

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-254/93011(DRP); 50-265/93011(DRP)

Docket Nos. 50-254; 50-265

License Nos. DPR-29; DPR-30

Licensee: Commonwealth Edison Company
Executive Towers West III
1400 Opus Place, Suite 300
Downers Grove, IL 60515

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

Inspection At: Quad Cities Site, Cordova, Illinois

Inspection Conducted: April 6 through May 17, 1993

Inspectors: T. E. Taylor
J. M. Shine
P. F. Prescott
F. Brush

Approved By:

Pat Hiland
Pat Hiland, Chief
Reactor Projects Section 1B

6/8/93
Date

Inspection Summary

Inspection from April 6 through May 17, 1993 (Report Nos. 50-254/93011(DRP); 50-265/93011(DRP))

Areas Inspected: Routine, unannounced safety inspection by the resident inspectors of contractor work activities; licensee action on previously identified items; operational safety verification; monthly maintenance observation; monthly surveillance observation; report review; and events.

Results: Of the eight areas inspected, one violation for inadequate procedures and failure to follow existing procedures was identified in paragraph 7. In the remaining areas no violations were identified.

EXECUTIVE SUMMARY

Plant Operation

Plant operations performance was mixed. Operations control of Unit 2 refuel outage activities and Unit 1 operator response to a failed feedwater regulating valve controller were good. However, two personnel errors resulted in an inadvertent start of the Unit 1 emergency diesel generator and an unintentional securing of the reactor water cleanup system.

Radiological Controls

During the refueling outage, minor examples of improperly stored material within radiological barriers were identified station management. Control of access to the drywell was adequate.

Maintenance and Surveillance

Performance in this area was mixed. The Unit 2 refueling outage continued on schedule with good management and work activity implementation. During the inspection period, maintenance deficiencies relating to the Unit 2 emergency diesel generator (EDG) cooling water pump and the installation of ECCS corner room drain strainers were identified. Reviews identified cases of inadequate work instructions, lack of training, and a lack of mechanical maintenance personnel knowledge of the temporary alteration program. Details of the EDG cooling water pump issue were documented in Inspection Report 254/265-93012(DRP).

Engineering and Technical Support

Performance in this area was mixed. An event concerning the Unit 1/2 EDG cooling water pump failure to start during a test activity was reviewed. Potential violations concerning loss of Unit 1/2 EDG for Unit 2 operation were identified. Details of this issue were documented in Inspection Report 254/265-93012(DRP). Day-to-day interface between system engineers, maintenance, and the operation's department was good.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

R. Pleniewicz, Site Vice President
*R. Bax, Station Manager
D. Bucknell, Assistant Technical Staff Supervisor
*J. Burkhead, Quality Verification Program Supervisor
*A. Chernick, Performance Enhancement Program
*D. Craddick, Assistant Superintendent - Maintenance
D. Gibson, Master Mechanic
*H. Hentschel, Operations Manager
J. Hoeller, Training Supervisor
G. Klone, Operating Engineer - Unit 1
*D. Kanakares, Regulatory Assurance NRC Coordinator
J. Kopacz, Operating Engineer - Unit 2
K. Leech, Security Administrator
*B. McGaffigan, Assistant Superintendent - Work Planning
A. Misak, Regulatory Assurance Supervisor
*B. Moravec, Engineering and Nuclear Construction Site Manager
B. Strub, Assistant Superintendent - Operations
*R. Walsh, Technical Staff Supervisor

*Denotes those attending the exit interview conducted on
May 18, 1993.

The inspectors also contacted other licensee employees including members of the engineering, operations, maintenance, and contract security staff.

2. Contractor Work Activities

During the recent Unit 2 refuel outage, the inspectors observed several contractor work activities. Activities monitored included operation of safety related system decontamination, reactor vessel level instrumentation (RVLIS) piping modifications, electrical cable pulls, and X-14 bellows repair activities. The inspectors also observed contractor personnel work performance in general. During the report period, the inspectors did not observe any inappropriate contractor work performance.

