January 27, 2006

Mr. Christopher M. Crane
President and Chief Nuclear Officer
Exelon Nuclear
Exelon Generation Company, LLC
Quad Cities Nuclear Power Station
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2
NRC INTEGRATED INSPECTION REPORT 05000254/2005006;
05000265/2005006; 07200053/2005002

Dear Mr. Crane:

On December 31, 2005, the U. S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Quad Cities Nuclear Power Station, Units 1 and 2. The enclosed report documents the inspection findings which were discussed on January 10, 2006, with Mr. Tulon and other members of your staff.

The inspection examined activities conducted under your license as they relate to safety and to 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, no findings of significance were identified.

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

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 05000254/2005006; 05000265/2005006; 07200053/2005002
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
Senior Vice President - Nuclear Services
Senior Vice President - Mid-West Regional
Operating Group
Vice President - Mid-West Operations Support
Vice President - Licensing and Regulatory Affairs
Director Licensing - Mid-West Regional
Operating Group
Manager Licensing - Dresden and Quad Cities
Senior Counsel, Nuclear, Mid-West Regional
Operating Group
Document Control Desk - Licensing
Vice President - Law and Regulatory Affairs
Mid American Energy Company
Assistant Attorney General
Illinois Emergency Management Agency
State Liaison Officer, State of Illinois
State Liaison Officer, State of Iowa
Chairman, Illinois Commerce Commission
D. Tubbs, Manager of Nuclear
MidAmerican Energy Company

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U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos.:	50-254, 50-265; 72-053
License Nos.:	DPR-29, DPR-30
Report No.:	05000254/2005006; 05000265/2005006; and 07200053/2005002
Licensee:	Exelon Nuclear
Facility:	Quad Cities Nuclear Power Station, Units 1 and 2
Location:	Cordova, Illinois
Dates:	October 1, 2005 through December 31, 2005
Inspectors:	K. Stoedter, Senior Resident Inspector M. Kurth, Resident Inspector S. Bakhsh, Health Physicist, Region III A. Barker, Project Engineer V. Everett, Senior Inspector, Region IV M. Gryglak, Materials Inspector J. House, Senior Radiation Specialist F. Jacobs, Safety Inspection Engineer R. Kellar, P.E., Health Physicist, Region IV P. Lee, PHD, CHP, Region III C. Phillips, Senior Operations Engineer L. Ramadan, Reactor Engineer R. Smith, Acting Resident Inspector R. Temps, Senior Transportation and Storage Safety Inspector R. Winter, Reactor Engineer C. Zoia, Operations Engineer R. Ganser, Illinois Emergency Management Agency
Approved by:	M. Ring, Chief Branch 1 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000254/2005006, 05000265/2005006; 07200053/2005002; 10/01/2005 - 12/31/2005; Quad Cities Nuclear Power Station, Units 1 & 2; Routine Integrated Inspection Report.

This report covers a 3-month period of inspection by resident inspectors and announced inspections by regional specialists in the areas of maintenance effectiveness, operator requalification, radiation protection, and the independent spent fuel storage installation. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 3, dated July 2000.

A. NRC-Identified and Self-Revealing Findings

No findings of significance were identified.

B. Licensee-Identified Violations

None.

REPORT DETAILS

Summary of Plant Status

Unit 1 operated at or near full power until December 31 when operations personnel reduced reactor power to 85 percent due to potential electromatic relief valve degradation concerns. Unit 1 operated at this power level for the remainder of the inspection period.

Unit 2 began the inspection period operating at maximum achievable power levels. On December 30 operations personnel reduced reactor power to support an at power drywell entry. The drywell entry was performed to identify the source of a 125 Vdc ground on the 3D electromatic relief valve (ERV) solenoid circuit. Upon entering the drywell, maintenance personnel identified unexpected degradation of the 3D ERV actuator components. As a result, the licensee shut down Unit 2 to inspect the remaining actuators. Unit 2 was shut down at the conclusion of the inspection period.

1. REACTOR SAFETY

Cornerstone: Initiating Events, Mitigating Systems, and Barrier Integrity

1R01 Adverse Weather Protection (71111.01)

a. Inspection Scope

From November 7 through December 23, 2005, the inspectors assessed the licensee's readiness for cold weather conditions by conducting detailed inspections of the licensee's winter readiness activities and reviewing the procedures used to verify the temperature of the battery rooms. The inspectors verified the completion of the licensee's cold weather readiness activities by reviewing records and by direct observation to ensure that the activities were performed as required by procedure. The inspectors performed a detailed inspection of the operations department's cold weather procedures related to battery room temperature to ensure that the operators were using the appropriate instruments to validate the battery electrolyte temperatures. The inspectors also discussed the performance of the battery room ventilation system with system engineering and operations personnel to assess whether a recent modification to the ventilation system had improved system performance. These inspections represented the completion of two inspection samples.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignment (71111.04)

.1 Partial Walkdowns

a. Inspection Scope

The inspectors performed partial walkdowns of the following risk-significant mitigating systems equipment during times when the equipment was of increased importance due to redundant systems or other equipment being unavailable:

- Unit 2B core spray system
- Unit ½ standby gas treatment system
- Unit 1B core spray system

The inspectors utilized the associated valve and breaker checklists to verify that the components were properly positioned and that support systems were configured as required. The inspectors examined the material condition of the components by visually inspecting the components in the field. The inspectors also compared the operating parameters for each piece of equipment to information contained in system operating procedures to ensure that there were no obvious equipment deficiencies. The inspectors reviewed outstanding work orders and issue reports associated with each system to verify that those documents did not reveal issues that could affect the equipment inspected. These inspections represented the completion of three quarterly samples.

b. Findings

No findings of significance were identified.

.2 Complete Walkdown

a. Inspection Scope

During the weeks of October 3 and October 10, 2005, the inspectors performed a complete walkdown of the reactor building closed cooling water system to verify the functional capability of the system. The system was selected due to the station's reliance on the system's operation for safe plant operations while at power. The inspection consisted of the following activities:

- A review of plant procedures (including selected abnormal and emergency procedures), drawings, the system health report, Technical Specifications, and the Updated Final Safety Analysis Report to determine overall system health, proper system alignment, and the system's licensing and design bases
- A review of outstanding maintenance work requests to determine items in need of repair

- A review of outstanding or completed temporary and permanent modifications to the system
- An electrical and mechanical walkdown of the system to verify proper alignment, component accessibility, availability, and condition

The inspectors also reviewed selected items documented in issue reports to verify that the items were appropriately addressed. This inspection represented the completion of one semi-annual sample.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors performed routine walk downs of accessible portions of the following risk significance fire zones:

- Fire Zone 1.1.1.6 - Unit ½ 690 Feet Elevation, Refuel Floor
- Fire Zone 1.1.2.2 - Reactor Building 595 Feet Elevation
- Fire Zone 8.2.6.A - Unit 1 Turbine Building 595 Feet Elevation, Feedwater Pump Room
- Fire Zone 8.2.8.A - Unit 1 Turbine Building Motor Generator Set 1B
- Fire Zone 8.2.8.D - Unit 2 Turbine Building 639 Feet Elevation, 2A Motor Generator Set
- Fire Zone 8.2.8.E - Unit 1 Turbine Building 639 Feet Elevation, Main Turbine Floor
- Fire Zone 8.2.8.E - Unit 2 Turbine Building 639 Feet Elevation, Main Turbine Floor
- Fire Zone 11.1.4 - Unit 2 Reactor Building 554 Feet Elevation, High Pressure Coolant Injection System Pump Room
- Fire Zone 11.2.2 - Unit 1 Reactor Building 554 Feet Elevation, 1B Residual Heat Removal System Room

The inspectors verified that transient combustibles were controlled in accordance with the licensee's procedures. During a walkdown of each fire zone, the inspectors observed the physical condition of fire suppression devices and passive fire protection equipment such as fire doors, barriers, and penetration seals. The inspectors observed the condition and placement of fire extinguishers and hoses against the Pre-Fire Plan fire zone maps. The physical condition of accessible passive fire protection features such as fire doors, fire dampers, fire barriers, fire zone penetration seals, and fire retardant structural steel coatings were also inspected to verify proper installation and physical condition. The inspections represented the completion of nine quarterly inspection samples.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification Program

Quarterly Review of Licensed Operator Training (71111.11Q)

a. Inspection Scope

On December 1, 2005, the inspectors observed an operations crew during a simulator training scenario to verify that operator performance was adequate, evaluators were identifying and documenting crew performance problems, and training was being conducted in accordance with procedures. The training scenario consisted of an inadvertent spill of radioactive materials, a primary containment leak that resulted in high drywell pressure, and a loss of high pressure emergency core cooling systems.

The inspectors evaluated crew performance in the areas of:

- Clarity and formality of communications
- Ability to take timely actions in the safe direction
- Prioritization, interpretation, and verification of alarms
- Procedure use
- Control board manipulations
- Oversight and direction from supervisors
- Group dynamics

Crew performance in these areas was compared to licensee management expectations and guidelines as presented in the following documents:

- OP-AA-101-111, “Rules and Responsibilities of On-Shift Personnel”
- OP-AA-103-102, “Watchstanding Practices”
- OP-AA-103-104, “Reactivity Management Controls”
- OP-AA-104-101, “Communications”

This inspection represented the completion of one quarterly sample.

b. Findings

No findings of significance were identified.

Biennial Licensed Operator Requalification Inspection (71111.11B)

.1 Facility Operating History

a. Inspection Scope

The inspectors reviewed the plant's operating history from October 2003 through October 2005, to assess whether the Licensed Operator Requalification Training program had addressed operator performance deficiencies noted at the plant. The inspectors reviewed inspection report findings.

b. Findings

No findings of significance were identified.

.2 Licensee Requalification Examinations

a. Inspection Scope

The inspectors performed a biennial inspection of the licensee's Licensed Operator Requalification Training program. The inspectors reviewed a sample of the current year requalification biennial written examinations and annual operating test material to evaluate general quality, construction, and difficulty level. The operating portion of the examination was inspected during October 31 through November 2, 2005. The operating examination material consisted of two dynamic simulator scenarios and six job performance measures. The biennial written examination was administered on November 3, 2005, and consisted of 20 open reference, multiple choice questions and 20 open reference static examination questions. The inspectors reviewed the methodology for developing the examinations, including the Licensed Operator Requalification Training program 2-year sample plan, probabilistic risk assessment insights, previously identified operator performance deficiencies, and plant modifications. The inspectors reviewed the licensee's program and assessed the level of examination material duplication during the current year annual examinations. The inspectors also interviewed members of the licensee's management, operations and training staff, and discussed various aspects of the examination development.

b. Findings

No findings of significance were identified.

.3 Licensee Administration of Requalification Examinations

a. Inspection Scope

The inspectors observed administration of the requalification operating test to assess the licensee's effectiveness in conducting the test and to assess the facility evaluators' ability to determine adequate performance using objective, measurable performance standards. The inspectors evaluated, in parallel with the facility evaluators, the

performance of 12 licensed operators for two operating shift crews during two dynamic simulator scenarios. Each crew consisted of three senior reactor operators, and three reactor operators. In addition, the inspectors observed licensee evaluators administer six job performance measures to selected licensed operators. The inspectors observed the training staff personnel administer the operating test, including pre-examination briefings, observations of operator performance, and individual and crew evaluations after the dynamic simulator scenarios.

b. Findings

No findings of significance were identified.

