMARY OF FINDINGS

IR 05000254/2010005, 05000265/2010005; 10/01/2010 - 12/31/2010; Quad Cities Nuclear Power Station, Units 1 & 2; Follow Up of Events and Notices of Enforcement Discretion.

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

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

#### **Cornerstone: Public Radiation Safety**

- Green. A Severity Level IV NCV of 10 CFR 50.71(e), "Periodic Update of the Final Safety Analysis Report," and an accompanying Green finding were identified by the inspectors for the failure to update documents incorporated by reference in the Updated Final Safety Analysis Report (UFSAR) and provided to the NRC in UFSAR updates. Specifically, the licensee did not update dose consequence calculations for a fire in the intermediate radwaste storage facility (IRSF) to reflect changes in packaging methods of solid radioactive waste material stored in the IRSF and used to provide a basis for determining if the increase in event consequences to offsite dose resulting from a fire in the facility was not more than minimal. Corrective actions included revision of the calculations and implementation of procedural controls to limit activity stored in the building to ensure offsite dose limits were not challenged in the event of a fire.

This finding was determined to be more than minor using IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because, if left uncorrected, the performance deficiency could have led to a more significant safety concern. Specifically, failure to update the UFSAR or associated licensing basis documents impacts the licensee's ability to adequately evaluate plant changes under the 10 CFR 50.59 processes and could lead to the licensee erroneously making unacceptable changes to the facility. The phase 1 SDP screening performed by the inspectors concluded that, since no actual release had occurred, no dose was received as a result of the issue, and the probability of the initiating design basis fire for the IRSF was extremely low, both the Radioactive Material Control and the Effluent Release Program flowcharts of IMC 0609 Appendix D, "Public Radiation Safety Significance Determination Program," determined the finding was of very low safety significance (Green). The inspectors determined that this finding did not reflect present performance because it is a legacy issue with changes made to the facility more than 10 years previously; therefore, there was no cross-cutting aspect associated with this finding. (Section 4OA3)

**B. Licensee-Identified Violations**

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

## REPORT DETAILS

### Summary of Plant Status

#### **Unit 1**

Unit 1 operated at 100 percent thermal power from September 1 through October 14, 2010, with the exception of planned power reductions for routine surveillances, planned equipment repair, and control rod maneuvers.

At 11:00 p.m. on October 14, 2010, operators began lowering reactor power from 100 percent to 25 percent power as part of a planned activity to remove the 1B reactor recirculation pump from service due to a cooling water leak on the 1B adjustable speed drive (ASD) unit (power supply to the pump). The pump was turned off at 05:00 a.m. on October 15, and the unit remained in single loop operations until repairs were completed on the affected ASD. The 1B reactor recirculation pump was restarted at 04:32 a.m. on October 16, and the unit returned to 100 percent power at 2:40 p.m. on October 16, 2010. The unit continued operating at 100 percent power through the end of the inspection period.

#### **Unit 2**

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

### **1. REACTOR SAFETY**

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

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

##### .1 Winter Seasonal Readiness Preparations

##### a. Inspection Scope

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

- Unit 1 and Unit 2 battery room ventilation;
- Unit 2 heating steam affecting safety-related switchgear; and
- active vehicle barriers.

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

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- Unit 1C residual heat removal pump and associated loop components; and
- Unit 2 high pressure coolant injection system with Unit 2 reactor core isolation cooling system out-of-service for maintenance.

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

These activities constituted two partial system walkdown samples as defined in IP 71111.04-05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On November 10, 2010, the inspectors performed a complete system alignment inspection of the Unit 1/2 standby gas treatment system to verify the functional capability of the system. This system was selected because it was considered both safety significant and risk significant in the licensee's probabilistic risk assessment. The inspectors walked down the system to review mechanical and electrical equipment line-ups; electrical power availability; system pressure and temperature indications, as appropriate; component labeling; component lubrication; component and equipment cooling; hangers and supports; operability of support systems; and to ensure that ancillary equipment or debris did not interfere with equipment operation. A review of a sample of past and outstanding WOs was performed to determine whether any deficiencies significantly affected the system function. In addition, the inspectors reviewed the CAP database to ensure that system equipment alignment problems were being identified and appropriately resolved. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Fire Zone 11.2.1, Unit 1 Reactor Building, Elevation 554'0", SW Corner Room - 1B Core Spray; and
- Fire Zone 1.1.1.5, Unit 1 Reactor Building, Elevation 666'6", 4<sup>th</sup> Floor East and West (Standby Liquid Control and Standby Gas Treatment).

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant; effectively maintained fire detection and suppression capability; maintained passive fire protection features in good material condition; and implemented adequate compensatory measures for out-of-service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment to this report, the inspectors verified that

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

These activities constituted two quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11)

.1 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 in 2010, 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 IP 71111.11, "Licensed Operator Requalification Program." The documents reviewed during this inspection are listed in the Attachment to this report.

Completion of this section constituted one biennial licensed operator requalification inspection sample as defined in IP 71111.11B.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On Tuesday, October 19, 2010, 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 that training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;

- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions and Emergency Plan actions and notifications.

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

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

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- Z0750: Source Range and Intermediate Range Instrumentation;
- Z7500: Standby Gas Treatment System; and
- Z0800: Spent Fuel Pool.

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 IP 71111.12-05.

b. Findings

No findings were identified.

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

.1 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

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

- Work Week (10-41-03) - Unit 1/2 emergency diesel generator (EDG), 1/2 EDG fuel oil tank inspection, Unit 1 reactor core isolation cooling (RCIC), and intake dredging with trash rake maintenance;
- Work Week (10-47-07) - 1A and 1B residual heat removal (RHR) and RHR service water (RHRSW), 1A RHR submarine door, emergent offsite line outage for L0404, 1A 125 Vdc battery charger, Unit 1/2 EDG, and intake dredging;
- Work Week (10-49-11) - Unit 1/2 service water pump, 1/2 standby gas treatment, safe shutdown makeup pump, Unit 2 RCIC, and Unit 2 EDG; and
- Work Week (10-50-12) - Safe shutdown makeup pump, 2A service water pump, reactor building ventilation isolation dampers, 1/2 EDG, U2 station blackout diesel generator, and offsite line 0404 to the Quad Cities switchyard.

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 IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Issue Report (IR) 1130373, Pressures from Approved Differential Pressure Calculations Not Used in Motor Operated Valves (MOVs) Calculations; and
- IR 1155789, Unit 1 Battery Room Roof Leaks.

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

This operability inspection constituted two samples as defined in IP 71111.15-05.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Temporary Plant Modifications

a. Inspection Scope

The inspectors reviewed the following temporary modifications:

- Engineering Change (EC) 380866: Remove valve 1-1299046 and install a threaded cap on each side of where the valve was removed;
- WO 01-099057: Install/remove temporary power to Unit 2 RHRSW vaults in support of painting activities; and
- EC 382294: Bypass main steam tunnel temperature switch.