During this report period, no instances of contractor personnel failure to follow procedures were noted. Through discussions with pipe fitters, review of work packages, and observation of welding activities, no discrepancies were identified.

The inspectors reviewed documentation associated with the X-12 bellows replacement performed during Q1R12. Minor quality control problems were identified by the licensee during work performance. One instance involved the failure to adhere to procedures by a welder. The procedure

problem and other discrepancies were corrected. The work performed by the welder was verified through in-service inspection (ISI) examination prior to acceptance by quality control personnel. Overall, the bellows replacement was effectively controlled and the documentation appeared adequate. The inspectors also interviewed personnel involved in the QIR12 outage and did not identify any concerns.

No violations or deviations were identified.

3. Licensee Action on Previously Identified Items (92701, 92702)

- a. (Closed) Violation (254/91024-01(DRP)): Failure to submit a 30-day report as required by 10 CFR 50.73(a)(2)(v) when the reactor core isolation cooling (RCIC) system pump discharge valve failed to open. The licensee's corrective actions included: establishing an Event Review Committee (ERC) to ensure appropriate notifications were made when required, reviewing the Notice of Violation and contributing factors in relation to operator requalification training, and sending a letter to operations management personnel clarifying the 10 CFR 50.73 (a)(2)(v) reporting criteria. The inspectors attended various ERC meetings, reviewed the licensee's corrective actions, and discussed the functions of the ERC with licensee personnel. The inspectors had no further concerns on this issue. This item is closed.
- b. (Closed) Open Item (254/91024-04(DRP)): Review of maintenance intervals for the feedwater regulating valves (FRVs). Previously, a reactor transient occurred when the 1A FRV failed open at 34% when signaled to fully close from the control room. It was subsequently identified that the FRVs were not included in a formal maintenance program. Another event was exacerbated by similar problems with the FRV. Additionally, both the air operated (AO) and the hydraulically operated (HO) FRVs have had problems with sticking or hanging up when exercised. Several attempts were made by the licensee to solve the problems associated with the FRVs. The system engineer implemented a basic preventive maintenance schedule for the FRVs. The improved maintenance practices and schedule for the FRVs should enhance the valves reliability. This item is closed.
- c. (Closed) Violation (254/91024-05(DRP)): Inadequate work instructions resulted in a breach of secondary containment and an inadvertent actuation of the fire protection deluge system. The licensee's corrective actions for the first event included labeling positions of the drywell/torus purge fan suction and discharge damper operators, marking the drywell/torus purge fan and filters as secondary containment boundaries, and revising applicable procedures. The licensee's corrective actions for the second event included revising applicable procedures to ensure that deluge systems were restored in the proper sequence and including the event in licensed and non-licensed operator

training. The inspectors noted that the licensee's corrective actions for these events were complete and had no further concerns on this issue. This item is closed.

- d. (Closed) Unresolved Item (254/92025-02(DRP)): Failure to promptly identify and correct a standby gas treatment (SBGT) system design deficiency. The licensee identified the need to make changes in the nuclear engineering department (NED) organization prior to the discovery of this issue. These changes, which were planned to be implemented in mid 1993, should address the matter identified by the unresolved item. The inspectors will review the NED changes and the licensee's corrective actions during future routine inspections. This effort will be tracked as Inspection Followup Item (50-254/93011-01(DRP)). The unresolved item is closed.

No violations or deviations were identified.

4. Operational Safety Verification (71707)

The inspectors observed control room operation, reviewed applicable logs, and conducted discussions with control room operators. The inspectors reviewed the operability of selected emergency systems, reviewed tagout records, and reviewed the proper return-to-service of affected components.

Tours of accessible areas of the plant were conducted to observe plant equipment conditions, including potential fire hazards, fluid leaks, excessive vibration, and to verify that equipment discrepancies were noted and being resolved by the licensee.

The inspectors observed plant housekeeping and cleanliness conditions and observed implementation of radiation protection and physical security plan controls. Radiological protection relative to controlling cable hoses and materials appeared to be a weakness. Several instances of work control problems were identified during the report period.

