U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-254/92012(DRS); No. 50-265/92012(DRS)

Docket Nos. 50-254; 50-265 Licenses No. DPR-29; No. 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: April 20 through May 8, 1992

Inspectors: _____ 6/22/92
G. M. Nejfelt Date

_____ 6-22-92
R. M. Lerch Date

Approved By: _____ 6/22/92
B. L. Burgess, Chief Date
Operational Programs Section

Inspection Summary
Inspection conducted April 20 through May 8, 1992 (Reports No. 50-254/92012(DRS); No. 50-265/92012(DRS))
Areas Inspected: Routine announced safety inspection of modification and design changes (MC 37700), including engineering and technical support (E&TS) with followup of a previously identified E&TS violation (MC 92702).
Results: One open item was opened to track resolution of technical staff engineer post-modification testing responsibilities (Paragraph 3.b). Also, one violation was identified for failing to perform an adequate safety evaluation (Paragraph 3.c).

Demonstrated strength was:

- Performance-based licensee audits of onsite engineering activities (Paragraph 4).

Demonstrated weaknesses were:

- Omission of Nuclear Quality Production (NQP) audit findings into the station trending database (Paragraph 4).
- Station departmental communication (Paragraph 5).
- System engineer's ownership for assigned equipment (Paragraphs 3.b and 7).

REPORT DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

+#R. L. Bax, Quad Cities Station Manager
#J. Renwick, CECo Project Manager, Downers Grove
G. Spedl, Quad Cities Production Superintendent
+ G. Tietz, Station Technical Superintendent
+ A. L. Misak, Regulatory Assurance Supervisor
+#C. A. Moerke, Quad Cities Site Supervisor, Engineering and Construction (ENC)
#M. Neels, Quality Control (QC) Supervisor
#R. Walsh, Technical Staff Supervisor
C. Smith, Nuclear Quality Production (NQP) Supervisor
#R. Dammann, Technical Staff Assistant Supervisor
#T. Tamlyn, Project Manager, ENC
+#D. Kanakares, NRC Coordinator
+#S. Stapp, Nuclear Quality Programs
C. Iben, Technical Staff
K. Johnson, NQP Engineer
T. Fuhs, Operating Experience (OPEX) Supervisor

U. S. Nuclear Regulatory Commission (NRC)

+ A. H. Hsia, Acting Section Chief, DRP, RIII
T. E. Taylor, Senior Resident Inspector, Quad Cities
+#G. M. Nejfelt, Inspector
+#R. M. Lerch, Inspector
J. Shine, Resident Inspector, Quad Cities
+#P. F. Prescott, Resident Inspector, Quad Cities

+Denotes individuals who attended interim exit meeting on April 24, 1992.

#Denotes individuals who attended exit meeting on May 8, 1992.

2. Licensee Action on Previous Inspection Violation (92702)

(Closed) Violation 50-254/91005-01: Cited two examples of inadequate modification design control. NRC letter of May 24, 1991, rescinded the first example, not reviewing diesel generator lube oil instrument seismic qualification test results, because no oil level indication was required in a seismic event. The second example, not specifying motor operated valve (MOV) limit switch ranges in work procedures (e.g., Modification M04-1-88-016) resulted in revising Maintenance Procedure QEMP 600-1 to include specific MOV limit switch ranges. This violation was closed.

3. Design Changes and Modifications (37700)

The following modification packages were reviewed for such items as design assumptions, safety-evaluations, post-modification testing, supporting procedures, the potential for unreviewed safety questions, and field verification. Unless otherwise noted, the modification adequately addressed technical, programmatic, and regulatory requirements.

a. Major Modifications

- Major Modification No. M04-89-039 provided continuous lubrication to the standby emergency diesel generator (EDG).

- Major Modification No. M04-2-88-061 removed an unreliable torus level recorder. The remaining torus level instrumentation complied with Technical Specifications and the Final Safety Analysis Report.

- Major Modification No. M04-2-90-003A installed the containment harden vent. The inspector witnessed limited post-modification test activities of this installation. Job assignments and pre-test briefings performed by a lead contractor employee were both well planned and executed w[illegible]h Technical Support Staff assistance.

b. Minor Modification

- Minor Modification No. P04-2-90-168 involved hinge pin modification and disk assembly replacement for a number of nonsafety-related check valves in the HPCI, RHR, and RWCU systems. Post-modification testing to verify check valve seating was not considered. This was a concern because potential safety system function degradation was ignored. A followup review was made by the inspector and a licensed senior reactor operator, which concluded that no apparent safety function was adversely affected.

