

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-254/85-02(DRS); 50-265/85-02(DRS)

Docket No. 50-254; 50-265

License No. DPR-29; DPR-30

Licensee: Commonwealth Edison Company
P.O. Box 767
Chicago, IL 60690

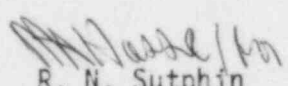
Facility Name: Quad Cities Nuclear Power Station, Units 1 & 2

Inspection At: Cordova and Chicago, IL

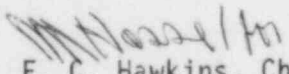
Inspection Conducted: January 21-25, February 5-7, 1985 at Cordova, IL
January 30 and February 1, 1985 at Chicago, IL

Inspectors: 
R. A. Hasse

3-1-85
Date


R. N. Sutphin

3-1-85
Date

Approved By: 
F. C. Hawkins, Chief
Quality Assurance Programs Section

3-1-85
Date

Inspection Summary

Inspection on January 21-25, January 30 and February 1, and February 5-7, 1985
(Report No. 50-254/85-02(DRS); 50-265/85-02(DRS))

Areas Inspected: Routine, unannounced inspection by two regional inspectors of licensee action on previous inspection findings; nonroutine reporting program; test and measuring equipment program; design change and modification program; audit program; and independent verification of equipment status. The inspection involved a total of 88 inspector-hours onsite and 12 inspector-hours at the corporate offices.

Results: Of the six areas inspected, no items of noncompliance or deviations were identified in five areas and one item of noncompliance with four examples were identified in one area (failure to adequately control design changes and modifications - Section I, Paragraph 1.b).

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DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- *N. Kalivianakis, Plant Superintendent
- **T. Tamlyn, Assistant Superintendent, Operations
- **G. Spedl, Technical Staff Supervisor
 - G. Carney, Modifications Coordinator
- **H. Griser, Senior QA Inspector
- **D. Rajcevich, Supervisor, I&C
- **C. Smith, QC Supervisor
 - M. Strait, SNED Engineer
 - J. Abel, Manager, SNED
 - J. Bitel, Director of QA, Operations

US NRC

- **A. Madison, Senior Resident Inspector
- **A. Morrongiello, Resident Inspector

Other personnel were contacted as a matter of routine during the inspection.

*Indicates those attending the exit meeting on January 25, 1985.

**Indicates those attending the exit meeting on January 25, and the exit meeting on February 7, 1985.

2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (254/84-11-05): Adequacy of design review for modifications to the Unit 1 bottom head drain line. This item has been escalated to an item of noncompliance (254/85-02-1B). See Section I, Paragraph 1.b.(2) of this report.

3. Program Areas Inspected

Details of the program areas inspected are documented in Sections I and II of this report.

SECTION I
Prepared By: R. A. Hasse

1. Design Changes and Modifications

This inspection focused on three recent Licensee Event Reports (LER's) resulting from faulty plant modifications and an unresolved item related to plant modifications identified by the Senior Resident Inspector. The inspector reviewed these items against the design change and modifications program to determine if they resulted from programmatic deficiencies or inadequate program implementation or both.

a. Documents Reviewed

- (1) Quality Requirement (Q.R.) No. 3, "Design Control", Revision 13.
- (2) Quality Procedure (Q.P.) No. 3-51, "Design Control for Operations - Plant Modifications", Revision 20.
- (3) QTP 500-11, "Safety-Related, Code Related, and Engineering Assisted Modifications", Revision 22.
- (4) QAP 300-12, "Electrical Jumpers and Relay Blocks", Revision 10.
- (5) SNED/PE Procedure Q.1, "Safety-Related and ASME Code Design Specifications", Revision 3.
- (6) Q.6, "Modifications Originated by Station Technical Staff", Revision 8.
- (7) LER 84-12, "Standby Gas Treatment System Trains Declared Inoperable Due to Loss of Heaters", August 6, 1984.
- (8) LER 84-14, "M01-1001-29A and 1-1001-29B (LPCI Valves) Failure", August 14, 1984.
- (9) LER 84-17, "Steam Jet Air Ejector Valves Incorrectly Installed", September 14, 1984.

b. Results of Inspection

The findings of the inspection and an assessment of the corrective actions taken by the licensee are summarized in the following paragraphs.