.4 Examination Security

a. Inspection Scope

The inspectors observed and reviewed the licensee's overall licensed operator requalification examination security program related to examination physical security (e.g., access restrictions and simulator considerations) and integrity (e.g., predictability and bias). The inspectors also reviewed the facility licensee's examination security procedure, any corrective actions related to past or present examination security problems at the facility, and the implementation of security and integrity measures (e.g., security agreements, sampling criteria, bank use, and test item repetition) throughout the examination process.

b. Findings

There were two issues the inspectors reviewed. First, the licensee identified that while conducting a dynamic simulator set during the current set of annual operating examinations an anomaly occurred with the computerized control room logs. Each day two crews take the examinations. The first crew performs two scenarios in the morning and the next crew does the same two scenarios in the afternoon. The operator in the balance of plant position for the morning crew in the first scenario used the computerized logs. An operator in the second crew, in the afternoon, called up the logs to make an entry, and they were blank as expected. The operator stated he made one single line entry the entire scenario. The log program is a data base program. A window comes up for each entry. When the entry is posted it comes up in the log highlighted in black. The operator stated that when he made his entry more than one black line came up. However, he was too busy to notice what, if anything, was written in the other lines. The operator brought this to the attention of the training instructors at the conclusion of the scenario. However, by the time the log was checked the simulator operator had wiped the log clean again. The licensee finished the scenario set but, due to the inability to verify that no information had come up on the log, decided to give the crew two more scenarios that week to complete their annual operating examination. The inspectors reviewed the licensee's Issue Report 386669, interviewed all individuals involved, and examined the operation of the computerized log program. The inspectors concluded that no information had been transmitted from one crew to another, and that the licensee's action to replace the examination material was conservative.

The second issue involved the NRC inspectors. At the conclusion of the first day of inspection, the lead inspector was speaking with the training manager in the parking lot about the inspection. As the other inspector approached, the lead inspector asked the other inspector about the number of unsatisfactory examination questions. The other examiner not only stated that one question was unsatisfactory, but inadvertently gave the topic of the question. This was not enough information to compromise the examination; however, to assure examination security, the topic of any question should not be discussed with anyone not on the examination security agreement. The training manager was not on the examination security agreement at the time. Per licensee procedure TQ-AA-201, "Examination Security and Administration," Revision 6, Step 4.2.1 required an individual to be briefed on the security requirements prior to gaining specific knowledge of the content of an examination. Therefore, the inspectors violated the licensee's security procedure. The lead inspector recommended that the training manager sign onto the security agreement. The lead inspector verified that the training manager signed onto the security agreement the next day. The licensee documented this event in Issue Report 393341.

The licensee documented these incidents in Issue Reports 386669 and 393341, respectively. The inspectors were appropriately notified of the incidents. The inspectors reviewed the licensee's investigation and assessed the overall incident for possible violation of 10 CFR 55.49, "Integrity of Examinations and Tests." The inspectors determined that no actual examination compromise had occurred. These issues were considered minor in nature and were not subject to enforcement action in accordance with NRC enforcement policy.

.5 Licensee Training Feedback System

a. Inspection Scope

The inspectors assessed the methods and effectiveness of the licensee's processes for revising and maintaining its Licensed Operator Requalification Training program up to date, including the use of feedback from plant events and industry experience information. The inspectors interviewed licensee personnel (operators, instructors, and management) and reviewed applicable procedures. In addition, the inspectors reviewed the licensee's quality assurance oversight activities, including the most recent licensee training department self-assessment report. The inspectors evaluated the licensee's ability to assess the effectiveness of its Licensed Operator Requalification Training program and the licensee's ability to implement appropriate corrective actions.

b. Findings

No findings of significance were identified.

.6 Licensee Remedial Training Program

a. Inspection Scope

The inspectors assessed the adequacy and effectiveness of remedial training conducted since the previous annual requalification examinations. The inspectors reviewed the remedial training documentation for 13 individuals that demonstrated unsatisfactory performance during the current 2-year training cycle. The inspectors also reviewed remedial training procedures and records to ensure that the subsequent re-evaluation was properly completed prior to returning the individuals and crews to licensed duties.

b. Findings

No findings of significance were identified.

.7 Conformance with Operator License Condition

a. Inspection Scope

The inspectors evaluated facility and individual operator license conformance with the requirements of 10 CFR Part 55. The inspectors reviewed the licensee's program for maintaining active operator licenses to assess compliance with 10 CFR 55.53(e) and (f). The inspectors reviewed the licensee's procedural compliance and the process for tracking on-shift hours for licensed operators. The inspectors also conducted reviews to verify that proficiency watch-standing hours were credited to the correct control room positions in accordance with Technical Specifications. The inspectors reviewed eight licensed operator medical records to ensure compliance with 10 CFR 55.21 and 55.25, and medical standards delineated in ANSI/ANS-3.4-1983. In addition, the inspectors reviewed the licensee's Licensed Operator Requalification Training program to assess compliance with the requalification program requirements prescribed by 10 CFR 55.59.

b. Findings

Introduction: The inspectors had a concern with the licensee's implementation of 10 CFR 55.53(e).

Description: In accordance with 10 CFR 55.53(e) to maintain active license status, a licensed operator shall actively perform the functions of an operator or senior operator on a minimum of seven 8-hour or five 12-hour shifts per calendar quarter. Per the 10 CFR 55.4 definition, actively performing the functions of an operator or senior operator means that an individual has a position on the shift crew that requires the individual to be licensed as defined in the facility's Technical Specifications, and that the individual carries out and is responsible for the duties covered by that position.

Quad Cities' Technical Specifications state that they may go below the minimum control room staffing requirements of 10 CFR 50.54(m) for a period of no longer than 2 hours. The minimum staffing requirements in 10 CFR 50.54(m) for a single control room with two units is two senior reactor operators and three reactor operators. The licensee

routinely staffs the control room with three senior reactor operators and four reactor operators.

Analysis: There is no safety consequence that the licensee staffs the control room with greater than the minimum number of licensed operators allowed by Technical Specifications. However, there is a regulatory issue as to how many operators can get credit for standing concurrent watches in the control room. If the licensee staffs the control room with more than the minimum number of operators without administrative controls to place the operators in the required Technical Specification control room watch stations, then inspectors cannot verify that all the operators stood a shift that met the requirements to maintain an active license as defined by 10 CFR 55.4.

Enforcement: The question as to whether the licensee can take credit for more operators than described by the minimum staffing specified in 10 CFR 50.54(m) for watch standing proficiency is an Unresolved Item pending further NRC review **(URI 05000254/2005006-01; 05000265/2005006-01)**.

.8 Conformance with Simulator Requirements

a. Inspection Scope

The inspectors assessed the adequacy of the licensee's simulation facility (simulator) for use in operator licensing examinations and for satisfying experience requirements as prescribed in 10 CFR 55.46, "Simulation Facilities." The inspectors reviewed a sample of simulator performance test records (i.e., transient tests, malfunction tests, and reactor core performance tests), simulator work order records, and the process for ensuring continued assurance of simulator fidelity in accordance with 10 CFR 55.46. The inspectors reviewed and evaluated the discrepancy process to ensure that simulator fidelity was maintained. This was accomplished by a review of discrepancies that were entered into the licensee's corrective action system verifying that the licensee adequately captured simulator problems and, finally, that corrective actions were performed and completed in a timely fashion commensurate with the safety significance of the item (prioritization scheme). Open simulator discrepancies were reviewed for importance relative to impact on 10 CFR 55.45 and 59 operator actions as well as nuclear and thermal hydraulic operating characteristics. Closed simulator discrepancies were reviewed for the last 12 months for timeliness of resolution. The inspectors reviewed the licensee's recent simulator core performance testing to assess that the simulator adequately replicated actual reactor plant core's performance characteristics. The inspectors also conducted interviews with the licensee's simulator configuration control personnel and completed the NRC Inspection Procedure 71111.11, Appendix C, checklist to evaluate whether or not the licensee's plant-referenced simulator was operating adequately as required by 10 CFR 55.46(c) and (d). The licensee does not currently use the simulation facility to meet the experience requirements in 10 CFR 55.31(a)(5).

b. Findings

No findings of significance were identified.

.9 Biennial Written Examination and Annual Operating Test Results

a. Inspection Scope

The inspectors reviewed the overall pass/fail results of the comprehensive biennial written tests, the annual job performance measure operating tests, and the annual simulator operating tests (required to be given per 10 CFR 55.59(a)(2)) administered by the licensee during calender year 2005. The overall results were compared with the Significance Determination Process in accordance with NRC Manual Chapter 0609, Appendix I, "Operator Requalification Human Performance Significance Determination Process." Year 2005 was the second year of the licensee's 24-month training program. This represented one sample.

b. Findings

No findings of significance were identified.

.10 Biennial Problem Identification and Resolution Review

a. Inspection Scope

The inspectors reviewed licensee self-assessments and two corrective action documents written to document deficiencies identified in the licensed operator training program. The licensee's self-assessments included a review of the licensed operator training program completed approximately a month prior to this inspection activity. The self-assessments and corrective action documents were reviewed to ensure that the full extent of the issues were identified, an appropriate evaluation was performed, the condition report was appropriately prioritized, and that actions were planned or in-progress to resolve the issues.

b. Findings

No findings of significance were identified.

1R12 Maintenance Implementation (71111.12)

.1 Quarterly Inspections

a. Inspection Scope

The inspectors reviewed the two samples listed below for items such as: (1) appropriate work practices; (2) identifying and addressing common cause failures; (3) scoping in accordance with 10 CFR 50.65(b) of the maintenance rule; (4) characterizing reliability issues for performance; (5) trending key parameters for condition monitoring; (6) charging unavailability for performance; (7) classification and reclassification in accordance with 10 CFR 50.65(a)(1) or (a)(2); and (8) appropriateness of performance criteria for structures, systems, and components/functions classified as (a)(2) and/or appropriateness and adequacy of goals and corrective actions of items classified

as (a)(1). In addition, the inspectors specifically reviewed events where ineffective equipment maintenance had resulted in invalid automatic actuations of safety equipment affecting the operating units. Items reviewed included the following:

- Reactor Fuel
- Electrohydraulic Control System

This inspection represented the completion of two quarterly samples.

b. Findings

No findings of significance were identified.

.2 Biennial Evaluation

a. Inspection Scope

The inspectors examined the maintenance rule periodic evaluation report completed for the period of May 2002 to May 2004. To evaluate the effectiveness of (a)(1) and (a)(2) activities, in accordance with 10 CFR 50.65, the inspectors examined a sample of (a)(1) action plans, performance criteria, functional failures, and incident reports. These same documents were reviewed to verify that the threshold for identification of problems was at an appropriate level and the associated corrective actions were appropriate. Also, the inspectors reviewed the maintenance rule procedures and processes. The inspectors focused the inspection on the following four systems (samples):

- 480 Vac System
- 4160 Vac System
- Reactor Feedwater Pump Ventilation
- Emergency Diesel Generator

The inspectors verified that the periodic evaluation was completed within the time restraints defined in 10 CFR 50.65 (once per refueling cycle, not to exceed 24 months). The inspectors also ensured that the licensee reviewed its goals, monitored structures, systems, and components performance, reviewed industry operating experience, and made appropriate adjustments to the maintenance rule program as a result of the above activities.

The inspectors verified that:

- The licensee balanced reliability and unavailability during the previous refueling cycle, including a review of high safety significant structures, systems, and components
- (a)(1) goals were met, that corrective action was appropriate to correct the defective condition, included the use of industry operating experience, and that (a)(1) activities and related goals were adjusted as needed
- the licensee had established (a)(2) performance criteria, examined any structures, systems, and components that failed to meet their performance

criteria, and reviewed any structures, systems, and components that have suffered repeated maintenance preventable functional failures including a verification that failed structures, systems, and components were considered for (a)(1)

In addition, the inspectors reviewed a maintenance rule self-assessment and audit reports that addressed the maintenance rule program implementation.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspectors reviewed the documents listed in the "List of Documents Reviewed" section of this report to ensure that appropriate risk assessments were performed prior to removing equipment from service and to determine if the risk associated with the listed activities agreed with the results provided by the licensee's risk assessment tool. The inspectors verified that risk assessments were performed as required by 10 CFR 50.65(a)(4) and licensee procedures. When possible, the inspectors conducted walkdowns to ensure that redundant mitigating systems and/or barrier integrity equipment credited by the licensee's risk assessment remained available. When compensatory actions were required, the inspectors conducted plant inspections to validate that the compensatory actions were appropriately implemented. The inspectors discussed emergent work activities with the shift manager, work week manager, and risk engineer to ensure that plant risk was reassessed. The inspectors also monitored the progress of emergent work activities to ensure that any potential delays in these activities did not adversely impact the operation of either unit.

