

February 20, 2002

Mr. Oliver D. Kingsley, President
Exelon Nuclear
Exelon Generation Company, LLC
Quad Cities Nuclear Power Station
4300 Winfield Road
Warrenville, IL 60555

SUBJECT: QUAD CITIES NUCLEAR POWER STATION
NRC INTEGRATED INSPECTION REPORT 50-254/02-02; 50-265/02-02

Dear Mr. Kingsley:

On February 10, 2002, 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 February 11, 2002, 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.

No findings of significance were identified.

Immediately following the terrorist attacks on the World Trade Center and the Pentagon, the NRC issued an advisory recommending that nuclear power plant licensees go to the highest level of security, and all promptly did so. With continued uncertainty about the possibility of additional terrorist activities, the Nation's nuclear power plants remain at the highest level of security and the NRC continues to monitor the situation. This advisory was followed by additional advisories and although the specific actions are not releasable to the public, they generally include increased patrols, augmented security forces and capabilities, additional security posts, heightened coordination with law enforcement and military authorities, and more limited access of personnel and vehicles to the sites. The NRC has conducted various audits of your response to these advisories and your ability to respond to terrorist attacks with the capabilities of the current design basis threat (DBT). From these audits, the NRC has concluded that your security program is adequate at this time.

O. Kingsley

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Sincerely,

/RA/

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

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

Enclosure: Inspection Report 50-254/02-02, 50-265/02-02

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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: 50-254/02-02; 50-265/02-02

Licensee: Exelon Nuclear

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

Location: 22710 206th Avenue North
Cordova, IL 61242

Dates: December 30, 2001 - February 10, 2002

Inspectors: K. Stoedter, Senior Resident Inspector
J. Adams, Resident Inspector
T. Ploski, Emergency Preparedness Inspector

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

SUMMARY OF FINDINGS

IR 05000254-02-02, IR 05000265-02-02 on 12/30/2001 - 02/10/2002, Exelon Nuclear, Quad Cities Nuclear Power Station, Units 1 & 2.

The inspection was conducted by resident and regional inspectors. Based on the results of this inspection, there were no findings. 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>.

A. Inspector Identified Findings

No findings of significance were identified.

B. Licensee Identified Findings

No findings of significance were identified.

Report Details

1. REACTOR SAFETY

Plant Status

Unit 1 began the inspection period at full power. On January 6, 2002, operations personnel reduced reactor power to approximately 95 percent for control rod exercising. Following the rod exercising, Unit 1 operated at full power until January 9 when jet pump #20 unexpectedly failed. Operations personnel entered the appropriate Technical Specifications which required that the unit be shutdown within 24 hours. During the 26 day forced outage, the licensee repaired multiple condenser tube leaks, replaced 16 jet pump beams, removed a previously leaking fuel bundle, replaced the damaged impeller on the 1B reactor recirculation pump, and completed an extensive fuel shuffle. The licensee returned Unit 1 to full power on February 7, 2002. On the afternoon of February 7, the 1B reactor recirculation pump tripped which resulted in a power reduction to approximately 35 percent. The licensee determined the cause of the pump trip on February 8, and returned the unit to full power for the remainder of the inspection period.

Unit 2 also began the inspection period at full power. On January 2, 2002, operations personnel reduced reactor power to 98.5 percent due to oscillations on the #2 turbine control valve. Reactor power was restored to 100 percent later the same day. On January 6, reactor power was reduced to approximately 65 percent for turbine valve testing and a control rod pattern adjustment. Following the testing and control rod pattern adjustment, the reactor operated at full power until January 23 when the unit entered a coastdown condition in preparation for the upcoming refueling outage. On January 24 operations personnel reduced reactor power to approximately 70 percent at the request of the MidAmerican Energy Company load dispatcher. Operations personnel returned the reactor to the maximum achievable power later the same day. Due to entering coastdown, Unit 2 reactor power decreased gradually over the remainder of the inspection period.

1R04 Equipment Alignments (71111.04)

a. Inspection Scope

The inspectors verified the system alignment of the following mitigating systems during the period:

- Unit 1A core spray system,
- Unit ½ emergency diesel generator,
- Unit 2 reactor core isolation cooling system, and
- Safe shutdown makeup pump.

The inspectors conducted walkdowns while redundant equipment was out-of-service for maintenance activities. The inspectors verified that the as-found system configuration and operating parameters supported the continued ability of the system to perform its

intended functions. The inspectors accomplished the verifications by comparing the as-found configuration of the accessible portions of the listed systems to the configuration specified in the respective Quad Cities operating procedures. The inspectors reviewed design and licensing information and discussed system configuration and performance with licensee personnel.

b. Findings

No findings of significance were identified.