The inspectors compared the temporary configuration changes and associated 10 CFR 50.59 screening and evaluation information against the design basis, the UFSAR, and the TS, as applicable, to verify that the modification did not affect the operability or availability of the affected system(s). The inspectors also compared the licensee's information to operating experience information to ensure that lessons learned

from other utilities had been incorporated into the licensee's decision to implement the temporary modification. The inspectors, as applicable, performed field verifications to ensure that the modifications were installed as directed; the modifications operated as expected; modification testing adequately demonstrated continued system operability, availability, and reliability; and that operation of the modifications did not impact the operability of any interfacing systems. Lastly, the inspectors discussed the temporary modification with operations, engineering, and training personnel to ensure that the individuals were aware of how extended operation with the temporary modification in place could impact overall plant performance. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings were identified.

1R19 Post-Maintenance Testing (71111.19)

.1 Post-Maintenance Testing

a. Inspection Scope

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

- WO 1367930: Unit 1/2 Emergency Diesel Generator Monthly Load Test;
- WOs 1367053, 1367054, 1367055, 1367057: Repair ASD HMI for Virus Removal; and
- WO 1379862: Unit 1/2 Control Room (CR) HVAC Chiller Various Leaks and WO 1382939 - CR B-HVAC RCU Tripped During PMT.

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

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

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22)

.1 Surveillance Testing

a. Inspection Scope

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

- QCOS 1400-01, Quarterly Core Spray System Flow Rate Test (Routine); and
- QCOS 1000-45, Unit 2 'B' Loop LPCI and Containment Cooling Modes of RHR Non-Outage Logic Test (Routine).

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" set points were within required ranges; and the calibration frequency were in accordance with TSS, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers code, and reference values were consistent with the system design basis;
- where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable;

- where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure;
- where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished;
- prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test;
- equipment was returned to a position or status required to support the performance of its safety functions; and
- all problems identified during the testing were appropriately documented and dispositioned in the CAP.

Documents reviewed are listed in the Attachment to this report.

This inspection constituted two routine surveillance testing samples as defined in IP 71111.22, Sections -02 and -05.

b. Findings

No findings were identified.

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

.1 Emergency Action Level and Emergency Plan Changes

a. Inspection Scopes

Since the last NRC inspection of this program area, Emergency Action Level and Emergency Plan changes were implemented based on your determination, in accordance with 10 CFR 50.54(q), that the changes resulted in no decrease in effectiveness of the Plan, and that the revised Plan as changed continues to meet the requirements of 10 CFR 50.47(b) and Appendix E to 10 CFR Part 50. Revisions to the Emergency Action Levels and Emergency Plan were reviewed by the inspectors in the Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station, Revisions 28 and 29. The inspectors conducted a sampling review of the Emergency Plan changes and a review of the emergency action level changes to evaluate for potential decreases in effectiveness of the Plan. However, this review does not constitute formal NRC approval of the changes. Therefore, these changes remain subject to future NRC inspection in their entirety.

This Emergency Action Level and Emergency Plan changes inspection constituted one sample as defined in IP 71114.04-05.

b. Findings

No findings were identified.

## 2. RADIATION SAFETY

### 2RS1 Radiological Hazard Assessment and Exposure Controls (71124.01)

This inspection constituted one complete sample as defined in IP 71124.01-05.

#### .1 Radiological Hazard Assessment (02.02)

##### a. Inspection Scope

The inspectors conducted walkdowns of the facility, including radioactive waste processing, storage, and handling areas to evaluate material conditions and performed independent radiation measurements to verify conditions.

The inspectors selected the following radiologically risk-significant work activities that involved exposure to radiation:

- Chemistry Reactor Water Sampling

For these work activities, the inspectors assessed whether the pre-work surveys performed were appropriate to identify and quantify the radiological hazard and to establish adequate protective measures. The inspectors evaluated the radiological survey program to determine if hazards were properly identified, including the following:

- identification of hot particles;
- the presence of alpha emitters;
- the potential for airborne radioactive materials, including the potential presence of transuranics and/or other hard-to-detect radioactive materials (This evaluation may include licensee planned entry into non-routinely entered areas subject to previous contamination from failed fuel);
- the hazards associated with work activities that could suddenly and severely increase radiological conditions and that the licensee has established a means to inform workers of changes that could significantly impact their occupational dose; and
- severe radiation field dose gradients that can result in non-uniform exposures of the body.

The inspectors observed work in potential airborne areas and evaluated whether the air samples were representative of the breathing air zone. The inspectors evaluated whether continuous air monitors were located in areas with low background to minimize false alarms and were representative of actual work areas. The inspectors evaluated the licensee's program for monitoring levels of loose surface contamination in areas of the plant with the potential for the contamination to become airborne.

##### b. Findings

No findings were identified.

.2 Instructions to Workers (02.03)

a. Inspection Scope

The inspectors selected various containers holding non-exempt licensed radioactive materials that may cause unplanned or inadvertent exposure of workers, and assessed whether the containers were labeled and controlled in accordance with 10 CFR 20.1904, "Labeling Containers," or met the requirements of 10 CFR 20.1905(g), "Exemptions To Labeling Requirements."

For work activities that could suddenly and severely increase radiological conditions, the inspectors assessed the licensee's means to inform workers of changes that could significantly impact their occupational dose.

b. Findings

No findings were identified.

.3 Contamination and Radioactive Material Control (02.04)

a. Inspection Scope

The inspectors observed locations where the licensee monitors potentially contaminated material leaving the radiological control area and inspected the methods used for control, survey, and release from these areas. The inspectors observed the performance of personnel surveying and releasing material for unrestricted use and evaluated whether the work was performed in accordance with plant procedures and whether the procedures were sufficient to control the spread of contamination and prevent unintended release of radioactive materials from the site. The inspectors assessed whether the radiation monitoring instrumentation had appropriate sensitivity for the type(s) of radiation present.

The inspectors reviewed the licensee's criteria for the survey and release of potentially contaminated material. The inspectors evaluated whether there was guidance on how to respond to an alarm that indicates the presence of licensed radioactive material.

The inspectors reviewed the licensee's procedures and records to verify that the radiation detection instrumentation was used at its typical sensitivity level based on appropriate counting parameters. The inspectors assessed whether or not the licensee has established a de facto "release limit" by altering the instrument's typical sensitivity through such methods as raising the energy discriminator level or locating the instrument in a high-radiation background area.

The inspectors selected several sealed sources from the licensee's inventory records and assessed whether the sources were accounted for and verified to be intact (i.e., they were not leaking their radioactive content).

The inspectors evaluated whether any transactions, since the last inspection, involving nationally tracked sources were reported in accordance with 10 CFR 20.2207.

b. Findings

No findings were identified.

.4 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors examined the licensee's physical and programmatic controls for highly activated or contaminated materials (nonfuel) stored within spent fuel and other storage pools. The inspectors assessed whether appropriate controls (i.e., administrative and physical controls) were in place to preclude inadvertent removal of these materials from the pool.

b. Findings

No findings were identified.

.5 Risk-Significant High Radiation Area and Very High Radiation Area Controls (02.06)

a. Inspection Scope

The inspectors discussed with the radiation protection manager the controls and procedures for high-risk high radiation areas and very high radiation areas. The inspectors discussed methods employed by the licensee to provide stricter control of very high radiation area access as specified in 10 CFR 20.1602, "Control of Access to Very High Radiation Areas," and Regulatory Guide 8.38, "Control of Access to High and Very High Radiation Areas of Nuclear Plants." The inspectors assessed whether any changes to licensee procedures substantially reduced the effectiveness and level of worker protection.