- Work Week October 10-16, 2005, including the undervoltage surveillance on safety related Bus 13-1 and planned maintenance of the service water piping
- Work Week October 17-23, 2005, including the planned and emergent maintenance and surveillance of the Unit 1 high pressure coolant injection system
- October 25-26, 2005, for emergent maintenance on the 1B feedwater regulator valve controller
- Work Week November 7-12, 2005, including the planned surveillance of the Unit 1 and 1A 125 Vdc chargers and planned maintenance of the 1A residual heat removal system
- December 13-14, 2005, for emergent maintenance on the safe shutdown makeup pump test return line check valve
- December 20-22, 2005, for emergent troubleshooting to determine the source of a 125 Vdc ground on the Unit 2 3D ERV

These inspections represented the completion of six samples.

b. Findings

On December 21, 2005, operations personnel declared the Unit 2 3D ERV inoperable after discovering that a 125 Vdc ground was present in the valve's actuation circuitry. The inspectors reviewed the online risk assessment that was performed upon declaring the valve inoperable. The inspectors found that the licensee had concluded that the unit's online risk remained Green.

Approximately 1 day later, the inspectors contacted the licensee's risk assessment engineer to discuss the assessment performed on December 21. The inspectors recalled that a previous risk assessment engineer had informed them that all of the safety valves and relief valves were needed to mitigate an anticipated transient without scram event which occurred at extended power uprate power levels. The inspectors questioned the risk engineer to determine how the unit's online risk remained Green if one of the valves needed to combat an anticipated transient without scram event was inoperable.

Individuals from the licensee's probabilistic risk assessment group evaluated the inspectors' question regarding the December 21 risk assessment. During the evaluation, the individuals identified discrepancies with the licensee's risk assessment tool and the probabilistic risk assessment anticipated transient without scram success criteria which could have resulted in the licensee incorrectly concluding that the risk associated with the inoperable ERV was Green instead of Yellow. The licensee documented these discrepancies in Issue Report 436449.

At the conclusion of the inspection period, the licensee was working with the risk assessment individuals to resolve the identified discrepancies. Because the discrepancies had not been resolved, the inspectors were unable to determine whether a performance deficiency had occurred during the development of the December 21 risk assessment. As a result, this item will remain unresolved pending the licensee's resolution of the discrepancies and a subsequent review by the inspectors **(URI 05000265/2005006-02)**.

1R14 Personnel Performance During Non-Routine Evolutions (71111.14)

The following two inspection samples were reviewed during the inspection period.

.1 Unexpected Failure of Ventilation Compressor

a. Inspection Scope

The inspectors monitored the licensee's response to the unexpected failure of the "B" control room emergency ventilation compressor while the non-safety ventilation train was out of service for maintenance. The inspectors conducted this inspection using the non-routine evolutions procedure since it was unclear whether the compressor failure was caused by an associated equipment problem or a personnel error. Upon learning of the failure, the inspectors reported to the control room to determine what had occurred. The inspectors discussed the event with the operators, reviewed the

abnormal operation procedures, and the corresponding log entries to verify that the operators' actions were in accordance with procedures. The inspectors reviewed the licensee's event response procedures, attended status meetings, and observed activities in the field to ensure that the licensee's review of this equipment failure was comprehensive and complete. The licensee's initial investigation determined that the compressor failed due to a relay malfunction which prevented the compressor from cycling on and off as designed. A more detailed investigation was ongoing at the conclusion of the inspection period.

b. Findings

No findings of significance were identified.

.2 Preparation for and Execution of At-Power Drywell Entry

a. Inspection Scope

On December 30, 2005, the licensee entered the Unit 2 drywell with the reactor at power. The entry was performed to aid in identifying the source of a 125 Vdc ground on the 3D ERV solenoid circuitry. Prior to the entry, the inspectors viewed a valve actuator located in the electrical maintenance hot shop to obtain a better understanding of the troubleshooting activities to be performed in the drywell. The inspectors attended several meetings, and had discussions with multiple individuals, to assess the thoroughness of the troubleshooting activities, that the radiological aspects of entering the drywell with the reactor at power had been addressed, and that operations personnel had developed compensatory measures to address the inadvertent actuation of an ERV, the need to move control rods, or the potential need to quickly shut down the reactor with individuals in the drywell. The inspectors observed a portion of the drywell entry activities from the control room and verified that the procedures needed to address any potential transient conditions which occurred during the drywell entry were readily available. The inspectors also observed activities at the drywell to verify that communications were established with multiple locations, the workers were aware of the activities they were to perform, individuals remained in low dose areas when appropriate, that the radiological briefings were complete, and that the licensee remained focused on nuclear safety.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors assessed the following operability evaluations associated with equipment operability issues to ensure that continued operability was properly justified and the subject component or system remained available such that no unrecognized increase in risk occurred. The inspectors also reviewed any needed compensatory measures to

verify that the measures worked as stated and the measures were adequately controlled.

- Operability Evaluation 386940 - Steam Leak in Unit 1 High Pressure Coolant Injection System
- Operability Evaluation 382474 - ½ B Control Room Ventilation Fan has a Bent Shaft
- Operability Evaluation 399518 - Unit 2 Reactor Core Isolation Cooling System Vent Verification Exceeded No Flow Time.

In addition, the inspectors reviewed selected issues that the licensee entered into its corrective actions program to verify that identified problems were being entered into the program with the appropriate characterization and significance. These inspections represented the completion of three samples.

b. Findings

No findings of significance were identified.

1R16 Operator Workarounds (71111.16)

.1 Quarterly Operator Workaround Assessment

a. Inspection Scope

The inspectors assessed the following operator workaround issues to determine the potential effects on the functionality of the corresponding mitigating systems. During these inspections, the inspectors reviewed the technical adequacy of the workaround documentation against the Updated Final Safety Analysis Report and other design information to assess whether the workaround conflicted with any design basis information. The inspectors also compared the information in abnormal or emergency operating procedures to the workaround information to ensure that the operators maintained the ability to implement important procedures when required.

- Operator Work Arounds 04-011 and 04-012, Compensatory Measures Required to Maintain Remote Isolation Capability of the Reactor Core Isolation Cooling Suction Valves to Meet NUREG 0737
- Operator Challenge 05-011, Unit 1 Relay Chatter During Start-up/Shutdown
- Operator Challenge 02-004, Unit 2 Low Flow Feedwater Regulator Valve Overlap Appears to be Causing Low Flow Feedwater Regulator Valve to Cycle Between 50-100 Percent During Start Up and Shut Down of the Unit

This review represented the completion of three inspection samples.

b. Findings

No findings of significance were identified.

.2 Cumulative Assessment of Operator Workarounds

a. Inspection Scope

The inspectors assessed the cumulative effects of all operator workarounds as of November 29, 2005. The inspectors utilized the Updated Final Safety Analysis Report and the Technical Specifications to determine the function of each system impacted by an operator workaround. Once the function was determined, the inspectors reviewed the contents of corrective action documents, modification packages, and procedure changes to determine the nature of the operator workaround and future actions to resolve each deficiency. After gaining a thorough understanding of each workaround, the inspectors interviewed licensee personnel and reviewed normal, abnormal, and emergency operating procedures to determine the potential effects of each workaround on the functionality of the corresponding systems. The inspectors also performed a word search on the corrective action program database to ensure that the licensee was entering issues associated with operator workarounds into the corrective action program with the appropriate characterization and significance. This review represented the completion of one cumulative review sample.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post maintenance testing activities listed below during the inspection period:

- Work Order 815911 - Standby Gas Treatment System, High Efficiency Pre-Filter High Differential Pressure
- Work Orders 607671, 713360, 782961, 511404, 581706, 768577, 681815, and 506622 - Modification of the Unit 1 Reactor Core Isolation Cooling Torus Suction Valves Control Switches in the Control Room
- Work Order 833770 - Lost Light Indication for Torus Vacuum Relief Valve 2-1601-20B
- Work Order 725412; Unit 1 “A” Residual Heat Removal Room Cooler Fan Maintenance
- Work Order 858313 - Steam Leak on Unit 1 High Pressure Coolant Injection System Steam Drain Line
- Work Order 871797 - “B” Control Room Emergency Ventilation Air Conditioning System Failure
- Work Order 779077 - Open and Inspect Safe Shutdown Makeup Check Valve 0-2901-5

For each post maintenance activity selected, the inspectors reviewed the Technical Specifications and Updated Final Safety Analysis Report information against the

maintenance work package to determine the safety function(s) that may have been affected by the maintenance. Following this review the inspectors verified that the post maintenance test activity adequately tested the safety function(s) affected by the maintenance, that acceptance criteria were consistent with licensing and design basis information, and that the procedure was properly reviewed and approved. When possible the inspectors observed the post maintenance testing activity and verified that the structure, system, or component operated as expected; test equipment used was within its required range and accuracy; jumpers and lifted leads were appropriately controlled; test results were accurate, complete, and valid; test equipment was removed after testing; and any problems identified during testing were appropriately documented. These inspections represented the completion of seven samples.

b. Findings

No findings of significance were identified.

1R20 Refueling and Other Outage Activities

a. Inspection Scope

On December 30, 2005, the licensee entered the Unit 2 drywell with the reactor at power in an effort to determine the cause of a 125 Vdc ground on the 3D ERV solenoid circuitry. Prior to the drywell entry, the inspectors attended various meetings to ensure that nuclear and radiological safety were maintained as required by regulations and procedures, that ERV troubleshooting actions were appropriate, and that the licensee had planned for the need to change reactor power, to insert a reactor scram, or to respond to an inadvertent equipment actuation while personnel were inside the drywell. Based upon the ERV inspection results, the licensee shut down Unit 2 so that the remaining ERV actuators could be inspected. Once the decision to shut down Unit 2 was made, the inspectors observed various portions of the shut down activities from the control room.

The inspectors also performed the following activities daily:

- Attended control room operator and/or outage management turnover meetings to verify that the current shutdown risk status was well understood and communicated
- Performed walkdowns of the main control room to observe the alignment of systems important to shutdown risk
- Reviewed selected issues that the licensee entered into its corrective action program to verify that identified problems were being entered into the program with the appropriate characterization and significance

Additionally, the inspectors observed the following specific activities, as appropriate:

- Shutdown and cooldown to a cold shutdown condition (MODE 4)
- Initiation of the shutdown cooling mode of the residual heat removal system

- Troubleshooting efforts for emergent plant equipment issues
- Reactor startup and power ascension

b. Findings

During a Unit 1 outage in 2003, the licensee found that the pilot line had sheared off of one of the ERVs during the operating cycle. The licensee attributed the pilot line failure to the presence of piping cold spring forces that were introduced during maintenance. Additional inspections of the ERV actuator found significant degradation/galling/gouging of the actuator posts and springs. The licensee concluded that the ERV actuator degradation occurred because the actuator was no longer adequately supported once the pilot line sheared. The licensee replaced the pilot line. The spring and post materials were upgraded to Inconel to prevent future degradation. The licensee also performed shaker table tests of the upgraded valve actuator to verify that ERV actuator degradation would not occur if the units operated at extended power uprate power levels for an entire operating cycle.

Upon removing the Unit 2 3D ERV actuator cover on December 30, 2005, the licensee found significant damage on several of the actuator components. Examples of the degradation included:

- Galling and gouging of the plunger posts
- Deformation of the actuator springs
- One of two limit switches no longer attached to the mounting plate
- One limit switch spacer plate was dislodged from the normal location
- Actuator plunger was partially depressed
- Actuator springs worn into their respective bushings
- Actuator pivot screw was dislodged from its normal location

Due to the amount of degradation present, the licensee concluded that the 3D ERV would not have been able to perform its safety function. The licensee inspected the other three ERV actuators and determined that while the actuators were degraded, the extent of the degradation was less than that observed on the 3D ERV. However, the inspectors were concerned about the amount of degradation observed since the licensee's previous testing indicated that significant ERV actuator degradation would not occur.

Based upon the ERV actuator degradation identified in 2005, it appeared that the licensee's previous test results and analysis were in error. The licensee initiated Issue Report 437858 to document this issue. Immediate corrective actions included replacing the Unit 2 ERV actuators, reducing Unit 1 power to pre-extended power uprate power levels, and scheduling an outage in early January to inspect the Unit 1 ERV actuators.

