June 11, 2001

EA-01-137
EA-01-138

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
Quad Cities Nuclear Power Station
1400 Opus Place, Suite 500
Downers Grove, IL 60515

SUBJECT: QUAD CITIES NUCLEAR POWER STATION
NRC INTEGRATED INSPECTION REPORT 50-254/01-08; 50-265/01-08

Dear Mr. Kingsley:

On May 16, 2001, the NRC completed an inspection at your Quad Cities Units 1 and 2 reactor facilities. The enclosed report documents the inspection findings which were discussed on May 16, 2001, with Mr. Tulon and other members of your staff.

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

Based on the results of this inspection, the inspectors identified one issue of very low safety significance (Green). In addition, the inspectors identified one issue regarding performance indicator reporting which was not quantified in terms of risk (No Color). Both of these issues were determined to involve violations of NRC requirements. However, because they have been entered into your corrective action program, the NRC is treating these issues as Non-Cited Violations, in accordance with Section VI.A.1 of the NRC's Enforcement Policy. If you deny these Non-Cited Violations, you should provide a response with the basis for your denial, within 30-days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-001; with copies to the Regional Administrator, Region III; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-001; and the NRC Resident Inspector at the Quad Cities Nuclear Power Station.

In accordance with 10 CFR 2.790 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/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

/RA/

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

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

Enclosure: Inspection Report 50-254/01-08; 50-265/01-08

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U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos:	50-254; 50-265
License Nos:	DPR-29; DPR-30
Report No:	50-254/01-08; 50-265/01-08
Licensee:	Exelon Nuclear
Facility:	Quad Cities Nuclear Power Station, Units 1 and 2
Location:	22710 206th Avenue North Cordova, IL 61242
Dates:	April 1 through May 16, 2001
Inspectors:	C. Miller, Senior Resident Inspector J. Adams, Resident Inspector J. House, Reactor Engineer T. Madeda, Physical Security Inspector R. Ganser, Illinois Department of Nuclear Safety
Approved by:	Mark Ring, Chief Branch 1 Division of Reactor Projects

SUMMARY OF FINDINGS

IR 05000254-01-08, IR 05000265-01-08, on 04/01 - 05/16/2001, Exelon Nuclear, Quad Cities Nuclear Power Station, Units 1 & 2. Heat sink performance and performance indicator verification.

The inspection was conducted by resident and regional inspectors. This inspection identified one Green issue, and one No Color issue, both of which involved Non-Cited Violations. The significance of most findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter 0609, "Significance Determination Process" (SDP). Findings for which the SDP does not apply are indicated by "No Color" or by the severity level of the applicable violation. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described at its Reactor Oversight Process website at http://www.nrc.gov/NRR/OVERSIGHT/index.html.

Cornerstone: Mitigating Systems

- Green. On June 15, 2000, station personnel removed two of the three rainbow pumps from the site. Quad Cities Updated Final Safety Analysis Report, Section 9.2.5, specifies that portable pumps (called rainbow pumps) of sufficient capacity (5100 gallons per minute) are onsite to provide makeup water to the ultimate heat sink in the event of a Lock and Dam 14 failure on the Mississippi River. The inspectors determined that the licensee had made a change to the facility as described in the Quad Cities Updated Final Safety Analysis Report without first determining if the change required a license amendment, contrary to the requirements of 10 CFR 50.59.

  The failure to meet the requirements of 10 CFR 50.59 was considered a Non-Cited Violation. The risk significance of this event was determined to be very low due to the very small initiating event frequency of the lock and dam failure, the slow rate of event progression once the initiating event occurs, and the availability of other onsite sources of water not credited in the event analysis (Section 1R07).

Cornerstone: Performance Indicator Verification

- No Color. Inspectors found that the licensee reported safety system functional failure data improperly. The three improperly reported safety system functional failures involved failures of the safe shutdown makeup pump, the Unit 2 emergency diesel generator, and Unit 2 intermediate range nuclear monitors.

  Review by the inspectors and by program specialists from the Office of Nuclear Reactor Regulation determined that these three events should have been reported as safety system functional failures. Had these been reported properly in either the January 2001 or April 2001 submittals, the safety system functional failure performance indicator would have shown eight failures for first Quarter 2000 Unit 2 data, and seven failures for fourth Quarter 2000 Unit 2 data which would have indicated performance in the regulatory

response or White band. The actual submittals showed performance indicator data in the licensee response or Green band. Because the information was related to a performance indicator that would have changed from Green to White had the complete information been submitted, this was considered a Non-Cited Violation of 10 CFR 50.9 (Section 4OA1).

Report Details

1. REACTOR SAFETY

Plant Status

Unit 1 entered the period operating at or near full power until April 26, when the unit was shut down for a 3-day maintenance outage. Unit 1 was returned to full power operation on April 29 following the replacement of both reactor recirculation pump seals. Unit 1 operated at or near full power for the remainder of the period, except for minor power decreases for turbine testing and/or control rod positioning.

Unit 2 entered the period operating at or near full power until April 14, when power was reduced to 68 percent to perform planned maintenance, control rod pattern adjustment, and control rod scram time testing. Operators returned Unit 2 to full power operation on April 15. Unit 2 operated at or near full power for the remainder of the period, except for minor power decreases for turbine testing and/or control rod positioning.