The inspectors discussed the controls in place for special areas that have the potential to become very high radiation areas during certain plant operations with first-line health physics supervisors (or equivalent positions having backshift health physics oversight authority). The inspectors assessed whether these plant operations require communication beforehand with the health physics group, so as to allow corresponding timely actions to properly post, control, and monitor the radiation hazards including re-access authorization.

The inspectors evaluated licensee controls for very high radiation areas and areas with the potential to become a very high radiation area to ensure that an individual was not able to gain unauthorized access to the very high radiation area.

b. Findings

No findings were identified.

2RS4 Occupational Dose Assessment (71124.04)

This inspection constituted one complete sample as defined in IP 71124.04-5.

.1 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed the results of radiation protection program audits related to internal and external dosimetry (e.g., licensee's quality assurance audits,

self-assessments, or other independent audits) to gain insights into overall licensee performance in the area of dose assessment and focus the inspection activities consistent with the principle of “smart sampling.”

The inspectors reviewed the most recent National Voluntary Laboratory Accreditation Program accreditation report on the vendor’s most recent results to determine the status of the contractor’s accreditation.

A review was conducted of the licensee procedures associated with dosimetry operations, including issuance/use of external dosimetry (routine, multi-badging, extremity, neutron, etc.), assessment of internal dose (operation of whole body counter, assignment of dose based on derived air concentration-hours, urinalysis, etc.), and evaluation of and dose assessment for radiological incidents (distributed contamination, hot particles, loss of dosimetry, etc.).

The inspectors evaluated whether the licensee had established procedural requirements for determining when external and internal dosimetry is required.

b. Findings

No findings were identified.

.2 External Dosimetry (02.02)

a. Inspection Scope

The inspectors evaluated whether the licensee’s dosimetry vendor is National Voluntary Laboratory Accreditation Program accredited; if the approved irradiation test categories for each type of personnel dosimeter used are consistent with the types and energies of the radiation present; and the way the dosimeter is being used (e.g., to measure deep dose equivalent, shallow dose equivalent, or lens dose equivalent).

The inspectors evaluated the onsite storage of dosimeters before their issuance, during use, and before processing/reading. The inspectors also reviewed the guidance provided to rad-workers with respect to care and storage of dosimeters.

The inspectors assessed whether non-National Voluntary Laboratory Accreditation Program accredited passive dosimeters (e.g., direct ion storage sight read dosimeters) were used according to licensee procedures that provide for periodic calibration, application of calibration factors, usage, reading (dose assessment) and zeroing. The licensee does not use non-National Voluntary Laboratory Accreditation Program accredited passive dosimeters.

The inspectors assessed the use of active dosimeters (electronic personal dosimeters) to determine if the licensee uses a “correction factor” to address the response of the electronic personal dosimeter as compared to the passive dosimeter for situations when the electronic personal dosimeter must be used to assign dose and whether the correction factor is based on sound technical principles.

The inspectors reviewed dosimetry occurrence reports or corrective action program documents for adverse trends related to electronic dosimeters, such as interference from electromagnetic frequency, dropping or bumping, failure to hear alarms, etc.

The inspectors assessed whether the licensee had identified any trends and implemented appropriate corrective actions.

b. Findings

No findings were identified.

.3 Special Dosimetric Situations (02.04)

Declared Pregnant Workers

a. Inspection Scope

The inspectors assessed whether the licensee informs workers, as appropriate, of the risks of radiation exposure to the embryo/fetus, the regulatory aspects of declaring a pregnancy, and the specific process to be used for (voluntarily) declaring a pregnancy.

The inspectors selected individuals who had declared pregnancy during the current assessment period and evaluated whether the licensee's radiological monitoring program (internal and external) for declared pregnant workers is technically adequate to assess the dose to the embryo/fetus. The inspectors reviewed exposure results and monitoring controls employed by the licensee and with respect to the requirements of 10 CFR Part 20.

b. Findings

No findings were identified.

Shallow Dose Equivalent

a. Inspection Scope

The inspectors reviewed shallow dose equivalent dose assessments for adequacy. The inspectors evaluated the licensee's method (e.g., VARSKIN or similar code) for calculating shallow dose equivalent from distributed skin contamination or discrete radioactive particles.

b. Findings

No findings were identified.

Neutron Dose Assessment

a. Inspection Scope

The inspectors evaluated the licensee's neutron dosimetry program, including dosimeter types and/or survey instrumentation.

The inspectors reviewed neutron exposure situations (e.g., independent spent fuel storage installation operations or at-power containment entries) and assessed whether: (a) dosimetry and/or instrumentation was appropriate for the expected neutron spectra, (b) there was sufficient sensitivity for low dose and/or dose rate measurement, and (c) neutron dosimetry was properly calibrated. The inspectors also assessed whether

interference by gamma radiation had been accounted for in the calibration and whether time and motion evaluations were representative of actual neutron exposure events, as applicable.

b. Findings

No findings were identified.

Assigning Dose of Record

a. Inspection Scope

For the special dosimetric situations reviewed in this section, the inspectors assessed how the licensee assigns dose of record for total effective dose equivalent, shallow dose equivalent, and lens dose equivalent. This included an assessment of external and internal monitoring results, supplementary information on individual exposures (e.g., radiation incident investigation reports and skin contamination reports), and radiation surveys' and/or air monitoring results when dosimetry was based on these techniques.

b. Findings

No findings were identified.

**4. OTHER ACTIVITIES**

40A1 Performance Indicator Verification (71151)

**Cornerstone: Barrier Integrity**

.1 Reactor Coolant System Specific Activity

a. Inspection Scope

The inspectors sampled licensee submittals for the reactor coolant system specific activity Performance Indicator (PI) for Quad Cities Nuclear Power Station Units 1 and 2 for the period from the third quarter 2009 through the second quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, was used. The inspectors reviewed the licensee's reactor coolant system chemistry samples, Technical Specification requirements, issue reports, event reports, and NRC integrated inspection reports for the period of third quarter 2009 through the second quarter 2010 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator and none were identified. In addition to record reviews, the inspectors observed a chemistry technician obtain and analyze a reactor coolant system sample. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two reactor coolant system specific activity samples as defined in IP 71151-05.

b. Findings

No findings were identified.

**Cornerstone: Public Radiation Safety**

.2 Radiological Effluent TS/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 PI for the period from the third quarter 2009 through the second quarter 2010. The inspectors used PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, 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 effluent summary data and the results of associated offsite dose calculations for selected dates between the third quarter 2009 through the second quarter 2010 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 IP 71151-05.

b. Findings

No findings were identified.

**Cornerstone: Mitigating Systems**

.3 Mitigating Systems Performance Index - Emergency AC Power System

a. Inspection Scope

The inspectors sampled licensee submittals for the Mitigating Systems Performance Index (MSPI) - Emergency AC Power System performance indicator for Quad Cities Unit 1 and Unit 2 for the period from the 4<sup>th</sup> quarter 2009 through the 3<sup>rd</sup> quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, MSPI derivation reports, issue reports, event reports and NRC integrated inspection reports for the period of October 2009 through September 2010 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 IP 71151-05.

b. Findings

No findings were identified.

.4 Mitigating Systems Performance Index - High Pressure Injection Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - High Pressure Injection Systems performance indicator for Quad Cities Unit 1 and Unit 2 for the period from the fourth quarter 2009 through the third quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 2009 through September 2010 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 IP 71151-05.

b. Findings

No findings were identified.