At the conclusion of the inspection period, the licensee had returned Unit 2 to service at pre-extended power uprate power levels. The licensee was also continuing their investigation to determine why the Unit 2 ERV actuators had degraded. The licensee planned to provide the NRC with the results of their investigation before increasing reactor power on either unit. Based upon the above information, the NRC's was unable

to determine whether a licensee performance deficiency had resulted in the ERV degradation. As a result, this item is considered unresolved pending a review of the licensee's investigation report **(URI 05000254/2005006-03; 05000265/2005006-03)**.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed the surveillance testing activity and/or reviewed completed surveillance test package for the test listed below:

- QCOS 6500-09 - Functional Test of Unit 1 Second Level Undervoltage (Bus 13-1)

The inspectors verified that the structures, systems, and components tested were capable of performing their intended safety function by comparing the surveillance procedure or calibration acceptance criteria and results to design basis information contained in Technical Specifications, the Updated Final Safety Analysis Report, and licensee procedures. The inspectors verified that each test or calibration was performed as written, the data was complete and met the requirements of the procedure, and the test equipment range and accuracy were consistent with the application by observing the performance of the activity. Following test completion, the inspectors conducted walkdowns of the associated areas to verify that test equipment had been removed and that the system or component was returned to its normal standby configuration. This inspection represented the completion of one sample.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES

4OA1 Performance Indicator Verification (71151)

Cornerstones: Occupational and Public Radiation Safety

.1 Radiation Safety Strategic Area

a. Inspection Scope

The inspectors sampled the licensee's Performance Indicator submittals for the periods listed below. The inspectors used PI definitions and guidance contained in Revision 3 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline," to verify the accuracy of the performance indicator data. The following performance indicators were reviewed:

- Occupational Exposure Control Effectiveness: Units 1 and 2

The inspectors reviewed the licensee's assessment of the performance indicator for occupational radiation safety, to determine if indicator related data was adequately assessed and reported during the previous four quarters. The inspectors compared the licensee's performance indicator data with the issue report database, reviewed radiological restricted area exit electronic dosimetry transaction records, and conducted walkdowns of accessible locked high radiation area entrances to verify the adequacy of controls in place for these areas. Data collection and analysis methods for performance indicators were discussed with licensee representatives to determine if there were any unaccounted for occurrences in the Occupational Radiation Safety performance indicator as defined in Revision 3 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline." This review represented one sample.

- Radiological Environmental Technical Specification/Offsite Dose Calculation Manual (RETS/ODCM) Radiological Effluent Occurrences: Units 1 and 2

  The inspectors reviewed data associated with the RETS/ODCM performance indicator to determine if the indicator was accurately assessed and reported. This review included the licensee's condition report database for the previous four quarters, to identify any potential occurrences such as unmonitored, uncontrolled or improperly calculated effluent releases that may have impacted offsite dose. The inspectors also selectively reviewed gaseous and liquid effluent release data and the results of associated offsite dose calculations and quarterly performance indicator verification records generated over the previous four quarters. Data collection and analyses methods for performance indicators were discussed with licensee representatives to determine if the process was implemented consistent with industry guidance in Revision 3 of Nuclear Energy Institute Document 99-02, "Regulatory Assessment Performance Indicator Guideline." This review represented one sample.

b. Findings

No findings of significance were identified.

4OA2 Identification and Resolution of Problems (71152)

.1 Routine Review of Identification and Resolution of Problems

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," and in order to help identify repetitive equipment failures or specific human performance issues for follow-up, the inspectors performed screening of all items entered into the licensee's corrective action program. This was accomplished by reviewing the

description of each new issue report and attending daily meetings when needed. Minor issues entered into the licensee's corrective action system as a result of the inspectors' observations are included in the list of documents reviewed which is attached to this report.

b. Findings

No findings of significance were identified.

.2 Semi-Annual Trend Review

a. Inspection Scope

As required by Inspection Procedure 71152, "Identification and Resolution of Problems," the inspectors performed a review of the licensee's issue reports to identify trends that could indicate the existence of a more significant safety issue. The inspectors' review was focused on repetitive equipment and corrective maintenance issues but also considered the results of daily inspector issue report screenings. The review also included issues documented outside the normal corrective action process such as system health reports, common cause analyses, trending reports, quality assurance assessments, performance indicators, maintenance rule assessments, and maintenance backlog lists. The inspectors' review nominally considered the 6 month period of June through December 2005. The inspectors compared and contrasted their results with the results obtained by the licensee during previous internal reviews.

b. Findings

No findings of significance were identified.

.3 Review of Licensee's Response to Electrohydraulic Control System Issues

Introduction

On April 19, 2005, operations personnel were performing Unit 1 startup activities following refueling outage 18. Approximately 2 hours after synchronizing the main generator with the electrical grid, the main turbine experienced increased bearing vibrations. The control room operators reduced turbine loading in an effort to lower the vibrations. During the load reduction, the operators identified that the turbine bypass valves failed to operate as expected. This resulted in the operators manually tripping the main turbine prior to the turbine automatically tripping on reverse power. The licensee initiated Issue Report 326110 and initiated a prompt investigation to ensure the details regarding this event were appropriately captured and corrected.

a. Evaluation of Issues

(1) Inspection Scope

The inspectors performed the following activities to better understand the event and assess the licensee's evaluation of the issues:

- Reviewed the information provided in Issue Report 236110
- Attended multiple meetings regarding the status of the prompt investigation, equipment troubleshooting, and equipment repair
- Interviewed operations personnel on-shift during the event
- Interviewed individuals involved in performing the prompt investigation and equipment troubleshooting
- Reviewed system lesson plans, control room logs, strip chart data, and troubleshooting plans
- Discussed the details of the event with a systems training instructor at the NRC's Technical Training Center
- Reviewed the results of the licensee's prompt investigation report

(2) Issues

The inspectors determined that additional measures should have been implemented to ensure that the issues surrounding the April 19 event were appropriately evaluated. For example, the on-shift operations crew provided information regarding the event details to the prompt investigation team. However, no one requested that the crew members put their observations in writing to aid the investigation team. In addition, the licensee did not have records which showed that the operating crew members were formally interviewed as part of the investigation process. Lastly, licensee management failed to recognize the potential value in assigning a member of the operations staff to the prompt investigation team. These weaknesses contributed to the licensee failing to fully understand the electrohydraulic control system's (EHC) performance until approximately 1 one month after the event. As a result, the licensee missed an opportunity to perform additional troubleshooting activities, identify the cause of the event, and implement appropriate corrective actions.

The licensee's prompt investigation report for this event was approved on April 25. The inspectors reviewed the report and were concerned that the apparent cause was attributed to a lack of knowledge by operations personnel regarding the response time of the EHC system during load shedding. The inspectors' concern was based upon discussions with an NRC systems training instructor which concluded that a system malfunction had occurred. The inspectors discussed this concern with operations management and during multiple weekly debriefings with senior station management.

In May 2005, the inspectors had additional discussions with members of the operations crew that were on-shift during the April 19 event. During these discussions, the inspectors made the operators aware of the prompt investigation report results. The inspectors received immediate feedback from the operators indicating that the prompt investigation results were incorrect. The shift manager told the inspectors that he would

personally contact the appropriate individuals to ensure that EHC system performance on April 19 was understood. The inspectors informed operations management about this discussion the following day. Operations management informed the inspectors that a meeting between the operations' crew and a prompt investigation team member was planned to discuss the contents of the prompt investigation report and the draft apparent cause report since these personnel had not met face to face as part of the prompt investigation process. The inspectors were concerned regarding the lack of timeliness for this meeting since approximately 4 weeks had elapsed between the event and the date of the meeting.

On May 23, 2005, a member of the prompt investigation team initiated Issue Report 337826. Through this issue report the inspectors learned that the licensee had determined that the conclusions drawn in the prompt investigation report were incorrect. Specifically, the licensee learned through subsequent discussions with the on-shift operations crew that the April 19 event occurred due to an EHC system malfunction rather than due to operator error (as previously believed). The licensee closed this issue report to a work request to ensure the additional troubleshooting and possible repairs were completed during the June 2005 steam dryer replacement outage. The inspectors noted that the licensee failed to assign any corrective actions to address why the prompt investigation team's initial conclusions were incorrect. The inspectors discussed the lack of corrective action assignments with licensee management several times between May 23 and July 21, 2005. However, little was done to address this process issue.

During this inspection period, the inspectors questioned licensee personnel to determine if any actions had been taken to address the process issue identified in May 2005. The inspectors learned that no actions had been taken. The inspectors performed an additional review of the prompt investigation report to determine whether the apparent cause information had been corrected. Through this review, the inspectors discovered that the prompt investigation report still contained information stating that the April 19 event was due to operator knowledge deficiencies. The inspectors held subsequent discussions with corrective action program personnel, prompt investigation team personnel, and operations personnel. Following these discussions, a member of the prompt investigation team initiated Issue Report 431850 to ensure that the incorrect information was corrected and that actions were taken to determine why an incorrect apparent cause was initially determined. These actions were ongoing at the conclusion of the inspection period.

b. Effectiveness of Corrective Actions

(1) Inspection Scope

The inspectors conducted interviews and reviewed multiple corrective action documents to determine if the licensee's corrective actions were appropriate.

(2) Issues

The inspectors concluded that the licensee's corrective actions for the April 19 event were not fully effective. Specifically, the lack of a robust implementation of the prompt investigation process resulted in the development of an incorrect apparent cause and a missed opportunity to perform additional troubleshooting and repairs. While the inspectors acknowledged the licensee's installation of monitoring instrumentation on the EHC system, obtaining the information discussed above from the operation's crew and a review of this event by an independent party could have prompted the performance of additional troubleshooting or the installation of additional instrumentation. In turn, these actions may have prevented or helped identify the cause of a subsequent EHC related reactor scram on June 17, 2005.

The inspectors reviewed the licensee's actions following the June 17 reactor scram and concluded that the actions were comprehensive. Although the cause of the scram was unable to be determined, the licensee used the previously installed monitoring equipment to identify six suspect circuit cards. These cards were removed from service and sent to an independent laboratory for additional testing. No obvious deficiencies were identified. The licensee also provided recent EHC system performance and troubleshooting information to an independent third party for additional review. While the third party recommended additional actions to the licensee, the third party was also unable to determine the cause of the scram. Unit 1 has not experienced any additional EHC system malfunctions.

.4 Review of Seismic Alarm Function at Site

Inspection Scope

For the past several years the site has responded to actual or apparent seismic events either felt on-site or recorded by a seismic recording device located on-site. The inspectors reviewed, compared, and contrasted the licensee's response, including personnel response, procedure implementation, and procedural adequacy against the regulatory and procedural requirements to ensure the licensee's responses to actual or apparent seismic events were appropriate.

Issues

On June 28, 2004, the licensee entered an Unusual Event due to seismic activity felt on-site. The seismic event epicenter was located approximately 100 miles east of the site as determined by the United States Geological Survey. The inspectors verified that the site entered the appropriate emergency plan and off-normal procedures. Various system walkdowns were completed to verify safety related and non-safety related systems were not damaged due to the seismic activity. The inspectors performed independent walkdowns to verify that systems were not damaged. The inspectors noted that although the seismic event was felt on-site, the seismic recording device did not detect the event. The device was subsequently tested and was found to be functioning properly. The licensee initiated Issue Report 231936 to document the occurrence and actions taken.

On June 20, 2005, the seismic recording device recorded an apparent seismic event. Coincidentally, a minor seismic event (magnitude 3.6 on the Richter Scale) was documented by the United States Geological Survey several hundreds of miles from the site in western Kentucky. The licensee downloaded data from the seismic recording device and concluded that the recording device had not actuated due to an actual seismic event. Normally the device would record a series of sinusoidal waves that increased and decreased with the intensity of the event. The recorded event was one sharp high amplitude spike. Based on the recorded amplitude, the seismic event should have been felt onsite and would have caused damage (recorded as 0.788 g's). However, no seismic activity was felt by personnel onsite. The probable event recorded was due, in all likelihood, to an accidental bumping of the device. The licensee initiated Issue Report 347036 to document the event. The licensee evaluated the procedures and its response associated with a seismic event and identified the following discrepancies:

- The site procedure and recording device time stamp were in conflict (Universal time vs. local time)
- A lack of communication resulted in the instrumentation department performing a functional test 2 days after the recorded event
- The operator's rounds procedure used to check the seismic recording device instructed operators to look for a solid red light to identify that a seismic event was occurring. However, the procedure did not instruct the operator that a red flashing light indicates that a seismic event had occurred and was recorded. Based on the lack of instruction, 1 day elapsed prior to operations personnel identifying the apparent seismic event.