  During six interviews of the technical staff, it was repeatedly found that engineers were relying on maintenance work planners or design engineers to prescribe post-maintenance and post-modification testing. This conflicted with the station procedure for technical staff engineers

(i.e., QAP 1270-14, Revision 3, "GUIDELINES FOR DEVELOPMENT OF MODIFICATION TESTS, Paragraph e.1), which stated that additional testing may be required to fully test the modification. The additional testing referred to testing beyond the minimum testing requirements provided by design engineering for engineer assisted modifications.

The procedural requirements provided were ambiguous. In addition to QAP 1270-14 above, QAP 1270-5, Revision 9, "REQUIRED TESTS OF MODIFICATION," Paragraph 2.a, stated that "Modification test requirements . . . will normally be specified by the designer of the modification . . ." and QAP 1270-17, Revision 3, "MINOR DESIGN CHANGE PROCEDURE," Paragraph C.8, stated that "The Cognizant Engineer will ensure that the tests . . . will meet or exceed . . . the acceptance testing checklist." For the check valve work, which was a minor design change, the mechanical test portion was marked as applicable. However, each of the 59 line items for the mechanical test was marked as not applicable (e.g., line items for check valve leakage). Technical staff engineers stated that there was probably no practical way to seat leak test these valves, although no other means of seat integrity verification was considered. Resolution of post-modification testing responsibilities was an open item pending a written response from the licensee (50-254/92012-01).

c. Temporary Modifications

- Temporary Modification No. 92-2-61 repaired a leaking heat exchanger tube in the Unit 2, 2C room cooler in the B/C residual heat removal service water (RHRSW) pump vault. Safety evaluation SE 92-76 dated March 11, 1992, did not evaluate the effects of notching an internal support piece in order to install a tube patch. The inspector communicated to the licensee's technical staff that the remaining tubes could potentially be affected in exactly the same location as the original tube.

  The licensee and vendor engineering performed an additional followup review. The review concluded that based on engineering judgement the cooler tubes would be essentially unaffected by the repair. The engineering review concluded that no safety function was

adversely affected. Review of the vendor assessment noted that the licensee's vendor cited removal of 1% of the support sheet area as part of its engineering bases while it would be more appropriate to consider that approximately 75% of the support sheet cross-section was removed. The reviewing organizations, licensee and vendor had also reviewed the original temporary modification and failed to address the modified support. The modification was temporary because the cooler was scheduled to be replaced at the next refueling outage in approximately 18 months.

10 CFR 50.59(b)(1) requires that safety evaluations document the bases why adverse conditions would not result from changes made to a facility. This was not done for SE 92-76 and is considered to be a violation of 10 CFR 50.59 (50-265/92012-02).

- Temporary Modification No. 91-1-23 installed a replacement tee connection to improve the off-gas main chimney monitor line flow. However, this temporary modification that was intended for two weeks was installed for 14 months with no permanent modification planned. Upon questioning by the inspector, the licensee closed this modification by revising the component replacement program listing. No modification was needed because no drawing change was required and like-for-like replacement was made (e.g., the tee connection manufactured from a steel block was replaced with a fabricated component).

The temporary modification program covered a wide range of work activities from simply lifting leads to complex temporary repairs. As noted above and in Paragraph 3.b, technical staff engineers demonstrated weaknesses in their assessment of the potential impact that modification work might have. The long term installation of a temporary modification and inadequate safety evaluation were indicative that greater control and oversight of these activities were needed.

4. Management of Station Trending Database

The Regulatory Assurance Department developed and maintained the station database that was used to identify engineering

performance trends. The current trending system was viable and provided management with a foundation to evaluate station and departmental effectiveness.

The most notable source of information omitted in the station trending database was performance-based NQP audit items that corrected problems during audits. For example, NQP Audit of February 7, 1992, QAA 04-92-01C, identified modification work procedures that:

- failed to consider an annunciator alarm;
- provided an ambiguous step to attach an automatic depressurization system (ADS) electrical connection; and
- furnished a technician with an outdated checklist to disconnect high voltage cables.