.5 Mitigating Systems Performance Index - Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI- Heat Removal System performance indicator for Quad Cities Unit 1 and Unit 2 for the period from the fourth quarter 2009 through the third quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, MSPI derivation reports, and NRC integrated inspection reports for the period of October 2009 through September 2010 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 IP 71151-05.

b. Findings

No findings were identified.

.6 Mitigating Systems Performance Index - Residual Heat Removal System

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Residual Heat Removal System performance indicator for Quad Cities Unit 1 and Unit 2 for the period from the fourth quarter 2009 through the third quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 2009 through September 2010 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 IP 71151-05.

b. Findings

No findings were identified.

.7 Mitigating Systems Performance Index - Cooling Water Systems

a. Inspection Scope

The inspectors sampled licensee submittals for the MSPI - Cooling Water Systems performance indicator for Quad Cities Unit 1 and Unit 2 for the period from the fourth quarter 2009 through the third quarter 2010. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, MSPI derivation reports, event reports and NRC integrated inspection reports for the period of October 2009 through

September 2010 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 IP 71151-05.

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

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

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.2 Daily Corrective Action Program Reviews

a. Inspection Scope

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

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

b. Findings

No findings were identified.

.3 Semi-Annual Trend Review

a. Inspection Scope

The inspectors performed a review of the licensee's CAP and associated documents to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment issues resulting in unplanned entry into actions of TS limiting conditions of operations that could have resulted in a shutdown required by TS, but also considered the results of daily inspector CAP item screening discussed in Section 4OA2.2 above, licensee trending efforts, and licensee human performance results. The inspectors' review nominally considered the six month period of April 1 through September 30, 2010, although some examples expanded beyond those dates where the scope of the trend warranted.

The review also included issues documented outside the normal CAP in major equipment problem lists, repetitive/reworks maintenance lists, departmental problem/challenges lists, system health reports, quality assurance audit/surveillance reports, self-assessment reports, and Maintenance Rule assessments. The inspectors compared and contrasted their results with the results contained in the licensee's CAP trending reports. Corrective actions associated with a sample of the issues identified in the licensee's trending reports were reviewed for adequacy. This review constituted a single semi-annual trend inspection sample as defined in IP 71152-05.

b. Findings

No findings were identified.

.4 Selected Issue Followup Inspection: Non-conservative Safety Limit Minimum Critical Power Ratio

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting a report of a non-conservative error in the Westinghouse code used to calculate the safety limit minimum critical power ratio and

the operating limit minimum critical power ratio. Preliminary reviews performed by the vendor indicated that the error in the safety limit minimum critical power ratio and the operating limit minimum critical power ratio could be non-conservative by 0.03.

Inspectors reviewed the licensee's evaluation of the fuel vendor's information, including the interim compensatory actions and crew operating guidance, to ensure the appropriate actions were in place to ensure the safety limit was not exceeded. This item is documented in the CAP as IR 1129487 and IR 1129289.

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

b. Findings

No findings were identified.

.5 Selected Issue Followup Inspection: 1B ASD Cooling Water Leak Leading to Single Loop Operations

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting a leak discovered on the 1B recirculation pump adjustable speed drive (ASD) on October 11, 2010. The licensee made preparations to identify the location of the leak and correct the condition. The licensee transitioned Unit 1 to single loop operations on the morning of October 15 and de-energized the 1B ASD. The leak was found on a cooling water hose connection associated with one of the input transformer coils. The licensee utilized this maintenance opportunity to perform repairs to the 1B ASD to return to service all previously bypassed power cells. The 1B ASD was restarted and Unit 1 returned to dual loop operation on the morning of October 16.

Inspectors reviewed the licensee's maintenance preparations, the impacts to online risk, risks associated with operating in single loop, and contingency planning for a cold shutdown for Unit 1. Inspectors verified that operations had appropriate short notice training for transitioning Unit 1 to single loop operations and for recovery of the idle loop. Inspectors observed the licensee's performance of reactivity manipulations, transitioning to single loop operations and also the recovery of the idle loop.

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

b. Findings

No findings were identified.

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

.1 (Closed) Licensee Event Report (LER) 05000254/2010-002, Unit 1 Reactor Scram due to Turbine Trip from Low Condenser Vacuum during Main Condenser Flow Reversal

This event, which occurred on August 12, 2010, occurred while a condenser circulating water flow reversal was in progress with the unit at 100 percent power. Circulating water valves required to reposition as part of the flow reversal failed to move as expected. The resulting reduced circulating water flow to the condenser caused condenser vacuum to lower rapidly (rising backpressure). High main condenser backpressure resulted in a turbine trip with a subsequent automatic scram on turbine stop valve closure. Sufficient circulating water flow was available to reestablish vacuum after the turbine trip and allow the bypass valves to control reactor pressure. Event Notification 46169 documents the uncomplicated scram.

The licensee entered the event into the corrective action process as IR 1100602. Corrective actions included replacement of all valve auxiliary contacts with pre-tested contactors, and inclusion of procedural actions to verify that valve position permissives were satisfied before operators performed a circulating water flow reversal. Documents reviewed in this inspection are listed in the Attachment to this report. This LER is closed.

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

.2 (Closed) Licensee Event Report (LER) 05000265/2010-002, Unit 2 Manual Reactor Scram due to 2B Recirculation Pump Trip

This event, which occurred on August 17, 2010, occurred when a manual reactor scram was inserted due to high reactor water level as a result of a trip of the 2B recirculation pump while Unit 2 was at 100 percent power. The licensee was performing maintenance to restore redundant operation of the Unit 2 adjustable speed drives ASD programmable logic controllers. During this evolution, the ASD tripped and opened the field breaker for the 2B recirculation pump motor. The loss of the 2B recirculation pump resulted in an increase in reactor water level. When reactor water level reached 44", operators inserted a manual scram as discussed during the pre-job brief. All rods fully inserted, reactor water level was returned to and maintained in the normal band with normal feedwater control. There were no complications during the shutdown. There were no safety system actuations, and no safety system actuations were expected. Event Notification 46184 documents the uncomplicated scram.

A self-revealed finding of significance associated with this event was documented in Inspection Report 05000254/2010004; 05000265/2010004. No additional findings of significance were identified in the review of this LER. This LER is closed.

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

.3 (Closed) Unresolved Item (URI) 05000254/2009004-02; 05000265/2009004-02: Adequacy of 10 CFR 50.59 Evaluation and Dose Consequences Assessment for Catastrophic Fire in the Interim Radwaste Storage Facility

a. Inspection Scope

In September 2009, inspectors identified that the licensee was storing radwaste in the intermediate radwaste storage facility (IRSF) in a packaged form that was different than the form evaluated in the current facility fire hazard analysis report. The fire hazard analysis provided the fire protection assessment for the IRSF as part of the licensee's 10 CFR 50.59 evaluation for the facility. As a result, the inspectors identified an URI for the apparent failure to complete a 10 CFR 50.59 evaluation to assess the potential changes in radiological consequences of a design basis fire consistent with the manner in which processed waste was stored in the IRSF. The initial discussion of this issue and documentation of the URI was presented in Inspection Report 05000254/2009004; 05000265/2009004 for Quad Cities Station. This URI is closed.

b. Findings

Introduction: A Severity Level IV NCV of 10 CFR 50.71(e), "Periodic Update of the Final Safety Analysis Report," and an accompanying Green finding were identified by the inspectors for the licensee's failure to update documents incorporated by reference in the UFSAR and provided to the NRC in UFSAR updates. Specifically, the licensee did not update dose consequence calculations for a fire in the IRSF to reflect changes in packaging methods of solid radioactive waste material stored in the IRSF and used to provide a basis for determining if the increase in event consequences for a fire in the facility was not more than minimal.