During the course of the review the inspectors determined and were concerned that the licensee relied on routine operator rounds to determine if the seismic recording device was activated. The seismic recording device is located in the sub-level of the turbine building and no seismic alarm exists in the control room. The reliance on periodic operator rounds to determine the activation of the seismic recorder could impact the licensee's timely response to and notification of seismic activity felt onsite. Although the inspectors were concerned that a seismic alarm did not exist in the control room, the inspectors determined through document reviews that the licensee was authorized to operate without seismic alarms in the control room. Based upon this information, the inspectors concluded that although the licensee's problem identification was lacking in some aspects, the activities associated with resolution appeared appropriate.

4OA3 Event Followup (71153)

.1 Cancellation of Licensee Event Report 50-254/05-004-00; 50-265/05-004-00 and Retraction of Event Notifications 41652 and 41766

On April 29, 2005, Quad Cities Power Station contacted the NRC to report that both offsite power sources were inoperable due to the predicted post-loss of coolant accident bus voltages being below the required values (see Event Notification 41652). An identical condition resulted in the submittal of Event Notification 41766 on June 11, 2005. On June 28 the licensee submitted Licensee Event Report 2005-004 to

document the details surrounding Event Notification 41652 as required by 10 CFR Part 50.73. Since that time, the licensee completed an evaluation which showed that the required post-loss of coolant accident bus voltages were overly conservative. Specifically, the previous values were calculated based upon both units experiencing simultaneous loss of coolant accidents. However, current NRC regulations only required the licensee to assume a loss of coolant accident on one unit while the other unit remained at its previously assumed power level. The resident inspectors and Region III electrical specialists performed an in-office review of the licensee's evaluation. The resident inspectors also discussed the results of the analysis with the licensee's electrical design engineers. The inspectors and the specialists concluded that the licensee's evaluation, and the subsequent revision of the post-loss of coolant accident bus voltages, was appropriate since the evaluation more accurately reflected the bus voltages available following a loss of coolant accident. Based upon this conclusion, the inspectors determined that the report cancellation and notification retractions were appropriate.

.2 (Closed) Licensee Event Report 05000254/05-005, Automatic Reactor Scram from High Reactor Pressure due to a Malfunction of the Electrohydraulic Control System

On June 17, 2005, the Unit 1 reactor automatically scrammed from 85 percent power due to experiencing a large increase in reactor vessel pressure. The maximum reactor vessel pressure reached during the event was 1044 psig. The licensee determined that the reactor vessel pressure increased due to an electro-hydraulic control system malfunction which resulted in the closing the main turbine control valves. Following this event, the inspectors interviewed operations, engineering, and maintenance personnel regarding the event details. The inspectors also monitored the licensee's troubleshooting and repair efforts to ensure that these activities were thorough, complete, and performed in accordance with the licensee's procedures. Based on the results of the troubleshooting efforts, the licensee concluded that the malfunction initiated in one of six control valve input circuit cards. All six cards were subsequently replaced. Additional laboratory analysis of the six suspect circuit cards was unsuccessful in determining the malfunction's actual cause. The inspectors reviewed the licensee's analysis process, laboratory test reports, and a third party assessment report to ensure that the circuit boards were subjected to the appropriate tests. No concerns were identified. Since the actual cause of the reactor scram was not identified, the inspectors were unable to determine if a performance deficiency occurred. As a result, no findings of significance or violations of NRC requirements were identified.

.3 (Closed) Licensee Event Report 05000254/05-002-01, Trip of Unit 1 Division 1 4kV Emergency Bus Feed to 480 Vac Emergency Buses in Both Divisions Due to Ineffective Previous Corrective Actions

During a review of the original licensee event report, the inspectors identified that the licensee had not indicated that this event was also applicable to Unit 2. On December 8, 2005, the licensee submitted a revised licensee event report for this issue which clearly identified that the event was applicable to both Unit 1 and Unit 2. The inspectors reviewed the report revision and had no concerns.

4OA5 Other Activities

.1 Review of Institute of Nuclear Power Operations Reports

The inspectors completed a review of the final report for the Institute of Nuclear Power Operations, December 2004 Evaluation, dated September 1, 2005.

The inspectors also completed a review of the final report for the Institute of Nuclear Power Operations, September 2005 Training Accreditation Visit.

.2 TI 2515/161 - Transportation of Reactor Control Rod Drives in Type A Packages

a. Inspection Scope

Through inspection and interviews of cognizant personnel, the inspectors examined site specific records pertaining to the licensee's use of Department of Transportation Specification 7A Type A packaging for the shipment of Control Rod Drive Mechanisms for the period between 2002 and the present. Licensee representatives and inspectors examined records for the purpose of determining the licensee's compliance with Department of Transportation requirements for transportation contained in 49 CFR Parts 173.412 and 173.415. The inspectors verified that Quad Cities Nuclear Generating Station had undergone refueling activities between January 1, 2002, and the present and that it had shipped irradiated control rod drives in Department of Transportation Specification 7A, Type A packaging.

b. Findings and Observations

No findings of significance were identified.

Title 10 CFR 71.5 required that NRC licensees comply with all applicable rules and regulations of the Department of Transportation when transporting Class 7 materials. Department of Transportation regulations contained in 49 CFR 173.415(a) required that the shipper of a Specification 7A package have available complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction comply with Specification 7A. Contrary to this requirement, Quad Cities Nuclear Generating Station shipped Class 7 materials, i.e., control rod drives, in Specification 7A packaging in the year 2002 and 2004 without having available documentation supporting the Specification 7A classification of the package. This issue represented a violation of minor significance and was not subject to enforcement action in accordance with Section IV of the Enforcement Policy. This item has been corrected by the licensee on a corporate wide (Exelon) basis.

Shipping documentation for the five irradiated control rod drive shipments made by the licensee in 2002 and 2004 was reviewed. In each instance, the licensee utilized Specification 7A packaging but did not have available complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, packaging design, and materials of construction complied with

Specification 7A, as required under Title 49, Code of Federal Regulations, Part 173.415(a).

The licensee reused Department of Transportation Specification 7A packages from General Electric, which had been utilized to transport refurbished control rod drives to the licensee in support of refueling outages. The packages were reloaded with used control rod drives which were then transported offsite. A review of these shipments indicated that no packages contained more than four used control rod drives, that the package gross weight did not exceed 7200 pounds, and that all other requirements for the transport of Class 7 material, as specified in 49 CFR Parts 100-177 were met.

This issue was screened in accordance with Manual Chapter 0612, Power Reactor Inspection Reports, Appendix B (Issue Screening). This issue is a performance deficiency, in that the licensee did not meet a requirement (49 CFR 173.415(a)). The issue is not subject to traditional enforcement, in that it did not involve an actual safety consequence, did not have the potential to impact the NRC's ability to perform its regulatory function, and had no willful aspects. The issue is not more than minor in that it cannot be reasonably viewed as a precursor to a more significant event; would not become a more significant safety concern if left uncorrected; is not related to a performance indicator; does not affect the public radiation cornerstone objective of ensuring adequate protection of public health and safety from exposure to radioactive materials released into the public domain as the result of routine civilian nuclear reactor operation; and, does not relate to maintenance risk assessment or risk management. Quad Cities Nuclear Generating Station initiated actions to determine if other Specification 7A packaging were utilized without having the appropriate support documentation available and to determine if any additional shipments of irradiated control rod drives were made in the same Specification 7A packaging in earlier years (prior to 2002). The licensee contacted the package vendor and obtained the required testing documentation. This issue was corrected by the licensee at the corporate level.

.3 Preoperational Testing of an Independent Spent Fuel Storage Installation (ISFSI) (60854)

a. Inspection Scope

Training

The inspectors reviewed the licensee's training program for the use of the Hi-Storm cask. The inspectors reviewed a number of the licensee's Performance Evaluation Sheets for a selected number of individuals to verify that they satisfactorily completed the training. The inspectors also compared training documentation to the licensee's computer database to verify the accuracy of data keeping. In addition, during the observations, the inspectors interviewed the licensee's staff to evaluate their knowledge regarding the objectives of their activities, the process, and the equipment. The inspectors reviewed the training material, including the content of the manuals, visual aids, and techniques used to perform on-the-job training. The inspectors also reviewed the instructors' qualifications and experience.

Quality Assurance

The inspectors reviewed the licensee's Quality Assurance (QA) program, as it applied to the ISFSI. This included a review of select information related to the purchase orders for two components to verify that QA packages were established for both components and that the purchase orders were incorporated the correct manufacturer design specifications. The inspectors selected the Multi-Purpose Canister (MPC) slings and the MPC lift cleats, which were classified as important to safety in the Final Safety Analysis Report (FSAR) for further review. The inspectors also reviewed the calibration records for the vacuum gauges that were used for the vacuum drying operations.

Exelon Nuclear Oversight conducted a QA audit in July 2005 to assess the dry fuel storage project compliance with the Exelon/AmerGen Quality Assurance Topical Report. The inspectors reviewed the licensee's audit report.

b. Findings

No findings of significance were identified.

.4 Preoperational Testing of an Independent Spent Fuel Storage Installation at Operating Plants (60854.1)

a. Inspection Scope

Demonstrations

The inspectors reviewed the loading and unloading procedures to verify that they contained all commitments and requirements specified in the license, the Technical Specifications, the FSAR, and Title 10 Code of Federal Regulations (CFR), Part 72. The inspectors also reviewed the licensee's contingency plan, and compared it against a list of possible failure scenarios and recovery actions to place the cask in a safe configuration.

The inspectors observed licensee personnel perform a number of activities associated with dry fuel storage to demonstrate their readiness to safely load spent fuel from the spent fuel pool (SFP) into the dry cask storage system. The inspectors attended pre-job briefs and post-job critique meetings to assess the licensee's ability to identify deficiencies. The inspectors interviewed personnel to verify that the equipment had been inspected prior to use and the necessary fit up tests were performed to ensure that the equipment was functional. During the demonstrations, inspectors evaluated the adequacy of the operational procedures and verified the staff's familiarity with procedures and the equipment. The inspectors observed the licensee demonstrate its ability to transfer spent fuel from the SFP to the ISFSI and to retrieve spent fuel from a loaded canister and return it to the SFP.

Fuel Selection

The inspectors reviewed the licensee's processes and methods associated with fuel characterization and selection. The inspectors reviewed a completed fuel selection package for the first cask to be loaded during the campaign to verify that the licensee used the criteria specified in the Certificate of Compliance (CoC), the Technical Specifications, and the FSAR to verify the acceptability of assemblies to be loaded in a cask. The inspectors also reviewed the training process used to qualify engineers to select fuel for dry cask storage. The inspectors reviewed the certification guides for a number of individuals and the documentation supporting completion of tasks as specified by the corporate policies and procedures. The inspectors interviewed a large number of licensee staff to verify their knowledge regarding fuel selection, record retention, and NRC notification requirements in the event of an emergency.

10 CFR 72.212 and 10 CFR 72.48 Evaluations

The inspectors reviewed the licensee's 10 CFR 72.212 evaluation and the referenced documents to verify the licensee prepared a written evaluation that demonstrated the conditions set forth in the CoC, FSAR and 10 CFR Part 72 were met. The review of the evaluation included the licensee's detailed evaluation of the dry fuel storage system and its impact on the plant operations and emergency systems. The inspectors reviewed seven 10 CFR 72.48 screenings and/or evaluations pertaining to changes made to the NRC-approved design of the cask. The inspectors also reviewed the licensee's procedure establishing the requirements for preparing, reviewing, approving, and documenting 10 CFR 72.48 screenings and/or evaluations. The inspectors evaluated the 10 CFR 72.48 training process, which included familiarization with the system design and structure, licensing documents, the loading process, and a final examination.

