

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-254/92003 (DRP); 50-265/92003 (DRP)

Docket Nos. 50-254; 50-265

Licenses No. DPR-29; DPR-30

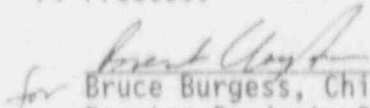
Licensee: Commonwealth Edison Company
Opus West III
1400 Opus Place
Downers Grove, IL 60515

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

Inspection At: Quad Cities Site, Cordova, Illinois

Inspection Conducted: January 5, 1992, through February 18, 1992

Inspectors: T. E. Taylor
J. M. Shine
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Approved By: 
for Bruce Burgess, Chief
Reactor Projects Section 1B

MAR 6 1992
Date

Inspection Summary

Inspection from January 5, 1992, through February 18, 1992 (Reports No. 50-254/92003 (DRP); 50-265/92003 (DRP))

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

Results: Of the areas inspected, no violations were identified. One unresolved item concerning procedure adherence pursuant to a new fuel mispositioning error was identified in paragraph 9.B.

Plant Operation

Overall plant operations have been steady. On February 7, 1992, a reactor scram occurred. Operator response was considered good. An Augmented Inspection Team (AIT) was sent to the site to review the scram. One area of concern was the number of off-normal instruments (ONI) in the control room. This issue was previously addressed by the resident staff and other inspectors. The licensee took aggressive corrective actions. The resident staff is evaluating future licensee efforts to control the number of ONIs. On February 14, 1992, a lightning strike occurred, resulting in a loss of all Unit 1 annunciators. An alert was declared for about an hour. The licensee

performed unit walkdowns and replaced annunciator fuses. An engineering evaluation for enhanced lightning protection is being performed.

Maintenance and Surveillance

- 1) Maintenance and surveillance activities during the Unit 2 refuel outage were monitored. In general, activities were performed in accordance with procedures in an adequate manner. One item of concern discovered during the Augmented Inspection Team (AIT) review of the scram that occurred on February 7, 1992, was the high pressure coolant injection (HPCI) system turbine stop valve overhaul in 1991. This item will receive further evaluation following issuance of the AIT report.
- 2) Repairs on the Unit 2 shroud access covers will extend the refuel outage to April 8, 1992.

Engineering and Technical Support

Overall engineering support for operations and maintenance activities has been adequate. Engineering support for the shroud access cover issue and torus surface metal impurities is considered good.

Radiological Controls

Overall radiological controls have been adequate. An increase in personnel contaminations has occurred during the Unit 2 refuel outage. The licensee is evaluating the contaminations to determine a means to reduce the number of contaminations.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- *R. L. Bax, Station Manager
- G. C. Tietz, Technical Superintendent
- *G. F. Spedl, Production Superintendent
- B. Strub, Assistant Superintendent - Operations
- R. Stols, Superintendent of Programs
- J. Fish, Master Mechanic
- J. Sirovy, Services Director
- *T. Tamlyn, Engineering and Nuclear Construction Site Manager
- *D. Craddick, Assistant Superintendent - Maintenance
- B. Tubbs, Operating Engineer - Unit 1
- J. Kopacz, Operating Engineer - Unit 2
- J. Swales, Work Planning Supervisor
- D. Bucknell, Assistant Technical Staff Supervisor
- *A. Misak, Regulatory Assurance Supervisor
- R. Walsh, Technical Staff Supervisor
- *C. Smith, "Year Quality Program Supervisor
- K. Leech, Security Administrator
- B. McGaffigan, Assistant Superintendent - Work Planning
- J. Hoeller, Training Supervisor
- D. Kanakares, Regulatory Assurance
- *L. Hamilton, Regulatory Assurance
- *K. Huisingh, Nuclear Quality Programs
- *J. Neal, Onsite Nuclear Safety

*Denotes those attending the exit interview conducted on February 18, 1992, and at other times throughout the inspection period.

The inspectors also talked with and interviewed several other licensee employees, including members of the technical and engineering staffs; reactor and equipment operators; shift engineers and foremen; electrical, mechanical, and instrument maintenance personnel; and contract security personnel.

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

- a. (Closed) Open Item (254/89027-01(DRP)): Failure of the Unit 1 Emergency Diesel Generator (EDG) to start upon turbine trip. On December 14, 1989, due to a turbine trip, the main generator field breaker opened. For .443 seconds transformer feeds to bus 14-1 were deenergized. The Unit 1 EDG run light came on, but the EDG did not auto start. The reason for the annunciator indication with no diesel start was differing relay characteristics, which reenergized the bus from the transformer before the EDG was required to auto start. Discussions with several operations and engineering personnel confirmed that the EDG, as designed, would

not start with a loss of unit auxiliary transformer unless offsite power was lost also. During each refueling outage, surveillance tests are performed to verify the operation of logic circuitry for the EDG for a loss of offsite power. Based on the above evaluation, this item is considered closed.