Observations

- a. Unit 1/2 Emergency Diesel Generator (EDG) Cooling Water Pump Failure

On April 22, 1993, during a 4 kv undervoltage functional test for Unit 2, the Unit 1/2 EDG cooling water pump failed to start. Preliminary review of the event identified the failure was an electrical circuit problem involving interactions between an undervoltage relay, safe shutdown relay, and an anti-pump breaker mechanism. This condition existed on Unit 2 since initial plant construction. Subsequently, the licensee modified Unit 2 control circuitry to correct the problem. The modification to Unit 1 circuitry was scheduled for the next refueling outage. A special

inspection to review this event was conducted during the report period. Results of that inspection were documented in Inspection Report 254/265-93012(DRP).

b. Operator Errors

On April 20, 1993, during testing activities intended for the Unit 1/2 EDG, the nuclear station operator (NSO) mistakenly started the Unit 1 EDG. On April 23, 1993, during a routine activity, pumping of the drywell sumps, the same NSO unintentionally closed the Unit 1 reactor water cleanup system inboard suction valve instead of securing the drywell floor sump pump. Although the safety impact of both errors was minimal, the lack of attention to detail was of concern.

c. Primary Containment Expansion Joints

On April 12, 1993, Senior Flexonics (SF), a manufacturer of clam shell expansion joints, notified the licensee of a potential Part 21 notification on clam shell expansion joints. The two-bellow type expansion joints (X-12 and X-16B) were designed to deflect with the movement of the drywell while maintaining the containment boundary during a design basis accident (DBA). However, the bellows were incorrectly certified as hydrostatically tested. SF assumed that the bellows would receive a hydrostatic test after installation. SF failed to note the requirements of American Society of Mechanical Engineering (ASME) Code Section III that the stamping and certifying could not be completed until the hydrostatic test was completed. Through an onsite engineering evaluation, the licensee considered the bellows operable. That conclusion was based on the performance of pressure test of the bellows to 50 psig per the requirements of 10 CFR 50, Appendix J. The test pressure was greater than the maximum DBA pressure of 48 psig, but less than the containment design hydrostatic test pressure of 62 psig. The licensee planned to test both bellows during the next Unit 1 refuel outage to satisfy ASME Code hydrostatic testing requirement.

d. 1B Feedwater Regulating Valve (FRV) Controller Failure

On May 12, 1993, with reactor power at 100% the 1B FRV controller failed low. Reactor water level started decreasing rapidly. The unit Nuclear Station Operator (NSO) was attempting to null the controller at the time of the controller failure. The NSO took manual control of the FRV and recovered reactor water level. The NSO's prompt action prevented an automatic reactor trip on low reactor water level for Unit 1.

No violations or deviations were identified.

5. Monthly Maintenance Observation (62703)

Station maintenance activities for both safety related and non-safety related systems were observed and/or reviewed to ascertain that they were conducted in accordance with approved procedures, regulatory guides and industry codes or standards, and in conformance with Technical Specifications.

The inspectors observed or reviewed portions of the following maintenance activities:

- Unit 2 EDG Cooling Water Pump Replacement
- Unit 2 Penetration X-14 Bellows Replacement
- Unit 2 EDG High Crankcase Pressure Breaker Trip Troubleshoot and Repair
- Q07170 Oil Leak Repair on Unit 2 EDG
- Unit 2 Jet Pump Set Screw Repair

Unit 2 Emergency Diesel Generator (EDG) Cooling Water Pump Lubrication

On March 29, 1993, an auxiliary operator identified a lubrication piping problem with the Unit 2 EDG cooling water pump. One week prior to the problem identification, operators were briefed by engineering on potential oiler problems. Review of the condition identified the probable cause to be a lack of training for maintenance and operations personnel, and inadequate instructions for the maintenance activity which occurred January 1992. The work package, used to disassemble the pump and lubrication piping, did not contain any specific information concerning the correct configuration for the oiler piping. Initial inspection of the bearings identified that the ball bearing retainers were destroyed. A special inspection by the NRC staff was conducted. Results of that efforts were documented in Inspection Report 254/265-93012(DRP).

