



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

REGION III
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May 3, 2013

Mr. Michael J. Pacilio
Senior Vice President, Exelon Generation Company, LLC
President and Chief Nuclear Officer, Exelon Nuclear
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Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2013002 AND
05000265/2013002

Dear Mr. Pacilio:

On March 31, 2013, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed inspection report documents the inspection results, which were discussed on April 9, 2013, with Mr. T. Hanley, 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.

Two self-revealed findings of very low safety significance were identified during this inspection. The findings were determined to involve violations of NRC requirements. Further, a licensee-identified violation which was determined to be of very low safety significance is listed in this report. The NRC is treating the issues as non-cited violations (NCVs) in accordance with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or significance 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 Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with copies to the Regional Administrator, Nuclear Regulatory Commission - Region III, 2443 Warrenville Road, Suite 210, Lisle, IL 60532-4352; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at the Quad Cities Nuclear Power Station.

If you disagree with a cross-cutting aspect assignment 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 (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

/RA by M. Kunowski for/

Robert Orlikowski, Acting Branch Chief
Branch 1
Division of Reactor Projects

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

Enclosure: Inspection Report 05000254/2013002 and 05000265/2013002
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report Nos: 05000254/2013002; 05000265/2013002

Licensee: Exelon Generation Company, LLC

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

Location: Cordova, IL

Dates: January 1 through March 31, 2013

Inspectors: J. McGhee, Senior Resident Inspector
B. Cushman, Resident Inspector
R. Winter, Reactor Engineer
V. Myers, Health Physicist
A. Shaikh, Reactor Inspector
V. Meghani, Reactor Inspector
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Approved by: Robert Orlikowski, Acting Branch Chief
Branch 1
Division of Reactor Projects

Enclosure

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SUMMARY OF FINDINGS

Inspection Report (IR) 05000254/2013002 and 05000265/2013002; 01/01/13 - 03/31/13; Quad Cities Nuclear Power Station, Units 1 and 2; Outage Activities and Identification, and Resolution of Problems.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Two Green findings were self-revealed. The findings were considered non-cited violations (NCVs) of NRC regulations. The significance of inspection findings are indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Components Within the Cross Cutting Areas" dated October 28, 2011. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy dated June 7, 2012. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process" Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. A finding of very low safety significance and associated non-cited violation of Technical Specifications 5.4.1.a, "Procedures," was self-revealed on March 13, 2013, when operators placing a clearance on the Unit 1 analog trip system de-energized the Unit 2 analog trip system resulting in a Unit 2 half-scam. The operators that opened the wrong breaker did not follow the instructions in the clearance order brief as required by OP-AA-109-101, "Clearance and Tagging," and misidentified the inverter on the south wall of the cable spreading room as the Unit 1 analog trip system inverter when it was actually the Unit 2 inverter. The operators did not use the concurrent verification techniques specified in the pre-job briefing for ensuring that the inverter was the correct component to be manipulated, and did not implement the clearance order as written. Immediate actions taken were removal of the implementing operators' qualifications and briefing to all operating personnel.

Inspectors determined that the issue was more than minor because it adversely affected the Reactor Safety Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. The performance deficiency challenged the configuration control attribute of the objective for operating equipment lineups. The inspectors determined the finding could be evaluated using the Significance Determination Process (SDP) in accordance with IMC 0609, Appendix A, "The Significance Determination Process For Findings At-Power." The inspectors answered all questions of Exhibit 1, "Initiating Events Screening Questions," for transient initiators and support system initiators. Questions in both categories were answered "No," and the finding screened as very low safety significance, or Green. Inspectors determined that a significant contributor to this finding was the failure of the operator performing breaker manipulation to verify the component label matched the clearance checklist and card in accordance with the site standard, HU-AA-101, Human Performance Tools and Verification Practices. As a result, inspectors identified that this issue had a cross-cutting aspect in the area of Human Performance - Work Practices for failure to use the human performance techniques to

ensure that the work tasks are performed safely and individuals do not proceed in the face of uncertainty (H.4(a)). (Section 1R20.1)

Cornerstone: Mitigating Systems

- Green. A finding of very low safety significance and associated non-cited violation of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," was self-revealed on March 1, 2013, during restoration from the 1B core spray logic test, when the 1/2 diesel generator cooling water pump (DGCWP) was discovered to have been lined up to Unit 2 emergency core cooling system room coolers instead of Unit 1 coolers as expected. The operators that had performed the initial valve manipulations on February 28, 2013, did not complete the alignment as required by QCOP 6600-15, "1/2 Diesel Generator Cooling Water Pump Cross Connect Alignment." Specifically, the operators executing QCOP 6600-15 did not follow the procedure for aligning the Unit 1/2 DGCWP to supply the Unit 1 emergency core cooling system room coolers. The issue was entered into the licensee's CAP as Issue Report 1486754, and the licensee restored operability of the Unit 1 DGCW pump to restore compliance. Standdown briefings were conducted for all station operators to discuss the event lesson learned, and performance management actions were implemented for the operators involved in the event.

This issue was more than minor because it adversely affected the Reactor Safety Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences in that failure to align cooling water per the procedure adversely impacted the cornerstone attribute of Configuration Control for operating plant equipment lineups. Specifically, the as-left equipment lineup was different than that reported to the main control room when the activity was completed. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609 Appendix A, "The Significance Determination Process For Findings At-Power." The inspectors answered all questions of Exhibit 2, "Mitigating Systems Screening Questions," Section A - Mitigating SSCs and Functionality (Except Reactivity Control Systems) "No," and therefore, the finding screened as Green or very low safety significance. This finding has a cross-cutting aspect in the area of Human Performance - Work Practices because the licensee personnel did not use human performance tools and techniques to ensure proper execution of the task (H.4(a)). (Section 4OA2.4)

B. Licensee-Identified Violations

One violation of very low safety significance that was identified by the licensee has been reviewed by inspectors. Corrective actions planned or taken by the licensee have been entered into the licensee's corrective action program. This violation and corrective action tracking numbers are listed in Section 4OA7 of this report.

REPORT DETAILS

Summary of Plant Status

Unit 1

Unit 1 operated at 100 percent thermal power throughout the evaluated period from January 1 through March 10, 2013, with the exception of planned power reductions for routine surveillances, main condenser flow reversals, planned equipment repair, and control rod maneuvers. On March 1, Unit 1 entered the power coast down period as the refueling outage approached. At 6:00 p.m. on March 10, operators began lowering reactor power to shut down the unit for refueling outage Q1R22. The unit remained shut down in the refueling outage through March 31, 2013.

Unit 2

Unit 2 operated at 100 percent thermal power until January 25, 2013, when power was lowered to 80 percent to perform a rod pattern exchange, recover two control rods that had previously been removed for maintenance on their hydraulic control units, repack the 2A feedwater regulating valve (FRV), and perform turbine testing. When the FRV could not be completely isolated for the required maintenance, Unit 2 was taken offline. On January 26 the turbine was taken offline and the reactor was shut down for maintenance outage Q2M29. Maintenance successfully completed repacking the 2A FRV during the night of January 26. Unit 2 was placed in Mode 2, Startup, at 10:13 a.m. on January 27, 2013, and the unit returned to full power at 10:15 p.m. on January 28, 2013. Unit 2 operated at 100 percent thermal power throughout the remainder of the evaluated period through March 31, 2013, with the exception of planned power reductions for routine surveillances, main condenser flow reversals, planned equipment repair, and control rod maneuvers.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- Unit 1 'B' core spray (CS) with the Unit 1 'A' loop of low pressure coolant injection system unavailable;
- Unit 2 'A' CS with Unit 2 high pressure coolant injection system unavailable;
- Unit 2 'B' CS with Unit 2 high pressure coolant injection system unavailable; and
- Unit 2 reactor core isolation cooling system with Unit 2 high pressure coolant injection system unavailable.

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

These activities constituted four partial system walkdown samples as defined in Inspection Procedure (IP) 71111.04-05.

b. Findings

No findings were identified.