No violations or deviations were identified.

3. Operational Safety Verification (71707)

During the inspection period, the inspectors verified that the facility was being operated in conformance with the licenses and regulatory requirements, and that licensee management was effectively carrying out its responsibilities for safe operation. This was done on a sampling basis through routine direct observation of activities and equipment, interviews and discussions with licensee personnel, independent verification of safety system status, and review of facility records. During the current Unit 2 refuel outage, operator performance and overall control of refuel and unit activities have been handled well. Consideration of shutdown risk for activity scheduling has been observed. The AIT, while reviewing the February 7, 1992, scram event, characterized operator performance as good.

On a sampling basis the inspectors daily verified: adequate control room staffing and coordination of plant activities with ongoing control room operations; operator adherence with approved procedures; operation as required by Technical Specifications (TS); adequate monitoring of control room instrumentation for abnormalities; that onsite and offsite power was available; plant and control room visits were made by station managers; and safety parameter display system (SPDS) operation.

During tours of accessible areas of the plant, the inspectors made note of general plant and equipment conditions, including control of activities in progress (maintenance and surveillance), observation of shift turnovers, and general safety items. The specific areas observed were:

a. Engineered Safety Features (ESF) Systems

Accessible portions of ESF systems and components were inspected to verify: valve position for proper flow path; proper alignment of power supply breakers for proper actuation on an initiating signal; proper removal of power from components if required by TS or Final Safety Analysis Report; and the operability of support systems essential to system actuation or performance through observation of instrumentation and/or proper valve alignment. The inspectors also visually inspected components for leakage, proper lubrication, and cooling water supply.

b. Radiation Protection Controls

The inspectors verified that workers were adhering to health physics procedures for dosimetry, protective clothing, frisking, posting, and selectively monitored radiation protection instrumentation for proper use, operability, and calibration. Personnel contaminations have increased due to refuel outage activities. A number of the contaminations have occurred in clean areas. Licensee radiation protection personnel are investigating the contamination events.

c. Security

The inspectors, by sampling, verified that persons in the protected area (PA) displayed proper badges and had escorts if required; vital areas were kept locked and alarmed, or guards posted if required; and personnel and packages entering the PA received proper search and/or monitoring.

d. Housekeeping and Plant Cleanliness

The inspectors monitored the status of housekeeping and plant cleanliness for fire protection and protection of safety-related equipment from intrusion of foreign matter.

The inspectors also monitored various records, such as tagouts, jumpers, shift logs and surveillances, daily orders, maintenance items, various chemistry and radiological sampling and analyses, third party review results, overtime records, quality assurance and/or quality control audit results and postings required per 10 CFR 19.11.

No violations or deviations were identified.

4. Monthly Maintenance Observation (62703)

Station maintenance activities 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 following items were considered during this review: the limiting conditions for operation were met while components or systems were removed from and restored to service; approvals were obtained prior to initiating the work; functional testing and/or calibrations were performed prior to returning components or systems to service; activities were accomplished by qualified personnel; and proper radiological and fire prevention controls were implemented.

The following maintenance activities were observed and reviewed:

Unit 1/2

Work Request (WR) Q72690, Cleaning, Inspection, and Lubrication of
345 kv Breakers

WR Q97792, Replacement of Breaker for U-2 Battery Room Line Heater

Unit 1

Repair and overhaul of High Pressure Coolant Injection Stop Valve
Replacement and Calibration of B Main Steam Line Flow Transmitter

Unit 2

WR Q97384, 385, 386 Reactor Building Isolation Damper Repairs

WR Q81876, Welding Steel Plate on Feedwater Heaters

WR Q22660, Repair Oil Leaks on U-2 Emergency Diesel Generator
(EDG) Governor

WR Q97992, HPCI Stop Valve Disassembly and Repair

WR Q98139, Investigation of Why EDG Field not Flashing at
8:00 p.m.

The inspectors monitored the licensee's work in progress and verified that it was being performed in accordance with proper procedures and approved work packages.

No violations or deviations were identified.

5. Monthly Surveillance Observation (61726)

The inspectors observed surveillance testing required by Technical Specifications during the inspection period and verified that testing was performed in accordance with adequate procedures, that test instrumentation was calibrated, that results conformed with Technical Specifications and procedure requirements and were reviewed by personnel other than the individual directing the test, and that deficiencies identified during the testing were properly resolved by the appropriate personnel.