No violations or deviations were identified.

6. Monthly Surveillance Observation (61726)

During the report period, the inspectors observed surveillance test activities. Observations made included one or more of the following attributes: testing was performed in accordance with adequate procedures; test equipment was in calibration; test results conformed with Technical Specifications and procedure requirements; test results were properly reviewed; and test deficiencies identified were properly resolved by the appropriate personnel.

The inspectors observed or reviewed portions of the following test activities:

- QOS 6600-1 Unit 1/2 EDG Monthly Load Test
- QOS 6600-1 Unit 1 EDG Monthly Load Test
- QTS 170-3 Unit 2 Standby Liquid Control System Outage Surveillance

- QOS 5700-2 Unit 2 Bus 24-1 Undervoltage Test
- Unit 2 Residual Heat Removal Service Water Loop "B" Hydrostatic Test
- QC EMS 350-2 Unit 2 RHR Loop "A" Logic Test
- QTP1600-S4 Unit 2 Strongest Rod Out Test
- RHR Valve 2 to 4 Motor Rotor Pole Modification Test

Diesel Generator (DG) Modification Test M04-2-91-018

During modification testing on the Unit 2 EDG, a spurious EDG automatic start signal was received. The EDG was secured and a review of the event was initiated. The EDG automatic start was not reportable due to the EDG being out-of-service during test activities. The root cause was attributed to inadequate test procedures. The procedure directed a placement of a jumper which enabled energization of the EDG automatic start relay. The spurious start was considered an isolated event. Previous modification testing during the refueling outage did not identify any significant discrepancies. However, this event indicated a potential weakness in the onsite review (OSR) process. The inspectors will continue to monitor the OSR and modification testing activities. This is considered an Inspection Followup Item (254/265-93011-02(DRP)).

No violations or deviations were identified. One inspection followup item was identified regarding the OSR process and modification testing activities.

7. Reactor Building Floor Drain Check Valve Issue

On March 31, 1993, the shift engineer (SE) was notified that the check valves which prevent back-flow of water into the reactor core isolation cooling/core spray (RCIC/CS) and loop 1A of the residual heat removal (RHR) rooms were removed for maintenance without installation of pipe plugs. Investigation revealed that a temporary alteration (TA) requiring installation of pipe plugs prior to commencement of maintenance on the check valves lines was not in place. With the check valves removed, the temporary plugs were required to fulfill the safety function of the check valves. The check valves had been removed at about 9:00 a.m. The plugs were not installed until 3:00 p.m. The following is a summation, by department, of problems identified during the inspectors review of this event.

a. Operations Department

The SE approving the work did not communicate to the next shift that work would begin on the following shift. In the SE's review of the work request (WR), the TA was overlooked.

The oncoming SE assumed that the TA was completed when it was mentioned that the strainer installation on the check valve lines was to begin. Normally, the maintenance department would brief the SE before work in the plant was to commence. However, communication regarding details of the activity did not occur.

b. Mechanical Maintenance (MM) Department

The MM foreman, being unfamiliar with the TA process, assumed that the approval signatures at the bottom of the first page of the TA form meant that the TA was already completed. The MM foreman stated that use of TAs was infrequent and no attempt was made to clarify questions. This indicated a lack of questioning attitude by the MM foreman. The senior MM foreman, who normally requested the performance of the out-of-service (OOS) and TA by operations, also thought the TA sheet in the WR was a copy and assumed the TA was already completed. The MM department was required to ensure boundaries were in place before work began in accordance with Quad Cities Administrative Procedure (QAP) 1500-14, "Preparation And Control Of General Work Request." The plugs were not verified as installed before work began on the strainer installation.

c. Work Planning

Unlike the OOS numbers, the instructions to perform a TA were routinely included in the body of a WR instead of being highlighted on the front page of a WR. In the review of the WR when categorizing the WR, the operations engineer did not adequately address the safety significance of the work. Because the task of installing the strainers was considered easy and the check valves were classified as non-safety related, the WR was categorized as a general WR which contained only "recommended instructions." Therefore, the safety significance and impact were overlooked. Although in the same sump, two WRs were written to install screens for the four check valves for the 1A RHR and 1A CS/RCIC rooms, which added confusion to the activity. Due to the discrepancies identified, the inspectors concluded that the work request instructions were not adequate for the strainer installations.