Discussion: The IRSF was constructed in the 1980s to store processed radioactive waste for short time periods incident to disposal at a low-level waste repository or for extended storage should disposal sites be unavailable.

The Fire Hazard Analysis (FHA) Report is an element of the Fire Protection Report (FPR) incorporated into the Quad Cities UFSAR. The FHA for the IRSF completed in July 1992 assumed the facility housed 200 containers of processed radwaste that was solidified or encapsulated in concrete and stored in steel or poly high integrity containers (HICs). The radiological consequences of a catastrophic facility fire were determined by calculation to result in a dose to the public of about 301.4 mrem or 1.2 percent of the 10 CFR 100 limit. The calculations that supported the 50.59 for radwaste storage were incorporated into the FPR and into the UFSAR by reference but were not entered into the facility's records management system. Procedures put in place to support operation of the facility did not include a limit on the number of HICs that could be stored in the facility, but the procedure did refer the user to the original IRSF 50.59 evaluation to determine if a particular liner type could be utilized. The inspectors determined that 50.59 applied to changing the storage forms because the changes affected the radiological consequences following a fire in the radwaste storage building.

The licensee's radwaste processing practices had been inconsistent with the assumptions in the 1992 calculation since the early to mid-1990s when the licensee changed the radwaste processing methodology (i.e., discontinued solidifying its processed waste and stored waste as dewatered resins). This inconsistency initially had

little or no offsite radiological potential consequence since the licensee continued to dispose of the containers and did not accumulate a significant amount of stored waste in the building. However, closure of disposal facilities in 2008 required the site to store an increased number of HICs containing dewatered resins. Although the process description in the UFSAR had been revised to reflect the change to dewatering resin, the supporting calculations for the FHA were not revised and the supporting 50.59 evaluation for the UFSAR change did not include an otherwise adequate basis for concluding that the changes did not require prior NRC approval.

Following identification of the discrepancy by inspectors, the licensee entered the issue into the station CAP as IR 966781 and performed a calculation that determined that the radiological consequence of the design basis fire in the IRSF (using the radioactive source term present in the facility in September 2009, and conservatively assuming 100 percent release to the environment) was less than 10 percent of the 10 CFR 100 dose guideline or approximately five times greater dose than that previously calculated due to the partial release to the environment from concrete fracture. In September 2009, the Quad Cities IRSF contained 51 stored liners of processed radwaste in the form of dewatered resin housed in polyethylene HICs. In June 2010, a completed revision of the calculations, which included additional conservatism, determined the offsite dose consequences to be 1.79 rem for this extremely low probability event or about 7.2 percent of 10 CFR 100 dose guidelines.

Analysis: The inspectors determined that the failure to update FPR documents incorporated by reference in the UFSAR and provided to the NRC was contrary to 10 CFR 50.71(e) and was a performance deficiency warranting a significance evaluation. This violation was determined to be more than minor in accordance with IMC 0612, "Power Reactor Inspection Reports," Appendix B, "Issue Screening," because, if left uncorrected, the performance deficiency could have led to a more significant safety concern. Specifically, failure to update the UFSAR or associated licensing basis documents impacts the licensee's ability to adequately evaluate plant changes under the 10 CFR 50.59 processes and could lead to the licensee erroneously making unacceptable changes to the facility. In this case, continued accumulation of radwaste in the IRSF to the number of containers the building was designed to hold and allowed by procedure would have resulted in a more significant dose to the public in the event of a design basis fire.

Violations of 10 CFR 50.71(e) are dispositioned using the traditional enforcement process instead of the SDP because they are considered to be violations that potentially impede or impact the regulatory process. However, if possible, the underlying technical issue is evaluated under the SDP to determine the severity of the violation. In this case, the inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609 Appendix D, "Public Radiation Safety Significance Determination Program." The phase 1 SDP screening performed by the inspectors concluded that since no actual release had occurred, no dose was received as a result of the issue, and the low probability of the initiating design basis fire for the IRSF, that both the Radioactive Material Control and the Effluent Release Program flowcharts of Appendix D indicate the finding was of very low safety significance (Green). The inspectors determined that this finding did not reflect present performance because it is a legacy issue with changes made to the facility more than 10 years previously; therefore, there was no cross-cutting aspect associated with this finding.

In accordance with Section 6.1.d.3 of the NRC Enforcement Policy, this violation is categorized as Severity Level IV because the information was not used to make an unacceptable change to the facility or procedures since the increase in dose consequences did not result in a reduction of greater than 10 percent of the previous margin to the 10 CFR 100 guidelines.

Enforcement: The Fire Protection Report at Quad Cities was incorporated into the UFSAR by reference. Title 10 CFR 50.71(e) required that licensees shall periodically update the Final Safety Analysis Report (FSAR), originally submitted as part of the application for the operating license, to assure that the information included in the report contains the latest information developed. This submittal shall include the effects of all the changes necessary to reflect information and analysis submitted to the Commission by the licensee or prepared by the licensee pursuant to Commission requirement since the submittal of the original FSAR, or as appropriate, the last update to the FSAR under this section.

Contrary to the above, from 1995 until June 24, 2010, the licensee did not update the UFSAR for material incorporated by reference. Specifically, the licensee had incorporated the FPR and supporting calculations into the UFSAR by reference but failed to update the calculations to ensure those changes did not create an unacceptable consequence to members of the public when the licensee changed the packaged form of radwaste stored in the building. In accordance with the Enforcement Policy, the violation was classified as a Severity Level IV violation because the underlying technical issue was of very low risk significance. Because this violation was of a very low safety-significance, was not repetitive or willful, and was entered into the licensee's CAP as IR 966781, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000254/2010005-01; 05000265/201005-01, "Failure to Update the UFSAR for Fire Protection Documents"**).

The finding is evaluated separately from the traditional enforcement violation; therefore, the finding is being assigned a separate tracking number (**FIN 05000254/2010005-02; 05000265/201005-02, "Failure to Update the UFSAR for Fire Protection Documents"**).

Corrective actions included revision of calculations, correction of the FHA basis documentations and associated 50.59 evaluation, and revision of the IRSF storage procedure to limit the number of liners and total activity stored in the building and put controls in place to ensure the assumptions in the calculations are maintained.

#### 40A5 Other Activities

##### .1 Operation of an Independent Spent Fuel Storage Facility Installation at Operating Plants (60855.1)

###### a. Inspection Scope

The inspectors observed and evaluated the licensee's Independent Spent Fuel Storage Facility Installation (ISFSI) program to verify compliance with the applicable Certificate of Compliance conditions, TSs, and procedures.

The inspectors reviewed procedures related to ISFSI cask handling, loading, movement, surveillance, and maintenance. The licensee's procedures related to the ISFSI were

under revision during the inspection period in preparation for future cask loading activities. Inspectors discussed planned procedure changes with the licensee.