The inspectors also witnessed portions of the following test activities:

Unit 1/2

QOS 6600-1 Emergency Diesel Generator (EDG) Monthly Load Test

Unit 1

QCOS 1000-2 Monthly Residual Heat Removal (RHR) Pump/RHR
Service Water Pump Operability Test

QCOS 1400-2, 4 Monthly Core Spray Pump/Valve Operability Test

QOS 6600-1 Diesel Generator Monthly Load Test Temporary Procedure
7483, Measuring the Differential Pressure Across
Control Rod Drive J-2

Unit 2

250 Volt Battery Service Test

QOS 6600-1 Diesel Generator Load Test

No violations or deviations were identified.

6. Refuel Activities (60710)

The Unit 2 refuel outage commenced on January 2, 1991. Major work activities have been: the reactor vessel head removal, in-service inspection of reactor vessel, core defuel, recirculation system decontamination, control rod drive replacement/repair, annunciator system repairs/modifications, motor operated valve (MOV) votes testing, local leak rate testing, the MOV 2 to 4 rotor modification, main turbine generator overhaul, HPCI turbine overhaul, drywell hardened vent modification, and installation of penetration for the reactor vessel level instrumentation modification.

Overall, the outage has been well managed. The new outage organization with a couple of minor changes has functioned well. Delays due to diesel generator problems, initial out-of-service (OOS) system backlogs, and an over-aggressive MOV schedule have been handled well with minimal effect on the outage schedule.

At the beginning of the outage, some problems were encountered with the new OOS system. This caused some delays in the motor-operated valve (MOV) work activities. Also due to emergent work for valve repairs, the scope of MOV outage work was reduced. With the exception of the initial OOS problems and MOV work activities, the original outage scope has remained close to schedule. However, due to a problem associated with the shroud access covers, the outage has been extended to April 8, 1992. The original completion date was March 19, 1992. Approximately 260 new work requests have been added for additional activities during the outage extension.

a. Torus Surface Metal Impurities

During painting activities and subsequent ultrasonic testing, five "cold lap" defects were identified in the torus. "Cold laps" are surface metal impurities introduced during manufacture. Each "cold lap" defect was ground out and recoated to avoid additional corrosion. The repairs did not reduce the torus wall to less than minimum wall thickness. An engineering evaluation was performed and the results supported continued operation. Evaluation of long-term solutions for any additional "cold lap" defects will be performed.

b. Cracking of Shroud Access Hole Cover Welds

On January 20, 1992, the shroud access hole covers (SAHC) in the lower plenum of the reactor vessel were discovered to have circumferential weld cracks. In-service inspection of the SAHC welds has indicated cracking problems at several plants. The licensee has contracted General Electric to undertake repairs of the SAHCs. The repair involves cutting a hole in the SAHC, dropping a hinged toggle clamp through the hole, and bolting a new

cover over the existing SAHC. Follow-up inspections during refuel outages and operating surveillances to monitoring the differential pressure between the annulus and lower vessel region will be used to evaluate integrity of the SAHCs. Due to the repair, the outage will be extended approximately two weeks. The new projected completion date of the outage is April 8, 1992.

No violations or deviations were identified.

7. Training Effectiveness (41400, 41701)

The effectiveness of training programs for licensed and non-licensed personnel was evaluated by the inspectors, by witnessing performance of surveillance, maintenance, and operational activities. In general, activities performed indicated an effective training program.

No violations or deviations were identified.

8. Report Review

During the inspection period, the inspector reviewed the licensee's Monthly Performance Report for December 1991. 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 Trend and Analysis Report for December 1991.

No violations or deviations were identified.

9. Events (93702)

a. Loss of All Unit 1 Annunciators

At 10:40 p.m., on February 14, 1992, all annunciators for the unit control panels were lost and an alert was declared. At the time of the alert Unit 1 was shut down following a reactor scram on February 7, 1992. The loss of annunciators was due to a lightning strike causing a loss of the 345 kv transmission line 0405 (Rock Creek). The subsequent power surge caused fuse degradation for the Unit 1 annunciator panels. Unit 2 was not affected. At 10:55 p.m. all annunciators, except for the 901-6 panel, were restored. A fuse for the 901-6 was replaced, and all annunciators were restored. The licensee replaced the main annunciator fuses and walked down all annunciator panels to assure no apparent problems existed. The alert was terminated at 11:54 p.m.

Following the annunciator loss, the main fuses were removed, a satisfactory continuity check performed, and the same fuses were reinstalled. This resulted in restoration of power to the annunciators. Subsequent to this, the main annunciator fuses were replaced with new fuses. Further investigation identified that

one of the main annunciator fuses in place during the lightning strike had internal separation at one of the fuse links.