1R05 Fire Protection (71111.05)

a. Inspection Scope

The inspectors conducted fire protection walkdowns of the Unit 1 and Unit 2 station blackout diesel generator rooms (Fire Zones SBO-3 and SBO-4) and the Unit 1 and 2 emergency diesel generator rooms (Fire Zones 9.1 and 9.2). These zones contained equipment related to the mitigating systems cornerstone. These inspections verified the proper control of transient combustibles and ignition sources, the material condition of fire detection and suppression systems, the operational lineup of fire detection and suppression systems, the maintenance of fire protection equipment, and the material condition and operational status of fire barriers. The inspectors also discussed issues associated with each fire zone with the fire marshal.

b. Findings

No findings of significance were identified.

1R07 Heat Sink Performance (71111.07)

a. Inspection Scope

The inspectors reviewed the design, performance, and maintenance of the 2B residual heat removal heat exchanger as part of the heat exchanger performance test conducted on January 30, 2002. The inspectors reviewed industry documents and discussed the testing procedure with engineering personnel to ensure that test acceptance criteria appropriately considered differences between testing conditions and design considerations, test results were appropriately categorized against pre-established acceptance criteria, and that the frequency of the performance test was acceptable. The inspectors also reviewed the test results and verified that test instrument inaccuracies and differences were also included in the test results.

b. Findings

No findings of significance were identified.

1R11 Licensed Operator Requalification (71111.11)

a. Inspection Scope

On January 9, 2002, the inspectors observed and assessed Crew F licensed operator performance during simulator training sessions. The training sessions required the operators to use the new digital feedwater control system, which will be installed during the upcoming refueling outages, and recall power uprate modification information. The first scenario involved a reactor recirculation flow controller failure, a condensate pump trip, a spurious Group 1 isolation, a failure of the reserve auxiliary transformer, and a loss of coolant accident. The second scenario included a loss of feedwater heating, the failure of the B feedwater regulating valve controller upscale, a turbine trip without bypass valves, and an anticipated transient without scram.

During the observations, the inspectors focused on the operators' response to alarms, the command and control of crew activities, communications practices, and implementation of emergency plan requirements. The inspectors observed the training evaluators' assessment of crew performance ensuring deficiencies were identified and corrected.

b. Findings

No findings of significance were identified.

1R12 Maintenance Rule Implementation (71111.12)

a. Inspection Scope

The inspectors reviewed the following risk significant system associated with the Mitigating Systems Cornerstone:

Unit	System	Maintenance Rule Function
1	High Pressure Coolant Injection	Z2300

The inspectors reviewed one problem documented in the following condition report for appropriate disposition with respect to the Maintenance Rule:

- Q2001-02784, "2-2301-4 Failed to Stroke Closed During QCOS 2300-06."

The inspectors reviewed the licensee's implementation of the maintenance rule, including the disposition of other condition reports, 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 discussed system problems and maintenance rule classifications with engineering personnel.

b. Findings

No findings of significance were identified.

1R14 Non-routine Evolutions (71111.14)

a. Inspection Scope

The inspectors observed operator performance following the failure of Unit 1 jet pump #20 on January 9, 2002, and a trip of the 1B reactor recirculation pump on February 7, 2002. The inspectors reviewed operations procedures, control room strip charts, equipment drawings, and industry information; and interviewed licensee personnel to independently verify the cause of each transient and evaluate licensed operator response.

b. Findings

No findings of significance were identified.

1R15 Operability Evaluations (71111.15)

a. Inspection Scope

The inspectors reviewed the operability evaluations associated with the failure of the drywell ventilation booster fan, a torus high level switch, a leak on the 1A residual heat removal system heat exchanger, and the potential for degraded jet pumps on Quad Cities Unit 2. A list of documents reviewed by the inspectors can be found in the List of Documents Reviewed section of this report.

The inspectors verified that operability evaluations were performed when required and that completed evaluations were technically adequate, justified continued operation, considered other degraded conditions where applicable, and referenced applicable sections of the Updated Final Safety Analysis Report and other design basis documents.

b. Findings

No findings of significance were identified.

1R19 Post Maintenance Testing (71111.19)

a. Inspection Scope

The inspectors reviewed the post-maintenance test data for the following activities associated with Initiating Event and Mitigating Systems Cornerstone equipment:

- Work Order 00323496, "Unit 2 Diesel Generator Cooling Water Pump Maintenance";
- Work Order 00397798, "Replace 1B Reactor Recirculation Pump Impeller"; and
- Work Order 00397374, "Troubleshoot and Repair Unit 1 Fuel Mast."

The inspectors verified that the post-maintenance tests demonstrated that the systems and components were capable of performing their intended function. Included in the review were the applicable sections of Technical Specifications, the Updated Final Safety Analysis Report, and vendor manuals. Following the completion of the tests, the inspectors verified that any test equipment used was removed and that equipment was returned to the proper configuration.

b. Findings

No findings of significance were identified.