.2 Semi-Annual Complete System Walkdown

a. Inspection Scope

On March 12, 2013, the inspectors performed a complete system alignment inspection of the Unit 1 'A' CS 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 and was aligned in an off-normal configuration with suction from the condensate storage tank. The inspectors walked down the system to review mechanical and electrical equipment lineups; 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 4.0, Service Building, Elevation 595'-0", Computer Room in Auxiliary Electric Room;
- Fire Zone 6.3, Service Building, Elevation 595'-0", Auxiliary Electric Room;
- Fire Zone 6.1.A, Unit 1 Turbine Building, Elevation 615'-6", 'A' Battery Charger Room U-1;
- Fire Zone 6.1.B, Unit 1 Turbine Building, Elevation 615'-6", 'B' Battery Charger Room U-1;
- Fire Zone 8.2.7.A, Unit 1 Turbine Building, Elevation 615'-6", Hydrogen Seal Oil Area and MCCs;
- Fire Zone 8.2.7.C, Unit 1/2 Turbine Building, Elevation 611'-6", Closed Cooling Water Area, ASD Oil Coolers, Turbine Oil Reservoirs; and
- Fire Zone 11.2.1, Unit 1 Reactor Building, Elevation 554'-0", SW Corner Room - 1B Core Spray.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and 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 seven quarterly fire protection inspection samples as defined in IP 71111.05-05.

b. Findings

No findings were identified.

1R08 Inservice Inspection Activities (71111.08)

From March 11 through March 15, 2013, the inspectors conducted a review of the implementation of the licensee's Inservice Inspection (ISI) Program for monitoring degradation of the reactor coolant system, risk significant piping and components, and containment systems.

The inservice inspections described in Sections 1R08.1 and 1R08.5 below constituted one inspection sample as defined in IP 71111.08.

.1 Piping Systems Inservice Inspections

a. Inspection Scope

The inspectors observed or reviewed records of the following nondestructive examinations mandated by the American Society of Mechanical Engineers (ASME) Section XI Code to evaluate compliance with the ASME Code Section XI and Section V requirements and if any indications and defects were detected, to determine if these were dispositioned in accordance with the ASME Code or an NRC-approved alternative requirement:

- Magnetic Particle Examination of the residual heat removal system heat exchanger support to shell weld 1003A-W-201A, Report No. Q1R22-003;
- Visual Examination (VT-3) of the reactor recirculation system variable spring cans and sway braces 0200-W-104A&B, Report No. 13-VT3-123;
- Ultrasonic Examination of the residual heat removal heat exchanger ring to bottom head weld, Report No. Q1R22-021;
- Ultrasonic Examination of residual heat removal system line pipe to elbow weld 1018C-2, Report No. Q1R22-007; and
- Visual Examination (VT-3) of the Rx Vessel Instrumentation Penetration N-11A and N-11B, Report No. IVVI-2013-RPV.

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

The inspectors observed and/or reviewed records of the following pressure boundary welds completed for a risk significant systems during the Unit 1 refueling outage to determine if the welding activities and any applicable non-destructive examination performed were completed in accordance with the ASME Code or NRC approved alternative.

- Welds FW1, FW2, FW3, FW4 fabricated under WO No. 01267203 – Replace Valve 1-1402-38B; 1B Core Spray Pump Minimum Flow Valve.

b. Findings

No findings were identified.

.2 Not Applicable

.3 Not Applicable

.4 Not Applicable

.5 Identification and Resolution of Problems

a. Inspection Scope

The inspectors performed a review of ISI-related problems entered into the licensee's CAP and conducted interviews with licensee staff to determine if:

- the licensee had established an appropriate threshold for identifying ISI-related problems;
- the licensee had performed a root cause (if applicable) and taken appropriate corrective actions; and
- the licensee had evaluated operating experience and industry generic issues related to ISI and pressure boundary integrity.

The inspectors performed these reviews to evaluate compliance with 10 CFR 50, Appendix B, Criterion XVI, "Corrective Action," requirements. The corrective action documents reviewed by the inspectors are listed in the Attachment to this report.

b. Findings

A licensee-identified finding is included in Section 4OA7 of this report. No other findings were identified.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review of Licensed Operator Regualification (71111.11Q)

a. Inspection Scope

On February 25, 2013, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator regualification training to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- crew's 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 simulator sample as defined in IP 71111.11.

b. Findings

No findings were identified.

.2 Resident Inspector Quarterly Observation of Heightened Activity or Risk (71111.11Q)

a. Inspection Scope

On January 27, 2013, the inspectors observed Unit 2 reactor startup activities in the main control room. This was an activity that required heightened awareness or was related to increased risk. 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 procedures;
- control board manipulations; and
- oversight and direction from supervisors.

The performance in these areas was compared to pre-established operator action expectations, procedural compliance, and task completion requirements.

This inspection constituted one quarterly licensed operator heightened activity/risk 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:

- Z5704: Reactor Building Heating, Ventilation and Air Conditioning (HVAC)
- Z5711-03: Safe Shutdown Makeup Pump HVAC

The inspectors reviewed events such as where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and

independently verified the licensee's actions to address system performance or condition problems in terms of the following:

- implementing appropriate work practices;
- identifying and addressing common cause failures;
- scoping of systems in accordance with 10 CFR 50.65(b) of the maintenance rule;
- characterizing system reliability issues for performance;
- charging unavailability for performance;
- trending key parameters for condition monitoring;
- ensuring 10 CFR 50.65(a)(1) or (a)(2) classification or re-classification; and
- verifying appropriate performance criteria for structures, systems, and components (SSCs)/functions classified as (a)(2), or appropriate and adequate goals and corrective actions for systems classified as (a)(1).

The inspectors assessed performance issues with respect to the reliability, availability, and condition monitoring of the system. In addition, the inspectors verified maintenance effectiveness issues were entered into the CAP with the appropriate significance characterization. Documents reviewed are listed in the Attachment to this report.

This inspection constituted two quarterly maintenance effectiveness samples as defined in IP 71111.12-05.

b. Findings

No findings 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 13-05-07 (maintenance outage Q2M29 including mode changes and power maneuvering, Unit 1 'A' loop of low pressure coolant injection and residual heat removal service water (RHRSW) out of service, motor operated valve 1-1001-19A diagnostics, emergent Unit 1 essential station service uninterruptible power supply failure, 1/2 emergency diesel generator surveillances, and Unit 2 'A' loop of RHRSW post-modification testing);
- Unit 1 Shutdown Safety Management Plan Revision 0, associated safety profile and contingency action plan for Level 1 and 2 outage schedule for refueling outage Q1R22;
- Work Week 13-11-13 (Unit 2 online risk evaluation and Unit 1 outage week 1: Unit 1 power changes and shutdown, cooldown to Mode 4, vessel disassembly and cavity flood-up, switchyard work that impacted Unit 2, electrical configuration changes that impacted both units, and multiple changes to protected equipment configurations);

- Work Week 13-12-01 (Unit 2 online risk evaluation and Unit 1 outage week 2: electrical configuration changes and equipment outages that impacted risk on both units and multiple changes to protected equipment configurations); and
- Work Week 13-13-01 (Unit 2 online risk evaluation and Unit 1 outage week 3: switchyard work that impacted risk on Unit 2, electrical configuration changes and equipment outages that impacted risk on both units, and multiple changes to protected equipment configurations).

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. Inspectors also verified that required management actions to minimize risk impact were implemented correctly.

Specific documents reviewed during this inspection are listed in the Attachment to this report. These maintenance risk assessments and emergent work control activities constituted five samples as defined in IP 71111.13-05.

b. Findings

No findings were identified.

1R15 Operability Determinations and Functional Assessments (71111.15)

.1 Operability Evaluations

a. Inspection Scope

The inspectors reviewed the following issues:

- Control room chiller flow control valve stroke time did not meet IST criteria;
- Seat leakage on Unit 2 high pressure coolant injection (HPCI) steam supply isolation valves;
- Multiple Unit 2 HPCI inlet drain pot high level alarms;
- Level III ground on the Unit 2 125 Vdc battery system;
- Received HPCI drain pot high level alarmed longer than expected;
- Degraded Boraflex trend in the spent fuel pool; and
- Target Rock safety relief valve accumulator sizing error.

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 seven samples as defined in IP 71111.15-05.

a. Findings

No findings were identified.

1R18 Plant Modifications (71111.18)

.1 Plant Modifications

a. Inspection Scope

The inspectors reviewed the following modification:

- Engineering Change 389172: EOC [extent of condition] - Open Phase - Protective Relaying

The inspectors reviewed the configuration changes and associated 10 CFR 50.59 safety evaluation screening 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, as applicable, observed ongoing work activities to ensure that the modifications were installed as directed and consistent with the design control documents; the modifications operated as expected; and that operation of the modifications did not impact the operability of any interfacing systems. As applicable, the inspectors verified that relevant procedure, design, and licensing documents were properly updated. Lastly, the inspectors discussed the plant modification with operations, engineering, and training personnel to ensure that the individuals were aware of how the operation with the plant modification in place could impact overall plant performance. Documents reviewed in the course of this inspection are listed in the Attachment to this report.

