



**UNITED STATES
NUCLEAR REGULATORY COMMISSION**

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

November 10, 2008

Mr. Charles G. Pardee
President and Chief Nuclear Officer (CNO), Exelon Nuclear
Chief Nuclear Officer (CNO), AmerGen Energy Company, LLC
4300 Winfield Road
Warrenville IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2008004;
05000265/2008004

Dear Mr. Pardee:

On September 30, 2008, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed report documents the inspection results, which were discussed on October 8, 2008, with Mr. T. Tulon and other members of your staff.

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

Based on the results of this inspection, one NRC-identified and two self-revealed findings of very low safety significance were identified. The findings involved violations of NRC requirements. However, because of their very low safety significance, and because the issues were entered into your corrective action program, the NRC is treating the issues as Non-Cited Violations in accordance with Section VI.A.1 of the NRC Enforcement Policy.

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

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of

C. Pardee

-2-

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Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000254/2008004; 05000265/2008004
w/Attachment: Supplemental Information

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

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SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2008004;
05000265/2008004

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

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

Report No: 05000254/2008004 and 05000265/2008004

Licensee: Exelon Nuclear

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

Location: Cordova, IL

Dates: July 1 through September 30, 2008

Inspectors: J. McGhee, Senior Resident Inspector
B. Cushman, Resident Inspector
J. Tapp, Acting Resident Inspector
W. Slawinski, Senior Health Physicist
C. Mathews, Illinois Emergency Management Agency

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

Enclosure

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SUMMARY OF FINDINGS

IR 05000254/2008004, 05000265/2008004; 07/01/2008 – 09/30/2008; Quad Cities Nuclear Power Station, Units 1 & 2; Flooding, Maintenance Risk Assessment, and Emergent Work Control.

This report covers a 3-month period of inspection by resident inspectors and announced baseline inspections by regional inspectors. Three Green findings were identified by the inspectors. The findings were considered Non-Cited Violations of NRC regulations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 4, dated December 2006.

A. NRC-Identified and Self-Revealed Findings

Cornerstone: Initiating Events

- Green. On August 20, a self-revealing finding of very low safety significance and associated Non-Cited Violation (NCV) of Technical Specification (TS) 5.4.1 were identified for an inadequate work instruction for Work Order 00781735-01, "Replace Power Supply for Unit 1 FRV [feedwater regulating valve] Deluge System." The inspectors determined that the work instructions for the activity did not include instructions to prevent deluge system actuation and led to an unplanned initiation of the Unit 1 feedwater regulating valve deluge system. A lockup of the '1B' feedwater regulating valve resulted due to conflicting control signal inputs. The inspectors determined that there were opportunities in the preparation and execution of the work instruction to prevent an unplanned initiation of the deluge system. Questions were asked by the instrument maintenance technicians in the pre-job brief about the function of the batteries in the fire control panel. The supervisor responded that the batteries supplied alarm backup and memory power only. The work continued on this response rather than obtaining more complete documentation or additional vendor assistance. The inspectors identified that the lack of rigor to validate system function and identify possible unintended consequences was a contributor to the event. The inspectors determined that the event was cross-cutting in the area of Human Performance, Decision Making, Conservative Assumptions (H.1 (b)). Corrective actions were to isolate the deluge to stop the event and identify and wipe down wet equipment in the area. After verification that the feedwater regulating valve control cabinets were dry, the 'B' feedwater regulating valve was returned to automatic operation. The work to replace the alternating current power supply in the fire protection panel was then reevaluated, instructions corrected, and work completed.

The inspectors determined that the failure to implement appropriate work instructions for changing power supplies in fire protection panels without causing an unplanned initiation of the deluge system is a performance deficiency and is more than minor because it impacts the Initiating Events Cornerstone attribute of procedure quality to limit the likelihood of events that upset plant stability. This event could reasonably be viewed as a precursor to a more significant event. The inspectors performed a Phase 1 SDP evaluation and determined that the answer to Initiating Events Cornerstone, Transient

Initiators question 1 of Table 4A of Manual Chapter 0609.04 was “No,” and determined that the worst case event would not likely result in mitigation equipment functions being unavailable. The issue is therefore screened as Green, and determined to be of very low safety significance. (Section 1R06)

Cornerstone: Mitigating Systems

- Green. A self-revealing finding of very low safety significance and associated NCV of TS 5.4.1 was identified for failure to follow written work instructions resulting in a non-functional main control room alarm and degraded flood protection measures. Specifically, a contract electrician did not perform work instructions as written and lifted energized leads for the 2D residual heat removal service water (RHRSW) vault door limit switch without the appropriate work package documents as required by station procedures. This action resulted in an inoperable control room alarm that was not corrected for approximately three months. Further investigation revealed the licensee was performing a surveillance to verify the RHRSW vault doors closed once per day, contrary to the surveillance periodicity of once per shift credited in the licensee’s flood protection analysis. The failure to follow the credited once-per-shift surveillance in combination with the non-functional supplemental control room alarm resulted in degraded flood protection measures associated with the 2D RHRSW vault. This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, Documentation Aspect because the licensee failed to provide enough detail in the work package to ensure that the control room alarm was verified as functional during the post-maintenance testing following completion of the work activity (H.2(c)). Corrective actions included repair of the limit switch and correction of the operator rounds to verify the vault doors closed each shift.

The finding is determined to be more than minor because it is associated with the Mitigating Systems Cornerstone attribute of external factors, flood hazard, and affects the cornerstone objective of ensuring the availability and capability of systems that respond to initiating events to prevent undesirable consequences. The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, “Significance Determination Process,” Attachment 0609.04, “Phase 1 - Initial Screening and Characterization of findings,” Table 4a for the Mitigating Systems cornerstone because the finding is associated with the operability and availability of the 2D train of the RHRSW mitigating system. The finding is of very low safety significance, Green, because the degraded flood protection measures did not result in the loss of operability or functionality of the 2D RHRSW system. (Section 1R06)

- Green. NRC inspectors identified a finding of very low safety significance and an associated NCV of 10 CFR 50.65(a) (4), “Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants,” when the licensee failed to effectively evaluate the risk associated with work on the Unit 1 station blackout (SBO) diesel generator, which resulted in an unplanned risk condition for Unit 1 and Unit 2 without the appropriate risk management actions. Specifically, the Unit 2 SBO diesel generator was determined to be unavailable after inspectors found the oil level in the governor below the indicating sight glass level due to leakage from a loose connection. Concurrently, the Unit 1 SBO diesel generator was unavailable due to planned maintenance. When unavailability of the Unit 2 SBO diesel generator was factored into the on-line risk model with the Unit 1 SBO diesel generator unavailable, the risk profile changed from Green to Yellow. Since the Unit 2 SBO diesel generator was assumed to be available in the

original risk evaluation, the underestimation of risk resulted in the station having no risk management actions in place as would have been required by procedure. Those actions include protecting pathways of safety-related equipment that could have a significant impact on the increase in risk, if unavailable. The inspectors also determined that the finding has a cross-cutting aspect in the area of Human Performance, Resources Component, Documentation Aspect because the licensee failed to provide timely and up-to-date procedures to check the engine governor oil sight glass level following the permanent modification to a different governor model that has an oil level sight glass (H.2(c)). Corrective actions included protecting the appropriate equipment and contacting mechanical maintenance to have the fitting tightened and the governor oil sump refilled to the proper level. The Operations Department initiated a process requiring a walkthrough verification of redundant equipment areas before removing equipment from service. Additionally, procedure revisions to operator rounds were made to include verification of sight glass level.