The Assistant Maintenance Superintendent wrote (in Audit Evaluation of February 14, 1992) that " . . . a list of minor problems seen during the audit [QAA 04-92-01C] . . . might help me address an issue before it becomes a major problem." Interviews with the NQP and Regulatory Assurance Supervisors found that both supervisors concurred that more needed to be done with information obtained from NQP audits (e.g., enter information into station database).

5. Effectiveness of Station Interdepartmental Communication

During the inspection, several instances of interdepartmental communication problems were noted. For example, effective information feedback would have prevented the following situations:

- System engineers were not aware of their responsibilities to implement Maintenance Department Procedure QCAP-500-23 to resolve equipment root cause problems by using problem analysis data sheet (PADS). This resulted in a backlog of items pending technical support staff action.
- Technical support staff neither received nor provided input, as intended by use of the "Aggregate Trend Report," to support formulation of site management priorities.
- NQP Audit Report, QAA 04-92-01C, failed to permanently correct a cited concern for not specifying electrical block screw torquing requirements in work packages. In an interview three months after this NQP audit, an electrical work analyst stated these torquing

requirements were within the capabilities of the skill of the craft, and were not required to be included in the work package.

- A system engineer, who was aware that the on-the-job-training (OJT) requirements for control rod friction and insert rod time tests had been erroneously deleted in OCTP 140-3, Revision 0, did not initiate a procedural revision.

A positive item was the pro-active approach taken by a NQP auditor (See Audit QAA 04-92-01C of February 7, 1992) to prevent a technician from using an outdated modification checklist prior to removing a high voltage cable.

6. Engineering Corrective Action

To improve engineering performance, management recently re-instituted the "Manager's Top Ten List" to address a number of acute problems (e.g., technical support staff backlogs of modifications and PADS reviews). Management established criteria for measuring engineering performance by the "[April] 1992 Management Plan." This plan provided performance expected for reducing the backlog of open modifications and tools to perform comprehensive 10 CFR 50.59 safety evaluations.

Requests for engineering assistance from other plant departments were typically handled effectively. For example, licensed operator training material was revised timely to reflect HPCI modifications. The most notable exceptions of site engineering assistance to other departments were (1) the system engineering backlog for determining maintenance root cause failures (Paragraph 5), and (2) a corrective action failure to address valve galling that was caused by valve welding (See NRC Inspection Report No. 50-254/92011).

A portion of the documentation for the closure of the licensee's Performance Enhancement Program (PEP) items was reviewed. Many of the items were assigned to the Engineering Nuclear Construction (ENC) organization. With the exception of an unmonitored fuse issue, the activities documented appeared satisfactory. The PEP items were a top management list of priority concerns with little input from the technical staff. The closure sign-offs also gave no indication of station technical staff input. The technical staff supervisor indicated that many items were assigned to ENC due to the resources available and that discussions held between the groups were not in the documentation. This approach raised a concern regarding issues or responsibilities for which the station technical staff may

not take on ownership but, in fact, ultimately must accept responsibility. One example of this was noted with regard to post-modification testing. This will be improved by the initiation of the station management plan which has staff input and managers concurrence prior to implementation.

Regarding the unmonitored fuse issue, which dated back to 1987, the licensee took the initiative through corporate engineering and vendors to study the issue of the adequacy of monitoring fuse status. The concern was that an unmonitored fuse could be blown and disable safety-related equipment for an unknown period. A PEP item was opened to evaluate a fuse in the standby gas treatment system that was found blown. The licensee's review determined that the problem was discovered by the surveillance program on an 18 month cycle which met all code requirements as well as Technical Specifications. The PEP item was initiated and signed off completed by the PEP manager and the ENC representative. No technical staff input was made. The technical staff could not provide a cognizant staff engineer or documentation to address this issue when the inspector questioned the basis for whether vendor recommendations were implemented or not. Of concern were unmonitored fuses identified in a fuse surveillance evaluation by the General Electric Company (GE) dated July 10, 1989, and their disposition. Eight fuses were identified in the audit as requiring surveillances as follows:

287-711B and 287-712B	—	ADS Backup Power Supply
233-772 and 2330-723	—	HPCI Backup Power Supply
F35 and F36	—	HPCI Auxiliary Relays
DDF4 and DDF5	—	HPCI Backup Power Supply

The licensee initiated surveillances once per refueling cycle. During this inspection, the licensee committed to increase the surveillance frequency on these fuses to quarterly. Four other fuses, two 15 ampere fuses at switchboard SWGR 13-1 for the 1/2 diesel generator (DG) auto start relay, and two 15 ampere fuses at SWGR 23-1 for the 1/2 DG auto start relay were identified as in need of more frequent surveillances. Surveillance frequency was once each refueling cycle. The GE evaluation stated that "monthly surveillance of these fuses may be required." No basis was provided. These fuses are significant because failure would defeat the auto-start of the 1/2 DG.

The technical staff reported that it was believed that quarterly surveillances were performed for three periods beginning in 1989; however, the surveillances had to be intrusive to the circuits and the benefits were not deemed to justify the risk of perturbing the circuit. Surveillances have been maintained on a fuel cycle

frequency. Failure history that was initiated in 1987 and based on the work request system did not indicate a fuse failure problem, but may not be a complete history. The licensee reported that a fuse survey was in progress which might be used to review the appropriateness of surveillances in the future. At the time of the inspection, the licensee met or exceeded regulatory and license requirements.

7. Engineering Staffing

Technical support staff experience has improved, because the majority of the 38 system engineers hired two years ago remained with the Staff. Engineering routinely reviewed and evaluated nonconformance and deficiency reports, work packages, and industry and NRC information to factor lessons learned into their program. Because of non-outage work load, the technical support staff, on occasion, relegated work to ENC (e.g., Performance Enhancement Program (PEP) issues).

System engineers were knowledgeable of their principal systems; however, knowledge of backup systems ranged from not knowing what backup systems were assigned to excellent (because it had been their principal system). The role as a backup system engineer was further hampered by inconsistencies in maintaining system notebooks. For example, in the RHR system notebook, the last event log entry was made 4 months earlier and no record of biweekly tours was maintained (required by QTP 010-T6, Revision 1 and QTP 10-T7, Revision 1).

Current program implementation problems were acknowledged by management and were the result of not obtaining feedback to verify program effectiveness. For example, system engineers were considered the focal point for all system work; however, system engineers neither assumed ownership for modification testing (See Paragraph 3.b) nor assessed site trending for potential engineering work (e.g., review of site "Quarterly Aggregate Trend Report"). Other examples of program implementation weaknesses were (1) the limited design basis information available to engineers, (2) failing to take corrective action to address valve galling that was caused by valve welding, and (3) not performing check valve seat leakage verification after modifications.

8. Training and Qualification Program

The system engineering staff core training consisted of a system engineering course (e.g., four weeks) and relevant licensee operator system training (e.g., one to five days). To supplement system engineering OJT, system engineers were afforded opportunities to attend seminars and workshops that

were outside the licensee's site organization.

To augment management's efforts to correct problems in preparing safety evaluations, training was provided to a select group of system engineers. A noticeable improvement in safety evaluation training was demonstrated comparing:

- a safety evaluation written after the training (e.g., SE 92-83 dated April 11, 1992, to install alternate CO_2 discharge nozzles into the Unit 1 diesel generator and day tank rooms)

TO

- safety evaluations written before the training (e.g., SE-91-281 to bypass the low reactor water level group III isolation signal).

Finally, the technical support staff was remiss in maintaining engineering training deviations as procedurally required (QTP 010-5, Revision 5, dated January 1992, p. 8) for ensuring that each system engineer was appropriately qualified prior to assignment of systems. However, no specific examples of engineering judgement lapses were identified.

9. Open Items

Open items are matters which have been discussed with the licensee, which will be reviewed further by the inspector(s), and which involve some action on the part of the NRC or licensee or both. An open item disclosed during this inspection is discussed in Paragraph 3.b.

10. Exit Meeting

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on May 8, 1992. The inspectors summarized the scope and findings of the inspection activities. The licensee acknowledged the inspection findings. One violation was identified for the safety evaluation lacking seismic consideration (see Paragraph 3.c). The inspectors also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such document/processes as proprietary.

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