1R20 Refueling and Outage (71111.20)

a. Inspection Scope

The inspectors observed shutdown activities following the failure of Unit 1 jet pump #20 on January 9, 2002. The inspectors monitored the licensee's cooldown process and ensured that Technical Specifications were followed during the transition into Modes 3, 4, and 5. The inspectors were present during the licensee's initial inspection of the failed jet pump to independently verify the jet pump's condition and the location of loose parts in the reactor vessel. As part of the 26 day forced outage, the inspectors monitored outage configuration management on a daily basis by verifying that the licensee maintained appropriate defense in depth to address all shutdown safety functions and satisfy Technical Specification requirements. Due to the large amount of work performed on the jet pumps and the 1B reactor recirculation pump, the inspectors closely monitored the reactivity and inventory control systems in addition to radiation protection practices. Proper operation of the decay heat removal system was verified during multiple control room tours and observations. Between February 1 and 6, 2002, the inspectors conducted multiple startup observations including a drywell closeout, startup testing, preparations for generator synchronization, troubleshooting of a combined intermediate valve, and control rod scram time testing.

b. Findings

No findings of significance were identified.

1R22 Surveillance Testing (71111.22)

a. Inspection Scope

The inspectors observed surveillance testing activities and/or reviewed completed packages for the tests listed below related to systems in the Mitigating Systems Cornerstone:

- QCOS 0202-07, "Jet Pump Flow Distribution Comparison," Revision 14, on multiple dates;
- QCOS 2300-11, "Contaminated Condensate Storage Tank/Torus Level Switch Functional Test," Revision 18, on January 4, 2002;

- QCOS 2300-04, "High Pressure Coolant Injection System Cold Shutdown Valve Test," Revision 14, on January 19, 2002; and
- QCOS 2900-04, "Safe Shutdown Make Pump Reactor Vessel Injection Test at Cold Shutdown," Revision 13, on January 28, 2002.

The inspectors verified that Technical Specifications, Updated Final Safety Analysis Report, and licensee's procedure requirements were met during each testing evolution. Vibration and valve timing results were compared against In-Service Testing requirements for those components subject to the program. The inspectors also verified that the testing demonstrated that the structure, system, or component was capable of performing its intended function.

b. Findings

No findings of significance were identified.

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

a. Inspection Scope

The inspector reviewed Revision 12 and Revision 13 of the Quad Cities Station's Annex to the Exelon Emergency Plan to determine whether changes identified in these revisions reduced the effectiveness of the licensee's emergency planning, pending onsite inspection of the implementation of these changes.

b. Findings

No findings of significance were identified.

4. OTHER ACTIVITIES (OA)

4OA3 Event Follow-up (71153)

a. Inspection Scope

The inspectors observed the licensee's response to the January 9, 2002, jet pump failure. The inspectors monitored plant parameters and operator performance during the transient and verified the status of mitigating systems. This information was provided to regional management to help in determining the need for an additional inspection. A regional specialist conducted a special inspection of the engineering issues associated with the jet pump failure from January 15 - 17, 2002. The results of the special inspection will be documented in Inspection Report 50-254/2002003. The inspectors also validated that the licensee corrected the cause of the jet pump failure and all associated equipment condition issues prior to restarting Unit 1.

b. Findings

No findings of significance were identified.

4OA6 Meetings

.1 Inspection Period Exit Meeting

The inspectors presented the inspection results to Mr. Tulon and other members of licensee management at the conclusion of the inspection on February 11, 2002. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Tulon, Site Vice President
M. Perito, Acting Plant Manager
D. Barker, Radiation Protection Manager
W. Beck, Regulatory Assurance Manager
G. Boerschig, Engineering Manager
R. Gideon, Work Control Manager
T. Hanley, Acting Operations Manager
A. Javorik, Maintenance Manager
K. Leech, Security Manager
K. Moser, Chemistry/Environ/Radwaste Manager
M. Snow, Nuclear Oversight Manager

NRC

M. Ring, Chief, Reactor Projects Branch 1

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF DOCUMENTS REVIEWED

1R04 Equipment Alignment

Number	Subject/Title	Date/Revision
QCOP 1400-01	Core Spray System Preparation for Standby Operation	Revision 13
QCOP 6600-04	Diesel Generator ½ Preparation for Standby Operation	Revision 19
QCOP 1300-01	Reactor Core Isolation Cooling System Preparation for Standby Operation	Revision 18
QCOP 2900-01	Safe Shutdown Makeup Pump System Preparation for Standby Operation	Revision 16