1R01 Adverse Weather (71111.01)

a. Inspection Scope

The inspectors evaluated the implementation of Quad Cities Abnormal Procedure (QCOA) 0010-10, "Tornado Watch/Warning or Severe Winds," Revision 9, following the issuance of tornado warnings on May 10, 2001, for an area that included the Quad Cities Station plant site. The inspectors reviewed QCOA 0010-10 and operating logs for May 10, 2001.

b. Findings

No findings of significance were identified.

1R04 Equipment Alignments (71111.04)

a. Inspection Scope

On April 19, 2001, the inspectors verified the system alignment of the number 1 station blackout diesel generator during a period of unavailability of the number 2 station blackout diesel generator. On April 26, 2001, the inspectors verified the system alignment of the accessible portion of the Unit 1A train of core spray during the unavailability of the 1B train of core spray for planned maintenance activities.

The inspectors performed system walkdowns and verified that the component configuration and operating parameters supported the system's ability to perform design functions. The inspectors reviewed design and licensing information, discussed system performance with licensee personnel, and compared as-found conditions to Quad Cities Operating Procedure 6620-05, "Station Blackout Diesel Generator 1(2) Preparation for

Standby Readiness," Revision 7; and Quad Cities Operating Procedure 1400-01, "Core Spray System Preparation for Standby Operation," Revision 12.

b. Findings

No findings of significance were identified.

1R05 Fire Protection Walkdowns (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns of the Unit 1 4160 volt alternating current Buses 13 (Fire Zone 8.2.8.B), and 14 (Fire Zone 8.2.8.A), and the Unit 2 4160 volt alternating current Buses 23 (Fire Zone 8.2.8.D), and 24 (Fire Zone 8.2.8.C). Each of these fire zones contained equipment related to the Mitigating Systems Cornerstone. The inspectors verified the proper control of transient combustibles and ignition sources, the material condition of fire detection and fire suppression systems, the operational lineup of fire detection and fire suppression systems, the maintenance of fire protection equipment, and the material condition and operational status of fire barriers. The inspectors discussed issues associated with the fire zones with the fire marshal, fire protection engineer, and licensee management. The inspectors reviewed the Quad Cities Units 1 and 2 Updated Fire Hazards Analysis, Section 8.2.8.A, "Unit 1 Switchgear Area," Revision 12; Section 8.2.8.B, "Unit 1 Switchgear Area," Revision 12; Section 8.2.8.C, "Unit 2 Switchgear Area," Revision 12; Section 8.2.8.D, "Unit 2 Switchgear Area," Revision 12; and Condition Report Q2001-01183, "Three Fire Doors Discovered Inoperable."

b. Findings

No findings of significance were identified.

1R06 Flood Protection Measures (71111.06)

a. Inspection Scope

The inspectors reviewed the following documents to identify those areas that can be affected by internal or external flooding:

- Sections 2.4.3 and 3.4 of the Updated Final Safety Analysis Report;
- Quad Cities Calculations QDC-1000-M-302, "Unit 1 Residual Heat Removal Supply from the Fire Water Supply System";
- QDC-1000-M-0847, "Use of Fire Water Supply System for External Flood Protection Measures"; and
- QDC-0030-M-0772, "Determination of Allowable Leakage Rates for Residual Heat Removal Service Water Vaults Flood Protection."

The inspectors reviewed Army Corps of Engineers river level records to assess seasonal susceptibilities and patterns for external flooding. The inspectors reviewed Quad Cities Technical Surveillance (QCTS) 0810-10, "Reactor Building Internal Flood Barriers," and

Quad Cities Abnormal Procedure (QCOA) 0010-16, “Flood Emergency Procedure,” to determine internal and external design flood levels for the site and areas of the plant containing equipment important to safety.

The inspectors selected the Unit 1 high pressure coolant injection pump room for a detailed walkdown of flood protection features. The Unit 1 high pressure coolant injection pump room contained a safety-related mitigating system susceptible to flooding from both internal and external sources. During the walkdown the inspectors verified the following:

- equipment below the flood line was sealed;
- no holes or unsealed penetrations in floors and walls existed between flood areas;
- watertight doors between flood areas were maintained and in good material condition;
- common drain system and sumps, including floor drain piping and check valves where credited for isolation of flood areas; and
- that sump pumps and level alarm circuits were operable.

The inspectors reviewed QCTS 0810-010, as performed on October 10, 2000. The test inspected flood protection features in the flood barrier separating the Unit 1 high pressure coolant injection pump room from the Unit 1 suppression pool area.

The inspectors monitored increases in the Mississippi River level at the plant site. The inspectors conducted a walkdown of QCOA 0010-16, “Flood Emergency Procedure,” and verified that the licensee was able to perform the specified actions. The inspectors observed a test of a pump designated to provide makeup water to the fuel pool in the event of an external flood in excess of 594-feet above mean sea level. The inspectors reviewed pump curves to verify that the pump could provide the required flow to the fuel pool.