(1) LER 84-012, Standby Gas Treatment (SBGT) System

On August 1, 1984, the SBGT system was modified by the installation of jumpers intended to bypass the heater high temperature cutoff switches. The modification was made without the benefit of a design review; an on-site review as required by Technical Specification, Section 6.1.G.2.a.4; or post-installation testing to verify the adequacy of the design or its installation.

As a result, the jumpers were installed across the wrong terminals. When the SBGT system was called upon to operate, due to the loss of the Reactor Protection System (RPS) 1 D MG set, both trains proved inoperable. The jumpers, as installed, provided a short circuit on the secondary side of the transformers in the heater logic circuit for both SBGT system trains. At the time of the occurrence, Unit 1 was in a refueling outage and Unit 2 was operating at 100% power.

This failure to adequately control the SBT system modification, resulting in this safety system being inoperable, is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (254/85-02-01A; 265/85-02-01).

The licensee attributed the cause of this event to poor drawings, dating back to original construction. The drawings have been subsequently corrected and the Technical Staff engineers instructed to more rigorously inspect actual plant configurations when working on modifications. The basic cause of this problem was the failure to treat the installation of the jumper as a modification; this led to an inadequate design review and failure to test the modification prior to operation. The licensee's corrective action did not address these issues.

The installation of the jumpers was accomplished in accordance with procedure QAP 300-12 ("Electrical Jumpers and Relay Blocks"). The procedure was not adequate for effecting a modification: it requires neither a safety analysis in accordance with 10 CFR 50.59 nor an on-site review prior to the modification's implementation in accordance with Technical Specification, Section 6.1.G.2.a.4. Discussions with licensee personnel, relative to the use of this procedure, revealed that jumpers and relay blocks were normally used as a maintenance or trouble shooting aid, not for plant modifications. In responding to this item of noncompliance, the licensee is requested to clarify the intended use of this procedure and the applicability of 10 CFR 50.59 and pre-installation on-site reviews.

(2) Modification M4-1-84-14, Installation of a 2" Tee in the Unit 1 Drain Line

A 2" tee and flange were added to the Unit 1 bottom head drain line leading to the Reactor Water Clean Up (RWCU) System. A vibration problem had been noted by the NRC Senior Resident Inspector and brought to the attention of the licensee prior to the modification being declared operational. Subsequent analyses, requested by the NRC, indicated a potential thermal stress problem which led to the removal of one support. An additional support was added to accommodate the vibration problem. Final approval by SNED was documented in January 1985. This modification was given advance approval by the Station Nuclear Engineering Department (SNED), installed, and declared operational by the station on July 23, 1984, without the required stress analyses having been completed in accordance with the FSAR Section 12.1.3. Additionally, no modification testing other than a hydrostatic test was performed.

This failure to complete an adequate analysis and to perform a test of this modification prior to operation is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (254/85-02-01B).

The licensee's corrective action included the performance of the design analyses requested by NRC and subsequent modifications to the piping supports. An assessment of the adequacy of the design process by the licensee has not been documented.

(3) LER 84-014, Low Pressure Coolant Injection (LPCI) Valve Failure

In 1980, modification M4-1-73-76 was made to the control circuit of the Unit 1 LPCI valves to prevent valve hammer during a continuous close signal. At that time, an error was made in the preparation of the wiring diagrams at the station, and the resulting installation was in error. SNED did not detect the error during their subsequent review of the diagrams. In addition, the post installation modification testing was not adequate to verify the design. Specifically, the test was designed to verify that the valves did not hammer; the valve operators installed at that time were equipped with brakes that prevented valve hammer.

During the 1984 refueling outage, the operators were replaced by operators without brakes. The work was accomplished as a routine maintenance task, using a standard maintenance procedure. The post maintenance test verified valve stroke time; it did not address the potential for valve hammer. During plant startup, the LPCI valves were found inoperable due to bent stems, resulting from valve hammer.

This failure to provide adequate design review and modification testing for these modifications is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (254/85-02-01C).

The anti-hammer circuits have been corrected. The licensee believes that the type of personnel error that caused this problem could no longer go undetected, in that wiring diagrams are now developed by SNED and reviewed by the station. The basic reasons the errors went undetected, inadequate reviews and post installation testing, have not been addressed.