The finding is determined to be more than minor because the finding is based on incorrect assumptions that changed the outcome of the risk assessment and therefore crossed the risk threshold requiring additional actions to manage the risk. The inspectors evaluated this finding using the Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process," worksheets of IMC 0609 because the finding is a maintenance risk assessment issue. Flowchart 1, "Assessment of Risk Deficit," requires the inspectors to determine the risk deficit associated with this issue. This finding was determined to be of very low safety significance because the incremental core damage probability deficit was less than 1E-6. (Section 1R13)

REPORT DETAILS

Summary of Plant Status

Unit 1

At 11:00 p.m. on September 13, 2008, Unit 1 performed a routine downpower for control rod pattern adjustment, scram timing checks, and turbine surveillance testing. The unit was restored to full power at 11:30 a.m. on September 14, 2008.

Unit 2

On July 16, the second in a series of power ascensions was conducted on Unit 2 as a post-maintenance test for the generator rewind work that was conducted during the last refueling outage. Power was raised to 2952 MWth (megawatts thermal) (2957 is 100 percent) and electrical output was raised from 912 MWe (megawatts electric) to 933 MWe. Unit 2 was returned to 912 MWe 12 hours later.

On August 11, 2008, a Unit 2 turbine electro-hydraulic system fluid leak (20 gallons per hour) was identified on a connection to the manifold block for the #4 control valve. The licensee lowered generator load to 640 MWe (about 70 percent thermal power) and took the #4 control valve out of service to replace the leaking valve. Once the repair was accomplished, the #4 control valve was returned to service. The unit returned to full power by 07:25 a.m. on August 12.

On August 13, 2008, the third in a series of power ascensions was conducted on Unit 2 as a post-maintenance test for the generator rewind work that was conducted during the last refueling outage. Power was raised to 2952 MWth and electrical output was raised from 912 MWe to 933 MWe. Unit 2 was returned to 912 MWe 12 hours later.

At 11:00 p.m. on September 6, 2008, Unit 2 performed a routine downpower for control rod pattern adjustment, scram timing checks, and turbine surveillance testing. The unit was restored to full power at 06:51 a.m. on September 7, 2008.

1. REACTOR SAFETY

Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

.1 Readiness For Impending Adverse Weather Condition – Tornado Warning

a. Inspection Scope

Since thunderstorms with potential tornados and high winds were forecast in the vicinity of the facility for July 10, 2008, the inspectors reviewed the licensee's overall preparations for the expected weather conditions. On July 10, 2008, the inspectors walked down the Units 1 and 2 high pressure coolant injection and reactor core isolation cooling systems, in addition to the licensee's emergency alternating current power systems, because their safety-related functions could be affected or required as a result of high winds or tornado-generated missiles or the loss of offsite power. The inspectors

evaluated the licensee's preparations against site procedures and determined that the staff's actions were adequate. During the inspection, the inspectors focused on plant specific design features and the licensee's procedures used to respond to specified adverse weather conditions. The inspectors also toured the plant grounds to look for any loose debris that could become missiles during a tornado. The inspectors evaluated operator staffing and accessibility of controls and indications for those systems required to control the plant. Additionally, the inspectors reviewed the Updated Final Safety Analysis Report (UFSAR) and performance requirements for systems selected for inspection, and verified that operator actions were appropriate as specified by plant specific procedures. The inspectors also reviewed a sample of corrective action program (CAP) items to verify that the licensee identified adverse weather issues at an appropriate threshold and dispositioned them through the CAP in accordance with station corrective action procedures. Specific documents reviewed during this inspection are listed in the Attachment.

This inspection constitutes one readiness for impending adverse weather condition sample as defined in Inspection Procedure 71111.01-05.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Quarterly Partial System Walkdowns

a. Inspection Scope

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

- Unit 1 Emergency Diesel Generator;
- Unit 2 Standby Liquid Control;
- Unit 1 & 2 Service Air Systems; and
- Unit 2 Reactor Core Isolation Cooling with Unit 2 High Pressure Coolant Injection Unavailable Due to Planned Maintenance.

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

appropriate significance characterization. Documents reviewed are listed in the Attachment.

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

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

.1 Routine Resident Inspector Tours (71111.05Q)

a. Inspection Scope

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

- Unit 2 Turbine Building, 250 VDC Battery Room;
- Unit 1 Turbine Building, Elevation 572', CRD Pumps;
- Unit 1 Turbine Building, Elevation 580', Cable Tunnel;
- Unit 2 Turbine Building, Elevation 580', Cable Tunnel;
- Unit 2 Turbine Building, Elevation 572', CRD Pumps; and
- Unit 1 Reactor Building, Elevation 554', HPCI and HPCI Access Tunnel.

The inspectors reviewed areas to assess if the licensee had implemented a fire protection program that adequately controlled combustibles and ignition sources within the plant, effectively maintained fire detection and suppression capability, maintained passive fire protection features in good material condition, and had implemented adequate compensatory measures for out of service, degraded or inoperable fire protection equipment, systems, or features in accordance with the licensee's fire plan. The inspectors selected fire areas based on their overall contribution to internal fire risk as documented in the plant's Individual Plant Examination of External Events with later additional insights, their potential to impact equipment which could initiate or mitigate a plant transient, or their impact on the plant's ability to respond to a security event. Using the documents listed in the Attachment, the inspectors verified that fire hoses and extinguishers were in their designated locations and available for immediate use; that fire detectors and sprinklers were unobstructed, that transient material loading was within the analyzed limits; and fire doors, dampers, and penetration seals appeared to be in satisfactory condition. The inspectors also verified that minor issues identified during the inspection were entered into the licensee's CAP. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

.1 Internal Flooding

a. Inspection Scope

The inspectors reviewed selected risk important plant design features and licensee procedures intended to protect the plant and its safety related equipment from internal flooding events. The inspectors reviewed flood analyses and design documents, including the UFSAR, engineering calculations, and abnormal operating procedures to identify licensee commitments. The specific documents reviewed are listed in the Attachment to this report. In addition, the inspectors reviewed licensee drawings to identify areas and equipment that may be affected by internal flooding caused by the failure or misalignment of nearby sources of water, such as the fire suppression or the circulating water systems. The inspectors also reviewed the licensee's corrective action documents with respect to past flood-related items identified in the CAP to verify the adequacy of the corrective actions. The inspectors performed a walkdown of the following plant area(s) to assess the adequacy of watertight doors and verify drains and sumps were clear of debris and were operable, and that the licensee complied with its commitments:

- 2D Residual Heat Removal Service Water Vault Door, and
- Unit 1 Feedwater Regulating Valve and Reactor Feed Pump Rooms.

This inspection constitutes two internal flooding samples as defined in Inspection Procedure 71111.06-05.

b. Findings

Introduction: A finding of very low safety significance and associated NCV of TS 5.4.1 was self-revealed when the technician performing the work failed to follow work order instructions for the 2D residual heat removal service water (RHRSW) vault door and, as a result, disabled the alarm for the open vault door. This deficiency was exacerbated because the credited flood barrier surveillance of verifying the 2D RHRSW system once per shift was only being performed once per day.

Description: On March 12, 2008, during the Unit 2 refueling outage, Mechanical Maintenance began planned maintenance on the 2D RHRSW system. This work required removal of the 2D RHRSW vault bulkhead and watertight door and consequently, removal of the submarine door limit switch was required. This limit switch provides the main control room alarm indication that the RHRSW vault watertight door is open. All work was completed by March 17, 2008, and Unit 2 startup occurred on March 30, 2008.