Subsequent to the event, the licensee has walked down all the annunciator panels and the 125 Vdc system with no apparent discrepancies. Also, an engineering evaluation to determine a resolution for future lightning strike protection has been initiated. The evaluation will consider the effects of a single failure for loss of offsite power and subsequent effects on the main annunciator fuses. On February 18, 1992, a Unit 1 start-up was initiated.

b. New Fuel Bundle Mispositioning Error

On January 24, 1992, a new fuel mispositioning error occurred in the spent fuel pool. Fuel handlers were transferring unirradiated fuel from the dry storage vault to pool storage rack locations. The fuel handling foreman (FHF) was verifying serial numbers of the fuel matched the nuclear component transfer list (NCTL) during the vault to prep machine phase of the transfer. Another fuel handler then specified rack location, per the NCTL, to the grapple operator, who then moved the fuel from the prep machine to the rack. The above fuel handler then verified proper bundle location. The fuel handler checked off an extra step as complete during the transfer.

The error resulted in misplacement of nine fuel bundles. The deviation was discovered when the FHF signaled the fuel handler that a page of the NCTL was about to be completed, who then noted the discrepancy. Fuel moves were halted with a bundle on the mast until the NCTL was revised to resolve the positioning concern. The bundle was then placed in a storage rack, with further moves suspended pending event review.

Interviews of the crew indicated that the apparent causes of the event were personnel error by the fuel handler and lack of independent verification. The administrative error by the fuel handler, coupled with no procedural requirements to verify the information provided by the fuel handler, caused the bundle misplacements. Additionally, the shift supervisor was unaware fuel moves had been in progress. The licensee attributed this to ambiguity in procedural guidance for the evolution, which caused the communication breakdown.

The safety consequences of the event appeared minimal. The licensee, through the routine fuel pool audit and double verification core reloading process, would have detected the misplacement error prior to placing fuel in the vessel. No challenge to spent fuel pool subcriticality margin occurred. The FHF was directing the activity when the misplacement occurred, and detected the error prior to the pool audit.

Corrective actions taken to prevent recurrence included procedure revisions to clearly require shift supervisor authorization as a prerequisite. Additionally, the procedure was enhanced to require double verification of both phases of the vault to rack transfer. Training on the event and subsequent procedure changes were conducted by the FHF prior to each crew's resumption of fuel moves.

The inspector reviewed the event and concluded that the corrective actions taken appeared adequate to prevent recurrence. However, the breakdown in communication is of concern. Communication breakdowns were identified as causal factors leading to past events of greater safety significance. The inspector is currently reviewing that communications were handled in accordance with applicable procedures. This concern will be considered an unresolved item (254/92003-01(DRP)) pending the result of this review.

c. Reactor Scram With Subsequent Equipment Failures

At approximately 2:01 a.m., on February 7, 1992, Unit 1 experienced a Group I isolation and subsequent reactor scram from 100% power. The apparent cause of the isolation was a spurious signal tripping the main steam line high flow protection system. Root cause of the isolation is considered unknown. Complications due to apparent equipment failures arose during scram recovery. These concerns included failure of the reactor feedwater pumps to trip at the appropriate set point, failure of the "C" electromagnetic relief valve to open upon manual initiation, and anomalies associated with main steam line flow indication. Operator response and utilization of the emergency operating procedures to stabilize the reactor were considered good.

NRC response to the event included routine resident inspector response and an Augmented Inspection Team (AIT). The AIT was dispatched to the site to assess the event and independently determine root causes of the scram and equipment failures. Additionally, an inspector from the Office of Analysis and Evaluation of Operational Data responded to gather data to perform a risk assessment of the event. A Confirmatory Action Letter documenting licensee initiatives in response to the event was issued on February 7, 1992. A significant amount of media attention was received throughout the event. The findings of the AIT will be documented in inspection report 254/92007. The risk assessment of the event will be documented in a separate correspondence.

One unresolved item and no violations or deviations were identified.

10. Meetings and Other Activities (30702)

On February 13, 1992, a public exit meeting was conducted by the Augmented Inspection Team (AIT) concerning the February 7, 1992, scam event. The Deputy Regional Administrator for Region III gave opening and closing remarks with the AIT Team Leader stating the team inspection findings. Representatives from local television, radio, and newspapers were present.

No violations or deviations were identified.

11. Unresolved Items

An unresolved item is a matter about which more information is required in order to ascertain whether it is an acceptable item, an open item, a deviation, or a violation. An unresolved item disclosed during this inspection is discussed in paragraph 9.b.

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 February 18, 1992. 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.