The inspectors reviewed the corrective actions program data base for past flooding events and documentation of previous NRC findings associated with flood protection. The inspectors verified that the licensee entered problems into their corrective action program and the problems were properly addressed for resolution. The inspectors reviewed the following condition reports:

- Condition Report Q2000-00043, “Failure of 2A RHRSW Vault Sump Pump Discharge Check Valve”;
- Condition Report Q2000-00046, “Failure of 2B RHRSW Vault Sump Pump Discharge Check Valve”;
- Condition Report Q2001-00190, “Weakness in External Flood Response Procedure”;
- Condition Report Q2001-01185, “River Level Indication”; and
- Condition Report Q2001-01193, “Difficulties in Initial Operation of Portable Pump Used for Flood Protection.”

b. Findings

No findings of significance were identified.

1R07 Ultimate Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the design, performance, and maintenance of the ultimate heat sink and continued to resolve concerns with the licensee's ability to provide the required makeup river water flow to the ultimate heat sink in the event of a failure of Lock and Dam number 14 (see Inspection Report 50-254/01-05; 50-265/01-05, Section 1R07.1 and Unresolved Item 50-254/01-05; 50-265/01-05). The inspectors discussed the performance and maintenance of the ultimate heat sink with maintenance and operations personnel, and the availability, maintenance, and performance of the rainbow pumps with the system engineer. The inspectors reviewed the following documents associated with the ultimate heat sink or the rainbow irrigation pumps:

- Quad Cities Abnormal Operating Procedure (QCOA) 0010-14, "Lock and Dam #14 Failure," Revision 3;
- Quad Cities Updated Final Safety Analysis Report, Section 9.2.5;
- 10 CFR 50.59 Screening Form, QC-S-2001-0026, "Revision of Section 9.2.5.2," dated April 6, 2001;
- Operability Determination for Condition Report Q2001-00833;
- Apparent Cause Evaluation for Q2001-00833;
- Condition Report Q2000-00448, "Ice Melt Gate Risk Considerations";
- Condition Report Q2001-00203, "Rainbow Pumps not Kept Onsite";
- Condition Report Q2001-00833, "Trash Rake Partially Blocked by Debris"; and
- Condition Report Q2001-01348, "Ultimate Heat Sink Makeup Sources."

b. Findings

From June 15, 2000, to January 20, 2001, the licensee maintained an insufficient number of the rainbow irrigation pumps on site to provide the pumping capacity specified in Quad Cities Updated Final Safety Analysis Report, Section 9.2.5. The licensee failed to meet the requirements of 10 CFR 50.59 prior to the removal of the pumps from the site. This was considered a Non-Cited Violation of NRC requirements. The removal of the rainbow irrigation pumps from the site was determined to be of very low safety significance (Green).

On January 19, 2001, the licensee discovered that one of the three rainbow irrigation pumps had been removed from the site. This event was entered into the corrective action program with Condition Report Q2001-00203. The licensee recovered the pump from its offsite storage location on January 20, 2001. The licensee's investigation of the event determined that two of the three rainbow pumps were removed from the site on June 15, 2000, to assist a local community with flooding. One of the pumps was returned shortly thereafter. The community requested to keep one of the pumps, and the licensee agreed to the request with the understanding that the pump be maintained and that it could be returned within 24-hours if needed.

The inspectors requested copies of the 10 CFR 50.59 screening or evaluation that provided the bases for the determination that the removal of the rainbow irrigation pumps from the site did not require a license amendment. The licensee indicated that at the time of the pump removal from the site station on June 15, 2000, personnel did not fully understand the requirements associated with the rainbow pumps, and no 10 CFR 50.59 screening or evaluation was performed. However, the licensee provided the inspectors with a copy of 10 CFR 50.59 Screening Form, QC-S-2001-0026, dated April 6, 2001, and a prepared change to the Updated Final Safety Analysis Report, Section 9.2.5.2.

In accordance with 10 CFR 50.59, Paragraph (c)(1), a licensee may make changes in the facility as described in the Final Safety Analysis Report (as updated) without obtaining a license amendment only if the change does not meet the criteria in Paragraph (c)(2). Quad Cities Updated Final Safety Analysis Report, Section 9.2.5, states that in the event of a failure of Lock and Dam number 14 on the Mississippi River, use of the ultimate heat sink to shutdown the reactors requires the operation of portable diesel pumps with a total capacity of 5100 gallons per minute to reverse the normal flow of makeup water and that portable pumps of sufficient capacity are onsite. The three onsite portable pumps designated to perform this function were called the rainbow pumps. All three rainbow pumps were needed to achieve the 5100 gallon per minute capacity. Contrary to the above, on June 15, 2000, the licensee made changes to the facility as described in the Final Safety Analysis Report (as updated) when two of the three rainbow irrigation pumps were removed from the site. The licensee made the change to the facility as described without first determining if 10 CFR 50.59 (c)(2) criteria had been met. Specifically, the licensee failed to ensure that removal of the rainbow irrigation pumps did not result in more than minimal increase in the ability to mitigate the consequences of a failure of Lock and Dam number 14. The failure to meet the requirements of 10 CFR 50.59 was considered a **Non-Cited Violation (50-254/01-08-01; 50-265/01-08-01)**. This violation is being treated as a Non-Cited Violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. The licensee entered the event into the corrective action program with Condition Report Q2001-01384. **Unresolved Item 50-254/01-05-01; 50-265/01-05-01** is closed.