Each day during routine operator rounds, operators enter each of three RHRSW vaults on each unit, which results in an alarm in the main control room each time a RHRSW vault door is opened. Between March 30 and April 10, 2008, the non-functional 2D RHRSW vault door alarm was not documented by main control room operators. On April 10, 2008, the 2D RHRSW vault door alarm was observed as not functioning by a main control room operator, and Issue Report 761473 was written to restore function of the alarm. A minor work request was generated on April 14, 2008, and was made a

B3 priority. A B3 priority work activity is to start work within 5 weeks. Minor work requests are tracked and monitored by the Fix-it-Now Team once a week. Other work activities were assigned a higher priority resulting in this work not being addressed until 10 weeks after it was identified. On June 27, 2008, Electrical Maintenance performed a walkdown for this work and identified that the limit switch leads were lifted and taped inside the switch.

The lifted leads were contrary to documented work instructions in Work Order 904761-10 Document #1A. Step 4.3 states “**REMOVE** the Door switch to allow removal of the bulkhead and Submarine Door.” In addition, a note was placed in the work instructions by Maintenance Planning which stated that “Review of history, indicates the vault room door switch does not need to be unwired, only unbolting and moving it out of the way.” If the electrical leads were to be lifted and landed, the work package would have contained the required electrical cable terminations and inspection forms along with a wiring diagram and clearance order or instructions that the work should be done Hot.

Licensee investigation into the failure to follow the work instructions revealed that the contract electrician performing this task had been to Quad Cities once before. This contractor was a member of the temporary power crew that does not normally work on in-plant equipment. The licensee’s conclusion was that this individual believed it was acceptable to lift the electrical leads based on craft capability. After the electrician lifted and taped the leads, the switch cover was then reinstalled, so the lifted leads were not visible. The switch was unbolted from the door and moved out of the way. Another electrician installing the switch bolted it back on the door in accordance with the work instructions without knowing the leads were lifted underneath the cover.

Further investigation into the basis for the main control room alarm revealed that this alarm was defined as a supplement to the credited flood protection administrative requirement to verify the RHRSW watertight doors were closed once per shift, as described in a series of reports with the U.S. Atomic Energy Commission identified as Quad Cities Station Special Report No. 3, 3A, 3B, and 3C. Quad Cities Station Special Report No. 3C described the credited flood protection measure to verify the watertight doors were closed once per shift. The inspectors questioned the licensee on the frequency of verification that the vault doors were closed. The licensee determined the RHRSW vault doors were verified closed once per day, which did not meet the flood protection measure of verifying the vault doors closed once per shift as credited in the flood protection analysis.

Analysis: The inspectors determined that the failure to follow documented work instructions for performing maintenance on the 2D RHRSW vault door, which resulted in a non-functional main control room alarm, was a performance deficiency. This deficiency was exacerbated because the credited flood protection measure of verifying the 2D RHRSW system once per shift was only being performed once per day. The finding was determined to be more than minor because the finding was associated with the Mitigating Systems Cornerstone attribute of external factors, flood hazard, and affected the cornerstone objective of ensuring the availability and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the credited and supplemental flood protection measures for the 2D RHRSW vault door were not in place, and therefore the flood hazard barriers were further degraded by the performance deficiency.

The inspectors determined the finding could be evaluated using the SDP in accordance with IMC 0609, "Significance Determination Process," Attachment 0609.04, "Phase 1 - Initial Screening and Characterization of findings," Table 4a for the Mitigating Systems Cornerstone because the finding is associated with the operability and availability of the 2D train of the RHRSW mitigating system. The finding was of very low safety significance, Green, because the degraded flood protection measures did not result in the loss of operability or functionality of the 2D RHRSW system.

This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, Documentation Aspect, because the licensee failed to provide enough detail in the work package to ensure that the post-maintenance test was performed correctly (H.2(c)). Specifically, step 4.8 of Document #1A in part, required the maintenance worker to "**ENSURE** proper indication for door operation." While the individual performing the step did verify proper door operation, this step did not contain enough detail to ensure that the control room alarm was verified functional following completion of the work activity. This resulted in an unknown non-functional control room alarm for approximately 12 days.

Enforcement: Technical Specification Section 5.4.1 states, in part, that "Written procedures shall be established, implemented, and maintained covering the following activities: The applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978." Paragraph 9 of this Regulatory Guide states, in part, that documented instructions for performing maintenance that can affect the performance of safety-related equipment shall be prepared and activities shall be performed in accordance with these instructions. The licensee established Document #1A for Work Order 904761-10 as the implementing instructions for removal and installation of the 2D RHRSW vault door.

Contrary to the above, while maintenance was being performed between March 12 and 17, 2008, Document #1A for Work Order 904761-10 was not implemented as required by the work instructions. Specifically, step 4.3 was not completed as stated in the work instructions. Because this violation was of very low safety significance and it was entered into the licensee's CAP as Issue Report 791288, this violation is being treated as a NCV, consistent with Section VI.A.1 of the NRC Enforcement Policy (**NCV 05000265/2008004-01**). Immediate corrective actions included Electrical Maintenance re-landing the leads and testing the alarm satisfactorily. Also, Operations has revised the operator rounds to verify the RHRSW vault doors are closed once per shift instead of once per day.

.2 Inadvertent Initiation of the Unit 1 Feedwater Regulating Valve Fire Protection Deluge

a. Inspection Scope

The inspectors reviewed the plant's response to an unplanned initiation of the Unit 1 feedwater regulating valve (FRV) fire protection deluge system resulting in minor flooding to the feedwater regulating valve area and wetting of some electrical equipment. The '1B' FRV responded to automatic signals and locked in place as a result of the water spray. Documents reviewed in this inspection are listed in the Attachment.

b. Findings

Introduction: A self-revealing finding of very low safety significance with an associated NCV of TS 5.4.1 was identified for an inadequate work instruction for Work Order 00781735-01, "Replace Power Supply for Unit 1 FRV Deluge System." This work instruction led to an unplanned initiation of the Unit 1 FRV deluge system. This resulted in the '1B' FRV being locked in place due to conflicting control signal inputs.

Description: On August 20, 2008, the Instrument Maintenance Department was performing work to replace the alternating current power supply to the deluge system for the Unit 1 FRV station. In the performance of this work, the deluge system was actuated, causing water to spray on the control cabinets of both Unit 1 FRVs. The '1A' FRV suffered no adverse action and continued to operate normally. The '1B' FRV suffered conflicting control inputs and locked itself in position as expected. The Instrument Maintenance Department contacted the control room to inform the operators of the deluge actuation and for permission to isolate the deluge system. Permission from the unit supervisor was granted and the Instrument Maintenance Department isolated the deluge system. No plant transient was identified. Reactor vessel water level remained constant throughout the event.

Analysis: The inspectors determined that the failure to implement appropriate work instructions when changing power supplies in fire protection panels without causing an unplanned initiation of the deluge system was more than minor because it impacts the Initiating Events Cornerstone attribute of Procedure Quality to limit the likelihood of events that upset plant stability and challenge critical safety functions. This event could reasonably be viewed as a precursor to a more significant event. The inspectors performed a Phase 1 SDP evaluation and determined that the answer to Initiating Events Cornerstone, Transient Initiators question 1 of Table 4A of IMC 0609.04, "Does the finding contribute to both the likelihood of a reactor trip AND the likelihood that mitigation equipment or function will not be available?" was "No." Therefore the issue is Green, or of very low safety significance.

The inspectors determined that there were opportunities in the preparation and execution of the work instruction to prevent an unplanned initiation of the deluge system. Questions were asked by the instrument maintenance technicians in the pre-job brief about the function of the batteries in the fire control panel. The supervisor responded that the batteries supplied alarm backup and memory power only. The work continued on this response rather than obtaining more complete documentation or additional vendor assistance. The inspectors identified that the lack of rigor to validate system function and identify possible unintended consequences was a significant contributor to the event. The inspectors determined that the event was cross-cutting in the area of Human Performance, Decision Making, Conservative Assumptions (H.1(b)).

Enforcement: Technical Specification 5.4.1.C requires that written procedures be established, implemented and maintained for the fire protection program implementation.