A tour was conducted of the ISFSI pad to assess the condition of the ISFSI. No flammable or combustible materials were observed inside the ISFSI cask storage area, and inspectors reviewed evaluations of flammable materials outside the ISFSI cask storage area. Inspectors independently reviewed environmental radiation levels around the ISFSI, and reviewed the licensee's radiation monitoring program for the ISFSI.

In addition, the inspectors reviewed a number of condition reports and the associated followup actions since the last ISFSI inspection. The inspectors reviewed 72.48 screenings and evaluations and changes to the licensee's 72.212 report.

b. Findings

No findings were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On January 11, 2011, the inspectors presented the inspection results to R. Gideon, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- Radiological Hazard Assessment and Exposure Controls, Occupational Dose Assessment and selected Performance Indicators with Mr. Scott Specht, acting plant manager, on October 1, 2010;
- The licensed operator requalification training annual operating test results with the licensed operator requalification training lead, Mr. E. Pannell, via telephone on December 7, 2010;
- The annual review of Emergency Action Level and Emergency Plan changes with the licensee's emergency preparedness manager, P. Tzomes, via telephone on December 16, 2010; and
- The operation of an ISFSI inspection with the site vice president, Mr. R. Gideon, on December 17, 2010.

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

#### 4OA7 Licensee-Identified Violations

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

- Title 10 CFR 26.4(a) states, in part, that all persons who are granted unescorted access to nuclear power reactor protected areas and perform specified duties shall be subject to an FFD program that meets the requirements of Part 26. Item (4) listed in 10 CFR 26.4(a) includes individuals performing maintenance or onsite directing maintenance of SSCs that a risk-informed evaluation process has shown to be significant to the public health and safety. Title 10 CFR 26.205(d)(4) states, in part, that individuals specified in §26.4(a)(4) have at least 1 day off in any 7 day period. Contrary to the above, workers and supervisors installing a feedwater flow instrumentation modification at Quad Cities Unit 2 worked in excess of 7 days from March 15 through March 22, 2010, without a day off. Specifically, contract employees installing a feedwater flow instrument modification that had been screened as risk significant during the planning phase and documented as a work hour rule “covered” activity were scheduled for and worked more than 7 straight days without a day off. Upon discovery as part of a licensee review activity, this issue was immediately documented in IR 1138328 and the subsequent investigation determined that the cause was a misunderstanding of the procedures and regulation with no intentional violation of policy. This issue is more than minor because the performance deficiency, if left uncorrected, would have the potential to lead to a more significant safety concern during future maintenance activities. Specifically, excessive work hours could increase the likelihood of human performance errors during plant maintenance activities that could affect equipment performance. The finding is of very low safety significance or Green because no significant events or human performance issues were directly linked to personnel fatigue as a result of the hours worked, the licensee conducted management observations during the work activity, all of the welds performed by the affected workers were radiographed and inspected, and post-modification testing verified all work was of the appropriate quality and the equipment performed as designed.

ATTACHMENT: SUPPLEMENTAL INFORMATION

## SUPPLEMENTAL INFORMATION

### KEY POINTS OF CONTACT

#### Licensee

M. Prospero, Plant Manager  
R. Gideon, Site Vice President  
W. Beck, Regulatory Assurance Manager  
S. Darin, Engineering Director  
D. Kallenbach, Radiation Protection Operations Manager  
K. Hungerford, Security Operations Manager  
K. Moser, Training Director  
V. Neels, Chemistry/Environ/Radwaste Manager

#### Nuclear Regulatory Commission

M. Ring, Chief, Reactor Projects Branch 1

#### Illinois Emergency Management Agency

C. Settles, Section Head

### LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

#### Opened

50-254/2010005-01;	NCV	Failure to Update the UFSAR for Fire Protection Documents
50-265/2010005-01		(Section 4OA3.3)
50-254/2010005-02;	FIN	Failure to Update the UFSAR for Fire Protection Documents
50-265/2010005-02		(Section 4OA3.3)

#### Closed

50-254/2010005-01;	NCV	Failure to Update the UFSAR for Fire Protection Documents
50-265/2010005-01		(Section 4OA3.3)
50-254/2010005-02;	FIN	Failure to Update the UFSAR for Fire Protection Documents
50-265/2010005-02		(Section 4OA3.3)
50-254/2010002-00	LER	Unit 1 Reactor Scram due to Turbine Trip from Low Condenser Vacuum during Main Condenser Flow Reversal (Section 4OA3.1)
50-265/2010002-00	LER	Unit 2 Manual Reactor Scram due to 2B Recirculation Pump Trip (Section 4OA3.2)
50-254/2009004-02;	URI	Adequacy of 10 CFR 50.59 Evaluation and Dose Consequences
50-265/2009004-02		Assessment for Catastrophic Fire in the Interim Radwaste Storage Facility (Section 4OA3.3)

#### Discussed

None

## LIST OF DOCUMENTS REVIEWED

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

### Section 1R01

- WO 1346659; Addition of Local Condensate Pumping Trap for U2 Reactor Building Ventilation
- WOs 1345970 & 1372194; Revise U1 and U2 Battery Room Thermostat Setpoints
- WO 1282535; Functional Test of the Ice Melt Valve

### Section 1R04

- QOM 1-1000-09; Unit 1 B RHR Valve Checklist; Revision 6
- QCOP 1000-02; RHR System Preparation for Standby Operation; Revision 24
- QOM 0-7500-01; Unit 1(2) Standby Gas Treatment Valve Checklist; Revision 7
- QCOP 7500-01; Standby Gas Treatment System (SBGTS) Standby Operation and Startup; Revision 19
- QOM-2-2300-01; Unit 2 HPCI Valve Checklist, Revision 17
- UFSAR, Section 6.5; Emergency Core Cooling System

### Section 1R05

- IR 1146321; NRC Identified Errors on Pre-fire plans
- Quad Cities Fire Protection Report Fire hazards Analysis; Fire Zone 1.1.1.5 Unit 1 Reactor Building Reactor Floor; Section 4.3
- Pre-Fire Plan RB-10; Unit 1 Reactor Building 666'6" Elevation Standby Liquid Control 4<sup>th</sup> Floor East; Fire Zone 1.1.1.5
- Pre-Fire Plan RB-11; Unit 1 Reactor Building 666'6" Elevation Standby Liquid Control 4<sup>th</sup> Floor West; Fire Zone 1.1.1.5
- Pre-Fire Plan RB-03; Unit 1 RB 554'0" Elevation SW Corner Room - 1B Core Spray; Fire Zone 11.2.1
- Quad Cities Fire Protection Report Fire hazards Analysis; Fire Zone 11.2.1 Unit 1 Southwest Corner Room; Section 4.3

### Section 1R11

- NRC Operator Requalification Simulator Scenario for Crew 'F' on October 19, 2010
- Results; Licensed Operator Annual Operating Test

### Section 1R12

- IR 866100; Unit 2 SRM 24 Indication Lowering
- IR 911549; Unit 2 IRM 15 Failed High
- IR 923840; SRM 21 Failed QCIS 0700-09
- IR 923847; SRM 22 Failed Signal to Noise Ratio for QCIS 0700-09
- IR 943518; IRM 12 Downscale Alarm
- IR 1045667; IRM 16 Reading 10X Higher than Other IRM Channels
- IR 1065288; Unit 1 IRM 16 6/7 Correlation Adjustment Could Not Be Made
- IR 1072896; Alarm 902-5 C15, RPS CHNL B IRM HI-HI or INOP

