



**Commonwealth Edison**

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April 21, 1988

Mr. A. Bert Davis  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region III  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Subject: Quad Cities Station Units 1 and 2  
Response to Inspection Report Nos.  
50-254/87-028 and 50-265/87-028

Reference (a): J.J. Harrison letter to Cordell Reed  
dated March 18, 1988.

Dear Mr. Davis:

Reference (a) documents the results of a special safety inspection conducted by Mr. J.A. Gavula of your office from September 19, 1987 through March 4, 1987 of activities at Quad Cities Nuclear Power Station Units 1 and 2.

During the course of that inspection, certain activities appeared to be in noncompliance with NRC requirements. Attachment A contains our response to the violations. A three day extension for this response was requested and received from Mr. J. Harrison, NRC Region III.

Commonwealth Edison understands the significance of the issues identified in the Notice of Violation and has implemented comprehensive corrective actions to prevent recurrence. These programs have been presented to the Region and NRR at several previous meetings and regular status reports have also been and continue to be provided for several of these efforts.

If there are any further questions regarding this matter, please contact this office.

Very truly yours,

N. P. Smith  
BWR Licensing Supervisor

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Attachment

cc: T. Ross - NRR  
NRC Resident Inspector - Quad

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ATTACHMENT A

COMMONWEALTH EDISON COMPANY

RESPONSE TO NOTICE OF VIOLATION

ITEM OF VIOLATION

1. 10 CFR 50, Appendix B, Criterion V, as implemented by Commonwealth Edison Company (CECo) Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations," and CECo Corporate Quality Assurance Manual, Nuclear Generating Station, "Quality Requirements," requires that activities affecting quality shall be prescribed by documented drawings and shall be accomplished in accordance with these drawings.

Contrary to the above, certain activities were not accomplished in accordance with documented drawings in that:

- a. Structural steel connections inside the drywell were not accomplished in accordance with the General Electric drawings. Certain beam connections had missing welds, missing bolts to welds that were apparently cut so they were no longer effective. This caused ten connections to exceed the allowable design stress limits. (254/87028-01A)
- b. Support M-1610-18 and other supports, designed as part of the Mark I torus attached piping modifications, were not installed in accordance with the specified drawings. (254/87028-01B; 265/87028-03)

CORRECTIVE ACTIONS TAKEN AND RESULTS ACHIEVED

- 1a. In September 1986, a walkdown was provided at Dresden Unit 2 to identify the interferences for recirculation pump steel modification. During this walkdown, some missing welds on cheek plate connections were identified. The connection between the radial and tangential beams of drywell structural steel consists, in part, of cheek plates.

A program was set up to inspect drywell structural steel including the cheek plate connections at Dresden and Quad Cities Stations in order to assess the safety significance of the missing welds. A conservative operability evaluation based on hypothetical assumptions was performed for both Quad Cities Units. The results of these evaluations have justified the continued operation of the units prior to shutdown for refueling during which time any potentially deficient connections would be repaired.

The drywell structural steel beam connections for Quad Cities Unit 1 have been inspected and evaluated. The inspections were performed on October 5 through 16, 1987. The evaluation for the inspected connections indicated that only 13 connections and beams required repairs in order to meet the FSAR commitments. All 13 connections and beams evaluated, however, resulted in stresses which would have justified interim continued operation. The previously mentioned 13 connections and beams have been repaired in order to satisfy the FSAR requirements. The Engineering Change Notices showing these repairs will be incorporated into the structural drawings on or before June 15, 1988.

A limited walkdown was conducted on Quad Cities Unit 2 during Fall 1986 outage. This walkdown was limited to the inspection of the cheek plate connections on two main drywell elevations. Approximately 145 connections are inspected. The result of evaluation for the inspected connections indicated that all the connections meet the FSAR requirements. All remaining structural steel connections in the Quad Cities Unit 2 drywell will be inspected during the ongoing April 1988 refueling outage. If repairs are required, they will be made during this outage to bring the connections within the FSAR Limits.