Contrary to the above, on August 20, 2008, while correctly performing the work instructions of Work Order 00781735-01 as written, the Unit 1 FRV deluge station initiated. The work instructions were not prepared in such a way as to prevent an unplanned initiation of the fire protection system. Because this violation was of very low safety significance, and because this issue was entered into the CAP as Issue Report

809047, this issue is being treated as a NCV consistent with Section VI.A.1 of the NRC Enforcement Policy (**NCV 05000254/2008004-02**). Corrective actions were to isolate the deluge to stop the event. Wetted equipment in the area was then identified and wiped down. After verification that the FRV control cabinets were dry, the 'B' FRV was returned to automatic operation. The work to replace the alternating current power supply in the fire protection panel was then reevaluated, instructions corrected, and work completed.

1R11 Licensed Operator Regualification Program (71111.11)

.1 Resident Inspector Quarterly Review (71111.11Q)

a. Inspection Scope

On September 8, 2008, the inspectors observed a crew of licensed operators in the plant's simulator during licensed operator requalification examinations to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with licensee procedures. The inspectors evaluated the following areas:

- licensed operator performance;
- crew's clarity and formality of communications;
- ability to take timely actions in the conservative direction;
- prioritization, interpretation, and verification of annunciator alarms;
- correct use and implementation of abnormal and emergency procedures;
- control board manipulations;
- oversight and direction from supervisors; and
- ability to identify and implement appropriate TS actions, and emergency plan actions and notifications.

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

This inspection constitutes one quarterly licensed operator requalification program sample as defined in Inspection Procedure 71111.11.

b. Findings

No findings of significance were identified.

1R12 Maintenance Effectiveness (71111.12)

.1 Routine Quarterly Evaluations (71111.12Q)

a. Inspection Scope

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

- 480 Volt Switchgear, and
- High Pressure Coolant Injection.

The inspectors reviewed events such as conditions where ineffective equipment maintenance had resulted in valid or invalid automatic actuations of engineered safeguards systems and independently verified the licensee's actions to address system performance or condition problems in terms of the following:

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

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

This inspection constitutes two quarterly maintenance effectiveness samples as defined in Inspection Procedure 71111.12-05.

b. Findings

No findings of significance were identified.

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

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 31 (7/28 - 8/3/08) [Intake bay dredging, #2 125 Volts Direct Current (Vdc) battery charger limiter calibration, #2A 125 Vdc battery charger limiter calibration, Unit 2 emergency diesel generator (EDG) load test];
- Work Week 32 (8/4 - 8/10/2008) [Intake Bay dredging, Unit 1 125 Vdc battery charger load test, 1/2 diesel fire pump inspection, 1/2 emergency diesel generator load test, 1A residual heat removal service water pump, 1B residual heat removal service water pump];
- Work Week 33 (8/11 – 8/17/2008) [Emergent electro-hydraulic system fluid leak-potential turbine trip initiator changed risk to yellow and impacted scheduled work requiring additional risk evaluation, intake bay dredging, high pressure

- coolant injection surveillances, Unit 1 station blackout diesel maintenance and endurance run];
- Work Week 36 (9/1 – 9/7/08) [Unit 2 planned downpower, 1/2A standby gas outage, Unit 2 EDG load test, rod select switch matrix repair, 2B CRB pump motor replacement]; and
 - Work Week 37 (9/8 – 9/14/09) [Emergent 1/2 EDG outage, #2 SBO diesel battery equalizing charge and test discharge, RCIC operability surveillance].

These activities were selected based on their potential risk significance relative to the Reactor Safety Cornerstones. As applicable for each activity, the inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and were accurate and complete. When emergent work was performed, the inspectors verified that the plant risk was promptly reassessed and managed. The inspectors reviewed the scope of maintenance work, discussed the results of the assessment with the licensee's probabilistic risk analyst or shift technical advisor, and verified plant conditions were consistent with the risk assessment. The inspectors also reviewed TS requirements and walked down portions of redundant safety systems, when applicable, to verify risk analysis assumptions were valid and applicable requirements were met.

These activities constituted five samples as defined in Inspection Procedure 71111.13-05.

b. Findings

Introduction: A finding of very low safety significance and associated NCV of 10 CFR 50.65(a)(4), "Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants," was identified by the inspectors when the licensee failed to adequately assess and manage the risk associated with work on the Unit 1 station blackout (SBO) diesel generator, which resulted in an unplanned risk condition for Unit 1 and Unit 2 without the appropriate risk management actions in place.

Description: On August 12, 2008, the licensee commenced planned maintenance on the Unit 1 SBO diesel generator, which uses a tandem engine design with the generator located between engine 'A' and engine 'B'. When work began on the Unit 1 SBO diesel, the licensee declared the machine inoperable and unavailable. In accordance with the licensee's probabilistic risk assessment model, on-line risk remained Green with one SBO diesel generator unavailable. The licensee also entered a 14-day administrative technical requirement for one SBO diesel generator unavailable.

On August 13, 2008, the NRC resident inspectors discovered that the Unit 2 SBO diesel generator engine 'B' governor sight glass had no visible oil. Operations verified that the oil level was not indicated in the sight glass and determined that there was an oil leak from a loose fitting which was found to be only finger tight. The shift declared the Unit 2 SBO diesel generator unavailable at 11:10 a.m. and entered a 7-day administrative technical requirement due to both the Unit 1 and Unit 2 SBO diesels being unavailable. Using a probabilistic risk assessment model, Operations determined on-line risk was now Yellow in this condition. Because the licensee had not known a Yellow risk condition existed, the risk management actions to address the higher risk condition associated with both unavailable SBO diesel generators had not been implemented. These included protecting the Unit 1/2 swing diesel and cooling water pump, Units 1

and 2 EDGs and their respective cooling water pumps, Bus 14-1 to Bus 24-1 cross-tie breakers, Bus 14-1 to Bus 19 tie breakers, and Bus 24-1 to Bus 29 tie breakers.

On June 9, 2008, Engineering Change 350829 had been completed on the Unit 2 SBO diesel generator to install a new governor to replace the existing obsolete governor, which did not have an oil level sight glass. As part of this modification, documentation to make a change to operator rounds was initiated to verify the governor oil level, but the change had not yet been implemented. In response to this issue, Operations initiated a standing order to require walk downs of redundant systems/trains prior to removing TS and probabilistic risk assessment systems from available status and also require operators to check all SBO diesel generator governor oil levels once per shift. As part of the extent of condition review, engineering determined that the safety-related emergency diesel generator governor oil levels were not checked during operator rounds, and this was also corrected.

Analysis: The inspectors determined that the failure to adequately assess and manage the risk associated with maintenance on the Unit 1 SBO diesel generator was a performance deficiency. The finding was determined to be greater than minor because the licensee's risk assessment was based on incorrect assumptions that when corrected changed the outcome of the assessment.

The finding was determined to affect the Mitigating Systems Cornerstone due to the unavailability of the SBO diesel generators contributing to degradation in short term decay heat removal. The inspectors then evaluated this finding using the Appendix K, "Maintenance Risk Assessment and Risk Management Significance Determination Process", worksheets of IMC 0609 because the finding is a maintenance risk assessment issue. Flowchart 1, "Assessment of Risk Deficit," requires the inspectors to determine the risk deficit associated with this issue. This finding was determined to be of very low safety significance, Green, because the incremental core damage probability deficit was less than 1E-6.

This finding has a cross-cutting aspect in the area of Human Performance, Resources Component, Documentation Aspect because the licensee failed to provide timely and up-to-date procedures to check engine governor oil sight glass level following the permanent modification to a design that has an oil level sight glass (H.2(c)).