- IR 1100856; SRM 21 Failed Signal to Noise Ratio
- IR 1101059; IRM 12 & IRM 15 Are Reading Erratic
- IR 1129306; MRule: Documentation of Performance Evaluation
- Enterprise Maintenance Rule Production Database for the following systems:
  - Z7500: Standby Gas Treatment System
  - Z0800: Spent Fuel Pool
- System Engineer Notebook and Accountability Logs for the following systems:
  - Standby Gas Treatment System
- IR 1134985; Racklife Update Not Completed as Scheduled
- IR 1093883; Vendor Error in Badger SFP Rack Testing Report
- EC 380867; Quad Cities Spent Fuel Pool Criticality Evaluation with Additional BORAFLEX Degradation
- IR 1093925; (Cantera) NETCO Issued Notice of Inability to Evaluate Possible 10CFR2
- NRC Generic Letter 96-04; BORAFLEX Degradation in Spent Fuel Pool Storage Racks
- IR 1136326; MRule: Performance Criteria Exceeded (0800-01)
- Maintenance Rule Expert Panel Meeting Minutes for December 9, 2010

#### Section 1R13

- Work Week 10-41-03 Safety Profile
- HLA Briefing for Intake Dredging Operations for October 4 - 29
- Work Week 10-47-07 Safety Profile
- Work Week 10-49-11 Safety Profile
- Work Week 10-50-12 Safety Profile

#### Section 1R15

- IR 1130373; Pressures from Approved DP Calcs Not Used in MOV Calcs
- QDC-1000-M-1318; Residual Heat Removal System Combined DBD and DP Calculation; Revision 0B
- IR 1130895; U-1 Battery Room Roof Leaking; 10/26/10
- IR 1155789; The U1 Battery Room Roof Leaks; 12/26/10
- IR 1156098; Poor Application of Tarps in U1 Battery Room; 12/27/10
- IR 1156458; Roof Over Unit 1 SBO Battery Roof Leaks; 12/28/10

#### Section 1R18

- EC 380866; Remove Valve 1-1299-46 and Install a Threaded Cap on Each Side of Where the Valve was Removed
- QOM 1-1200-01; Unit 1 Reactor Water Valve Checklist; Revision 10
- QCOP 1200-01; RWCU System Fill and Vent; Revision 24
- QCOP 1200-03; Removal of a RWCU Filter Demineralizer from Operation; Revision 22
- QCOP 1200-05; RWCU Filter Demineralizer Manual Backwash and Pre-coat; Revision 34
- QCOP 1200-06; Return of a RWCU Filter Demineralizer to Operation; Revision 20
- IR 1088624; Provide MMD Support to Locate Source of Leakage into RBEDT
- WO 1099057; Install/Remove Temporary Power to Unit 2 RHRSW vaults
- EC 382294; Bypass Main Steam Line Tunnel Temperature Switch TS 1-0261-15D
- TS 3.3.6.1 and Associated Bases

- WO 1389166; Troubleshoot 1/2 GP 1 Isolation from 595-101D Relay
- IR 1144254; Temperature Switch 1-261-15D is Grounded
- IR 1144217; Ground in 1-261-15D Circuit Causing ½ GP 1 Isolation
- Drawing No. 4E - 1503B

#### Section 1R19

- WO 1367930; Diesel Generator Load Test (IST)
- QCOS 6600-43; Unit 1/2 Emergency Diesel Generator Load Test; Revision 43
- WO 1367053; Repair 1A ASD HMI for Virus Removal
- WO 1367054; Repair 1B ASD HMI for Virus Removal
- WO 1367055; Repair 2A ASD HMI for Virus Removal
- WO 1367057; Repair 2B ASD HMI for Virus Removal
- WO 1379862; 1/2 CR HVac Chiller Various Leaks
- IR 1131218; Control Room B-HVAc RCU Tripped During PMT
- WO 1382939; Control Room B-HVAc RCU Tripped During PMT
- WO1374484; Control Room Emergency Filtration Test (IST)
- QCOS 5750-02; Control Room Emergency Filtration Test (IST)
- UFSAR 9.4.1; Control Room Area HVac System
- UFSAR 6.4; Habitability Systems

#### Section 1R22

- QCOS 1000-45; Unit 2 (B) Loop LPCI and Containment Cooling Modes of RHR Non-Outage Logic Test
- IR 1120328; Spade Lug Disconnected on Relay
- QCOS 1400-01; Quarterly Core Spray System Flow Rate Test; Revision 39

#### Section 1EP4

- Exelon Nuclear Radiological Emergency Plan Annex for Quad Cities Station; Revisions 27, 28, and 29

#### Section 2RS1

- NF-AA-390; Spent Fuel Pool Material Log; Revision 4
- QCOP 0700-06; Unit 2 Transversing-Incore-Probe; Revision 13
- RP-AA-460; Controls for High and Locked High Radiation Areas; Revision 20
- RP-AA-460-1001; Controls for Very High Radiation Areas; Revision 2
- RP-AAB-460; Transversing-In-Core-Probe Area Access Controls; Revision 1
- RP-AA-503; Unconditional Release Survey Method; Revision 2

#### Section 2RS4

- RP-AA-210; Dosimetry Issue, Usages, and Control; Revision 17
- RP-AA-220; Bioassay Program; Revision 6
- RP-AA-222; Methods for Estimating Internal Exposure From in vivo and in vitro Bioassay Data; Revision 3
- RP-AA-250; External Dose Assessment from Contamination; Revision 4
- NRC Form 748; National Source Tracking Transaction Report; January 27, 2009

#### Section 4OA1

- CY-QC-120-724; Quarterly Tritium Release Report Attachment 2; Revision 1
- CY-QC-120-720; Actual Dose Data Attachment 2; Revision 4
- LS-AA-2090; Monthly Data Elements for NRC Reactor Coolant System (RCS) Specific Activity; Revision 4
- CY-QC-120-503; Reactor Water Radionuclide Analysis; Revision 1
- NEI 99-02; Regulatory Assessment Performance Indicator Guideline, Revision 6
- 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 4OA2

- IR 1124902; 1B ASD Coolant Leak from Transformer Panel
- QCOP 0202-43; Reactor Recirculation System Startup; Revision 3
- QCOP 0202-40; ASD Cooling System Operation; Revision 4
- QCOP 0202-33; Unit 1 Reactor Recirculation System Shutdown; Revision 10
- IR 1129487; Non-conservative Safety Limit MCPR
- IR 1129289; Dresden and Quad Cities Non-conservative SLMCPR
- Westinghouse Letter NF-BEX-10-156 dated October 21, 2010 and addressed to Jill Fisher; "Dresden and Quad Cities Impact of CAP #10-294-N004, 'Non-conservatism in SLMCPR Calculation with McSLAP'"
- Westinghouse Letter NF-BEX-10-159 dated October 27, 2010 and addressed to Jill Fisher; "Confirmation of Results for Dresden and Quad Cities Impact of CAP #10-294-N004, 'Non-conservatism in SLMCPR Calculation with McSLAP'"
- 50.59 Screening No. QC-S-2010-0100; Establishment of Lower Administrative Limit on MFLCPR per Attachment A to QCGP 4-1; Revision 0
- IR 1012573; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1037116; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1065951; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1076575; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1087229; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1097440; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1109778; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance
- IR 1134153; PI OM.01, Unplanned Entries Into Shutdown LCOs, in Variance

