

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/87027(DRS); 50-455/87025(DRS)

Docket Nos. 50-454; 50-455

Licenses No. NPF-37; NPF-66

Licensee: Commonwealth Edison Company  
Post Office Box 767  
Chicago, IL 60690

Facility Name: Byron Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois and  
CECo Corporate Office

Inspection Conducted: July 7-9, and August 20-21, 1987

Inspector: *Z. Falevits*  
Z. Falevits

*1/14/88*  
Date

Approved By: *Ronald N. Gardner*  
Ronald N. Gardner, Chief  
Plant Systems Section

*1/14/88*  
Date

Inspection Summary

Inspection on July 7-9, and August 20-21, 1987 (Reports No. 50-454/87027(DRS);  
No. 50-455/87025(DRS))

Areas Inspected: Routine, unannounced safety inspection of licensee action on previous inspection findings; followup review of non-seismically qualified components in Emergency Diesel Generator (DG) control circuitry; observation of maintenance surveillance activities, and training (62705, 92702, 92705, 41400).

Results: Of the four areas inspected, no violations or deviations were identified in three areas. One violation was identified in one area (failure to assure, via the design review process, that seismically qualified electrical components were used in the DG control circuitry - Paragraph 3).

## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company (CECo)

- \*R. E. Querio, Station Manager
- \*R. C. Ward, Services Superintendent
- \*G. K. Schwartz, Assistant Superintendent, Maintenance
- \*D. W. Berg, Nuclear Safety Engineer
- \*D. K. Johnson, General Foreman, I.M.
- \*W. D. Pirnat, Regulatory Assurance Engineer
- \*M. F. Blessing, Technical Staff Engineer
- \*R. J. Morvec, Assistant Construction Superintendent
- \*R. B. Klingler, Senior Quality Assurance Engineer
- \*W. J. Walter, Assistant Technical Staff Supervisor
- \*M. Snow, Regulatory Assurance Supervisor
- \*E. Zittle, Regulatory Assurance Staff
- B. Shelton, Engineering Manager, PWR
- +D. Elias, Byron & Braidwood Engineering Superintendent
- +W. J. Grosko, Project Engineering, PWR Engineer
- K. Ainger, Nuclear Licensing Engineer
- R. Gesior, QA Engineer

#### Sargent & Lundy Engineers (S&L)

- +D. P. Galanis, Electrical Project Engineer
- R. J. Moery, Component Qualification Engineer
- +S. Malak, PMED Engineer
- +M. Hassaballa, Component Qualification Supervisor

The inspector also contacted and interviewed other licensee and contractor personnel during this inspection.

\*Denotes persons attending the July 9, 1987, site exit interview.

+Denotes persons attending the August 21, 1987, exit interview at the CEC Co Corporate office.

### 2. Licensee Action on Previous Inspection Items

- a. (Closed) Unresolved Item [454/87002-04(DRP); 455/87002-03(DRP)]  
This item concerned an event described in LER 454/86035 in which the licensee determined on December 17, 1986, that non-seismically qualified parts were installed in the Emergency Diesel Generators (DG) for Units 1 and 2. During the review of this item, the inspector determined that the licensee's design control measures failed to assure that only seismically qualified components were used in the DG control circuitry. As a result, this item is considered a violation of 10 CFR 50, Appendix B, Criterion III, as discussed in Section 3 of this report.