Enforcement: Title 10 CFR 50.65(a)(4) requires, in part, that the licensee assess and manage the increase in risk that may be associated with performing maintenance activities prior to performing the maintenance.

Contrary to the above, on August 13, 2008, the licensee failed to adequately assess and manage the increase in risk associated with the Unit 2 SBO diesel generator prior to performing maintenance on the Unit 1 SBO diesel generator. As a result, the licensee's risk assessment was based on incorrect assumptions that changed the outcome of the assessment and the appropriate systems were not being protected. Because this violation was of very low safety significance and the issue was entered into the CAP as Issue Report 806700, the issue is being treated as an NCV consistent with Section VI.A.1 of the NRC Enforcement Policy (**NCV 05000254/2008004-03; 05000265/2008004-03**). Immediate corrective actions included protecting the Unit 1/2, Unit 1, and Unit 2 EDGs and their respective cooling water pumps; Bus 14-1 to Bus 24-1 cross-tie breakers; Bus 14-1 to Bus 19 tie breakers; and Bus 24-1 to Bus 29 tie breakers

until at least one SBO diesel was restored; and repairing the fitting and restoring the governor oil level.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the following issues:

- Core Spray High Point Vents;
- Cracked Mounting Feet on ½ EDG Air Turning Box;
- Calculation for Motor Operated Valves Used Outdated Design Inputs;
- Unit 1 HPCI Room Cooler Fouling;
- MCC 18/19-5 Power Supply Transfer time out of tolerance at 19.4 seconds; and
- Submerged Switchyard Power Cables.

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

This inspection constitutes six samples as defined in Inspection Procedure 71111.15-05.

b. Findings

No findings of significance were identified.

1R19 Post-Maintenance Testing 71111.19)

a. Inspection Scope

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

- Unit 2 Power Ascension Test to Maximum Thermal Power;
- Unit 2 125 Vdc Battery Charger #2A Current Limit Check and Calibration;
- Unit 1 RHR Service Water Pump Operability Test;
- Unit 1 Station Blackout Diesel Endurance Run;
- Unit 2 Electro-Hydraulic System Oil Leak; and
- Unit 1/2 Emergency Diesel test after Failed Contactor Replacement.

These activities were selected based upon the structure, system, or component's ability to impact risk. The inspectors evaluated these activities for the following (as applicable): the effect of testing on the plant had been adequately addressed; testing was adequate for the maintenance performed; acceptance criteria were clear and demonstrated operational readiness; test instrumentation was appropriate; tests were performed as written in accordance with properly reviewed and approved procedures; equipment was returned to its operational status following testing (temporary modifications or jumpers required for test performance were properly removed after test completion), and test documentation was properly evaluated. The inspectors evaluated the activities against TS, the UFSAR, 10 CFR Part 50 requirements, licensee procedures, and various NRC generic communications to verify 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 constitutes six samples as defined in Inspection Procedure 71111.19-05.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

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:

- QCIS 0300-02, Unit 1 Division 1 SCRAM Discharge Volume Rochester Instruments Calibration and Functional Test (routine);
- QCOS 2900-01, Safe Shutdown Makeup Pump Flow Rate Test (IST);
- QCIS 2300-04, Unit 2 HPCI Steam Line High Flow Analog Trip System Calibration and Functional Test (routine);
- QCOS 1600-07, Reactor Coolant Leakage in the Drywell (leakage); and
- QCOS 1000-06, RHR Pump / Loop Operability Test (IST).

The inspectors observed plant activities and reviewed procedures and associated records to determine whether: any preconditioning occurred; 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 were consistent with the system design basis; plant equipment calibration was correct, accurate, and properly documented; as-left setpoints were within required ranges; calibration frequencies were in accordance with TSs, the UFSAR, procedures, and applicable commitments; measuring and test equipment calibration was current; test equipment was used within the required range and accuracy; applicable prerequisites described in the test procedures were satisfied; test frequencies met TS requirements to demonstrate operability and reliability; tests were

performed in accordance with the test procedures and other applicable procedures; jumpers and lifted leads were controlled and restored where used; test data and results were accurate, complete, within limits, and valid; test equipment was removed after testing; where applicable for inservice testing activities, testing was performed in accordance with the applicable version of Section XI, American Society of Mechanical Engineers Code, and reference values were consistent with the system design basis; where applicable, test results not meeting acceptance criteria were addressed with an adequate operability evaluation or the system or component was declared inoperable; where applicable for safety-related instrument control surveillance tests, reference setting data were accurately incorporated in the test procedure; where applicable, actual conditions encountering high resistance electrical contacts were such that the intended safety function could still be accomplished; prior procedure changes had not provided an opportunity to identify problems encountered during the performance of the surveillance or calibration test; equipment was returned to a position or status required to support the performance of its safety functions; and all problems identified during the testing were appropriately documented and dispositioned in the CAP. Documents reviewed are listed in the Attachment to this report.

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

b. Findings

No findings of significance were identified.

1EP6 Drill Evaluation (71114.06)

.1 Emergency Preparedness Drill Observation

a. Inspection Scope

The inspectors evaluated the conduct of a routine licensee emergency drill on July 16, 2008, to identify any weaknesses and deficiencies in classification, notification, and protective action recommendation development activities. The inspectors observed emergency response operations in the Technical Support Center to determine whether the event classification, notifications, and protective action recommendations were performed in accordance with procedures. The inspectors also attended the licensee drill critique to compare any inspector-observed weaknesses with those identified by the licensee staff in order to evaluate the critique and to verify whether the licensee staff was properly identifying weaknesses and entering them into the CAP. As part of the inspection, the inspectors reviewed the drill package and other documents listed in the Attachment to this report.

This inspection constitutes one sample as defined in Inspection Procedure 71114.06-05.

b. Findings

No findings of significance were identified.

.2 Training Observation

a. Inspection Scope

The inspector observed a simulator training evolution for licensed operators on September 8, 2008, which required emergency plan implementation by a licensee operations crew. This evolution was evaluated and expected to be included in performance indicator data regarding drill and exercise performance. The inspectors observed event classification and notification activities performed by the crew. The inspectors also attended the post-evolution critique for the scenario. The focus of the inspectors' activities was to note any weaknesses and deficiencies in the crew's performance and ensure that the licensee evaluators noted the same issues and entered them into the CAP. As part of the inspection, the inspectors reviewed the scenario package and other documents listed in the Attachment to this report.

This inspection constitutes one sample as defined in Inspection Procedure 71114.06-05.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstones: Occupational Radiation Safety, Public Radiation Safety

2OS1 Access Control to Radiologically Significant Areas (71121.01)

.1 Plant Walkdowns and Radiation Work Permit Reviews

a. Inspection Scope

The inspectors reviewed licensee controls and surveys in the following radiologically significant work areas within radiation areas, high radiation areas and airborne radioactivity areas in the plant to determine if radiological controls including surveys, postings and barricades were acceptable.

- Radwaste Building Truck Bay;
- Refuel Floor of Reactor Building, Units 1 & 2; and
- Clean-up Phase Separator and Heat Exchanger Rooms, Units 1 & 2.

This sample was credited and documented in Inspection Report 05000254/2008002; 05000265/2008002; therefore, this supplemental information does not represent a sample.

The inspectors reviewed radiation work permits for airborne radioactivity areas or areas with the potential for airborne radioactivity to verify barrier integrity and engineering controls performance (e.g. high-efficiency particulate air ventilation system operation) and to determine if there was a potential for individual worker internal exposures of >50 millirem committed effective dose equivalent. These areas included various Unit 2 drywell locations and the reactor cavity during the licensee's March 2008 outage.

Work areas having a history of, or the potential for, airborne transuranics were evaluated to verify that the licensee had considered the potential for transuranic isotopes and provided appropriate worker protection.