### Section 4OA3

- EN 46169; Unit 1 Reactor Automatic Scram Due to Turbine Trip
- QOA 3300-02; Loss of Condenser Vacuum; Revision 36
- QOA 5600-04; Loss of Turbine Generator; Revision 27
- USAR Section 10.4.5; Circulating Water System
- IR 1104031; NOS ID U1 Post Transient Review Package Deficiencies
- IR 1100692; Main Turbine Trip Was Received
- IR 1100602; U1 Rx Scram Due to Loss of Condenser Vacuum
- LER 05000254/2010-002; Unit 1 Reactor scram Due to Turbine Trip from Low Condenser Vacuum during Main condenser Flow Reversal
- EC 380216; Interim Radwaste Storage Facility (IRSF) Design Basis Dose Eval; Revision 000
- QDC-0000-M-1787; Interim Radwaste Storage Facility (IRSF) Design Basis Event Dose Assessment; Revision 000
- QDC-0000-M-1788; Atmospheric Dispersion Factors (X/Q) for Interim Radwaste Storage Facility (IRSF); Revision 000
- QC-E-2010-003; 50.59 Evaluation for EC 380216; Revision 0
- QCOP 2050-11; Determining Placement of Containers in the Interim Radwaste Storage Facility; Revision 7
- QC Fire Protection Report, Revision 19; Section 4.2, Fire Zones with Abbreviated Fire Hazards Analysis (Fire Zone 26.1)
- UFSAR, Revision 10; Section 11.4, Solid Waste Management System
- NUREG-0800, USNRC Standard Review Plan, Section 11.4, Solid Waste Management Systems
- Generic Letter 81-38; Storage of Low Level Radioactive Wastes at Power reactor Sites
- IE Circular 80-18; 10 CFR 50.59 Safety Evaluations for Changes to Radioactive Waste Management Systems

### Section 4OA5.1

- 72.48 Screening / Evaluations
- 72.48-0035; Spent Fuel Cask Site Transportation; Revision 0
- 72.48-0036; HI-TRAC Preparation; Revision 0
- 72.48-0037; MPC Alternate Cooling; Revision 0
- 72.48-0039; Studs Holding Vent Screens to HI-STORM Break Off; Revision 0
- 72.48-0040; Studs Holding Vent Screens to HI-STORM Break Off; Revision 1
- 72.48-0041; MPC Engineering Change Orders and Supplier Manufacturing Deviation Reports; Revision 3
- 72.48-0042; Fuel Data for Quad Cities 1 and 2 Dry Cask Storage for 2009; Revision 0
- 72.48-0043; Review of Campaign 5 Welding Procedures; Revision 0
- 72.48-0044; Non-Conformance Report for HI-TRAC 100D Pool Lid Assembly; Revision 0
- 72.48-0045; HI-TRAC Movement within the Reactor Building; Revision 0
- 72.48-0046; Helium Mass Spectrometer Leak Test Procedure; Revision 1
- 72.48 Screening / Evaluations (continued)
- 72.48-0048; HI-STORM Inspection Procedure; Revision 0
- 72.48-0049; Spent Fuel Cask Site Transportation; Revision 0
- 72.48-0050; HI-TRAC Preparation; Revision 0
- 72.48-0051; MPC Inspection; Revision 0
- 72.48-0052; Joint in Concrete Pavement Needs to be Cleaned and Resealed; Revision 0
- 72.48-0053; Helium Mass Spectrometer Leak Test Procedures; Revision 0
- 72.48-0054; Spent Fuel Cask Abnormal Conditions; Revision 0

- 72.48-0055; ISFSI Pad Core Sample Installation Activities; Revision 0
- 72.48-0056; 72.212 Evaluation Report, Revision 4; Revision 0
- Corrective Action Documents
- AR 1013087; PM Pre NRC ISFSI Inspection Check-In; May 5, 2010
- AR 1109732; NER NC-10-051-Y, Site Alignment with CoC for Dry Casks; September 31, 2010
- AR 1116385; Holtec Identifies ISFSI FSAR Deficiency; September 21, 2010
- AR 1132087; NOS ID-CAP Assignment Closed Prior to Completing All Actions; June 18, 2010
- AR 540810; NOS Recommends Developing a Fleet-Wide 10 CFR 72.48 Process; October 5, 2006
- AR 976273; Unexpected Temperature Reading During MPC Blowdown; October 20, 2009
- AR1067412; NOS Identifies ISFSI Deficiency and Recommendation; April 27, 2010
- Drawings
- Quarterly ISFSI Pad [Radiation] Survey; November, 22, 2010
- Procedures
- QCFHP 0800-01; Integrity Surveillance for the ISFSI; Revision 1
- QCFHP 0800-05; Spent Fuel Cask Abnormal Conditions; Revision 2
- QCFHP 0800-63; HI-STORM Inspection; Revision 7
- QCFHP 0800-72; HI-STORM Processing; Revision 5
- QCFHP 0800-74; Helium Cooldown System Operations and MPC Reflood; Revision 6
- QCFHP 0800-75; MPC Inspection; Revision 5
- QCFHP 0800-79; MPC Alternate Cooling; Revision 2
- QCFHP 0800-82; MPC Unloading Operations; Revision 1
- RP-QC-302; HI-TRAC Radiation Survey; Revision 2
- Work Orders
- WO 01263065; Perform an Integrity Inspection of the ISFSI; Revision 1
- QCNPS 72.212 Report; Revision 3
- QCNPS 72.212 Report; Revision 4
- Quad Cities Annual Physical Inventory of ISFSI, June 8, 2009
- Quad Cities Annual Physical Inventory of ISFSI, June 18, 2010
- ISFSI Audit NOSA-QDC-10-11; October 27, 2010

## LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
ASD	Adjustable Speed Drive
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CR	Control Room
EC	Engineering Change
EDG	Emergency Diesel Generator
FHA	Fire Hazard Analysis
FPR	Fire Protection Report
FSAR	Final Safety Analysis Report
HIC	High Integrity Container
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Issue Report
IRSF	Intermediate Radwaste Storage Facility
ISFSI	Independent Spent Fuel Storage Facility Installation
LER	Licensee Event Report
MOV	Motor-Operated Valve
MSPI	Mitigating Systems Performance Index
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
ODCM	Offsite Dose Calculation Manual
PARS	Publicly Available Records System
PI	Performance Indicator
PM	Post-Maintenance
RCIC	Reactor Core Isolation Cooling
RETS	Radiological Effluent Technical Specification
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
SDP	Significance Determination Process
SSC	Systems, Structures, and Components
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
URI	Unresolved Item
WO	Work Order

M. Pacilio

-2-

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Sincerely,

**/RA/**

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

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

Enclosure: Inspection Report 05000254/2010005; 05000265/2010005  
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SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2  
NRC INTEGRATED INSPECTION REPORT 05000254/2010005;  
05000265/2010005

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