- 1.b During the Dresden Station Unit 2 Fall 1986 refueling outage, CECO identified an embedment plate which appeared to have pulled away from the concrete beam it was embedded in. An operability assessment was initiated assuming a support attached to the embedment plate on the Dresden Unit 2 Core Spray Pump Discharge piping system was not functional. A review of the Mark I analysis calculations, piping isometrics and field data taken to support the operability assessment, was performed. During this review, discrepancies between the as-built condition and the analysis documentation were found. For example, a support included in the analysis had not been designed and installed and a support specified for demolition during the Mark I program had not been removed.

As a result of these discrepancies, all piping systems at Dresden Station Units 2 and 3 and Quad Cities Units 1 and 2 analyzed and modified for Mark I loads were walked down. The information from the walkdowns was then compared to the piping analytical model.

The Piping Configuration Verification Program (PCV) was initiated to systematically rank all discrepancies for their level of significance and resolve them and demonstrate FSAR compliance. This program is described in Nutech Engineers Report No. CEC-99-024, dated June 22, 1987. A presentation was made to the NRC on July 27, 1987 at NRR in Bethesda. The Piping Configuration Verification Program is on-going. Project status reports are sent to the NRC on a periodic basis, the most recent of which is detailed in an April 15, 1988 letter from I.M. Johnson (CFCO) to A.B. Davis (NRC Region III).

Specific reference was made to Support M-1610-18 as an example of a Mark I torus attached piping modification which was not installed in accordance with specified drawings. As a result, this support was found to be installed with clearances that exceeded specified installation tolerances. In subsequent analyses, it was determined that, due to this discrepancy, the associated piping system would exceed the FSAR stress allowables but was within established operability limits. The condition was corrected through the addition of additional shims.

The other examples cited in the Inspection Report were addressed either via re-analysis or by field modification of the system in question. Resolution of all discrepancies are being accomplished on a model basis. The schedule for resolution by piping model is detailed in our PCV Program Status Reports.

#### CORRECTIVE ACTION TAKEN TO AVOID FURTHER VIOLATIONS

The comprehensive programs conducted to review drywell structural steel connections and embedment plates should ensure that similar deficiencies which occurred during original construction do not remain undetected.

The implementation of the new modification program described in the CECO presentation to Region III on February 26, 1987 should preclude the recurrence of similar events associated with as-built drawings, design analyses and procedures. In particular, the new program requires walkdowns to verify as-found and as-modified piping. These walkdowns include the contractor, the Architect/Engineer (A/E) and the cognizant CECO engineers. In addition, a post modification document control checklist is used to identify procedures, drawings and training required for completion of the modification. The checklist requires review and approval by the Technical Staff Supervisor, Quality Control Supervisor, and Station QA Superintendent prior to close-out of the modification. All items listed on the checklist must be updated prior to the final approvals, thus incorporating the modification into the design basis of the station.

The comprehensive new modification program, along with a revision to the A/E Guidebook (made on March 18, 1987) which specifically defines A/E interface requirements using piping stress analyses as a primary example, should preclude further violations such as those identified in Items 1b and 2b of the Inspection Report.

#### DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved for Item 1a (embedment plates) with the completion of the Embedment Plate Assessment program.

Full compliance for Item 1b (Mark I torus attached piping modifications configuration verification) will be achieved with the completion of the PCV Program, currently scheduled for August 30, 1988. Progress made in meeting this schedule will continue to be documented in our PCV Program status reports transmitted to both NRC Region III and NRR.

ITEM OF VIOLATION

2. 10 CFR 50, Appendix B, Criterion III, as implemented by CECO Topical Report CE-1-A, "Quality Assurance Program for Nuclear Generating Stations," and CECO Corporate Quality Assurance Manual, Nuclear Generating Stations, "Quality Requirements," requires that measures shall be established to assure that the design bases are correctly translated into drawings and that design control measures shall be applied to stress analyses.