Heavy Loads

The inspectors reviewed the original design basis requirements for the crane as well as several other NRC-approved documents to compare those requirements to the current crane configuration. The Quad Cities reactor building crane was licensed as a 110-ton single-failure-proof crane on January 27, 1977. The crane had been reviewed and licensed to NRC Branch Technical Position APCSB 9-1, "Overhead Handling Systems for Nuclear Power Plants."

The inspectors reviewed the licensee's seismic analysis of the reactor building crane structural components to determine structural integrity of the crane and the supporting structure during an earthquake. The inspectors reviewed recent modifications to the crane supporting structure to verify that the licensee complied with American Welding Society D1.1 standards, including the weld pre and post-heat requirements.

The inspectors reviewed the licensee's brittle fracture assessment report for the reactor building crane. The inspectors reviewed records of visual and NDE inspections conducted in 1989, 1992, and 2003 to assess the condition of the deformations and cracking of the lower beams of the crane support. The inspectors also reviewed the original 125 percent overload test performed on August 31, 1976, as well as

documentation regarding the specifications on the wire rope, the crane hook, and the load block.

The inspectors reviewed the initial load test records, Non-Destructive Examination records, and the visual inspection records associated with the 125-ton Transfer Cask Lift Yoke. The inspectors reviewed documentation related to the MPC slings to verify they were adequately tested and designed for the appropriate load rating and temperature. The inspectors also reviewed documentation for the slings used to move the MPC lid and the associated shackles, shoulder eye bolts, and turnbuckles.

The inspectors reviewed the licensee's maintenance program for the crane to verify the licensee's personnel perform inspections in accordance with industry standards. The inspectors also reviewed procedures associated with operating the crane and training records for two crane operators. The inspectors performed a visual inspection of the crane structure to confirm that the crane had no major structural defects. In addition, the inspectors reviewed 12 Action Recommendation Reports associated with the crane.

Emergency Preparedness and Fire Protection

The inspectors reviewed the licensees's fire analysis report as well as the emergency preparedness plan to verify that the licensee incorporated new Emergency Action Levels to the plant emergency plan to address the possible emergency scenarios, their classification, and recovery actions associated with the storage of dry fuel.

Radiation Protection

The inspectors evaluated the licensee's radiation protection program as it related to the operation of the ISFSI. The inspectors reviewed the As-Low-As-Reasonably-Achievable Plan and the procedures associated with radiation protection safety to verify that all dose rate limits and surveillance requirements contained in the Technical Specifications were incorporated into procedures. The inspectors also reviewed methods of personnel monitoring and survey of the transfer cask, the storage cask, and the pad. The inspectors interviewed the licensee's personnel to verify their knowledge regarding the scope of the work and the radiological hazards associated with transfer and storage of dry fuel.

b. Findings

No findings of significance were identified.

.5 Operation of an Independent Spent Fuel Storage Installation (60855.1)

a. Inspection Scope

The inspectors observed and evaluated the licensee's loading of casks 1 and 2 and the transfer of the casks to the pad to verify compliance with the applicable CoC conditions and associated Technical Specifications. The inspectors reviewed portions of documentation after the licensee completed certain loading activities. Specifically, the

inspectors reviewed the welding records, the vacuum drying and helium leak testing records, as well as the visual and dye penetrant records for casks 1 and 2. In addition, the inspectors reviewed two new 10 CFR Part 72.48 screenings and a number of condition reports that were generated during the loading campaign.

b. Findings

No findings of significance were identified.

4OA6 Meetings

.1 Exit Meeting

The inspectors presented the inspection results to Mr. T. Tulon and other members of licensee management at the conclusion of the inspection on January 10, 2006. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

.2 Interim Exit Meetings

Interim exits were conducted for:

- Occupational and public radiation performance indicators with Mr. T. Tulon on October 25, 2005
- Maintenance Effectiveness Periodic Evaluation with Mr. D. Barker, Work Management Director on October 28, 2005
- Biennial Licensed Operator Requalification Program Inspection with Mr. T. Tulon on November 4, 2005
- Examination Results were obtained from Mr. D. Snook on November 28, 2005
- Independent Spent Fuel Storage Installation with Mr. D. Barker, Work Management Director on September 16, and December 16, 2005

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel
T. Tulon, Site Vice President
R. Gideon, Plant Manager
R. Armitage, Training Manager
D. Barker, Work Control Manager
J. Bartlett, Operations Training Manager
W. Beck, Regulatory Assurance Manager
J. Dolter, Reactor Engineering
M. Dykema, Radiation Protection
T. Hanley, Maintenance Manager
D. Moore, Nuclear Oversight Manager
K. Moser, Engineering Manager
V. Neels, Chemistry/Environ/Radwaste Manager
K. Ohr, Radiation Protection Manager
M. Perito, Operations Manager
W. Purdy, Projects
J. Reiss, Holtec International
L. Ruff, Training
A. Scott, Shift Operations Superintendent
D. Smith, Projects
D. Snook, Licensed Operator Requalification Training Supervisor
J. Van Pelt, Site Maintenance Rule Coordinator
A. Williams, Radiation Protection Supervisor
B. Zanc, Training

Nuclear Regulatory Commission personnel
G. Dick, NRR Project Manager
J. Neurauter, Reactor Inspector, Region III
M. Ring, Chief, Reactor Projects Branch 1
C. Sheng, Senior Materials Engineer, Office of Nuclear Reactor Regulation

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

05000254/2005006-01 05000265/2005006-01	URI	Questions Regarding Crediting of Required Licensed Operator Watches (Section 1R11.7)
05000265/2005006-02	URI	Adequacy of Risk Assessment Associated With Unit 2 Electromatic Relief Valves (Section 1R13)

05000254/2005006-03 05000265/2005006-03	URI	Potential Inoperability of Multiple Electromatic Relief Valves (Section 1R20)

Closed

05000254/05-002-01	LER	Trip of Unit 1 Division 1 4kV Emergency Bus Feed to 480 Vac Emergency Buses in Both Divisions Due to Ineffective Previous Corrective Actions
05000254/05-004; 05000265/05-004	LER	Offsite Power Inoperable Due to Low Predicted Switchyard Voltage
05000254/05-005	LER	Automatic Reactor Scram from High Reactor Pressure due to a Malfunction of the Electro-Hydraulic Control System

Discussed

None

LIST OF DOCUMENTS REVIEWED

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

Section 1R01: Adverse Weather

Issue Report 433852; Battery Room Ventilation Concerns Provided by NRC; dated December 14, 2005
QCOP 0010-01; Winterizing Checklist; Revision 32
Letter from M. A. Jackson to N. J. Kalivianakis; dated August 10, 1984
Calculation VT-10; Heating Load for Unit 1 and 2 Battery Rooms During Station Blackout; Revision 1
Issue Report 346066; Question on Meterological Temperatures Against Design Temperatures; dated June 21, 2005
Issue Report 430589; NRC Identified Concerns with Battery Room Ventilation; dated December 5, 2005
QCOP 0010-02; Required Cold Weather Routines; Revision 20

Section 1R04: Equipment Alignment

QOM 2-1400-10; 2B Core Spray Valve Checklist; Revision 3
QCOP 1400-01; Unit 1(2) Core Spray System Preparations for Standby Operations; Revision 17
QOM ½-7500-01; Unit ½ Standby Treatment Gas System Valve Checklist; Revision 5
QCOP 7500-01; Unit 1(2) Standby Gas Treatment System Standby Operations and Start-up; Revision 18
QCOP 7500-02; Standby Gas Treatment System Shutdown; Revision 14
Issue Report 367434; RBCCW Heat Exchanger Loss of Service Water Flow; dated August 27, 2005
QCOA 3700-01; RBCCW Low Pressure; Revision 4
QCOP 3700-02; RBCCW System Startup and Operation; Revision 19
QOM 1-3700-01; Unit 1 RBCCW Valve Checklist (Outside the Drywell); Revision 8
QOM 2-3700-01; Unit 2 RBCCW Valve Checklist; Revision 6
Drawing M33; Diagram of Reactor Building Closed Cooling Water System; Unit 1 Sheets 1 and 2; Revision AO/F
Drawing M75; Diagram of Reactor Building Closed Cooling Water System; Unit 2 Sheets 1 and 2; Revision AK/C
Schematic 4E-1397; Schematic Control Diagram Reactor Building Cooling Water Pumps; Unit 1; Revision L
Schematic 4E-1398; Schematic Control Diagram Reactor Building Cooling Waster System MOV's; Unit 1; Revision G
QOM 1-1400-10; Unit 1 B Core Spray Valve Checklist; Revision 4

Section 1R05: Fire Protection

Fire Hazards Analysis for Quad Cities Unit 1 and 2
Pre-Fire Plans:

Fire Zone 8.2.8.A; Unit 1 Turbine Building Motor Generator Set 1B;
Fire Zone 11.2.2; Unit 1 Reactor Building 554 Feet Elevation, 1B Residual Heat Removal System Room;
Fire Zone 1.1.1.6; Unit ½ 690 Feet Elevation, Refuel Floor;
Fire Zone 1.1.2.2; Reactor Building 595 Feet Elevation;
Fire Zone 8.2.6.A; Unit 1 Turbine Building 595 Feet Elevation, Feedwater Pump Room;
Fire Zone 8.2.8.D; Unit 2 Turbine Building 639 Feet Elevation, 2A Motor Generator Set;
Fire Zone 11.1.4; Unit 2 Reactor Building 554 Feet Elevation, High Pressure Coolant Injection System Pump Room
Fire Zone 8.2.8.E; Unit 1 Turbine Building 639 Feet Elevation, Main Turbine Floor; and
Fire Zone 8.2.8.E - Unit 2 Turbine Building 639 Feet Elevation, Main Turbine Floor

Section 1R11: Licensed Operator Requalification

Quad Cities 2005 Fourth Quarter Performance Indicator Drill; Revision 0
QGA 100; RPV Control; Revision 7
QGA 200; Primary Containment Control; Revision 8
QGA 500-1; RPV Blowdown; Revision 11
8 Licensed Operator Medical Records
20 Senior Reactor Operator and 20 Reactor Operator Written Questions for the Biennial Comprehensive Written Examination and 20 Senior Reactor Operator and 20 Reactor Operator for the Biennial Static Exam
Inspection Report 05000254/2004010; 05000265/2004010
Inspection Report 05000254/2003013; 05000265/2003013
2 Simulator Crew Evaluation Reports
6 Job Performance Measures
13 Malfunction Test (MF) Procedures/results
Current MF Testing Schedule
19 Simulator Work Requests Related to MF and Certification Discrepancies
Boiling Water Reactor Core Performance Testing for Q1C19 Data Compared to the Modeled Core
4 Most Recent Simulator Certification Reports
Simulator Baseline Data Collection for Simulator Testing
Simulator Review Board Minutes and Actions Taken for 2005
List of Differences Between the Quad Cities Simulator and Quad Cities Units 1 and 2
Quad Cities' Exelon Simulator Minor Maintenance Report; June 3 to November 3, 2005
Q1R18 Simulator Photo Comparison Results
2 Simulator Scenarios for the Current Requalification Exam
Licensee's Response/Justifications for IP 71111.11; Appendix C
Action Request 00393341; "Exam Security Near Miss During NRC IP 71111.11 Inspection"
13 TQAA 210-4101; "Remedial Training Notification and Action or Failure," Forms
LS-AA-126-1001; "Focused Area Self-Assessment Report," NRC 71111.11 Pre-Inspection"; Revision 3; dated June 16, 2005
Training Advisory Committee and Curriculum Review Committee Meeting Minutes for 2005

TQ-AA-10600102; "Licensed Operator Requal Training Classroom Attendance Sheets," Revision 0, for 2004 and 2005