This inspection is one permanent plant modification sample 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 activities to verify that procedures and test activities were adequate to ensure system operability and functional capability:

- QUA-1-1001-19A: MOV [motor operated valve] Diagnostic Test;
- WO 1440267: MSIV Combined LLRT [local leak rate test] (IST) Partial for the 1D MSIV;
- QCTS 0600-09: RCIC [reactor core isolation cooling] Steam Exhaust Local Leak Rate Test;
- WO 1448076: Permanent Repair of Leak in 1A RHR [residual heat removal] Heat Exchanger;
- WO 1624044: Local Leak Rate Test of Feedwater check valve 1-0220-58B;
- QCOS 0201-08: Reactor Vessel Class 1 and Associated Class 2 System Leak Test;
- QCOS 6600-49: Division I Emergency Core Cooling System Simulated Auto-actuation and Diesel Generator Auto-start Surveillance TIC-3096; and
- WO 1626057: 1-1402-38B 1B Core Spray Min Flow Valve Non-Functional.

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 eight post-maintenance testing samples as defined in IP 71111.19-05.

b. Findings

No findings were identified.

1R20 Outage Activities (71111.20)

.1 Refueling Outage Activities

a. Inspection Scope

The inspectors reviewed the safe shutdown management plan (SSMP) and contingency plans for the Unit 2 refueling outage (RFO), which started on March 11, 2013, and was still in progress at the end of the reporting period, to confirm that the licensee had appropriately considered risk, industry experience, and previous site-specific problems in developing and implementing a plan that assured maintenance of defense-in-depth. During the RFO, the inspectors observed portions of the shutdown and cooldown processes and monitored licensee controls over the outage activities listed below:

- licensee configuration management, including maintenance of defense-in-depth commensurate with the SSMP for key safety functions and compliance with the applicable TS when taking equipment out of service;
- implementation of clearance activities and confirmation that tags were properly hung and equipment appropriately configured to safely support the work or testing;
- installation and configuration of reactor coolant pressure, level, and temperature instruments to provide accurate indication, accounting for instrument error;
- controls over the status and configuration of electrical systems to ensure that TS and SSMP requirements were met, and controls over switchyard activities;
- monitoring of decay heat removal processes, systems, and components;
- controls to ensure that outage work was not impacting the ability of the operators to operate the spent fuel pool cooling system;
- reactor water inventory controls including flow paths, configurations, and alternative means for inventory addition, and controls to prevent inventory loss;
- controls over activities that could affect reactivity;
- maintenance of secondary containment as required by TS;
- licensee fatigue management, as required by 10 CFR 26, Subpart I;
- refueling activities, including fuel handling and sipping to detect fuel assembly leakage; and
- licensee identification and resolution of problems related to RFO activities.

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

This inspection is continued into the next reporting period and the remainder of the inspection and documentation of the completed sample will be included in NRC Integrated Inspection Report 05000254/2013003, 05000265/2013003.

b. Findings

Introduction: A self-revealed finding of very low safety significance (Green) and associated non-cited violation of Technical Specifications 5.4.1.a, "Procedures," occurred on March 13, 2013, when operators placing a clearance on the Unit 1 analog trip system (ATS) de-energized the Unit 2 ATS, resulting in a Unit 2 half-scam. The operators that placed the tag on the wrong component did not follow the instructions in the clearance order brief as required by OP-AA-109-101, "Clearance and Tagging," and

misidentified the inverter on the south wall of the cable spreading room as the Unit 1 ATS inverter when it was actually the Unit 2 inverter.

Description: On March 13, 2013, two non-licensed operators were tasked with hanging a clearance to de-energize the Panel 2201-73BB, Unit 1 analog trip system. The clearance order writer on the night shift conducted the pre-job brief for the two non-licensed operators. The brief discussed the expected configuration of components, the verification methods to be used, and the importance of using human performance tools during the task. Concurrent verification was briefed as the method to be used to verify and position components during the clearance implementation.

The operators then went out into the plant to hang tags for Clearance Order 00105833, "Analog Trip Inverter PS4." The operators went to Unit 1 Bus 1B1 to hang the danger tag for the 2201-73BB supply breaker. This breaker was already open as discussed in the brief and the tag was placed without issue.

The operators then entered the cable spreading room on the Unit 1 side to pull fuses from inside panel 2201-73BB per the clearance checklist. The fuses were removed using concurrent verification without incident.

The first operator then moved to the south wall of the cable spreading room where a small inverter was located. The operator incorrectly identified the component as the Unit 1 analog trip Inverter PS4 and opened the input power breaker located on the front cover of the inverter in preparation for hanging the clearance tag. The second operator identified that the component identifier did not match the checklist. When the breaker was opened, Panel 2202-73BB was de-energized and Unit 2 received several alarms and a half-scam. Control room operators responded to the alarms and dispatched a senior reactor operator to the cable spreading room to investigate. The input breaker was reclosed 2 minutes later to restore power to 2202-73BB and the control room operators reset the half-scam.

The operators' actions did not meet the performance requirements of OP-AA-109-101 "Clearance and Tagging," Step 10.4.1.1D which states in part;

"Execute the C/O [Clearance Order] checklist actions with Checklist in hand:

1. Follow all actions as instructed during the C/O prejob brief.
2. Follow the proper sequence specified.
3. Place equipment in the positions/conditions specified."

The equipment identifier for the inverter in the cable spreading room was INVERTER 2-0263-PS4 ANALOG TRIP DIV II and the label had a yellow background (Unit 2 component labels are yellow.) The component that was supposed to be manipulated was located in the auxiliary electric room on the floor below, and a note on the checklist clearly identified the location to be the north wall of the auxiliary electric room. Additionally, the equipment identifier read INVERTER PS4 ANALOG TRIP DIV II PANEL 2201-73BB which matched the nomenclature on the danger tag exactly. The Unit 1 label had a blue background that matched the paper color of the clearance checklist.

The operators did not use the concurrent verification techniques specified in the pre-job briefing for ensuring that the inverter was the correct component to be manipulated, and therefore did not implement the clearance order as written. Immediate actions taken

were restoration of power to 2202-73BB and rest of the half-scrum condition; removal of the operators from duties; performance of for cause fitness-for-duty testing and fatigue assessments; and plant manager briefings for all operating personnel. In addition, all non-licensed operators were evaluated on return to work performing selected plant activities to ensure they understood the requirements and could effectively implement them in the field.

Analysis: While performing the clearance order, the operators did not position and tag the Unit 1 inverter input breaker as specified by the checklist. Additionally, the operators did not act concurrently as briefed when positioning the input breaker. Failure to comply with OP-AA-109-101 was a performance deficiency. Inspectors determined that the issue was more than minor because it adversely affected the Reactor Safety Initiating Events Cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during power operations. The performance deficiency challenged the configuration control attribute of the objective for operating equipment lineups.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) For Findings At-Power." The inspectors answered all questions of Exhibit 1 "Initiating Events Screening Questions," for transient initiators and support system initiators. Questions in both categories were answered "No," and the finding screened as very low safety significance, or Green.

Inspectors determined that a significant contributor to this finding was the failure of the operator performing breaker manipulation to verify the component label matched the clearance checklist and card in accordance with the site standard, HU-AA-101, Human Performance Tools and Verification Practices. As a result, inspectors identified that this issue had a cross-cutting aspect in the area of Human Performance - Work Practices for failure to use the human performance techniques to ensure that the work tasks are performed safely and individuals do not proceed in the face of uncertainty (H.4(a)).

Enforcement: Technical Specifications 5.4.1.a required that written procedures be established, implemented, and maintained covering the applicable procedures recommended in Regulatory Guide 1.33, Quality Assurance Program Requirements (Operation).

Regulatory Guide 1.33, Appendix A, Section 1, "Administrative Procedures," listed equipment control (e.g. locking and tagging) as one of the specified procedures.

OP-AA-109-101 "Clearance and Tagging," Step 10.4.1.1D which states in part;

"Execute the C/O [Clearance Order] checklist actions with Checklist in hand:

1. Follow all actions as instructed during the C/O prejob brief.
2. Follow the proper sequence specified.
3. Place equipment in the positions/conditions specified."

