

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-254/83-32(DE); 50-265/83-32(DE)

Docket Nos. 50-254; 50-265

Licenses 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, Illinois and Chicago, Illinois

Inspection Conducted: October 7 and 20, 1983 and April 16, 1984.

Inspector: *Hand for*
R. A. Hasse

6/6/84
Date

Approved By: *Hand*
F. C. Hawkins, Chief
Management Programs Section

6/6/84
Date

Inspection Summary

Inspection on October 7 and 20, 1983 and April 16, 1984 (Reports No. 50-254/83-32(DE); 50-265/83-32(DE))

Areas Inspected: Special, announced inspection by a region-based inspector of the adequacy of corrective action in response to receipt and installation of nonconforming material discovered by internal surveillance. The inspection involved 24 inspector-hours by one NRC inspector.

Results: No items of noncompliance were identified.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

- *G. Marcus, Director QA, Engineering and Construction
- *D. Gibson, QA Supervisor, Quad Cities
- *R. Rybak, Nuclear Licensing Administrator
- *J. Frizzel, General Engineer

U.S. Nuclear Regulatory Commission

N. Chrissotimos, Senior Resident Inspector

*Denotes those attending the exit interview on April 16, 1984.

2. Nonconforming Strut Pin Material

a. Problem Summary

During a QA surveillance conducted in October 1982, CECo determined that they had received pipe supports at Quad Cities not in conformance with purchase order requirements. The nonconformance was not detected during receiving inspection and many of the struts had been installed. Adequacy of corrective actions was examined by the inspector.

b. Documents Reviewed

- . Memorandum - D. Gibson to W. Shewski, January 4, 1983 - Synopsis of Events Surrounding Strut Problem.
- . Audit QAM-4-82-69, November 18, 1982 - Audit of Elcen Metal Products Co. by CECo.
- . EDS Nuclear Specification 0590-003-11, Rev. 2, May 1, 1981.
- . Surveillance QAM-4-82-105, October 27, 1982 - Surveillance of Receiving Inspection.
- . SMAD Report M-208-83, January 19, 1983.
- . SMAD Report M-347-83, February 1, 1983.
- . EDS Report 09-0590-0006, Rev. 1, April 1983.

c. Results of Inspection

In response to IE Bulletin 79-14, CECo initiated an upgrade to the piping supports for their Quad Cities and Dresden facilities. EDS Nuclear prepared the specifications for the ridged struts required

for the upgrade. Since the original piping supports for Quad Cities and Dresden were built to ANSI B31.1, the specification called out this standard rather than ASME Section III, subsection NF. An advance purchase order was then issued to Elcen Metal Products Co. calling out the EDS Nuclear specification.

During the processing of the confirmatory purchase order (P.O.), CECO QA noted that Elcen's ANSI B31.1 QA Program had not been approved by CECO and that they had many problems with it. Consequently, the purchase order specified that Elcen's approved ASME QA Program was to be applied and certification to that fact was to be supplied by Elcen. Elcen apparently did not review the P.O. against the advance P.O. and the struts were fabricated to the ANSI B31.1 QA program.

The certificate of conformance supplied with the struts stated that the struts were fabricated in accordance with the requirements of ANSI B31.1, the P.O. and the specifications. The receiving inspector apparently assumed that the specifications called out the ASME QA Program and that the certificate of conformance supplied was adequate. A subsequent surveillance determined that the original specification did not impose the ASME QA Program. A subsequent audit by CECO indicated a lack of material traceability and process documentation.

In November 1982, CECO performed analyses and destructive testing on a sample of one of each size strut from Quad Cities and Dresden to confirm that the materials were as specified. The chemical composition and mechanical properties were verified to match those of the specified materials except for the load pins. The pin material was specified to be ASTM A193 B7 (Heat treated AISI 4140 chromium-molybdenum steel). Of the 19 pins initially tested, 17 were probably be AISI 4140 with some having no or improper heat treat and 2 were probably A36 carbon steel. Eleven of the pins did meet the specified mechanical properties and 8 (including the carbon steel pins) failed the mechanical properties tests. On January 4, 1983, CECO placed a hold on all Elcen struts and components and a stop work on all installations at Quad Cities and Dresden. An analysis by EDS Nuclear showed that based on flexural and shear stress, the mechanical properties of all pins did meet AISC/ASME allowables. Additional testing of Quad Cities and Dresden strut assemblies at 5 times design load for 5 minutes resulted in no pin deformation.

The stop work order was lifted on January 10, 1983 with the proviso that all pins used in future installation would be hardness tested to confirm proper material. Units installed were accepted "as is" based on the EDS Nuclear analysis.

As a result of the material traceability problem identified at Quad Cities and Dresden, CECO filed a potential 10 CFR 50.55(e) notification on December 23, 1982 for Byron, Braidwood and LaSalle Unit 2 (for which Elcen had provided some materials). Byron and Braidwood pipe supports are subject to the requirements of subsection NF of the ASME Boiler and Pressure Vessel Code.

Material tested from these facilities also indicated problems with the pin material. However, analyses performed by EDS Nuclear indicated that the mechanical properties were within code allowables. Pin sizes 1 through 4 were qualified by elastic analyses and sizes 5 through 10 by plastic analysis. Margins were as small as ~1% in some cases. CECO issued a final 10 CFR 50.55(e) report on January 21, 1983, closing the technical issue for all plants based on the EDS Nuclear analyses.

The inspector was satisfied that the corrective actions taken relative to the programmatic problems were adequate and timely. Receiving inspectors were given additional training including a review of the Elcen problem. The findings of the CECO audit of Elcen have been closed. All work performed by Elcen for CECO will be done to Elcen's ASME QA Program and all materials purchased from suppliers on their (Elcen's) approved nuclear vendors list.

The adequacy of the testing program and the analysis of the test results including acceptability of the method of disposition by the ASME Boiler and Pressure Vessel Code is considered an unresolved item pending a technical review by the NRC (254/83-32-01; 265/83-32-01).

3. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 2.c.

4. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) on Apr. 16, 1984, and summarized the scope and findings of the inspection activities.