The inspectors reviewed the significance of not maintaining portable pumps of sufficient capacity onsite and determined that the issue was more than a minor issue because it could have a credible impact on safety in the event of a failure of Lock and Dam number 14. Additionally, the inspectors determined that the failure to maintain sufficient pumping capacity onsite could credibly affect the operability and availability of both the residual heat removal systems and the emergency diesel generators, both mitigating systems, and therefore should be evaluated for risk significance by the Significance Determination Process. The inspectors and regional senior reactor analyst screened the issue and determined the risk significance of this event to be very low (Green) due to the very small initiating event frequency of the lock and dam failure, the slow rate of event progression once the initiating event occurs, and the availability of other onsite sources of water not credited in the event analysis.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors reviewed the licensee's implementation of the maintenance rule, including a review of scoping, performance criteria, performance monitoring, expert panel meeting minutes, short-term and long-term corrective actions, and current equipment performance status. The inspectors reviewed the maintenance rule function (Z4100-07) to provide makeup water to the ultimate heat sink to maintain sufficient cooling to the station to permit operation of the residual heat removal service water and diesel generator cooling water pumps when the normal heat sink (the river) is unavailable. The inspectors reviewed Problem Identification Forms Q1999-04088, "½ A Rainbow Irrigation Pump Failed to Start," and Q1999-04145, "½ A Rainbow Irrigation Pump Failed to Start," for proper maintenance rule classifications.

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 licensee's evaluation of plant risk for planned maintenance activities on the safe shutdown makeup pump and the ½ emergency diesel generator. The inspectors also reviewed planned and emergent work risk considerations for Unit 2 core spray work while the Unit 2 emergency diesel generator was inoperable. During the inspection, the inspectors assessed the operability of redundant train equipment and verified that the licensee's planning of the maintenance activities minimized the length of time that the plant was subject to increased risk. The inspectors verified that problems with the 2B service water pump seal, an emergent plant condition, were considered for risk by the licensee. The inspectors also interviewed operations, engineering, and work control department personnel and reviewed Nuclear Station Procedure WC-AA-103, "On-Line Maintenance," Revision 3.

In addition, the inspectors reviewed Condition Reports Q2001-01312, Q2001-01090, and Q2001-01104 to verify that identified problems were being entered into the program, appropriately characterized, and considered for effect on the plants risk profile.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed licensee operability considerations relating to a mismatch between Units 1 and 2 drywell structural steel and the plant drawings associated with the

steel members. Condition Reports Q2001-00510 and 01271 were reviewed, and licensee engineers were interviewed regarding the discrepancies. The inspectors ensured that licensee corrective actions were planned to correct the deficiencies, and that analyses showed that in the short term, the equipment affected by the structural deficiencies was considered operable.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the following post maintenance testing packages to confirm that the tests were adequate for the scope of the maintenance. The inspectors also determined that the tests restored the operational readiness consistent with the design and licensing basis document:

Mitigating Systems Cornerstone

For maintenance on the Unit 2 high pressure coolant injection valves 2-2399-64 and 65, the following documents were reviewed:

- Condition Report CR Q2001-01217;
- Work Request 990278596-01, “Inspect Valve. Check Valve Failed Surveillance Test”;
- Work Request 990278597-01, “Inspect Valve. Check Valve Failed Surveillance Test”;
- Procedure QCMM 1515-09, “Inspection of Safety Related Check Valves During Disassembly, Repair and Reassembly of Valves”;
- Procedure QCAP 0400-06, “Check Valve Preventive Maintenance Program”;
- Procedure ER-AA-400, “Check Valve and Preventive Maintenance Program”;
- Procedure QCMM 1530-04, “Post Maintenance Verification Guide for Check Valves”;
- Procedure AD-AA-106, “Disposition of Nonconformance,” Attachment 10, “Nonconformance Evaluation Form”;
- Component Maintenance History; and
- Procedure QCOS 2300-18, “HPCI Steam Exhaust Vacuum Breaker Line Check Valves IST Functional Test.”

For replacement of the 1A reactor recirculation pump mechanical seal, the inspectors interviewed the unit supervisor and observed seal performance during reactor startup, and reviewed the testing requirements of Work Request 990057934.

For replacement of the 1B reactor recirculation pump mechanical seal, the inspectors interviewed the unit supervisor and observed seal performance during reactor startup, and reviewed the testing requirements of Work Request 990167044.

For the Unit 1 3B Electromatic Relief Valve replacement, the inspectors interviewed the unit supervisor, overviewed relief valve testing and reseating performance during reactor startup, and reviewed the testing requirements of Work Request 990248908.

For maintenance on the Unit 1 Number 16 intermediate range nuclear monitor, the inspectors interviewed the unit supervisor, ensured overlap performance was observed during reactor startup, and reviewed the testing requirements of Work Request 990279993. Inspectors also reviewed the overlap data sheets recorded in procedure QCTS 0920-04 for the April 29, 2001, reactor startup. Condition Report Q2001-01257 was also reviewed.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

On April 21, 2001, the licensee performed periodic surveillance procedure QCOS 2300-18, "HPCI Steam Exhaust Vacuum Breaker Line Check Valves IST Functional Test." Results of the surveillance indicated that check valves 2-2399-64 and 65 had failed to meet the acceptance criteria.