Contrary to the above, operators failed to implement the requirements of OP-AA-109-101, "Clearance and Tagging," in that the operators positioning the component did not verify the component to be tagged acting concurrently as instructed during the prejob brief, and did not operate the equipment as specified on the checklist

in that they opened the breaker for a component on Unit 2 instead of Unit 1. Because this violation was determined to be of very low safety significance and this issue has been entered into the licensee's CAP as Issue Report (IR) 1487334, this violation is being treated as an NCV consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000254/2013002-01; 05000265/2013002-01, "Failure to Follow Clearance Order Instructions"**). Immediate corrective actions were to restore power to the Unit 1 inverter and reset the half-scam, remove qualifications of the operators involved in placing the clearance, and brief all operators on the errors, the procedural requirements, and the actions the operators should have taken in this circumstance.

.2 Other Outage Activities

a. Inspection Scope

The inspectors evaluated outage activities for a maintenance outage that began on January 26, 2013, and continued through the January 28, 2013. The inspectors reviewed activities to ensure that the licensee considered risk in developing, planning, and implementing the outage schedule.

The inspectors observed or reviewed the reactor shutdown and cooldown, outage equipment configuration and risk management, electrical lineups, selected clearances, control and monitoring of decay heat removal, control of containment activities, personnel fatigue management, startup and heatup activities, and identification and resolution of problems associated with the outage. Maintenance outage, Q2M29, was scheduled to repack the 2A feedwater regulating valve (FRV) so that control of the valve could be returned to automatic. Inspectors monitored startup activities as reported in Section 1R11.2 of this report.

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

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 6600-20, Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test (routine);
- QCOS 5750-16, Control Room Ventilation Differential Pressure Test (routine);
- QCTS 0600-33, Drywell Pneumatic System Suction Local Leak Rate Test (AO-1(2)-4720, AO-1(2)-4721) (ISO Valve);
- QCOS 0202-08, Reactor Recirculation Shutdown Power Operated Valve Test (IST);

- QCTS 0600-05, Main Steam Isolation Valve Local Leak Rate Test (AO-1(2)-203-1A B C D, AO-1(2)-203-2A B C D) (ISO Valve);
- QCOS 1600-07, Reactor Coolant Leakage in the Drywell (RCS);
- QCOS 0250-11, Main Steam Isolation Valve Closure Scram Sensor Channel Non-outage Functional Test for RPS Channel 'B' (IST); and
- QCOS 1600-54, Secondary Containment Capability Test (routine).

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

- did preconditioning occur;
- the effects of the testing were adequately addressed by control room personnel or engineers prior to the commencement of the testing;
- acceptance criteria were clearly stated, demonstrated operational readiness, and consistent with the system design basis;
- plant equipment calibration was correct, accurate, and properly documented;
- as-left setpoints were within required ranges; and the calibration frequency was in accordance with TSs, the USAR, procedures, and applicable commitments;
- measuring and test equipment calibration was current;
- test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied;
- test frequencies met TS requirements to demonstrate operability and reliability; tests were performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used;
- test data and results were accurate, complete, within limits, and valid;
- test equipment was removed after testing;
- where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, ASMEs 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
- 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 three routine surveillance testing samples, two inservice testing sample, one reactor coolant system leak detection inspection sample, and two containment isolation valve samples as defined in IP 71111.22, Sections -02 and -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 Inspection Planning (02.01)

a. Inspection Scope

The inspectors reviewed all licensee performance indicators for the occupational exposure cornerstone for follow-up. The inspectors reviewed the results of radiation protection program audits (e.g., licensee's quality assurance audits or other independent audits). The inspectors reviewed any reports of operational occurrences related to occupational radiation safety since the last inspection. The inspectors reviewed the results of the audit and operational report reviews to gain insights into overall licensee performance.

b. Findings

No findings were identified.

.2 Radiological Hazard Assessment (02.02)

a. Inspection Scope

The inspectors determined if there have been changes to plant operations since the last inspection that may result in a significant new radiological hazard for onsite workers or members of the public. The inspectors evaluated whether the licensee assessed the potential impact of these changes and has implemented periodic monitoring, as appropriate, to detect and quantify the radiological hazard.

The inspectors reviewed the last two radiological surveys from selected plant areas and evaluated whether the thoroughness and frequency of the surveys were appropriate for the given radiological hazard.

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:

- 1A residual heat removal heat exchanger repair;
- turbine system work; and
- inboard main steam isolation valve overhaul.

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.

.3 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."

The inspectors reviewed the following radiation work permits used to access high radiation areas and evaluated the specified work control instructions or control barriers:

- main steam isolation valve overhaul;
- 1A residual heat removal heat exchanger repair; and
- Shaw electromagnetic relief valve/safety relief valve/Target Rock valve work.

For these radiation work permits, the inspectors assessed whether allowable stay times or permissible dose (including from the intake of radioactive material) for radiologically significant work under each radiation work permit were clearly identified. The inspectors evaluated whether electronic personal dosimeter alarm set-points were in conformance with survey indications and plant policy.

The inspectors reviewed selected occurrences where a worker's electronic personal dosimeter noticeably malfunctioned or alarmed. The inspectors evaluated whether workers responded appropriately to the off-normal condition. The inspectors assessed whether the issue was included in the corrective action program and dose evaluations were conducted as appropriate.

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.

.4 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.

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.

.5 Radiological Hazards Control and Work Coverage (02.05)

a. Inspection Scope

The inspectors evaluated ambient radiological conditions (e.g., radiation levels or potential radiation levels) during tours of the facility. The inspectors assessed whether the conditions were consistent with applicable posted surveys, radiation work permits, and worker briefings.

The inspectors evaluated the adequacy of radiological controls, such as required surveys, radiation protection job coverage (including audio and visual surveillance for remote job coverage), and contamination controls. The inspectors evaluated the licensee's use of electronic personal dosimeters in high noise areas as high radiation area monitoring devices.

The inspectors assessed whether radiation monitoring devices were placed on the individual's body consistent with licensee procedures. The inspectors assessed whether the dosimeter was placed in the location of highest expected dose or that the licensee properly employed an NRC-approved method of determining effective dose equivalent.

The inspectors reviewed the application of dosimetry to effectively monitor exposure to personnel in high-radiation work areas with significant dose rate gradients.

The inspectors reviewed the various radiation work permits for work within airborne radioactivity areas with the potential for individual worker internal exposures.

For these radiation work permits, the inspectors evaluated airborne radioactive controls and monitoring, including potential for significant airborne levels (e.g., grinding, grit blasting, system breaches, entry into tanks, cubicles, and reactor cavities). The inspectors assessed barrier (e.g., tent or glove box) integrity and temporary high-efficiency particulate air ventilation system operation.

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.

The inspectors examined the posting and physical controls for selected high radiation areas and very high radiation areas to verify conformance with the occupational performance indicator.

b. Findings

No findings were identified.

.6 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 reduce 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 very-high radiation areas to ensure that an individual was not able to gain unauthorized access to the very-high radiation area.

b. Findings

No findings were identified.

.7 Radiation Worker Performance (02.07)

a. Inspection Scope

The inspectors observed radiation worker performance with respect to stated radiation protection work requirements. The inspectors assessed whether workers were aware of the radiological conditions in their workplace and the radiation work permit controls/limits in place, and whether their performance reflected the level of radiological hazards present.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be human performance errors. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. The inspectors discussed with the radiation protection manager any problems with the corrective actions planned or taken.

b. Findings

No findings were identified.

.8 Radiation Protection Technician Proficiency (02.08)

a. Inspection Scope

The inspectors observed the performance of the radiation protection technicians with respect to all radiation protection work requirements. The inspectors evaluated whether technicians were aware of the radiological conditions in their workplace and the radiation

work permit controls/limits, and whether their performance was consistent with their training and qualifications with respect to the radiological hazards and work activities.

The inspectors reviewed radiological problem reports since the last inspection that found the cause of the event to be radiation protection technician error. The inspectors evaluated whether there was an observable pattern traceable to a similar cause. The inspectors assessed whether this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

b. Findings

No findings were identified.

.9 Problem Identification and Resolution (02.09)

a. Inspection Scope

The inspectors evaluated whether problems associated with radiation monitoring and exposure control were being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP. The inspectors assessed the appropriateness of the corrective actions for a selected sample of problems documented by the licensee that involve radiation monitoring and exposure controls. The inspectors assessed the licensee's process for applying operating experience to their plant.

b. Findings

No findings were identified.

2RS2 Occupational As-Low-As-Is-Reasonably-Achievable Planning and Controls (71124.02)

The inspection activities supplement those documented in NRC Integrated Inspection Report 05000254/2012002, 05000265/2012002 and constitute one complete sample as defined in IP 71124.02-05.