(4) LER 84-017, Steam Jet Air Ejector (SJAE) Suction Valves

During the 1984 refueling outage, the Unit 1 SJAE suction gate valves were replaced with butterfly valves in accordance with modification M4-1-83-12. The design, design review, and installation packages failed to identify that the valves could be installed in different orientations. The valves were installed in an orientation which permitted them to fail open; they were required to fail closed (a safety-related function). Indication in the control room of valve position was also opposite of actual valve position. Position indication was based on operator position, rather than actual valve position. The modification test accepted valve position as indicated by operator position. As a result, the test did not detect that the valves were improperly installed. The incorrect installation was detected while attempting to draw a vacuum on the condenser during startup.

Consequently, the action statement of Technical Specification, Section 3.8.C.1 was entered.

This failure to adequately control the valve modification is considered to be an item of noncompliance with 10 CFR 50, Appendix B, Criterion III (254/85-02-01D).

The licensee attributed the cause of this incident to the fact that it was not recognized that the disc/operator orientation could be keyed to fail either open or closed. Corrective action included (1) a discussion with involved personnel to impress on them the need for thorough modification tests and (2) the preparation of a maintenance procedure for the installation of butterfly valves. The permanent procedure had not been issued as of February 5, 1985 (LER commitment date was January 1, 1985). A temporary procedure was issued on or about January 5, 1985. Failure of the designer, reviewers, and persons preparing the installation packages to adequately familiarize themselves of job details was not addressed.

2. Audit Program

The inspector reviewed the audit program for Quad Cities to determine if it was in compliance with 10 CFR 50, Appendix B; industry standards; the licensee's QA program; and the Technical Specifications.

a. Documents Reviewed

- (1) QP 18-51, "Audits for Operations - Quality Assurance Program Audits", Revision 14.
- (2) 1984 Audit Nos. 1 and 2 for Quad Cities (performed by Corporate QA).
- (3) QAM 4-84-47, "Audit of Design and Procurement Control" (performed by Station QA on October 9-15, 1984).
- (4) AQM 4-84-49, "Audit of Corrective Actions Program", (performed by Station QA on December 8, 1984).

b. Results of Inspection

Corporate QA audits of Quad Cities are conducted semiannually. The audits address all 18 criteria of 10 CFR 50, Appendix B. Audit team members were drawn from the QA staff of other stations. The audits are performed to ensure that QA requirements are being met by the station and to provide an independent assessment of QA program implementation for the QA Manager. Station QA personnel also perform audits of station activities on a routine basis which address the 18 criteria of 10 CFR 50, Appendix B and Technical Specification.

A review of two corporate and two station audits indicated that they were conducted by qualified personnel. Followup actions were timely. A review of station audit schedules indicated that they were being met. Technical Specification audits were scheduled such that all line items are covered in a specified time period; this time period varies from station to station depending on the complexity of their

Technical Specifications. As appropriate, technically qualified personnel outside the QA organization were included on the audit teams.

During the review of audit checklist items, the inspector identified one concern. Specifically, audit questions are primarily derived from QA program documents (Quality Requirements and Quality Procedures). While these questions generally cross reference the appropriate requirements of codes and standards, questions are not typically derived directly from these codes and standards; thus, the audits tend to assess procedural compliance rather than compliance with the requirements of the applicable codes and standards. Pending further review, this is considered an open item (254/85-02-02; 265/85-02-02).

3. Independent Verification of Equipment Status

The inspector discussed with station personnel the use of independent verification of equipment status to determine if the requirements of Section 5.2.6 of ANSI N18.7 were being met.

Currently, independent verification is not being performed on release of equipment from service at Quad Cities; however, a recent memorandum from the corporate offices directed all CECO stations to implement independent verification of this activity by March 15, 1985. Pending implementation of this directive, this is considered an open item (254/85-02-03; 265/85-02-03).