The inspectors discussed this event with the system engineer, reviewed test data for the surveillance tests and the following documents to determine that plant equipment could perform its intended function and satisfy the requirements contained in the Technical Specifications:

- Control Room Logs dated April 21, 2001;
- QCOS 2300-18, "HPCI Steam Exhaust Vacuum Breaker Line Check Valves IST Functional Test";
- QCOS 2300-20, "HPCI Turbine Exhaust Vacuum Breaker Outage Report;"
- System Description LN-2300, "HPCI";
- Action Request AR 990143636;
- Condition Report CR Q2001-01217;
- Technical Specification 3.5.A.3, "Emergency Core Cooling System";
- Event Notification No. 37937, "Quad Cities Unit 2 HPCI Inoperable Due to Failed Turbine Exhaust Line Vacuum Breaker Check Valves";
- 10CFR50.72, "Immediate Notification Requirements for Operating Nuclear Power Reactors"; and
- USNRC IE Information Notice No. 82-26, "RCIC and HPCI Turbine Exhaust Check Valve Failures."

On April 18, 2001, the inspectors observed Unit 2 testing using surveillance procedure QCIS 0200-28, "ATWS Analog Trip System Calibration and Functional Test."

The inspectors also observed testing during reactor startup to verify the operability of the 3B electromatic relief valve on Unit 1. Inspectors observed setup and completion of

activities in conjunction with surveillance test QCOS 0203-03, "Main Steam Relief Valves Operability Test," on April 29, 2001.

b. Findings

No findings of significance were identified.

2. RADIATION SAFETY

Cornerstone: Occupational Radiation Safety

2OS1 Access Control

.1 Plant Walkdowns, Radiological Boundary Verifications, and Radiation Work Permit Reviews (71121.01)

a. Inspection Scope

The inspector conducted walkdowns of the radiologically restricted area to verify the adequacy of radiological boundaries and postings. Specifically, the inspector walked down radiation and high radiation area boundaries in the Reactor and Radwaste Buildings. Confirmatory radiation measurements were taken to verify that these areas were properly posted and controlled in accordance with 10 CFR Part 20, licensee procedures and Technical Specifications. A radiation work permit for tours was reviewed for protective clothing requirements and dosimetry requirements including alarm set points. The inspector also observed radiation protection preparations for the Unit 1 reactor recirculation pump seal replacement project including a pre-job work planning meeting and an as low as is reasonably achievable briefing.

b. Findings

No findings of significance were identified.

Cornerstone: Public Radiation Safety

2PS1 Radioactive Gaseous and Liquid Effluent Treatment and Monitoring Systems

.1 Offsite Dose Calculation Manual (71122.01)

a. Inspection Scope

The inspector reviewed the Annual Radiological Environmental Operating Report for the year 2000 to verify that the radiological effluent program was implemented as described in the Updated Safety Analysis Report and the Offsite Dose Calculation Manual. The inspector reviewed the report for significant changes to the Offsite Dose Calculation Manual and to the design and operation of the radioactive waste processing system.

b. Findings

No findings of significance were identified.

.2 Gaseous and Liquid Release Systems Walkdowns (71122.01)

a. Inspection Scope

The inspector performed walkdowns of the major components of the gaseous and liquid release systems to verify that the current system configuration was as described in the Updated Safety Analysis Report and the Offsite Dose Calculation Manual, and to observe ongoing activities and equipment material condition. This included radiation and flow monitors, filtration systems, tanks, and vessels. The inspector also discussed the radioactive waste processing system including operations and components with the cognizant system engineer.

b. Findings

No findings of significance were identified.

.3 Gaseous and Liquid Releases (71122.01)

a. Inspection Scope

The inspector reviewed liquid and gaseous radioactive waste release records including radiochemical analytical results to verify that appropriate treatment equipment was used, that the radwaste effluents were processed and released in accordance with the Offsite Dose Calculation Manual, and that releases met the 10 CFR Part 20 requirements.

b. Findings

No findings of significance were identified.

.4 Changes to the Offsite Dose Calculation Manual (71122.01)

a. Inspection Scope

The inspector reviewed changes made by the licensee to the Offsite Dose Calculation Manual as well as to the liquid and gaseous radioactive waste processing system design, procedures, or operation since the last inspection to verify that changes were documented in accordance with the requirements of the Offsite Dose Calculation Manual and the Technical Specifications.

b. Findings

No findings of significance were identified.

.5 Dose Calculations (71122.01)

a. Inspection Scope

The inspector reviewed Radiological Effluent Release Reports for the years 1999 and 2000, and the Annual Radiological Environmental Operating Report for 2000 to ensure that the annual doses to the public were below the licensee's Technical Specification or Offsite Dose Calculation Manual (i.e., Appendix I to 10 CFR Part 50 values) limits.

b. Findings

No findings of significance were identified.

.6 Air Cleaning Systems (71122.01)

a. Inspection Scope

The inspector reviewed air cleaning system surveillance test results to ensure that test results were within the licensee's acceptance criteria. The inspector reviewed surveillance test results for the gaseous release systems to verify that the flow rates were consistent with Updated Safety Analysis Report values.

b. Findings

No findings of significance were identified.