.1 Radiological Work Planning (02.02)

a. Inspection Scope

The inspectors selected the following Radiation Work Permits:

- turbine system work;
- Unit 2 drywell replace 2B recirculation pump and motor; and
- electromagnetic relief valve/safety relief valve/Target Rock valve repair/replace.

The inspectors compared the results achieved (dose rate reductions, person-rem used) with the intended dose established in the licensee's as-low-as-is-reasonably-achievable (ALARA) planning for these work activities. The inspectors compared the person-hour estimates provided by maintenance planning and other groups to the radiation protection group with the actual work activity time requirements, and evaluated the accuracy of these time estimates. The inspectors assessed the reasons (e.g., failure to adequately

plan the activity, failure to provide sufficient work controls) for any inconsistencies between intended and actual work activity doses.

The inspectors determined whether post-job reviews were conducted and if identified problems were entered into the licensee's CAP.

b. Findings

No findings were identified.

.2 Verification of Dose Estimates and Exposure Tracking Systems (02.03)

a. Inspection Scope

The inspectors evaluated the licensee's method of adjusting exposure estimates, or re-planning work, when unexpected changes in scope or emergent work were encountered. The inspectors assessed whether adjustments to exposure estimates (intended dose) were based on sound radiation protection and ALARA principles or if they were just adjusted to account for failures to control the work. The inspectors evaluated whether the frequency of these adjustments called into question the adequacy of the original ALARA planning process.

b. Findings

No findings were identified.

.3 Problem Identification and Resolution (02.06)

a. Inspection Scope

The inspectors evaluated whether problems associated with ALARA planning and controls are being identified by the licensee at an appropriate threshold and were properly addressed for resolution in the licensee's CAP.

b. Findings

No findings were identified.

4. **OTHER ACTIVITIES**

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

4OA1 Performance Indicator Verification (71151)

.1 Unplanned Scrams per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams per 7000 Critical Hours performance indicator (PI) for Quad Cities Units 1 and 2 for the period from the first quarter 2012 through the fourth quarter 2012. To determine the accuracy of the PI

data reported during those periods, PI definitions and guidance contained in the Nuclear Energy Institute (NEI) Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC integrated inspection reports for the period of January 2012 through December 2012 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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

b. Findings

No findings were identified.

.2 Unplanned Scrams with Complications

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Scrams with Complications performance indicator for Quad Cities Units 1 and 2 for the period from the first quarter 2012 through the fourth quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, event reports, and NRC integrated inspection reports for the period of January 2012 through December 2012 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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

b. Findings

No findings were identified.

.3 Unplanned Transients per 7000 Critical Hours

a. Inspection Scope

The inspectors sampled licensee submittals for the Unplanned Transients per 7000 Critical Hours performance indicator for Quad Cities Units 1 and 2 for the period from the first quarter 2012 through the fourth quarter 2012. To determine the accuracy of the PI data reported during those periods, PI definitions and guidance contained in the NEI Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 6, dated October 2009, were used. The inspectors reviewed the licensee's operator narrative logs, issue reports, maintenance rule records, event reports and NRC integrated inspection reports for the period of January 2012 through December 2012 to validate the accuracy of the submittals. The inspectors also reviewed the licensee's

issue report database to determine if any problems had been identified with the PI data collected or transmitted for this indicator, and none were identified.

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

b. Findings

No findings were identified.

4OA2 Identification and Resolution of Problems (71152)

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

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

a. Inspection Scope

As part of the various baseline inspection procedures discussed in previous sections of this report, the inspectors routinely reviewed issues during baseline inspection activities and plant status reviews to verify 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. In addition, inspectors verified that defects or non-conformances identified via 10 CFR Part 21, "Reporting of Defects and Noncompliance," were appropriately identified and evaluated. 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 follow-up, the inspectors performed a daily screening of

items entered into the licensee's CAP. This review was accomplished through inspection of the station's daily condition report packages.

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

b. Findings

No findings were identified.

.3 Annual Sample: Review of Operator Workarounds

a. Inspection Scope

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

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

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

b. Findings

No findings were identified.

.4 Selected Issue Follow-Up Inspection: 1/2 Diesel Generator Cooling Water Found Lined Up to Incorrect Unit

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting a human performance error that left the swing or Unit 1/2 diesel generator cooling water pump (DGCWP) discharge aligned to Unit 2 after operators were dispatched to align it to provide cooling to the Unit 1 emergency core cooling system (ECCS) room coolers. The realignment was being performed to allow testing to be performed that would make the Unit 1 DGCWP inoperable. Issue Report 1482214 identified that the error was discovered approximately 25 hours after the misalignment and after the Unit 1 DGCWP had been restored to an operable status. The restoration of the Unit 1 DGCWP to an operable status had restored compliance to TS 3.7.2, "Diesel Generator Cooling Water (DGCW) System," requirements. Additional details of the event and the inspectors' conclusions are included in the following finding.

The inspectors reviewed applicable procedures, TS, and UFSAR sections during the course of the inspection. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

Introduction: A self-revealed finding of very low safety significance (Green) and NCV of 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures and Drawings," were identified on March 1, 2013, during restoration from the 1B core spray logic test, when operators performing the test restoration found the 1/2 DGCWP lined up to Unit 2 instead of to Unit 1 as expected. The operators that performed the initial valve manipulations on February 28, 2013, did not complete the alignment as required by QCOP 6600-15, "1/2 Diesel Generator Cooling Water Pump Cross Connect Alignment."

Discussion: At 05:00 a.m. on February 28, 2013, two operators supporting performance of QCOS 1400-16, "Unit 1 Division II Core Spray Logic Functional Test," were dispatched to perform step H.3 which required them to manually lineup the Unit 1/2 DGCWP to supply the Unit 1 ECCS room coolers per QCOP 6600-15. The first operator went to the 595' elevation of the turbine building to verify the supply valve to Unit 2 header, 2-3999-89, closed as required by step F.1 of QCOP 6600-15.

The second operator traveled to the Unit 1/2 emergency diesel generator room to start the Unit 1/2 DGCWP from panel 2212-50. The first operator waited in the turbine building at the 1/2 DGCWP flow indicator, FI 1/2-3941-27, and verified flow to the diesel generator was greater than 900 gpm. The operator in the turbine building was then supposed to throttle open the supply to the Unit 1 ECCS header, Valve 1/2-3999-89, to obtain a flow rate between 404 and 450 gpm on flow indicator FI 1-3941-28 while maintaining the flow to the diesel above 900 gpm. Instead, he throttled open the Unit 2 ECCS header supply, Valve 2-3999-89, and set the flow rate using FI 2-3941-28, Unit 2 ECCS room cooler flow indicator. Although the valve equipment identification numbers were similar, the valves are physically located a significant distance apart from each other.

The operator that made the error had a preconceived idea that the valve he verified closed was the valve he was later going to open. He verified the valve number with the procedure before he verified it closed. He did not verify the number of the valve he opened with the procedure step he was executing. As the operator in the turbine building was establishing flow, the second operator returned from the diesel room. The second operator watched as flow was established, but did not verify the valve being manipulated was the correct valve. After flow was established, he returned to the diesel room to stop the 1/2 DGCWP.

The licensee staff declared the Unit 1 DGCWP inoperable on February 28 because the automatic start feature of the pump and emergency diesel generator were disabled due to configuration changes made by QCOS 1400-16. Because the pump was inoperable, operators entered Condition B of TS 3.7.2 for one unit DGCW subsystems inoperable and not capable of supporting the ECCS room emergency coolers. Action B.1 required a DGCW subsystem to be aligned to the ECCS room coolers within 1 hour OR the associated emergency core cooling systems were to be declared inoperable within 1 hour. The 1 hour time clock for the two actions was concurrent. Because the effort to align the Unit 1/2 DGCWP using QCOP 6600-15 was not completed correctly, action B.1 was not completed within the time frame required. Since the operating staff thought they had taken the appropriate action under B.1, they did not perform action B.2. With neither action B.1 nor action B.2 completed within 2 hour with no other action specified by TS 3.7.2, the implementation methodology for TS would have required entry into TS LCO 3.0.3 and a transition to Mode 3 within 13 hours.

At 1:38 p.m. on March 1, 2013, QCOS 1400-16 had progressed to the point that the Unit 1 diesel generator and Unit 1 DGCWP were declared operable. At 4:00 p.m. on March 1, during the restoration of the DGCWP lineup, the error was discovered by another operator and reported to shift management. After reporting the condition, the operators received direction to continue the restoration and returned the lineup to its normal configuration in accordance with QCOP 6600-15.