This inspection constitutes one sample as defined by Inspection Procedure 71121.01-5.

The inspectors reviewed the licensee's physical and programmatic controls for highly activated and/or contaminated materials (non-fuel) stored within spent fuel or other storage pools to determine whether adequate barriers were in-place to ensure against unauthorized or inadvertent movement of these materials.

This inspection constitutes one sample as defined by Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

.2 Problem Identification and Resolution

a. Inspection Scope

The inspectors reviewed a sample of the licensee's self-assessments, audits, licensee event reports, and special reports related to the access control program to verify that identified problems were entered into the CAP for resolution.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

The inspectors reviewed corrective action reports related to access controls and high radiation area radiological incidents (issues that did not count as performance indicator occurrences identified by the licensee in high radiation areas <1R/hr). Staff members were interviewed and corrective action documents were reviewed to verify that follow-up activities were being conducted in an effective and timely manner commensurate with their importance to safety and risk based on the following:

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

This sample was credited and documented in Inspection Report 05000254/2008002; 05000265/2008002; therefore, this supplemental information does not represent a sample.

The inspectors evaluated the licensee's process for problem identification, characterization, prioritization, and verified that problems were entered into the CAP and resolved. For repetitive deficiencies and/or significant individual deficiencies in problem

identification and resolution, the inspectors verified that the licensee's self-assessment activities were capable of identifying and addressing these deficiencies.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

.3 Job-In-Progress Reviews and Work Practices in Radiologically Significant Areas

a. Inspection Scope

The inspectors observed the following jobs that were being performed in radiation areas, airborne radioactivity areas, or high radiation areas for observation of work activities that presented the greatest radiological risk to workers:

- Dry Cask Removal from Spent Fuel Pool; and
- Reactor Cooling Isolation System Surveillance Testing.

The inspectors reviewed radiological job requirements for these activities, including radiation work permit requirements and work procedure requirements, and attended the pre job briefings.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

Job performance was observed with respect to these requirements to assess whether radiological conditions in the work area were adequately communicated to workers through pre-job briefings and postings. The inspectors also evaluated the adequacy of radiological controls, including required radiation and contamination surveys and radiation protection job coverage.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

Radiological work in high radiation work areas having significant dose rate gradients was reviewed to evaluate the application of dosimetry to effectively monitor exposure to personnel and to assess the adequacy of licensee controls. These work areas involved areas where the dose rate gradients were severe thereby increasing the necessity of providing multiple dosimeters or enhanced job controls.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

.4 High Risk-Significant, High Dose Rate, High Radiation Area and Very High Radiation Area Controls

a. Inspection Scope

The inspectors held discussions with the acting radiation protection manager concerning high dose rate/high radiation area and very high radiation area controls and procedures, including procedural changes that had occurred since the last inspection, in order to assess whether any procedure modifications substantially reduced the effectiveness and level of worker protection.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

The inspectors discussed with radiation protection supervisors the controls that were in place for special areas that had the potential to become very high radiation areas during certain plant operations. The inspectors assessed if plant operations required communication beforehand with the radiation protection group, so as to allow corresponding timely actions to properly post and control the radiation hazards.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

The inspectors conducted plant walkdowns to assess the posting and locking of the entrances to the plant's two high dose rate high radiation areas. No very high radiation areas existed at the time of the inspection.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

.5 Radiation Worker Performance

a. Inspection Scope

The inspectors reviewed radiological problem reports for which the cause of the event was due to radiation worker errors to determine if there was an observable pattern traceable to a similar cause, and to determine if this perspective matched the corrective action approach taken by the licensee to resolve the reported problems. Problems or issues with planned and taken corrective actions were discussed with the radiation protection manager.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

.6 Radiation Protection Technician Proficiency

a. Inspection Scope

The inspectors reviewed radiological problem reports for which the cause of the event was radiation protection technician error to determine if there was an observable pattern traceable to a similar cause, and to determine if this perspective matched the corrective action approach taken by the licensee to resolve the reported problems.

This inspection constitutes one sample as defined in Inspection Procedure 71121.01-5.

b. Findings

No findings of significance were identified.

2OS2 As Low As Reasonably Achievable Planning And Controls (71121.02)

.1 Inspection Planning

a. Inspection Scope

The inspectors reviewed the licensee's dose performance for its March 2008, Unit 2 refueling outage (Q2R19), focusing on work activities that accrued collective dose greater than 5 rem and other jobs of lesser dose that varied significantly from their projected dose. The inspectors compared the results achieved, including dose rate reductions and person-rem used, with the intended dose established in the licensee's as-low-as-is-reasonably-achievable (ALARA) planning for these work activities. Reasons for inconsistencies between intended and actual work activity doses were reviewed.

The licensee's post-job (work activity) reviews and post outage ALARA report were reviewed to verify that identified problems were entered into the licensee's CAP.

These two samples were credited and documented in Inspection Report 05000254/2008002; 05000265/2008002; therefore, this supplemental information does not represent additional samples.

b. Findings

No findings of significance were identified.

.2 Source-Term Reduction and Control

a. Inspection Scope

The inspectors reviewed licensee records to determine the historical trends and current status of tracked plant source terms and determined that the licensee was making allowances and developing contingency plans for expected changes in the source term due to changes in plant fuel performance issues or changes in plant primary chemistry.

This inspection constitutes one required sample as defined in Inspection Procedure 71121.02-5.

The inspectors verified that the licensee had developed an understanding of the plant source-term, that this included knowledge of input mechanisms to reduce the source term and that the licensee had a source-term control strategy in place that included a cobalt reduction strategy and shutdown ramping and operating chemistry plan which was designed to minimize the source-term external to the core. Other methods used by the licensee to control the source term including component and system decontamination, and use of shielding were evaluated.

This inspection constitutes one optional sample as defined by Inspection Procedure 71121.02-5.

The licensee's identification of specific sources was reviewed, along with exposure reduction actions and the priorities the licensee had established for implementation of those actions. The results that had been achieved against these priorities since the last refueling cycle were reviewed. For the current assessment period, source reduction evaluations were verified along with actions taken to reduce the overall source-term compared to the previous year.

This inspection constitutes one optional sample as defined by Inspection Procedure 71121.02-5.

b. Findings

No findings of significance were identified.

.3 Declared Pregnant Workers

a. Inspection Scope

The inspectors reviewed the licensee's monitoring methods and procedures, radiation exposure controls, and the information provided to declared pregnant women to determine if an adequate program had been established and implemented to limit embryo/fetal dose. The inspectors reviewed dose records of declared pregnant workers for the current assessment period to verify that the exposure results and monitoring controls employed by the licensee complied with the requirements of 10 CFR Part 20.

This inspection constitutes one required sample as defined by Inspection Procedure 71121.02-5.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

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

4OA1 Performance Indicator Verification (71151)

.1 Safety System Functional Failures

a. Inspection Scope

The inspectors sampled licensee submittals for the safety system functional failures performance indicator for Units 1 and 2 for the period from the 1st Quarter 2007 to the 2nd Quarter 2008. To determine the accuracy of the performance indicator data reported during those periods, performance indicator definitions and guidance contained in the Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," Revision 5, and NUREG-1022, "Event Reporting Guidelines 10 CFR 50.72 and 50.73" definitions and guidance, were used. The inspectors reviewed the licensee's operator narrative logs, operability assessments, maintenance rule records, maintenance work orders, issue reports, event reports and NRC Integrated Inspection reports for the period of January 2007 through June 2008 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 performance indicator data collected or transmitted for this indicator and none were identified. Specific documents reviewed are described in the Attachment to this report.

This inspection constitutes two safety system functional failures samples as defined in Inspection Procedure 71151-05.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

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

a. Scope

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

the issue. Minor issues entered into the licensee's CAP as a result of the inspectors' observations are included in the attached List of Documents Reviewed.