.7 Effluent Monitor Calibrations (71122.01)

a. Inspection Scope

The inspector reviewed records of instrument calibrations performed since the last inspection for effluent radiation monitors. The inspector also reviewed the current effluent radiation monitor alarm setpoint values for agreement with station requirements.

b. Findings

No findings of significance were identified.

.8 Counting Room Instrument Calibrations and Quality Control (71122.01)

a. Inspection Scope

The inspector reviewed the quality control records for radiochemistry instrumentation used to identify and quantitate radioisotopes in effluents, in order to verify that the instrumentation was calibrated and maintained as required by site procedures. This review included calibrations of gamma spectroscopy/spectrometry systems, liquid scintillation instruments, and associated instrument control charts.

b. Findings

No findings of significance were identified.

.9 Interlaboratory Comparison Program (71122.01)

a. Inspection Scope

The inspector reviewed the results of the 1999 and 2000 Interlaboratory Comparison Program along with the radiochemistry quality control program (Section .8) in order to evaluate the licensee's capability to perform radiochemical measurements, and to assess the quality of radioactive effluent sample analyses performed by the licensee. The inspector reviewed condition reports to verify that the licensee's quality control program identified and resolved any deficiencies identified.

b. Findings

No findings of significance were identified.

.10 Identification and Resolution of Problems (71122.01)

a. Inspection Scope

The inspector reviewed audits and self-assessments conducted during the previous year to evaluate the effectiveness of the licensee's self-assessment process in the identification, characterization, and prioritization of problems, and to verify that previous radiological instrumentation and effluent related issues were adequately addressed. Condition reports written during the previous year that addressed radioactive treatment and monitoring program deficiencies were also reviewed to verify that the licensee had effectively implemented the corrective action program.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA1 Performance Indicator Verification (71151)

a. Inspection Scope

The inspectors reviewed Unresolved Item 50-254/01-02-01; 50-265/01-02-01 which dealt with four events which the licensee did not classify as safety system functional failures because of a determination that the safety function was met or that reporting criteria were not applicable. The four issues involved failures of the Unit 1 high pressure injection system, the safe shutdown makeup pump, the Unit 2 emergency diesel generator, and Unit 2 intermediate range nuclear monitors. Inspectors reviewed licensee event reports and other event reports related to the failures. Condition Report

Q2001-01446 was also reviewed. Information regarding Licensee Event Reports 50-265/2000002, 50-265/2000003, and 50-254/2000007(retracted) were forwarded to the Office of Nuclear Reactor Regulation. Information regarding Event 37636 (retracted), including design calculation QDC-2300-M-1059, Piping and Instrument Diagram M-3132, Root Cause Evaluation Report number ATI 41494-02, Calculation M-984D-69/Q1.HPCI.OIC, and Report 93173-1 "Limit Criteria for Piping Reaction Load Changes" were delivered to Region III piping specialists for review.

b. Findings

Inspectors found that the initial calculation provided by the licensee regarding Event 37636 involving air in the high pressure coolant injection piping, did not justify that the function of the high pressure coolant injection system could be met. The inspectors asked the licensee for further information regarding the calculation to verify the assertions in the root cause report. This will be tracked independently as **Unresolved Item 50-254/01-08-02** pending review by regional piping specialists.

Further review by the inspectors and by program specialists from the Office of Nuclear Reactor Regulation determined that the other three events should all have been reported as safety system functional failures. Had these been reported properly in either the January 2001 or April 2001 submittals, the safety system functional failure performance indicator would have shown eight failures for first Quarter 2000 Unit 2 data, and seven failures for fourth Quarter 2000 Unit 2 data which would have indicated performance in the regulatory response or White band. The actual submittals showed performance indicator data in the licensee response or Green band.

On March 3, 2000, the licensee issued Licensee Event Report 50-265/2000003, which indicated that the intermediate range nuclear monitor system had less instruments available than what was required by Technical Specifications to be operable. The inspectors issued Non-Cited Violation 50-265/00001-03 in response to this event. The licensee had indicated that the intermediate range nuclear monitor function was not required in the plant conditions (refueling mode) during the event. In addition the licensee indicated administrative controls would be in place to protect against inadvertent criticality. The inspectors found that the system was required to be in place by the Technical Specifications for the refueling mode such that an acceptable number of instruments from each channel could monitor the reactor core and provide a trip signal for control rod insertion in the event of an unplanned reactor power increase. The ability of the intermediate range nuclear monitor system to perform this function with less than the required number instruments was not demonstrated by the licensee. Therefore this event was considered a safety system functional failure.

On February 23, 2000, the licensee issued Licensee Event Report 50-265/2000002 which indicated that the Unit 2 emergency diesel generator vent fan switch was positioned incorrectly. This caused the generator to be inoperable because of reliance on either offsite or Unit 1 electrical power not associated with the Unit 2 emergency diesel generator. The licensee initially notified the NRC on January 28, 2000, that with this switch in the incorrect position and the shared emergency diesel generator unavailable, both emergency power sources for Unit 2 were inoperable. The inspectors

found that this would have prevented the Unit 2 emergency diesel generator from fulfilling its function as a separate and independent emergency power source. Therefore this event was considered a safety system functional failure. The inspectors issued Non-Cited Violation 50-265/00001-01 in response to this event. These two additional failures caused the first quarter 2000 data for Unit 2 to go from 6 to 8 failures which would result in a White performance indicator.