d. Engineering Review

Since July 1990, these valves have been a problem due to corrosion and debris buildup in the valves. Initially, the licensee did not address prevention for valve corrosion and debris buildup; rather, a new valve design was selected to solve the problem. Subsequently, the failure history of the check valves warranted a higher level of attention. As with problems identified in previous inspection reports, this event was another example of a non-safety related component affecting safety related system operation. Failure to have adequate work instructions for the work activity and adhere to existing procedures is considered a Violation of 10 CFR 50, Appendix B, Criterion V (254/93011-03(DRP)).

One violation was identified.

8. Refuel Activities (60710)

Refueling activities continued on schedule with minimal discrepancies. Major evolutions completed during the report period were core reload, reactor vessel assembly, vessel hydrostatic test, X-14 bellows repair, RHR logic test, control rod drive (CRD) friction test, and CRD timing. The evolutions were well planned and managed. Outage completion was scheduled for May 28, 1993. During the report period, contractor activities observed were properly conducted in accordance with approved procedures.

a. Main Steam Line Plug Dislodging Event

On March 28, 1993, while the reactor cavity was flooded in preparation for vessel internal inspection, the "A" main steam line (MSL) plug became dislodged from the steam line nozzle in the vessel. The resultant surge of water into the "A" MSL created a hydraulic pressure transient which caused the "B" and "C" MSL plugs to become partially dislodged. No personnel injury or equipment damage occurred. There was some delay in outage work because additional boundaries had to be established.

A similar event occurred during the last Unit 1 outage. After this event, the licensee assembled an investigative team. Several problems were identified. Short term corrective actions were proposed and initiated. In addition, there were long term corrective actions proposed which received management review for implementation.

The root cause investigation could not identify a definitive root cause for the incident. The investigation was thorough and corrective actions were considered adequate.

b. Weld Crack On 2" Equalizing Line

On April 2, 1993, during a routine radiation inspection surveillance, a high concentration of smearable contamination was detected. Subsequent non-destructive testing revealed a through wall crack on the 2 inch recirculation equalizing line socket weld connecting to the recirculation manifold cross-tie valve 6B. The crack was 3/32-5/32 inches long. The weld was not part of the in-service inspection (ISI) scope due to the pipe size. The exact cause of the crack propagation could not be identified. The licensee discussed the issue with the NRC and received an approval to perform an overlay weld repair. The crack would receive a permanent repair during the next refuel outage.

9. Report Review

During the inspection period, the inspector reviewed the licensee's Monthly Performance Report for March 1993. The inspector confirmed that the information provided met the requirements of Technical Specification 6.9.1.8 and Regulatory Guide 1.16.

The inspector also reviewed the licensee's Monthly Performance Update Report for April 1993.

No violations or deviations were identified.

10. Management/Plant Status Meeting

A meeting was held on April 20, 1993, between the Site Vice President, Station Manager, Region III Deputy Director Division of Reactor Projects, Branch Chief DRP Branch 1, and members of their staffs. The purpose of the meeting was for the licensee to provide an update on the status of Units 1 and 2, and discuss recent personnel errors and equipment availability concerns.

No violations or deviations were identified.

11. Inspection Followup Items

Inspection Followup Items are matters which have been discussed with the licensee, which will be reviewed further by the inspectors, and which involve some action on the part of the NRC or licensee or both. An inspection followup item disclosed during this inspection is discussed in Paragraph 6.

12. Exit Interview

The inspectors met with the licensee representatives denoted in Paragraph 1 during the inspection period and at the conclusion of the inspection on May 18, 1993. The inspectors summarized the scope and results of the inspection and discussed the likely content of this inspection report. The licensee acknowledged the information and did not indicate that any of the information disclosed during the inspection could be considered proprietary in nature.