Analysis: The operators' failure to follow the station procedure to accomplish equipment lineups was a performance deficiency. Specifically, the operators executing QCOP 6600-15 did not follow the procedure for aligning the Unit 1/2 DGCWP to supply the Unit 1 ECCS room coolers. This issue was more than minor because it impacted the Reactor Safety - Mitigating Systems Cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences in that failure to align cooling water per the procedure adversely impacted the cornerstone attribute of Configuration Control for operating plant equipment lineups. Specifically, the as-left equipment lineup was different than that reported to the main control room when the activity was completed.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, Appendix A, "The Significance Determination Process (SDP) For Findings At-Power." The inspectors answered all questions of Exhibit 2, "Mitigating Systems Screening Questions," Section A - Mitigating SSCs and Functionality (Except Reactivity Control Systems),"No" and therefore, the finding screened as Green or very low safety significance.

This finding has a cross-cutting aspect in the area of Human Performance Work Practices because the licensee personnel did not use human performance tools and

techniques to ensure proper execution of the task. Specifically, the operators did not use human error prevention techniques such as self and peer checking while executing the procedure to ensure the valves were aligned in accordance with procedural direction (H.4(a)).

Enforcement: Title 10 CFR 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states in part that activities affecting quality shall be prescribed by procedures of a type appropriate to the circumstances and shall be accomplished in accordance with these procedures. Procedure QCOP 6600-15 affected the configuration of safety-related components and required the components configuration to be aligned in a standby emergency lineup to the Unit 1 ECCS room coolers.

Contrary to the above, on February 28, 2013, the operators executing QCOP 6600-15 did not follow the procedure for aligning the Unit 1/2 DGCWP to supply the Unit 1 ECCS room coolers resulting in the system being lined up to Unit 2. Because this violation was of very low safety significance and it was entered into the licensee's CAP as IR 1486754, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (**NCV 05000254/2013002-02; 05000265/2013002-02, "Diesel Generator Cooling Water Pump Aligned to Wrong Unit"**). The licensee's restoration of operability of the Unit 1 DGCW pump during restoration from QCOS 1400-16 restored compliance. Standdown briefings were conducted for all station operators to discuss the event lesson learned and performance management actions were implemented for the operators involved in the event.

.5 Selected Issue Follow-Up Inspection: Spent Fuel Pool Rack Cell Inoperability - Unsustainable Trend

a. Inspection Scope

During a review of items entered in the licensee's CAP, the inspectors recognized a corrective action item documenting the impact of the most recent update of the tool monitoring the degradation of the Boraflex in the spent fuel pool storage racks. Issue Report 1477271 documented the continued adverse trend in available storage rack locations due to Boraflex degradation. Engineering Change (EC) 392410, "Degraded Boraflex Fuel Rack Operability," documented the technical basis supporting continued operability for the fuel racks and considered all fuel types currently stored in the spent fuel pool racks. Compensatory measures put in place in response to the degrading condition included enhanced procedural controls and administrative restrictions on rack locations for certain types of fuel. The licensee continues to make progress installing rack inserts to replace the degraded Boraflex. Inspectors determined the appropriate evaluations were performed for the compensatory measures prior to implementation. Documents reviewed as part of this inspection are listed in the Attachment to this report.

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) 05000265/2012-001-00: Main Steam Isolation Valve Local Leak Rate Test Exceeds Technical Specifications Limit

This event, which occurred on March 19, 2012, documented failure of the two main steam Isolation valves (MSIVs) in the 'B' main steam line to meet the as-found leak rate testing limits. The minimum pathway leakage for the 'B' main steam line exceeded the TS surveillance limit of 34 standard cubic feet per hour (scfh) and was entered into the licensee's CAP as IR 1342937. The inboard valve was measured at 54.5 scfh and the outboard valve was measured at 45.6 scfh. The total combined minimum pathway leakage result for all MSIVs was 49.12 scfh and did not exceed the total allowed leakage limit of 86 scfh. The valves were disassembled and inspected. Some plug and seat wear were noted. The plugs were replaced and the valve seats were repaired to restore compliance. Post-maintenance testing for the 'B' main steam line was measured at 27.9 scfh and the surveillance test requirement was satisfied prior to unit restart.

The licensee determined the most likely cause for the higher than expected leakages was a valve design that allows for the plug to become misaligned with the seat ring during closure resulting in wear on the valve seats. Several corrective actions were implemented to develop and test a modification to the valve stem and plug assembly to limit the wear and improve reliability of the seating surfaces.

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

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

4OA6 Management Meetings

.1 Exit Meeting Summary

On April 9, 2013, the inspectors presented the inspection results to Mr. T. Hanley, and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- The results of the inservice inspection with Mr. T. Hanley on March 15, 2013.
- The inspection results for the areas of radiological hazard assessment and exposure controls; and occupational ALARA planning and controls with Mr. T. Hanley, Site Vice President, on March 22, 2013.

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

4OA7 Licensee-Identified Violations

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

Cornerstone: Mitigating Systems Cornerstone

- Title 10 CFR 50, Appendix B, Criterion V states, in part, that activities affecting quality shall be prescribed by documented instructions and procedures appropriate to the circumstances and shall be accomplished in accordance with these instructions and procedures. Contrary to the above, on November 5, 2012 and November 7, 2012, the licensee failed to incorporate ASME Code required VT-2 examination requirements into work instructions for work to be performed on a safety-related component. Specifically, WO 1453938-30 and WO 1453938-36, which required cutting and welding activities to be performed on the RHRSW system during installation of branched sub-assemblies, did not contain EC 385181 CC-AA-103, Attachment C. The EC 385181 CC-AA-103, Attachment C is the document that contained the requirement to perform a VT-2 examination immediately after sub-assembly installation as required by the ASME Code Section XI. On November 12, 2012, Project Management initiated IR 1439104, "VT-2 Inspections Not Performed." Issue Report 1439104 identified that the required VT-2 had not been performed on the installed sub-assemblies under WOs 1453938-30 and 145398-36. 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. Specifically, not performing the VT-2 system pressure/leakage test following 'hot tapping' the RHRSW line would call into question the quality of welds created during 'hot tapping' of the RHRSW line and could potentially undermine the integrity of the RCS pressure boundary because that RHRSW line was in operation during the 'hot tapping' process. This finding was determined to be of very low safety significance or Green in accordance with IMC 0609, Appendix G because at least one RHR loop (train 'A') was operable during the time period from when the 'hot tapping' was performed to when the ASME Code required VT-2 was finally performed on the RHRSW Train 'B' line. In addition, the sub-assemblies' weld locations off the RHRSW train 'B' line did not exhibit any system leakage during the VT-2 examination that was conducted on November 12, 2012.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

T. Hanley, Site Vice President
W. Beck, Regulatory Assurance Manager
J. Colgan, Chemistry Supervisor
D. Collins, Radiation Protection Manager
A. Misak, Deputy Maintenance Director
K. Nicely, Corporate Licensing
K. O'Shea, Operations Director
K. Ohr, Site Engineering Director
T. Petersen, Regulatory Assurance Lead
T. Wojcik, NOS Manager

Nuclear Regulatory Commission

R. Orlikowski, Acting Chief, Reactor Projects Branch 1

Illinois Emergency Management Agency (IEMA)

C. Settles, IEMA

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

05000254/2013002-01; 05000265/2013002-01	NCV	Failure to Follow Clearance Order Instructions (Section 1R20.1)
05000254/2013002-02; 05000265/2013002-02	NCV	Diesel Generator Cooling Water Pump Aligned to Wrong Unit (Section 4OA2.4)

Closed

05000254/2013002-01; 05000265/2013002-01	NCV	Failure to Follow Clearance Order Instructions (Section 1R20.1)
05000254/2013002-02; 05000265/2013002-02	NCV	Diesel Generator Cooling Water Pump Aligned to Wrong Unit (Section 4OA2.4)
05000265/2012001-00	LER	Main Steam Isolation Valve Local Leak Rate Test Exceeds TS Limits (Section 4OA3.1)

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 1R04

- M-36, Diagram of Core Spray Piping, Revision BG
- QCOP 1400-08, Unit 1 Core Spray System Preparation for Standby Operation, Revision 000
- UFSAR Section 6.3, Emergency Core Cooling System
- M-78, Diagram of Core Spray Piping, Revision BJ
- QCOP 1400-09, Unit 2 Core Spray System Preparation for Standby Operation, Revision 000
- QCOP 1400-08, Revision 0; Unit 1 Core Spray System Preparation for Standby Operation
- M-36; Diagram of Core Spray Piping