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

b. Findings

No findings of significance were identified.

.2 Daily Corrective Action Program Reviews

a. Scope

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

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

b. Findings

No findings of significance were identified.

.3 Selected Issue Follow-up Inspection: Q2R19 Snubber Failures

a. Scope

During a review of items entered in the CAP, the inspectors recognized several corrective action items documenting piping snubber failures on high energy systems and safety-related systems during the recent refueling outage. The inspectors interviewed the program owner to ensure the program requirements regarding scope expansion and failure evaluation were properly implemented. Additionally, the inspectors questioned the programmatic response to multiple and repetitive snubber failures and less than expected service life. The inspectors also reviewed the root cause evaluation report and associated corrective action plan generated in response to the multiple test failures.

The above constitutes completion of one in-depth problem identification and resolution sample as defined in Inspection Procedure 71152, Section 02.02 and 05.

b. Findings

No findings of significance were identified.

4OA5 Other Activities

.1 Quarterly Resident Inspector Observations of Security Personnel and Activities

a. Inspection Scope

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

The inspectors also reviewed a report of the results of a survey of the site security organization relative to its safety conscious work environment. The inspectors considered whether the surveys were conducted in a manner that encouraged candid and honest feedback. The results were reviewed to determine whether an adequate number of staff responded to the survey. The inspectors also reviewed Exelon's self-assessment of the survey results and verified that any issues or areas for improvement were entered into the CAP for resolution.

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

b. Findings

No findings of significance were identified.

4OA6 Management Meetings

.1 Exit Meeting Summary

On October 8, 2008, the inspectors presented the inspection results to T. Tulon and other members of the licensee staff. The licensee acknowledged the issues presented. The inspectors confirmed that none of the potential report input discussed was considered proprietary.

.2 Interim Exit Meetings

Interim exits were conducted for:

- Radiological access control and ALARA program inspection with Mr. T. Tulon and other licensee staff on September 12, 2008.

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

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

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

Nuclear Regulatory Commission

M. Ring, Chief, Reactor Projects Branch 1

LIST OF ITEMS OPENED, CLOSED AND DISCUSSED

Opened

50-265/2008004-01	NCV	2D Vault Door Work Order Instructions Not Followed
50-254/2008004-02	NCV	Inadvertent Initiation of the Unit 1 Feedwater Regulating Valve Fire Protection Deluge
50-254/2008004-03; 50-265/2008004-03	NCV	Licensee Failure to Adequately Assess and Manage Risk Associated with Work on U1 SBO

Closed

50-265/2008004-01	NCV	2D Vault Door Work Order Instructions Not Followed
50-254/2008004-02	NCV	Inadvertent Initiation of the Unit 1 Feedwater Regulating Valve Fire Protection Deluge
50-254/2008004-03; 50-265/2008004-03	NCV	Licensee Failure to Adequately Assess and Manage Risk Associated with Work on U1 SBO

LIST OF DOCUMENTS REVIEWED

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

1R01 Adverse Weather

- QCOA 0010-10; Tornado Watch-Warning, Sever Thunderstorm Warning or Severe Winds; Revision 18
- EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 26

1R04 Equipment Alignment

- QCOP 6600-01; Diesel Generator 1(2) Preparation for Standby Operation, Revision 35
- QOM 2-1100-02; Standby Liquid Control System Fuse and Breaker Checklist, Revision 7
- QOM 2-1100-01; Unit 2 SBLC Valve Checklist, Revision 8
- QCOS 1100-07; SBLC Pump Flow Rate Test, Revision 30
- M-82; Diagram of Standby Liquid Control Piping, Revision AN
- QOM 1-4600-01, U1 Service Air Valve Checklist, Revision 012
- QOM 1-4600-01, U2 Service Air Valve Checklist, Revision 008
- QOM 2-1300-02; Unit 2 RCIC Valve Checklist (RCIC Room), Revision 10
- QCOP 1300-01; RCIC System Preparation for Standby Operation, Revision 31
- QCOS 1300-11; RCIC Valve Position Verification, Revision 10
- IR 623021; Remove Requirement to Lockwire RCIC Trip and Throttle Valve, 4/28/07

1R05 Fire Protection

- QCMMS 4100-01; Fire Extinguisher Inspection, Revision 29
- Pre-plan TB-102; Fire Zone 7.2, Unit 2 Turbine Bldg. El. 628'-6", 250V Battery Room; Revision 22
- Pre-plan TB-67; Fire Zone 8.2.5, Unit 1 Turbine Bldg. El. 580'-0", U1 Cable Tunnel
- Pre-plan TB-66; Fire Zone 8.2.3.A, Unit 1 Turbine Bldg. El. 572'-6" CRD Pumps
- Pre-plan TB-92; Fire Zone 8.2.5, Unit ½ Turbine Bldg. El. 580'-0" U-2 Cable Tunnel
- Pre-plan TB-91; Fire Zone 8.2.2.-1, Unit 2 Turbine Bldg. El. 572'-6" CRD Pumps
- Pre-plan RB-2; Fire Zone 11.1.3, Unit 1 Reactor Bldg. El. 554'-0" HPCI & HPCI Access Tunnel, Revision 13

1R06 Flood Protection

- IR 803877; RHRSW Vault Doors not Verified Closed per Commitment, 8/5/08
- Quad Cities Unit 2 Modification Approval Sheet, Modification Number M-4-2-74-52; Vault Door Limit Switches, 4/23/74
- IR 791288; RHRSW Vault Door Alarm Inoperative Due to Q2R19 Work, 6/27/08
- Quad Cities Special Report No. 3B., Supplementary Information Concerning Condensate Pump Room Modifications."; 4/27/73
- Quad Cities Special Report No. 3C., Supplementary Information Concerning Condensate Pump Room Modifications."; 10/11/73
- IR 761473; U2 D RHRSW Vault Door Alarm Inop, 4/10/08

- IR 799867; Alarm not Functioning was not Observed by MCR Personnel, 7/24/08
- WO 904761-10; Replace the 2-1001-1D RHR Service Water Valve, 3/11/08
- QCMPM 1500-02; RHR Service Water Vault Submarine Door Preventive Maintenance, Revision 8
- IR 809047; U-1 FWRV Fire Protection Initiation/1B FWRV Locked Up; 08/20/2008
- Prompt Investigation 809047-02 for IR 809047
- Root Cause Evaluation 809047-03 for IR 809047
- Work Order #781735 Replace Power Supply for U1 FRV Deluge
- Work Order #892548 Replace Power Supply for U2 FRV Deluge

1R11 Licensed Operator Requalification Program

- LOCT-1073-ECORE; Primary Containment Venting Due to Exceeding Primary Containment Pressure Limit; Revision 11
- EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 26

1R12 Maintenance Rule Implementation

- IR 685578; U1/2 DGCWP Tripped During QCOS 6600-43; 10/16/07
- IR 765337; When C/S Taken to Start, Auto Trip Light Came Up; 4/20/08
- IR 765332; Control Power Lost for Bus 28 Cubicle 3B – 2B RB Supply Fan; 4/20/08
- IR 775712; RPC Exceeded for 480V Maintenance Rule Z7000-01 Function; 5/14/08
- IR 780189; 480V Switchgear Maintenance Rule Function Z7000-01 A2-AT-RISK; 5/22/08

1R13 Maintenance Risk and Emergency Work

- IR 806700; U2 SBO DG Governor has no Visible Oil in Sight glass; 8/13/08
- IR 807285; NOS ID – EDG and SBO Governor Oil Level Issues; 8/14/08
- QCOS 1000-44; Unit 2 “B” Loop LPCI and Containment Cooling Modes of RHRSW Non-Outage Logic Test; Revision 10
- AR 00824849; 5 Minute Time Delay Relay Failed (10A-K48B)
- AR 00600638; Failure of Relay 10A-K48B During QCOS-1000-33