On November 27, 2000, the licensee issued Licensee Event Report 50-254/2000007 regarding an inoperable safe shutdown makeup pump controller. In a December 22, 2000, letter from the Site Vice President to the NRC Document Control Desk, the licensee retracted the licensee event report. In the retraction, the licensee indicated that "the safe shutdown makeup pump system is designed to function as a backup to the reactor core isolation cooling system to satisfy the requirements of 10 CFR 50, Appendix R, Section III G, 'Fire Protection of Safe Shutdown Capability'." The licensee further indicated that the design of equipment used for 10 CFR 50 Appendix R is not required to be single failure proof.

The inspectors determined that the safe shutdown makeup pump was, indeed, described as a backup to the reactor core isolation cooling system. However, the inspectors also found that licensee procedures specified the safe shutdown makeup pump as the primary high pressure injection source for fires requiring safe shutdown protection, and that it may be the only protected high pressure injection source for certain fire scenarios because the reactor core isolation cooling system is not available for those fire scenarios. Abnormal Operating Procedure QCOA 0010-12, "Fire Explosion," Revision 17, Attachment D provided a list of protected equipment available to provide high pressure injection for fires in various plant locations. The safe shutdown makeup pump was listed as the primary injection source for fires in certain areas of the turbine building, reactor building, switchgear area, cable tunnel, service building, and battery and charger areas. Appendix R procedure series QCARP 0010, Revision 1 also listed the safe shutdown makeup pump as the injection source used to mitigate the consequences of a fire in the locations described by the QCOA 0010-12 procedure. Technical Specification 3.8.J required the safe shutdown makeup pump to be operable in Modes 1, 2 and 3. The inspectors found that the failure of the controller with Unit 2 in Mode 1 was a failure that could have prevented the fulfillment of the safety function of the safe shutdown makeup pump which was needed for shutting down the reactor and maintaining the reactor in a safe shutdown condition. Therefore this failure should have been maintained as a report in accordance with 10 CFR 50.73.(a).(2).(v) and counted in performance indicator data.

In addition to the other two failures described above, this additional failure caused the fourth quarter 2000 safety system functional failure data for Unit 2 to increase from the reported number of four failures (Green performance) to seven failures (White performance). Failure to accurately report performance indicator data is considered a No-Color finding because the significance determination process cannot be used to evaluate the reporting failure. Part (a) of 10 CFR 50.9 requires that information provided to the Commission by a licensee shall be complete and accurate in all material respects. Failure to report performance indicator data accurately was considered a **Non-Cited Violation 50-265/01-08-03** of 10 CFR 50.9. Because submittal of inaccurate information may impact the NRC's ability to carry out its regulatory function, the significance of the

violation was assessed using the traditional enforcement process. This Severity Level IV violation is being treated as a Non-Cited Violation, consistent with Section VI.A.1 of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as Condition Report Q2001-01446. **Unresolved Item 50-254/01-02-01; 50-265/01-02-01** is closed.

4OA2 Identification and Resolution of Problems (71152)

(Closed) Unresolved Item (50-254/00-19-01; 50-265/00-19-01): This Unresolved Item involved the acceptability of the licensee's current practice for controlling unescorted personnel access to specific vital areas in the plant. This issue was forwarded to the Office of Nuclear Reactor Regulation for evaluation and resolution. The Office of Nuclear Reactor Regulation concluded that the licensee's practice of permitting access to all vital areas for individuals whose work needs pertain only to a single vital area conformed to NRC regulatory requirements and the licensee's security plan commitments. This item is closed.

4OA6 Meetings

.1 Inspection Period Exit Meeting

The inspectors presented the inspection results to Mr. Toulon and other members of licensee management at the conclusion of the inspection on May 16, 2001. The licensee acknowledged the findings presented. No proprietary information was identified.

.2 Interim Exit Meeting

Senior Official at Exit:	George Barnes, Plant Manager
Date:	April 27, 2001
Proprietary:	No
Subject:	Radiological Effluents and Access Control
Change to Inspection Findings:	No

KEY POINTS OF CONTACT

Licensee

T. Tulon, Site Vice President
G. Barnes, Plant Manager
D. Barker, Radiation Protection Manager
W. Beck, Regulatory Assurance Manager
P. Behrens, Chemistry/Environ/Radwaste Manager
G. Boerschig, Engineering Manager
R. Chrzanowski, Nuclear Oversight Manager
R. Gideon, Work Control Manager
M. McDowell, Operations Manager
M. Perito, Maintenance Manager
D. Barker, Radiation Protection Manager
G. Barnes, Plant Manager
K. Ohr, Radiation Protection Supervisor
K. Leech, Security Manager

NRC

M. Ring, Chief, Projects Branch 1

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-254/01-08-01; 50-265/01-08-01	NCV	Failure to Meet Requirement of 10 CFR 50.59
50-254/01-08-02	URI	Performance Indicator - Calculation
50-265/01-08-03	NCV	Failure to Report Performance Indicator Data Accurately

