

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-237/86019(DRS); 50-249/86023(DRS)

Docket Nos. 50-237; 50-249

Licenses No. DPR-19; DPR-25

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

Facility Name: Dresden Station, Units 2 and 3

Inspection At: Dresden Site, Morris, IL

Inspection Conducted: June 30 through July 3, 1986

Inspector: *for* J. F. Norton

*7/17/86*  
Date

Approved By: *D. H. Danielson*  
D. H. Danielson, Chief  
Materials and Processes Section

*7/17/86*  
Date

Inspection Summary

Inspection on June 30 through July 3, 1986 (Reports No. 50-237/86019(DRS); 50-249/86023(DRS))

Areas Inspected: Routine unannounced inspection of the resolution of IE Bulletin 79-02 "Pipe Support Baseplate Design Using Concrete Expansion Anchors."

Results: No violations or deviations were identified.

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## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company (CECo)

- \*D. Scott, Station Manager
- \*M. Strait, Station Nuclear Engineering Division
- \*D. Adam, Regulatory Assurance
- \*R. Jeisy, Station Quality Assurance
- \*R. Flessner, Services Superintendent

#### U. S. Regulatory Commission

- L. McGregor, Senior Resident Inspector
- \*E. Hare, Resident Inspector

\*Denotes those present at the exit interview.

### 2. Licensee Action on IE Bulletins

(Closed) IE Bulletin No. 79-02 (237/79-02-BB; 1B; 249/79-02-BB; 1B): IE Bulletin No. 79-02 "Pipe Support Baseplate Design/Construction Using Concrete Expansion Anchor Bolts."

#### a. Background

IE Bulletin 79-02 addresses the design and construction of pipe support baseplates with concrete expansion anchors. The bulletin was issued March 3, 1979, and supplemental revisions were issued July 21, August 20, and November 8, 1979. The primary purpose of the bulletin was to assure that licensees had appropriately considered baseplate flexibility and its potential effects on anchor loads.

#### b. Testing Program

- (1) Commonwealth Edison Company (CECo) committed to perform static, dynamic and relaxation testing of expansion anchors to verify that the static and dynamic characteristics and capacities of the anchors conform to IE Bulletin 79-02. (CECo letter Cordell Reed to J. G. Keppler dated July 5, 1979.) A summary report entitled, "Static, Dynamic and Relaxation Testing of Expansion Anchors in Responses to NRC IE Bulletin 79-02," was issued July 20, 1981.
- (2) The purpose of the test program was to supplement previous responses which had referred to these tests. The specific items addressed by the tests were ultimate static capacities of various types of expansion anchors; load-displacement relationships for these anchors; behavior of expansion anchors subjected to simulated seismic events and other cyclic loads; baseplate flexibility and its effect on anchor loads; and the phenomenon of relaxation (loss of anchor preload) with time.

- (3) These tests were divided into four phases (A through D), and provided a clear understanding of anchor behavior under a wide range of static and dynamic loadings and the effect of various parameters on that behavior.
- (a) Phase A involved static tension tests of single anchors and provided an understanding of individual anchor behavior. This series of tests proved that the level of preloading of the anchor at the time of testing does not affect the ultimate capacity of the anchor.
  - (b) In Phase B type tests, wedge, sleeve, and shell type anchored plate assemblies were cyclically loaded to simulate seismic or pipe transient type loadings. These tests were performed in reinforced concrete and concrete blocks walls, and confirmed that anchors embedded in concrete block and mortar can withstand cyclic load levels of at least 25% of the anchor ultimate static capacity. Tests in reinforced concrete demonstrated that anchors could withstand cyclic loads up to 50% of the anchor ultimate static capacity. Also, it was determined that preload was not a determining factor as far as capacity of the anchor was concerned.
  - (c) Phase C tests were static tests on anchored baseplate assemblies for purposes of determining the effects of prying action on flexible plates. The results of these tests revealed that prying action is in the order of 15% to 20% of the applied load. This increase was lower than originally anticipated due to lower stiffness modulus of expansion anchors installed in concrete.
  - (d) Phase D tests were run to determine the amount of relaxation of load that occurs in an anchor after it has been preloaded. After the cyclic tests were completed, which demonstrated that preload is not required to withstand cyclic loading, it was subsequently determined that the relaxation phenomenon is not of significant concern.
- (4) A major finding resulting from the testing is that loss of preloading in an anchor does not affect the static ultimate load capacity of the anchor, nor is preload required for an anchor to withstand cyclic loadings.
- (5) The licensee field tested anchor installations at Dresden Station as follows:

Load Test	1208 tested	9 failures
Thread Engagement	1120 tested	6 failures
Shell Projection	1128 tested	3 failures
Angularity	1805 tested	77 failures

This data represents a 95% confidence level. This is consistent with CECO's commitments to the NRC regarding the "95-5" criteria

presented in D. L. Peoples letter to J. G. Keppler, dated February 19, 1980.

c. Conclusion

All expansion anchors which did not meet inspection criteria were modified or replaced. Modifications were accomplished in accordance with licensee engineering and QA/QC requirements. The NRC inspector reviewed quality records on several of the anchor installations. No QA/QC deficiencies were discerned. The NRC inspector, based on this review concluded that the actions set forth in IE Bulletin 79-02 have been complied with for Dresden Station, Units 2 and 3.

3. Exit Meeting

The inspector met with licensee representatives (denoted under Persons Contacted) at the conclusion of the inspection on July 3, 1986. The inspector summarized the purpose and findings of the inspection. The licensee acknowledged the findings as reported herein. The inspector also discussed the likely informational content of the inspectors report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/ processes as proprietary.