SECTION II
Prepared By: R. N. Sutphin

1. Test and Measuring Equipment Program

The inspector reviewed the program to verify that the licensee had implemented a program that was in conformance with regulatory requirements, industry guides, and standards to control safety-related test and measuring equipment.

a. Documents Reviewed

- (1) QP No. 12-51, "Control of Measuring and Test Equipment for Operations - Portable Test and Measuring Equipment," Revision 12.
- (2) QP No. 12-1, "Calibration Control of Commonwealth Edison Test and Measurement Equipment," Revision 11.
- (3) QAP 400-6, "Control of Measuring and Test Equipment for Operations," Revision 3.
- (4) QMP 100-6, "Control of Use and Accuracy of Measuring Equipment," Revision 4.
- (5) QMP 100-7, "Measuring Equipment and Standards," Revision 5.
- (6) QIP 100-3, "Measuring and Test Equipment Calibration," Revision 1.
- (7) QIP 100-4, "Control of Measuring and Testing Equipment," Revision 1.
- (8) QIP 100-T1, Master list of all equipment, including all M&TE inventories by the Quad Cities Instrument Department.
- (9) QIP 100 T-7, Schedule for the calibration by OAD of the M&TE in Category 1.
- (10) Technical Center Instrument Systems Semi-Annual Report - Quad Cities, January 24, 1985.
- (11) 1984 QA Surveillances: QAM 4-84-64, QAM 4-84-99, QAM 4-84-102, and QAM 4-84-113.
- (12) Technical Center Instrument System Monthly Reports.
- (13) Discrepancy Reports
- (14) QA Audit Report No. QAM 4-84-29
- (15) Calibration Records

b. Results of Inspection

The inspector reviewed the test and measurement equipment records, reports and schedules. Selected items of equipment identified in these documents were examined and all found to be within the current calibration requirements as verified by calibration tags and reports. Discrepancy reports were written when problems were identified during calibration activities and appropriate corrective action taken. Systems for evaluation of the consequences of having used a measuring device that is subsequently found to be out of calibration were in place; and discussions with personnel involved, as well as a review of specific records, demonstrated an acceptable understanding of this process. The licensee had effected policies for the replacement of measuring equipment that had been damaged or deteriorated to the extent that it threatened the reliability of calibration.

No items of noncompliance or deviation were identified.

2. Nonroutine Reporting Program

The inspector reviewed the licensee's program for review and evaluation of off normal operating events, unplanned maintenance activities, surveillance testing, and outage activities to verify conformance with regulatory requirements. The inspector also reviewed the program for the review of vendor bulletins and circulars for applicability to the facility. Objectives of this inspection centered on program definition, assignment of responsibilities, evidence of timely review and identification of safety-related events, potentially significant events, internal reporting, reporting to the NRC, and corrective action.

a. Documents Reviewed

- (1) QP No. 15-1, "Reporting Quality Nonconformances during Construction and Test," Revision 10.
- (2) QP No. 15-2, "Reporting Significant Deficiencies that Occur During Construction and Test," Revision 11.
- (3) QP No. 15-51, "Nonconforming Materials, Parts and Components for Operations - Spare Parts and Materials," Revision 14.
- (4) QP No. 15-52, "Nonconforming Materials, Parts and Components for Operations - Deviation and Comments," Revision 10.
- (5) QP No. 15-53, "Nonconforming Materials, Parts and Components for Operations - Inspection and Test," Revision 11.
- (6) QAP 1200-1, "Deviation Report Procedure," Revision 11.
- (7) NSDD-A07, "Potentially Significant Events," Revision 0.

- (8) QAP 1200-2, "10CFR Part 21, Reporting of Defects and Noncompliance," Revision 6.
- (9) QP Forms 15-52-1, "Deviation Reports," (DVR).
- (10) QAP 1200-TI, "Deviation Report Flow Chart Quad Cities," Revision 5.
- (11) Deviation Report Log.
- (12) OSR Form 2, "Station Response to Off-Site-Review Report".

b. Results of Inspection

The inspector verified that administrative controls, responsibilities, and procedures had been established for prompt review and evaluation of off normal events, planned and unplanned maintenance and surveillance testing activities, vendor bulletins and circulars, and 10 CFR Part 21 items. Controls had also been established for reporting safety-related events internally and to NRC and for completion of corrective actions related to these events.

No items of noncompliance or deviations were identified.

Open Items

Open items are matters which have been discussed with the licensee which will be reviewed further by the inspector, and which involve some action on the part of the NRC or licensee or both. Open items disclosed during the inspection are discussed in Section I, Paragraphs 2.b and 3.

Exit Interview

The inspectors met with licensee personnel (denoted in the Persons Contacted paragraph of this report) on January 25 and February 7, 1985. The inspectors summarized the scope and findings of the inspection. The probable contents of the report were discussed with the licensee personnel and no proprietary information was identified.