Section 1R12: Maintenance Rule Implementation

Maintenance Rule Periodic Refueling Assessment; May 1, 2000 to May 1, 2002
Maintenance Rule Periodic Refueling Assessment; May 1, 2002 to May 1, 2004
Maintenance Functional Failures from May 2002 to May 2004; dated December 2004
Quad Cities Station Maintenance Rule Performance Criteria; dated October, 2005
Maintenance Rule Category (a)(1) List from 2000 to 2005; dated August 2005
Maintenance Rule (a)(1) Action Plan for 4160 Vac Switchgear; dated February 2003
Maintenance Rule (a)(1) Action Plan for Reactor Feedpump HVAC; dated November 2003
Maintenance Rule (a)(1) Action Plan for 480 Vac; dated February 2005
Expert Panel Meeting Minutes; dated September 26, 2002
Expert Panel Meeting Minutes; dated February 13, 2003
Expert Panel Meeting Minutes; dated March 11, 2004
Health and Status Reports for 480 Vac System, 4160 Vac System, Reactor Feedwater Pump HVAC; and Emergency Diesel Generator; dated September 2005
Issue Report 111721; Reactor Feedwater Pump Ventilation; dated June 12, 2002
Issue Report 132397; Agastat Time-Delay Relay - Coil Lead Solder Connection Issue; November 20, 2002
Issue Report 275607; MO-1-1001-26A would Not Open During QCOS 1000-09; dated November 22, 2004
ER-AA-310-1003; Maintenance Rule - Performance Criteria Selection; Revision 3
ER-AA-310-1004; Maintenance Rule - Performance Monitoring; Revision 3
ER-AA-310-1005; Maintenance Rule - Dispositioning Between (a)(1) and (a)(2); Revision 2
ER-AA-310-1007; Maintenance Rule - Periodic (a)(3) Assessment; Revision 3
AT-296876-05; MRule Biennial Inspection Check-In Self-Assessment Report, dated October 7, 2005
NF-AA-430; Failed Fuel Action Plan; Revision 2
Expert Panel Meeting Minutes; Status Report for Reactor Fuel; dated October 13, 2005
Issue Report 378095; Fuel Failure on Quad Unit 2; dated September 26, 2005

Section 1R13: Maintenance Risk Assessments and Emergent Work Evaluation

Work Week Safety Profiles for the Weeks of October 10 - 16, October 17-23, and November 7 -12, 2005
Daily Production Schedules; dated October 10 - 16, October 17-23, and November 7-12, 2005
Issue Report 390185; 1B Feedwater Regulator Valve Fluctuations Resulting in Feedwater Regulator Valve Lockup; dated October 25, 2005
Issue Report 433595; Lost Parts as Found on Check Valve SSMP 0-2901-5; dated December 13, 2005
Issue Report 434290; Comprehensive Impact Review of SSMP Check Valve Lost Parts; dated December 15, 2005
Engineering Change 358600; Quad Cities Lost Parts Evaluation SSMP Check Valve 0-2901-5; dated December 14, 2005
Engineering Change 358623; Evaluation of Impact of Lost Parts from SSMP Check Valve 0-2901-5; dated December 14, 2005

Quad Cities Inservice Testing Bases Document for Valve 0-2901-004
American Society of Mechanical Engineers OMa Code Subsection ISTC; Inservice Testing of Valves in Light-Water Reactor Power Plants; 1996 Edition
American Society of Mechanical Engineers OM-10; Inservice Testing of Valves in Light Water Reactor Power Plants; 1988 Edition
Issue Report 435858; Unit 2 D ERV Declared Inoperable/Unplanned 14 Day LCO; dated December 21, 2005
Risk Assessment for Unit 2 3D ERV Inoperability

Section 1R14: Non-Routine Evolutions

QCOS 5750-02; Control Room Emergency Filtration Systems Test; Revision 34
Control Room Operator Logs; dated November 30, 2005
QOA 5750-15; Complete Loss of Control Room HVAC; Revision 8
Issue Report 429064; B Train HVAC Air Compressor Failed; dated November 30, 2005
Equipment Outage Report for Control Room Emergency Ventilation Air Conditioning System; dated November 30, 2005
Prompt Investigation Report for Issue Report 429604; dated December 2, 2005
3D ERV Outage Team Reports
3D ERV Ground - Repair and Troubleshooting Status Report
Work Order 776224; Contingency to Investigate/Repair Ground on Unit 2 125 VDC System
Issue Report 436239; Damaged Terminal Board in 2-2202-5 Panel; dated December 21, 2005
Issue Report 435857; Unit 2 125 VDC Ground Returned to Level III Criteria; dated December 21, 2005
Issue Report 435795; 125 V Ground in Auto Blowdown Main Feed; dated December 20, 2005

Section 1R15: Operability Evaluations

Issue Report 386940; Steam Leak in Unit 1 High Pressure Coolant Injection System; dated October 17, 2005
Issue Report 382474; ½ B Control Room Ventilation Fan has a Bent Shaft; dated October 5, 2005;
Issue Report 399518; Unit 2 Reactor Core Isolation Cooling System Vent Verification Exceeded No Flow Time; dated November 16, 2005
LS-AA-105; Operability Determinations; Revision 1

Section 1R16: Operator Workarounds

Operator Challenge 05-003; Off Gas Filter Building HVAC System Issues; dated April 27, 2005;
Operator Challenge 05-014; CCST/CST Heater Breakers Trip During Surveillance Testing; dated July 28, 2005
Operator Work Around 04-013; Degraded Switchyard Voltage Issues and Transformer Loading Concerns During a LOCA; dated October 11, 2004
Operator Challenge 05-010; 1B MSDT to 1D2 Heater Normal Level Control Valve Operates in the 30 to 100 Percent Range; dated June 24, 2005
Operator Work Around 03-002; Unit 2 Feedwater Heater Issues; dated January 30, 2003
Operator Work Around 04-014; Degraded Switchyard Voltage Issues and Transformer Loading Concerns During a LOCA; dated October 11, 2004

Operator Challenge 05-013; Unit 2 Reactor Feed Pump Vent Fan Damper Needs Manual Assistance to Operate; dated July 28, 2005
Operator Work Arounds 04-011 and 04-012; Compensatory Measures Required to Maintain Remote Isolation Capability of the RCIC Suction Valves to Meet NUREG 0737; dated August 26, 2004
Operator Challenge 05-011; Unit 1 Relay Chatter During Start-up/Shutdown; dated July 28, 2005
Operator Challenge 02-004; Unit 2 Low Flow Feedwater Regulator Valve Overlap Appears to be Causing Low Flow FWRV to Cycle Between 50-100 Percent During Start-up and Shutdown of the Unit; dated April 16, 2002
Issue Report 227718; Review RCIC System Design and Licensing Basis, NUREG 0737; dated October 6, 2004
Issue Report 244262; OWA Review for Defeating RCIC Suction Valve Swap Logic; dated September 12, 2004
QCOP 2300-09; Bypassing HPCI and RCIC High Torus Level Automatic Suction Transfer; Revision 4
QCOP 1300-06; Defeating RCIC Suction Automatic Transfer to Torus; Revision 0
OP-AA-102-103; Operator Work-Around Program; Revision 1

Section 1R19: Post Maintenance Testing

QCTS 0430-02; SBGT System In-Place DOP Leak Test of the HEPA Filters, Unit ½; Revision 7
QCOS 7500-05; SBGT System Monthly Operability Test, Unit ½; Revision 26
QCOS 7500-06; SBGT System Power Operated Valve Test, Unit ½; Revison 19
Work Order 184619; ½ B SBGT System Demister Differential Pressure Out of Band for QCOS 7500-05; dated July 28, 2005
TIC 1320; Modification test for EC 350636; dated October 26, 2005
QCOS 1300-06; RCIC System Power Operated Valve Test; Revision 24
QCOS 1300-05; Quarterly RCIC Pump Operability Test; Revision 38
Issue Report 386791; Lost Light Indication for Torus Vacuum Relief Valve 2-1601-20B; dated October 17, 2005
QCOS 1600-14; Pressure Suppression System Power Operated Valve IST Testing (Unit 2); Revision 20
Work Order 833770; Lost Light Indication for Torus Vacuum Relief Valve 2-1601-20B; dated October 17, 2005
Work Order 725412; Unit 1 A RHR Room Cooler Fan Maintenance; dated November 9, 2005
Work Order 858313 - Steam Leak on Unit 1 High Pressure Coolant Injection System Steam Drain Line; dated October 18, 2005
QCOS 5750-02; Control Room Emergency Filtration Systems Test; Revision 34
Control Room Operator Logs; dated December 5, 2005
QCOS 2900-01; Safe Shutdown Makeup Pump Flow Test; Revision 29

Section 1R20: Refueling and Outage Activities

Initial ERV Inspection Results; dated December 30, 2005
Issue Report 437638; 2-0203-3D ERV Inspection; dated December 30, 2005
Issue Report 436739; Annunciator SER CRT 'Electrical Relief Valve Open VLV 2-203-3D; dated December 26, 2005

Issue Report 435858; Unit 2 D ERV Declared Inoperable/Unplanned 14 Day LCO; dated December 21, 2005

Section 1R22: Surveillance Testing

QCOS 6500-09; Functional Test of Unit 1 Second Level Undervoltage (Bus 13-1); Revision 15
MA-QC-773-523; Quad Cities NOAD Unit 1 Technical Specification Undervoltage Relay and Degraded Voltage Relay Calibration; Revision 4

Section 4OA1: Performance Indicator Verification

PRP.01; Radiation Protection Performance Indicator Data For 2004-2005; Revision 0
Liquid Releases and Dose Summary Data for October 1, 2004 - October 1, 2005
Gaseous Releases and Dose Summary Data for October 1, 2004 - October 1, 2005
Electronic Dosimeter Transaction Data Greater Than 100 Millirem for 2005

Section 4OA2: Identification and Resolution of Problems

Root Cause Report for Issue Report 345152; dated July 25, 2005
Prompt Investigation Report for Issue Report 345152; dated June 20, 2005
Draft Apparent Cause Report for Issue Report 326110; dated July 14, 2005
Prompt Investigation Report for Issue Report 326110; dated April 25, 2005
Issue Report 431850; Inconsistencies in Issue Documentation; dated December 8, 2005
OP-AA-106-101-1001; Event Response Guidelines; Revision 7
PowerLabs Report QDC-61914; dated August 26, 2005
QCOP 0010-07; Seismograph Event Retrieval; Revision 3
Issue Report 346171; Seismic Event Recorded, Operator Rounds Were Inadequate; dated June 21, 2005
Issue Report 347036; Clarification Regarding Seismograph Issues; dated June 23, 2005
Issue Report 231936; Declared and Unusual Event Earth Quake Felt Onsite by Security; dated June 28, 2004
EP-AA-111; Emergency Classification and Protective Action Recommendations; Revision 10
Letter dated December 29, 1993; from NRC to Mr. D. L. Farrar, Manager of Regulatory Affairs, Commonwealth Edison; Subject Regarding the Safety Evaluation for Proposed Changes to the Emergency Action Levels for Commonwealth Edison's Generating Station Emergency Plan Annexes

Section 4OA5: Other

TI 2515/161: Transportation of Reactor Control Rod Drives in Type A Packages

Container Products Corp. Engineering Documentation; dated December 21, 2004
Container Certification DOT-7A Type A Package # 1349; dated February 19, 2005
Container Certification DOT-7A Type A Package # 1209-S; dated March 4, 2005
Container Certification DOT-7A Type A Package # 1352; dated February 19, 2005

Independent Spent Fuel Storage Installation Inspection Training

Performance Evaluation Completion Sheets
Performance Training and Evaluation Guides
Performance Training Completion Sheets
Training Manual; HI-STORM 100 System Overview; Revision 0

Quality Assurance

Audit Report NOSA-QDC-05-13; Quad Cities Station Independent Spent Fuel Storage Installation; dated August 2, 2005
Certificate of Calibration Certificate # 0010371549; Vacuum Gage with Transducer; dated September 15, 2005
Certificate of Calibration Certificate # 0010371552; Vacuum Gage with Transducer; dated September 15, 2005
Holtec Material Design Specification PS-1209; Purchase Specification for the MPC Cleats; Revision 4
Holtec Material Design Specification PS-1211; Purchase Specification for the MPC Lift Sling; Revision 5
Report NO-AA-10; Quality Assurance Topical Report; Revision 76