Section 1R05

- IR 1468661; NRC ID'D Hose Crossing Fire Zones w/no Firestop. Emergent Dose
- Pre Fire Plan Fire Zone 11.2.1, Unit 1 Reactor Bldg. El. 554'-0" SW Corner Room - 1B Core Spray
- Quad Cities Fire Protection Report, Fire Hazard Analysis; Revision 20
- Pre-fire Plan FZ 4.0; SB 609'-0" Elev., Computer Room in Auxiliary Electric Room
- Pre-fire Plan FZ 6.1.A; Unit 1 TB 615'-6" Elev., "A" Battery Charger Room U-1
- Pre-fire Plan FZ 6.1.B; Unit 1 TB 615'-6" Elev., "B" Battery Charger Room U-1
- Pre-fire Plan FZ 6.3; SB 595'-0" Elev., Auxiliary Electric Room
- Pre-fire Plan FZ 8.2.7.A; Unit 1 TB 615'-6" Elev., Hydrogen Seal Oil Area and MCC's
- Pre-fire Plan FZ 8.2.7.C; Unit 1/2 TB 611'-0" Elev., Closed Cooling Water Area, ASD Oil Coolers, Turbine Oil Reservoirs;

Section 1R08

- WO 01267203; Replace Valve 1-1402-38B; 1B Core Spray Pump Minimum Flow Valve; Revision 0
- ASME Weld Record for Weld No. RW-1, RW-2 (Document 2.1); May 28, 2011
- ASME Weld Record for Weld No. FW-1, FW-2 (Document 2.1); May 21, 2011
- Magnetic Particle Examination Data Sheet, Report Number NDE-553; May 28, 2011
- Magnetic Particle Examination Data Sheet, Report Number NDE-570; May 26, 2011
- WPS 1-1-GTSM-PWHT, ASME Welding Procedure; Revision 2
- IR 01232184; Original ASME Section XI Repair Replacement form Missing; June 23, 2011
- IR 01330265; NDE not Performed During Install of 1C LP RHRSW Elbow; February 22, 2012
- IR 01361586; Through Wall Leak on SME Class 3 RHRSW Piping; May 20, 2012
- IR 01361930; Original ASME Section XI Repair Replacement Form Missing; May 3, 2012
- IR 01372679; Corrosion Identified on HPCI Keep Fill Manual Valve; May 31, 2012
- IR 01426497; IGSCC Category D Welds Documentation of PHC Position; October 15, 2012
- IR 0128921; Work Completion Delay Due to Valve Being Installed Incorrect; May 21, 2011
- IR 01487809; PSU – ISI Hanger 0200-W-104 A and B Exam Indications; March 14, 2013
- EC 393063; Evaluation of ISI Support 1012A-W-104; Revision 0
- EC 392889; Evaluation to Determine Additional ISI Examination Scope Per ASME Section XI, 1995 Edition Through the 1996 Addenda, IWF-2430(c); Revision 0

- WO 01461177; Q1R22 ISI Support Activities in A RHR Room; Revision 1A
- NDE Report No. Q1R22-021; Ultrasonic Examination of the Residual Heat Removal Heat Exchanger Ring To Bottom Head Weld; March 12, 2013
- GE-UT-301; Procedure for Manual Ultrasonic Examination of Pressure Retaining Vessel Welds Less Than 2" In Thickness; Revision 1
- IR 00914413; PSU Q1R20 CISI Indication on X-01 Moisture Barrier; May 1, 2009
- WO 01232144; Repair The X-01 Moisture Barrier; May 5, 2009
- NDE Report No. GV-105; Containment Visual Examination Report After X-01 Moisture Barrier Repair; May 21, 2009
- NDE Report No. Q1R22-003; Magnetic Particle Examination Report of Support Welded to RHRHX Shell; March 6, 2013
- GE-MT-100; Procedure for Magnetic Particle Examination (Dry Particle, Color Contrast or Wet Particle, Fluorescent); Revision 6
- NDE Report No. 13-VT3-123; VT-3 Examination Report for Reactor Recirculation System Variable Spring Can and Sway Braces 0200-W-104 A&B; March 17, 2013

Section 1R11

- QCGP 1-1; Normal Unit 1 Startup TIC 3134; Revision 92A
- Evaluation scenario guide for February 25, 2013

Section 1R12

- Enterprise Maintenance Rule Production Database for the following systems:
 - Z5704: Reactor Building HVAC
 - Z5711-03 Safe Shutdown Make-up Pump Room HVAC
- Failure Report for Z5704
- IR 1417996; Low Reactor Building Differential Pressure While Entering Reactor Water Clean-up Room for Clearance Order Activity
- IR 1418466; Unexpected Reactor Building Differential Pressure >0" When Entering Unit 2 Reactor Water Clean-up Heat Exchanger Room
- IR 1445178; Received Unexpected Alarm 912-5 C-1, Reactor Building Low Differential Pressure
- IR 1445314; Reactor Building Differential Pressure Going Positive During Troubleshooting
- Failure Report for Z5711
- IR 1447089; Breaker for SSMP Room Cooler Found Tripped
- IR 1195945; Noticed SSMP AHU Fan Blower Not Operating When Expected
- IR 1476941; Mrule [Maintenance Rule] A1 Evaluation Delayed

Section 1R13

- Work Week Safety Profile (13-05-07)
- Q1R22 Refuel outage Shutdown Safety Management Plan Summary
- Q1R22 Shutdown Safety Contingency Plans and Protected Equipment
- Work Week Safety Profile (13-11-13)
- Work Week Safety Profile (13-12-01)
- Work Week Safety Profile (13-13-01)

Section 1R15

- IR 1462791; 0-5741-333 Stroke Time Did Not Meet IST Criteria
- IR 1471241; Seat Leakage on Unit 2 HPCI Steam Supply Isolation Valves
- IR 1472180; Many Unit 2 HPCI Inlet Drain Pot High Level Alarms 902-3B-11
- IR 1473775; Received HPCI Drain Pot HI Level Alarm Longer Than Expected
- EC 388116; Level III Ground on the Unit 2 125 VDC Battery system
- EC 392410; Degraded Boraflex Fuel Rack Operability
- IR 1479695; Target Rock Accumulator Sizing Error
- EC 392614; Calculation NUC-60 Used Data From a Vendor Manual That Did Not Include Conditions for Successive SRV Valve Actuations
- EC 362300; Unit 1 Target Rock SRV Accumulator Check Valve Degraded
- IR 0523803; Inadequate Testing of Target Rock SRV Accumulator

Section 1R18

- EC 389172; EOC – Open Phase Detection – Protective Relaying
- QC-S-2012-0093, 50.59 Screening for EC 389172
- QC-E-2012-003, 50.59 Evaluation for EC 389172
- 4E-1333; Relay and Metering Diagram Reserve Auxiliary Transformer 12 and 4160 Transformers 13 and 14
- 4E-1301; Single Line Diagram
- 4E-1339; Schematic Diagram Reserve Auxiliary Transformer 12 Tripping Relays
- WO 01541783; Loss of Single Phase Protective Relaying EC 389172

Section 1R19

- MOV Post-Test Data Review Worksheet, QUA-1-1001-19A; dated 01/29/13
- MOV PVT Interval Performance Review data Collection QUA-1-1001-19A; dated 01/29/13 and 09/19/05
- WO 1440267; MSIV Combined LLRT (IST)
- QCTS 0600-05; Main Steam Isolation Valve Local Leak Rate Test (AO-1(2)-203-1A B C D, AO-1(2)-203-2A B C D); Revision 16
- WO 1438528; 1-1301-64 RCIC Exhaust Stop Check Replace
- QCTS 0600-09; RCIC Steam Exhaust Local Leak Rate Test CK-1(2)-1301-41 SCK-1(2)-1301-64
- WO 1448076; Permanent Repair of Leak in 1A RHR Heat Exchanger
- WO 1624044; Q1R22 PSU-FW 220-58B LLRT As-Found Exceeded Admin Limit
- QCTS 0600-07; Feedwater Check Valve Local Leak Rate Test 1(2)-220-58A/B 1(2)-220-62A/B; Revision 19
- QCOS 0201-08; Reactor Vessel Class 1 and Associated Class 2 System Leak Test; Revision 56
- QCOS 6600-49; Division I Emergency Core Cooling System Simulated Auto-actuation and Diesel Generator Auto-start Surveillance TIC-3096
- IR 1491799; Q1R22 PSU-MO1-1402-38B 1B CS MIN FLOW VLV NON FUNCTIONAL
- WO 1626057; PSU 1-1402-38B 1B Core Spray Min Flow Valve Non Functional