Contrary to the above:

- a. The fabrication drawings for embedment plates incorrectly specified an 18 inch spacing for anchor straps instead of 9 inches. The embedment plates are subsequently fabricated different from the design basis causing three plates to exceed the design stress limit. (254/87028-02A; 265/87028-02A)
- b. Design calculations for the Unit 1 Core Spray discharge line, Model Q1.10.2, contained incorrect pipe schedule information. (254/87028-02B; 265/87028-02B)

CORRECTIVE ACTION TAKEN AND RESULTS ACHIEVED

- 2a. In mid-February 1987, a deformed embedment plate was identified at Dresden Station. CECO then began an investigation to determine the probable cause of the deformation of these plates at Dresden and Quad Cities Stations. It was subsequently determined that the deformation was a result of loading from a piping transient and could not have occurred under design basis loads. However, it was revealed that the staggered strap anchor spacing shown on the subject embedment plate shop drawing did not conform to that intended on the design drawing. The shop drawing showed a larger strap anchor spacing which initially indicated that the embedment plate may not have the same load carrying capacity as originally intended. Further investigation of the shop and design drawing anchor spacing revealed that this same discrepancy was also applicable to other strip embedment plates with staggered strap anchors at both the Dresden and Quad Cities Stations. Ultrasonic testing of a sample of strip embedment plates at both stations confirmed that the as-installed staggered strap anchor spacing conformed with that shown on shop drawings. This therefore led to the initiation of a comprehensive strip embedment plate assessment program for Dresden and Quad Cities Stations.

The purpose of the assessment program was to confirm the adequacy under design basis attachment loads of approximately 1200 strip embedment plates at Quad Cities Station which were constructed with a larger strap anchor spacing than that intended on the design drawings. A walkdown of

the critical plates was performed to verify the plates' attachment configurations. The program concluded that the misinterpretation of the design drawing embedment plate anchor spacing during shop drawing preparation does not adversely affect the continued safe operation of the plants and that after installation of three repairs all strip embedment plates will satisfy the plant FSAR allowable stress commitments. This program was completed in September 1987.

- 2b. During the operability assessment described in the response to 1.b. above, it was noted that pipe schedule information recorded on the original walkdown survey isometrics prepared for the NRC IE Bulletin 79-14 program was different from that shown on the Piping and Instrumentation Drawing (P&ID). The responsible A/E used the isometrics as design input during the qualification of torus attached piping for Mark I loadings. To resolve this discrepancy, in addition to other types of discrepancies noted, the Piping Configuration Verification (PCV) Program was initiated.

To address the pipe size and schedule issue, the A/E reviewed the IE Bulletin 79-14 piping isometrics, the P&IDs, and the A/E Mark I piping models for all the torus attached piping greater than 4" which had been analyzed during the Mark I program. This included approximately 65 piping models at Dresden and Quad Cities Stations, including model Q1.10.2, which was cited in the violation. The pipe size (diameter) and wall thicknesses were compared, and any inconsistencies were noted. These inconsistencies are being resolved by revising the piping calculations, as required, to reconcile the difference. The piping isometrics will be revised, if required, before this program is concluded. The P&IDs are assumed to be correct, since they are the original design basis documents.

A total of five (5) pipe size/schedule discrepancies were found at Dresden Units 2 and 3, and four (4) at Quad Cities Units 1 and 2. FSAR compliance has now been demonstrated on all of these models. None of these discrepancies, by themselves, resulted in field corrective work.

#### CORRECTIVE ACTION TAKEN TO AVOID FURTHER VIOLATIONS

See response provided in Item 1.

#### DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance has been achieved for Item 2a (embedment plates) with the completion of the Embedment Plate Assessment Program.

Full compliance for Item 2b (Mark I torus attached piping modifications configuration verification) will be achieved with the completion of the PCV Program, currently scheduled for August 30, 1988. Progress made in meeting this schedule will continue to be made in our PCV Program status reports which are transmitted to both NRC Region III and NRR.