Demonstrations

Issue Report 368921; Dry Cask Storage Project - Procedure Changes (from Demo)
QCFHP 0800-01; HI-TRAC Operations Within the Reactor Building; Revision 2
QCFHP 0800-02; Haul Path And ISFSI Dry Run Operations; Revision 1
QCFHP 0800-03; MPC Processes; Revision 1
QCFHP 0800-05; Spent Fuel Cask Abnormal Conditions; Revision 0
QCFHP 0800-63; HI-STORM Inspection; Revision 1
QCFHP 0800-64; Transporter Operations; Revision 0
QCFHP 0800-65; Spent Fuel Cask Site Transportation; Revision 3
QCFHP 0800-68; HI-TRAC Preparation; Revision 1
QCFHP 0800-69; HI-TRAC Movement Within the Reactor Building
QCFHP 0800-70; HI-TRAC Loading Operations; Revision 1
QCFHP 0800-71; MPC Processing; Revision 2
QCFHP 0800-72; HI-STORM Processing; Revision 0
QCFHP 0800-74; Helium Cooldown System Operation and MPC Reflood; Revision 2
QCFHP 0800-75; MPC Receipt Inspection; Revision 0
QCFHP 0800-76; Transporter Undocumented Visual Inspection; Revision 0
QCFHP 0800-78; Vacuum Drying System Operation; Revision 1
QCFHP 0800-79; MPC Alternate Cooling; Revision 0
QCAP 2300-31; Processing 10 CFR 72.212; Revision 0
QCMM 5800-05; RX Bldg Overhead Crane Utilization; Revision 15

Fuel Selection

Engineering Training Certification Guides for ENANRX05; Dry Cask Storage-Select/Doc
Manual L5-AA-1010; Exelon Reportability Reference Manual; Revision 9

Procedure NF-AA-310; Special Nuclear Material and Core Component Movement; Revision 7
Procedure NF-AA-320; Controlling Nuclear Fuel Receipt, Movement to Dry Storage and Shipment; Revision 5
QCTP 0950-02; Holtec MPC Fuel Spacer Matrix; Revision 0
QCTP 0950-03; Fuel Selection and Documentation for Fuel Cask Loading; Revision 0
QCTP 0950-03; Fuel Selection Package; MPC ID No. QDCS01
RM-AA-102; Control of Documents; Revision 4
Training Manual N-QCESPCT; Dry Cask Storage Fuel Selection; dated March 3, 2005

10 CFR Part 72.212 and 10 CFR Part 72.48 Evaluations

10 CFR Part 50.59 Screening No. QC-S-2005-0187; Revision No. 0
10 CFR Part 50.59 Evaluation No. UFSAR-05-R9-017; UFSAR Update for Dry Cask Storage Including Review Against Heavy Loads Program As Required by Cask CoC; Revision 0
72.48 Screening No. 646; Change the weld contour symbol at the weld joining top and bottom of the optional two-piece lid assembly
72.48 Evaluation No. 670; Creation of the dual-purpose lid version of the 100-ton HI-TRAC transfer cask
72.48 Screening No. 705; Gap of 11/16"between the top plate (item 15) and the lid bottom plate (item 25)
72.48 Screening No. 718; Change of the nominal thickness of Metamic neutron absorber panel
72.48 Screening No. 721; Need to fabricate item 34 from two pieces
72.48 Screening No. 749; Change to perform the transfer operation without the top lid on the transfer cask
72.48 Screening No. 750; Change to perform the transfer operation with the pool lid fastened using the bolts tightened without specific torque requirements
Issue Report 364085; Clarification of Regulatory Commitment in NRC Bulletin 96-02
Issue Report 364887; UFSAR Changes for Dry Cask Storage
Issue Report 374128; Exelon Record Retention Schedule Needs Clarification
Procedure QCAP 2300-30; 72.48 Review Process For Dry Cask Storage; Revision 0
Quad Cities Generating Station, Units 1 and 2; 10CFR 72.212 Evaluation Report; Revision 16
Training Module K01; 72.48 Licensing Documents; dated January 2, 2005
Training Module K02; ISFSI System and Component Training; dated January 2, 2005
Training Module K03; Review Process for Dry Cask Storage; dated January 2, 2005

Heavy Loads

AR 00288364; 10CFR21 for 125 Ton Hoist on Reactor Building Crane Issued by Whiting; dated January 6, 2005
AR 00290338; Reactor Building Crane Modification to Restore Rating; dated January 13, 2005
AR 00336485; Was Reactor Building Overhead Crane Overstressed; dated May 18, 2005
AR 00339421; Reactor Building Overhead Crane Sporadic Shutdown; dated May 29, 2005
AR 00339690; Inspect Reactor Building Overhead Crane with Technical Representative Prior to Q2R18; dated May 31, 2005
AR 00344309; Reactor Building Overhead Crane Bridge Limit Switches Do Not Work; dated June 15, 2005
AR 00347096 ;Interface with Load Path Limiter Bracket and Girder Bracket; dated June 24, 2005

AR 00352209; Reactor Building Crane Lost Power During Lift; dated July 9, 2005
AR 00141040; Reactor Building Crane Main Hoist Components Do Not Meet Factor of Safety; dated January 24, 2003
AR 00141628; Reactor Building Steel Connections Don't Match Construction/Shop Drawings; dated January 28, 2003
AR 00142972; Reactor Building and 175 ton Turbine Building Cranes Auxiliary Hoist Bolts Require Replacement; dated February 4, 2003
AR 00148976; Deficiency at the Anchor Bolt for Main Columns; dated March 13, 2003
Component Completion Record No1027-208-10; MPC Lid Lifting Sling, Anc. #208
Component Completion Record Lift Yoke; dated April 5, 2005
Issue Report 336485; Rx Bldg On Crane Overstressed
Issue Report 363943; Reactor Building Overhead Crane UFSAR Requires Clarification
Issue Report 368649; Enhancements to Load Cell Calibration Process
Issue Report 368665; Documentation Inconsistencies with QCFHP 500-16
Issue Report 368859; Reactor Building Overhead Crane Inspections
Issue Report 369290; Wrong PO Number on Vendor C of C
Issue Report 371699; Reactor Building Overhead Crane Lubrication Program
Issue Report 371678; Reactor Building Overhead Crane Not Lubricated as Required
Issue Report 371990; Reactor Building Overhead Crane Rail Clips
Issue Report 373320; Reactor Building Crane Overload Limit
Issue Report 373541; Additional Inspections on the RB Overhead Crane
Issue Report 374118; Discrepancy in Component Completion Record (CCR)
Drawing 4E-6511; Schematic Diagram Reactor Building Crane; Revision 1
Drawing 4E-6515; Electrical Installation Bridge Limit Switches Reactor Building Redundant Crane Unit 1 & 2; Revision C
Design Analysis No. QDC-5800-S-1359; Seismic Analysis of the Reactor Building Main 125 Ton Overhead Structural Components; dated August 4, 2005
Design Analysis No. C10780.26; Evaluation of Critical Load Carrying Crane (RBOC) Components When Handling 125 Tons for Class A Services per CMAA #70 (1971) by Whiting Corporation; dated August 4, 2005
Holtec Report No. HI-2043236; Structural Analysis for 125 Ton Transfer Cask Lift Yoke
Instructions, Provide and Install Load Cell Simulator with the assistance of Fairbanks Scales Tech-Terry Elsbury for the RX Bldg. Crane; dated October 25, 2005
Procedure 5-VII; Load Test of New 125 Ton Redundant Trolley; Revision 1
MA-AA-716-021; Rigging and Lifting Program; Revision 3
MA-AA-716-022; Control of Heavy Loads Program; Revision 0
QCGM-0303-01; Crane Operator Daily Visual Inspection; Revision 4
QCFHP 0500-16; Reactor Building Crane Surveillance Test Prior to Operations in the Restricted Mode; Revision 3
QCEPM 0700-08; Reactor Building Annual Overhead Crane Inspection; Revision 7
QCFHP 0800-69; HI-TRAC Movement Within the Reactor Building; Revision 0
QCFHP 0800-70; HI-TRAC Loading Operations; Revision 1
QCMPM 5800-01; Annual Crane Inspection and Preventative Maintenance Inspection; Revision 8
QCMPM 5800-02; Periodic Inspection and Preventative Maintenance Program for Overhead Cranes, Jib Cranes and Monorail Systems; Revision 20
QCMM 5800-05; Reactor Building Crane Utilization; Revision 15
QCMPM 5800-32; Inspection of Slings; Revision 3

Report No. SL-008250; Brittle Fracture Assessment of the Reactor Building Main 125 Ton Overhead Crane Structural Steel Components and Supporting Runway Girders and Columns; dated August 31, 2005
Site Engineering Services Request No. 4-0093; dated July 21 1989
Site Engineering Services Request No. 4-0973; dated March 24, 1992
Work Order No. 593772; Perform NDE on RB Overhead Crane Bridge Lower Beam Box; dated August 6, 2003

Emergency Preparedness

Issue Report 372711; Potential Enhancements to ISFSI Emergency Actions
EP-AA-1006; Radiological Emergency Plan Annex for Quad Cities Station; Revision 20
S&L Report SL-008202; Fire Hazard Analysis; Revision 1

Radiation Protection

RP-AA-210; Dosimetry Issue, Usage, and Control; Revision 5
RP-AA-300-1001; Discrete Radioactive Particle Controls; Revision 0
RP-QC-303; HI-TRAC Radiation Survey; Revision 0, Draft
RP-QC-304; HI-STORM Radiation Survey; Revision 0, Draft
RP-QC-305; ISFSI Radiation Survey; Revision 0
RP-AA-401; Review ALARA Plan for 2005 Spent Fuel Dry Cask Storage Project; Revision 4

Loading

AR No. 399912; ISFSI Related-71 Needs Clarification
AR No. 399714; Training Required on Dry Cask Storage Tech Specs and Related PR
AR No. 426384; ISFSI Access During Performance of QCOS 9910-01
AR No. 429142; Dry Cask Transporter Suspended Load
AR No. 431394; DSC Multi-Purpose Pump Plastic Pump Housing Cracked
AR No. 431980; Some Operators Didn't Receive ISFSI Familiarization Training
AR No. 432557; Enclosure needed at Entrance E to ISFSI
AR No. 432571; DCS Transporter Engine Block & Fluid Reservoir Heater Trips
AR No. 432565; Dry Cask Storage Transporter Hydraulic Fluid Leaks
AR No. 433719; ½ SBGT LCO Moved for Dry Cask Storage Project
AR No. 433942; Aux Hydraulic Pump Failure on DSC Transporter
AR No. 434282; Scheduled Dry Cask Storage Activities Delayed
Screening No. 72.48-0001; Dimensional Change to Mpc Neutron Absorber and MPC, Installation of an Extra Anti-rotation Bar in MPC 68-130, Addition of a 0.5 Blend Area at the Top of the MPC Lid Weld Area
Screening No. 72.48-0002; Two Piece Construction of HI-STORM 100s Lid Vent Shield, Damage to HI-STORM by Falling from Cart at Production Plant, HI-STORM 100s Lid Fit Problems Due to Shell Top Plate Warping
Work Order 843296-04; FH Perform Dry Cask Loading Operations for First Cask Load
Work Order 843296-05; FH Perform Dry Cask Loading Operations for Second Cask Load
Work Order 843296-13; PCI Weld Cover on First Cask
Work Order 843296-14; PCI Weld Cover on Second Cask

LIST OF ACRONYMS USED

CoC	Certificate of Compliance
CFR	Code of Federal Regulations
DRP	Division of Reactor Projects
DRS	Division of Reactor Safety
EHC	Electrohydraulic Control System
ERV	Electromatic Relief Valve
FSAR	Final Safety Analysis Report
ISFSI	Independent Spent Fuel Storage Installation
MF	Malfunction Report
MPC	Multi-Purpose Canister
NRC	Nuclear Regulatory Commission
PARS	Publically Available Records System
QA	Quality Assurance
RBCCW	Reactor Building Closed Cooling Water
RETS/ODCM	Radiological Environmental Technical Specifications/Offsite Dose Calculation Manual
SFP	Spent Fuel Pool
Vac	Volts Alternating Current
Vdc	Volts Direct Current