Section 1R20

- IR 1489751; NRC ID Contaminated Area Improperly Downposted
- IR 1490120; Fuel Movement Abnormality During Core Reload (Shuffle 2)
- IR 1490590; Q1R22 IVVI Top Guide Rim Weld 11 Indications
- EC 392937; Q1R22 Top Guide Rim Weld Flaw Evaluation

Section 1R22

- QCOS 1600-07; Reactor Coolant Leakage in the Drywell
- QCOS 6600-20; Diesel Generator Endurance and Margin/Full Load Reject/Hot Restart Test; Revision 63
- QCOS 5750-16; Control Room Ventilation Differential Pressure Test (J.7.A); Revision 06
- WO 1441783; Control Room Ventilation DP Test
- QCTS 0600-33; Drywell Pneumatic System Suction Local Leak Rate Test (AO-1(2)-4720, AO-1(2)-4721); Revision 14
- QCOS 0202-08; Reactor Recirculation Cold Shutdown Power Operated Valve Test; Revision 16
- QCTS 0600-05; Main Steam Isolation Valve Local Leak Rate Test (AO-1(2)-203-1A B C D, AO-1(2)-203-2A B C D); Revision 16
- QCOS 0250-11; Main Steam Isolation Valve Closure Scram Sensor Channel Non-Outage Functional Test for RPS Channel 'B'; Revision 1
- QCOS 1600-54; Secondary Containment Capability Test; Revision 0
- WO 1472044; Secondary Containment Capability Test

Section 2RS1

- RP-AA-300-1001; Discrete Radioactive Particle Controls; Revision 3
- RP-AA-302; Determination of Alpha Levels and Monitoring; Revision 4
- RP-AA-203; Exposure Control and Authorization; Revision 3
- RP-AA-376; Radiological Postings, Labeling, and Markings; Revision 6
- RP-AA-1002; Radiological Risk Management; Revision 3
- RP-AA-460-001; Controls for Very High Radiation Areas; Revision 4
- RP-AA-460; Controls for High and Locked High Radiation Areas; Revision 23
- RWP 10014126; Inboard MSIV Overhaul; Revision 0
- RWP 10014211; 1A RHR HX Repair; Revision 0
- RWP 10014143; Shaw ERV/SRV/T.Rock Valves Work; Revision 0
- IR 01480241; NOD ID: On-Line WOS Not Screened for Radiological Risk; Dated February 26, 2013
- IR 01481609; Workers Entered RAD Area Without EDs; Dated February 28, 2013
- IR 01471475; Numerous Tools Exceeding Limits in TB Tool Crib; Dated February 3, 2013

Section 2RS2

- RWP 10013048; Turbine System Work; Revision 0
- RWP 10012958; U2 DW Replace 2B Recirc Pump and Motor (Q2R21) Shaw; Revision 1
- RWP 10012941; (U2 DW) SRV/ERV/TR Remove/Replace (Q2R21) Exelon; Revision 0
- RP-AA-400; ALARA Program; Revision 9
- IR 01489525; Q1R22 OLL – RWP 1014143 to Exceed Estimate by 25%; Dated March 18, 2013
- IR 01481950; Technical Rigor Not Applied to ALARA Plan; Dated February 28, 2013

Section 4OA1

- Nuclear Energy Institute (NEI) Document 99-02; Regulatory Assessment Performance Indicator Guideline, Revision 6
- Licensee 2012 Performance Indicator Submittals

Section 4OA2

- Operator Workaround List from 01/29/2013
- Operator Workaround Board Meeting agenda for Tuesday 02/26/2013
- Operator Workaround Board Meeting Minutes for March 4, 2013
- Operator Workaround Board Meeting Minutes for April 26, 2012
- Operator Workaround Board Meeting Minutes for July 31, 2012
- Operator Workaround Board Meeting Minutes for September 26, 2012
- Operator Workaround Board Meeting Minutes for October 31, 2012
- Operator Workaround Board Meeting Minutes for December 26, 2012
- Operator Workaround Board Meeting Minutes for January 29, 2013
- Equipment Status Log from 2/20/2013
- Clearance Order Log from 2/20/2013
- Degraded Equipment Log from 2/20/2013
- Main Control Room Deficiency List
- Compensatory Actions from Turnover Sheets, Daily Orders, and Standing Orders
- Temporary Modifications List
- Compensatory actions in open Operability Determinations
- Operator Burden/Degraded Equipment Aggregate Assessment performed 1/16/2013
- OP-AA-102-103, Operator Work-Around Program, Revision 3
- OP-AA-102-103-1001, Operator Burden and Plant significant Decisions Impact Assessment Program, Revision 4
- QCOP 6600-15, 1/2 Diesel Generator Cooling Water Pump Cross Connect Alignment, Revision 11
- QCOS 1400-16, Unit 1 Division II Core Spray Logic Functional Test, Revision 0
- IR 1482214, 1/2 DGCWP Found Lined Up to Incorrect Unit
- QCAN 901(2)-3 H-7, RHR Pump Area High Temperature, Revision 7
- RSA-Q-90-02, ECCS Pump Room Transient Response to Loss of Room Cooler for Quad Cities Station Units 1 and 2, Revision 0
- TS 3.7.2 and TS Bases B3.7.2
- UFSAR Section 9.5.5, Diesel Generator Cooling Water
- UFSAR Chapter 6.3, Emergency Core Cooling Systems
- IN 2012-13; Boraflex Degradation Surveillance Programs and Corrective Actions in the Spent Fuel Pool
- IR 1477271; SFP (Spent Fuel Pool) Rack Cell Inoperability – Unsustainable Trend
- EC 392410; Degraded Boraflex Fuel Rack Operability
- UFSAR Chapter 9.1 Fuel Storage and Handling

Section 4OA3

- IR 1342931; LLRT MSIV 2D Leakage Exceeded Admin Limit of <34 SCFH
- IR 1342935; LLRT MSIV 2B Leakage Exceeded Admin Limit of <34 SCFH
- IR 1342937; LLRT MSIV 1B Leak Exceeded Admin Limit of <34 SCFH
- IR 1342938; LLRT MSIV 1A Leakage Exceeded Admin Limit of <34 SCFH
- IR 1418916; NOS ID: NOS NIRB Identified MSIV LLRT Plan Issues

- IR 1439528; NOS ID: MSIV NIRB Action Plan Not Progressing Satisfactorily
- TS 3.6.1.3, Primary Containment Isolation Valves (PCIVs) and associated Bases
- UFSAR Section 15.6.5.5 Radiological Consequences (of a Loss of Coolant Accident)

Section 4OA7

- IR 1439104, VT-2 Inspections Not Performed

LIST OF ACRONYMS USED

ADAMS	Agencywide Document Access Management System
ALARA	As-Low-As-Is-Reasonably-Achievable
ASME	American Society of Mechanical Engineers
ATS	Analog Trip System
CAP	Corrective Action Program
CFR	Code of Federal Regulations
CS	Core Spray
C/O	Clearance Order
DCGW	Diesel Generator Cooling Water
DGCWP	Diesel Generator Cooling Water Pump
DRP	Division of Reactor Projects
EC	Engineering Change
ECCS	Emergency Core Cooling System
EOC	Extent of Condition
FRV	Feedwater Regulating Valve
HPCI	High Pressure Coolant Injection
HVAC	Heating, Ventilation, and Air Conditioning
IMC	Inspection Manual Chapter
INPO	Institute of Nuclear Power Operations
IP	Inspection Procedure
IR	Issue Report
ISI	Inservice Inspection
LER	Licensee Event Report
LLRT	Local Leak Rate Test
MOV	Motor Operated Valve
MSIV	Main Steam Isolation Valve
NCV	Non-Cited Violation
NEI	Nuclear Energy Institute
NRC	U.S. Nuclear Regulatory Commission
OWA	Operator Workaround
PARS	Publicly Available Records System
PI	Performance Indicator
RCIC	Reactor Core Isolation Cooling
RFO	Refueling Outage
RHR	Residual Heat Removal
RHRSW	Residual Heat Removal Service Water
scfh	Standard Cubic Feet per Hour
SDP	Significance Determination Process
SSC	Systems, Structures, and Components
SSMP	Safe Shutdown Management Plan
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
WO	Work Order

M. Pacilio

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Sincerely,

/RA by M. Kunowski for/

Robert Orlikowski, Acting Branch Chief
Branch 1
Division of Reactor Projects

Docket Nos. 50-254, 50-265
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Letter to M. Pacilio from R. Orlikowski dated May 3, 2013

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2013002 AND
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