1R15 Operability Evaluations

- IR 801914; Core Spray Vents not at absolute high point on discharge; 7/30/08
- QCOS 1400-01; Core Spray Operability Verification
- Calculation QDC-1400-M-1170, Revision 2
- Engineering Calculations 371614, 371440, 371501; Response of ECCS venting to NRC Generic Letter 2008-01
- QDC-6600-S-1289; Seismic Evaluation of Degraded DG Air Turning Box Supports, Revision 0
- Engineering Calculation 339445
- IR 126770; Weld Cracks on DG Air Turning Box
- IR 622100; Evaluation of IR 177026 Cable Assessment; 04/26/2007
- IR 177026; Underground Cable Assessment; 09/23/2003
- IR 817098; Manhole #3 Has Rusted Brackets and Unistrut; 9/12/08
- IR 819424; U-1 HPCI Room Cooler Inspection Results; 09/18/2008
- EC 372166; Determining Acceptance Criteria for the Number of Tubes Plugged in the HPCI Room Cooler for a Prompt Operability Determination; 9/19/2008
- QDC-5700-M-0806, Revision 001A; ECCS Room Cooler Performance Calculation Under Design Basis and Degraded Conditions; 7/11/2007

- QDC-2300-M-0700, Revision 2; Quad Cities HPCI Room Thermal Response with Reduced Room Cooler Capability; 12/2/2004
- QCOS 6700-01; MCC 18/19-5 Auto Transfer Logic Operability Surveillance
- QCOS 0202-08; Revision 12, Reactor Recirculation Cold Shutdown Power Operated Valve Test
- TODI NFM9800175, Revision 2, LOCA Input Parameters for Quad Cities Unit 1 & 2 for Siemens Atrium-9B Fuel
- IR 805033; NOS Finding: Superseded Sources Used for Midacalc Inputs, 08/07/2008
- QUA-1-1001-18A; AC Motor Operated Gate Valve Calculation; Revision 3

1R19 Post-Maintenance Testing

- TIC-2153; Power Ascension Test to Maximum Thermal Power, Revision 0
- QCTS 0210-05; Current Limit Check for Safety Related 125 VDC and 250 Vdc Chargers, Revision 5
- QCOS 1000-04; RHR Service Water Pump Operability Test Revision 48
- QCOS 6620-10; SBO DG 1(2) Endurance/Margin and Full Load Reject Test, Revision 26
- IR 806915; U1 SBO DG Output Breaker Failed to Close In, 8/13/08
- QCOS 6620-05; SBO DG 1(2) Fuel Oil Transfer Pump Quarterly Test, Revision 14
- IR 807421; U1 SBO Engine B Lube Oil Sump Level Indication; 8/15/08
- IR 807441; LT-6620-111A Failed Upscale; 8/15/08
- IR 806915; U1 SBO DG Output Breaker Failed to Close In; 8/13/08
- IR 807365; Bus 61 Cub 1 U1 SBO Output Breaker Bad Pigtail Connection; 8/14/08

1R22 Surveillance Testing

- QCIS 0300-02; Unit 1 Division 1 SCRAM Discharge Volume Rochester Instruments Calibration and Functional Test, Revision 9
- QCOS 2900-01; Safe Shutdown Makeup Pump Flow Rate Test Revision 28
- Work Order #01133797-01, OPS PMT to perform QCOS 2900-01
- QCIS 2300-04; HPCI Steam Line High Flow Analog Trip System Calibration and Functional Test, Revision 16
- QCOS 1600-07; Reactor Coolant Leaking in the Drywell, Revision 27
- QCOS 1000-06; RHR Pump / Loop Operability Test, Revision 44

1EP6 Drill Evaluation

- EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 26

2OS1 Access Control to Radiologically Significant Areas

- 762812; High Radiation Door Issues; dated April 13, 2008
- 798037; Higher Than Expected Dose Rates in Floor drain Surge Tank Pump Room; dated July 18, 2008
- 760436; Unit 2 RWCU Phase Separator Room – Higher Than Expected Dose Rates; dated April 7, 2008
- 748998; High Dose Rates on RWCU Decant Pump Drain to Equipment Drain Tank; dated March 13, 2008
- 752017; Boilermaker Received Unexpected Dose Rate Alarm; dated March 19, 2008
- 723651; Invalid ED Rate Alarm; dated January 17, 2008
- 750913; Unexpected ED Dose Rate Alarm in Unit 2 RHR Room; dated March 16, 2008

- 762827; Near Miss LHRA Event and Associated Quick Human Performance Investigation Report; dated April 13, 2008
- RP-AA-460; Controls for High and Very High Radiation Areas; Revision 13
- RP-AA-460-001; Controls for Very High Radiation Areas; Revision 1
- RP-AA-460; Controls for High And Locked High Radiation Areas; Revision 17
- RP-AA-301; Radiological Air Sampling Program; Revision 2
- RP-QC-301-1001; Airborne Radioactivity Sampling & Analysis; Revision 5
- QCOP-1000-29; Shutdown Cooling Startup and Operation From Outside the Control Room; Revision 15
- QCOP-1000-01; RHR Fill and Vent; Revision 16
- RP-AA-210; Dosimetry Issue, Usage and Control; Revision 14
- NF-AA-390; Spent Fuel Pool Material Control; Revision 2
- Other Documents:
- RWP 10009665; 2008 Spent Fuel Dry Cask Storage Project; Revision 0
- RWP 10009665 ALARA Plan; Spent Fuel Dry Cask Storage Project (5 Casks); Revision 1
- Check In Self-Assessment Report; ALARA Planning and Access Control to Radiologically Significant Areas; dated June 19, 2008
- RWP 10008563; Reactor Disassembly/Reassembly/Cavity Work/Wall Clean; Revision 0
- RWP 10008602; Under Vessel Instrumentation Work; Revision 0
- Quad Cities Station Spent Fuel Pool Material Log; dated September 2008

2OS2 ALARA Planning and Controls

- 713522; 2-2001-702B Valve Exceeded Dose Goal Due to Rework; dated December 19, 2007
- RP-AA-270; Prenatal Radiation Exposure; Revision 4
- Root Cause Investigation Report; Q2R19 Collective Radiation Exposure Exceeds Business Plan Goal; dated June 11, 2008
- Quad Cities Q2R19 Refueling Outage Report; March 2008
- Declaration of Pregnancy Forms and Associated Dose Records for Various Periods in 2007 – July 2008

4OA1 Performance Indicator Verification

- LER 265/2005-002; Main Steam Relief Valve Actuator Degradation, Revision 1
- IR 712433; Write WR to Remove and Clean the Stemnut for MO 2-1001-4 A; 12/17/2007
- IR 664381; MO 1-1001-4B Indicates Dual; 8/24/2007
- IR 664478; Need WO to Pull and Clean MO 1-1001-4B Stem Nut; 8/25/2007

4OA2 Identification and Resolution of Problems

- IR 758609; Perform Root Cause for Q2R19 Snubber Failures; 04/03/2008

LIST OF ACRONYMS USED

ALARA	As-Low-As-Is-Reasonably-Achievable
CAP	Corrective Action Program
EDG	Emergency Diesel Generator
FRV	Feedwater Regulating Valve
HPCI	High Pressure Coolant Injection
IMC	Inspection Manual Chapter
MWe	Megawatts Electric
MWth	Megawatts Thermal
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
RHRSW	Residual Heat Removal Service Water
SBO	Station Blackout
SDP	Significance Determination Process
TS	Technical Specification
UFSAR	Updated Final Safety Analysis Report
Vdc	Volts Direct Current