Closed

50-254/01-08-01; 50-265/01-08-01	NCV	Failure to Meet Requirement of 10 CFR 50.59
50-265/01-08-03	NCV	Failure to Report Performance Indicator Data Accurately
50-254/01-05-01; 50-265/01-05-01	URI	Failure to Meet Requirement of 10 CFR 50.59
50-254/01-02-01; 50-265/01-02-01	URI	Failure to Report Performance Indicator Data Accurately
50-254/00-19-01; 50-265/00-19-01	URI	Personnel Authorization to Vital Areas

LIST OF ACRONYMS AND INITIALISMS USED

CFR Code of Federal Regulations
IDNS Illinois Department of Nuclear Safety
IFI Inspection Follow-up Item
LER Licensee Event Report
NRC Nuclear Regulation Commission
QCOA Quad Cities Abnormal Operating Procedure
QCTS Quad Cities Technical Surveillance
SDP Significance Determination Process
URI Unresolved Item
VIO Violation

LIST OF DOCUMENTS REVIEWED (Not previously listed)

2OS1 Access Control

AD-AA-106	Root Cause Evaluation Report	April 17, 2001
Q1M13	Outage Dose Rate and Source Term Summary	April 26-29, 2001
Q2001-00494	Elevated Dose Rates Outside 2A RWCU Pump Room	February 13, 2001
QC-MM 0202-01	Reactor Recirculation Pump Mechanical Seal Removal and Replacement	April 24, 2001
RWP 01-1014	Reactor Recirculation Pump Mechanical Seal Removal and Replacement	April 23, 2001
RWP 01-001	Plant Tours	January 1, 2001
	ALARA Post Job Review, Unit 2 Seal Replacement	April 23, 2001

2PS1 Radiological Effluents

AD-AA-103	Self Assessment Plan Format	January 2, 2001
LS-AA-126	Radiation Protection Department Focus Area Self Assessment	April 11, 2001
Q2000-01123	Radioactive Effluent Monitor Documentation Problems	March 10, 2000
Q2000-01187	Main Chimney High Range Noble Gas Monitor Inoperable - 7 Day LCO	March 18, 2000
Q2000-01878	Unable to Establish Isokinetic Sample Flow at Main Chimney Based on Current Flow Indicator	May 18, 2000
Q2000-03532	Radwaste Liquid Effluent Flow Rate Recorder	October 7, 2000
Q2001-00284	N.O. Identified Counting Room Calibration and Control Chart Problems	January 25, 2001
Q2001-00361	Self Assessment Deficiencies-RP ODCM	February 2, 2001
Q2001-00688	N.O.S. Identified a Lack of Instructions for an Air Monitor Alarm Response	March 2, 2001
Q2001-01067	Effective Sections of ODCM not in Site Manuals	April 6, 2001
Q2001-01148	Transcription Error in Annual Report for 2000	April 16, 2001

QCCP 0400-17	Main Chimney Noble Gas SPING Monitor Calibration	January 5, 2000
QCCP 0400-28	Main Chimney SPING/Victoreen Operational Check	September 16, 1999
QCCP 0400-24	Verification of Off Gas Holdup Line Flow Rate and Adsorber Retention Times	February 21, 2001
QCCP 0300-07	Service Water Monitor Calibration	September 15, 1999
QCCP 0800-05	GeLi Calibration Values	November 7, 2000
QCCP 0400-18	Main Chimney Noble Gas Monitor Calibration	November 29, 1999
QCCP 0300-07	Radwaste Effluent Monitor Calibration	November 11, 1999
QCCP 0400-28	Victoreen Sampling System Calibration	September 16, 1999
QCIS 2400-01	Primary Containment Radiation Monitor Calibration/Function Test	September 20, 2000
QCIS 1700-07	Reactor Building Ventilation and Fuel Pool Radiation Monitoring Calibration and Function Test	December 12, 2000
QCIS 2400-01	Drywell Radiation Monitor Calibration/Function Test	January 19, 2001
QCIS 1700-03	Main Steam Line Log-Radiation Monitor Calibration/Functional Test	January 3, 2001
QCTS 0430-05	Standby Gas Treatment System Removal of Charcoal Adsorber Test Canisters	September 28, 1999
QOP 2000-25	Liquid Release Batch 7179	January 30, 2001
QOP 2000-25	Liquid Release Batch 7160	September 25, 2000
QOP 2000-25	Liquid Release Batch 7173	November 27, 2000
QOP 2000-25	Liquid Release Batch 7186	April 18, 2001
SVP-00-018	Quad Cities Radioactive Effluent Report for 1999	March 23, 2000
SVP-01-029	Quad Cities Radioactive Effluent Report for 2000	March 30, 2001
SVP-01-050	Quad Cities Annual Operating Report	May 1, 2000
	Counting Room Lower Limit of Detection	April 3, 2000
	Change Summary ODCM, 2001	January 2001

Quad Cities Offsite Dose Calculation Manual	2000
Analytics Interlaboratory Cross Check Program	2000
Liquid Scintillation Efficiency Curve	October 6, 2000
Tritium Quality Control Chart	July 1999-April 2001