1R05 Fire Protection

Number	Subject/Title	Date/Revision
	Fire Hazards Analysis for Fire Zone SBO-4	Revision 12
	Fire Hazards Analysis for Fire Zone SBO-3	Revision 12
	Fire Hazards Analysis for Fire Zone 9.2	Revision 12
	Fire Hazards Analysis for Fire Zone 9.1	Revision 12

1R07 Heat Sink Performance

Number	Subject/Title	Date/Revision
QCOS 1000-29	Residual Heat Removal Heat Exchanger Thermal Performance Test	Revision 6
EPRI NP-7552	Heat Exchanger Performance Monitoring Guidelines	
Generic Letter 89-13	Service Water System Problems Affecting Safety-Related Equipment	

1R11 Licensed Operator Requalification

Number	Subject/Title	Date/Revision
04LORT7/EPU Dynamic 1	Reactor Recirculation Flow Controller Failure, Condensate Pump Trip, Group 1, Loss of T-12, and LOCA.	November 29, 2001
04LORT7/EPU Dynamic 2	Loss of Feedwater Heating, Feedwater Runout, Turbine Trip Without Bypass, and Anticipated Transient Without SCRAM.	November 29, 2001

1R12 Maintenance Rule Implementation

Number	Subject/Title	Date/Revision
Q2001-02784	2-2301-4 Failed to Stroke Closed During QCOS 2300-06	September 5, 2001

1R14 Non-routine Evolutions

Number	Subject/Title	Date/Revision
	Strip Charts for Main Chimney, Offgas Radiation Monitor, Main Steam Line Radiation Monitor, and Reactor Recirculation Pump Parameters	January 9, 2002
GE Service Information Letter 330	Jet Pump Beam Cracks	June 9, 1980 February 1981 October 27, 1993
QCOS 0202-09	Reactor Recirculation Single Loop Operations Outage Report	Revision 11
QCOP 0202-07	Reactor Recirculation Single Loop Operation Determination of Total Core Flow	Revision 10
QCOA 0202-04	Reactor Recirculation Pump Trip - Single Pump	Revision 17

1R15 Operability Evaluations

Number	Subject/Title	Date/Revision
Condition Report # 90738	Extent of Condition Review for BWR-3 Jet Pump Hold Down Beams	January 16, 2002

Supporting Operability Evaluation for Condition Report # 90738	Extent of Condition Review for BWR-3 Jet Pump Hold Down Beams	Revision 0 and Revision 1
Condition Report # 87785	Unit 1 Drywell Booster Fan Trip	December 20, 2001
Supporting Operability Evaluation for Condition Report # 87785	Continued Ability to Maintain Drywell Temperature with a Failed Drywell Ventilation Booster Fan.	Revision 0
Condition Report # 88262	1B Torus Level Switch Failed to Reset During QCOS 2300-11	December 27, 2001
Supporting Operability Evaluation for Condition Report # 88262	Impact of Potential Crud/Debris on the Safety function of the 1B Torus Level Switch	Revision 0
Supporting Operability Evaluation for Condition Report # Q2001-03159	Leak from Residual Heat Removal Heat Exchanger 1A	Revision 1

1R19 Post Maintenance Testing

Number	Subject/Title	Date/Revision
QCOS 6600-06	Diesel Generator Cooling Water Pump Flow Rate Test	Revision 20
Work Order 00397798	Replace 1B Reactor Recirculation Pump Impeller	
	Apparent Cause for Condition Report 90000, "1B Reactor Recirculation Pump Trip"	January 31, 2002
QCOS 0202-19	Unit 1 Reactor Recirculation System Post Maintenance Startup	Revision 3
QCOP 0202-08	Reactor Recirculation Pump Seal Vent	Revision 11
TIC-0325	Temporary Procedure for Uncoupled Run of 1B Reactor Recirculation Pump Motor	January 25, 2002
Condition Report # 93517	1B Recirc Motor Tripped During Uncoupled Run	January 31, 2002

Work Order Troubleshoot and Repair Unit 1 Refueling Mast
00397374

QCFHP 0500-08 Refueling Interlocks Revision 9

1R22 Surveillance Testing

Number	Subject/Title	Date/Revision
QCOS 0202-07	Jet Pump Flow Distribution Comparison	Revision 14
QCOS 2300-04	HPCI System Cold Shutdown Valve Test	Revision 14
QCOS 2900-04	Safe Shutdown Makeup Pump Reactor Vessel Injection Test at Cold Shutdown	Revision 13
QCOS 2300-11	Contaminated Condensate Storage Tank/Torus Level Switch Functional Test	Revision 18

1EP4 Emergency Action Level and Emergency Plan Changes

Number	Subject/Title	Date/Revision
	Quad Cities Annex to the Exelon Emergency Plan	Revision 12
	Quad Cities Annex to the Exelon Emergency Plan	Revision 13