- b. (Closed) Unresolved Item [454/87017-04(DRP); 455/87016-04(DRP)]  
During a previous inspection, the resident inspector noted that the time from the start of decay of the voltage on bus 142 to the actuation of the bus undervoltage relay appeared to exceed the limit of Technical Specification 3.3.2, Table 3.3-4, Functional Unit 8.a (2.2 verses 1.8 seconds). However, bench testing of the undervoltage relay, both before and after the test, indicated that the relay was within the TS limit of 1.8 seconds and that its setpoint had not changed. The licensee believed that the inductive loading on the 4.16kv bus caused a slower voltage decay which caused the undervoltage relay to energize at 2.2 seconds. The licensee also believed that this was acceptable and that the relays met the TS requirements. The inspector reviewed this issue and discussed the findings with NRR. NRR concluded that bench testing was an acceptable method for calibrating and setting the undervoltage relays to the Technical Specification requirements. Based on this position, this item is considered closed.
3. Followup Review of Non-Seismically Qualified Components in Emergency Diesel Generator Control Circuitry
- a. The inspector conducted a followup review of the event described in LER 454/86035. This LER stated that on December 17, 1986, with Unit 1 in Mode 1 and Unit 2 in Mode 3, the licensee's AE, Sargent & Lundy (S&L), identified that non-seismically qualified components were erroneously installed (wired) in the control circuits of the Units 1 and 2 Emergency Diesel Generators (DGs).
- The inspector conducted interviews with licensee and S&L personnel and examined the applicable design and logic drawings and procedures to determine the cause of the installation error.
- (1) The review indicated that on December 4, 1986, the Byron Architect Engineer, Sargent & Lundy (S&L), identified four components (limit switches 12E01 and 12E02 and pressure switches 33E02 and 33E01) which were not listed as safety-related on the qualified parts list for the DGs. These components were erroneously wired into the electrical overspeed safety-related trip circuitry of the DGs. Failure of either component in both diesel logic trains would have caused a de-energization of the emergency master run relays which would in turn de-energize the fuel oil solenoids and stop the DGs. It was also determined that during a seismic event these non-qualified devices could actuate, preventing the DGs from starting or cause them to stop. The cause of the design error was determined to be Cooper-Bessemer's (CB) erroneous placement of non-seismically qualified components into a safety-related circuit. The original intent for the components used in the overspeed circuitry was for alarm purposes only. The inspector determined that the initial design review conducted by S&L failed to identify the design error.

- (2) During this followup review, the inspector examined S&L's design review methodology as it pertains to the seismic qualification and technical adequacy of safety-related components and vendor supplied design drawings which had been reproduced onto S&L approved design drawings. Sargent & Lundy Procedure GQ-3.09, Revision 5, entitled "Foreign Design Documents," states in Paragraph A.3 that "the Project Leader, Project Supervisor or Supervising Design Engineer shall assign a qualified individual to review foreign design drawings." In addition, Paragraph B.1 states that "the Inter and/or Intra Department Commentators shall review the design drawings, as required within their area of responsibility, for compliance with the requirements of the procurement specification . . . latest design information and/or Vendor's proposal data . . . ."

S&L Procedure GQ-3.09 further requires that the foreign design drawings be forwarded to the client (CECo) and other external interfacing organizations for design reviews and comments; that the Engineer/Supervisor satisfactorily resolve those comments within its area of responsibility; that the contractor's technical data, such as design data, design specifications, seismic reports, etc., be sent to the responsible engineer for review and processing; that the Project Manager establish a system for monitoring receipt of contractor's technical data documents to ensure that all required documents have been submitted for review; and that the responsible engineer prepare a letter of reply to the vendor which will include any comments and the action to be taken by the vendor.

The inspector reviewed Sargent & Lundy's Procedure GQ-3.07, Revision 7, entitled, "Sargent & Lundy Drawings" which described the quality assurance requirements for the preparation, comment, review, approval and distribution of S&L drawings that pertain to safety-related structures, systems and components.

Paragraph 3.2.3.1 of Procedure GQ-3.07, states "Provisions shall be established for obtaining comments, as necessary, on the technical adequacy of a drawing from interfacing departments and divisions, and external sources such as clients". In addition, Paragraph 3.2.4 requires that provisions shall be established to provide for a documented review and review of the technical adequacy of a drawing. A design review shall be performed prior to release of the drawing for fabrication, installation, construction, or release to another organization for use in other design activities. The drawing shall be reviewed and commented upon, in accordance with a departmental standard, for technical adequacy for the purpose of release. When the drawing is technically adequate, the reviewer shall sign the drawing on the drawing release record as reviewer. Furthermore, the reviewer's signature on the drawing certifies that the drawing is technically correct, that interfacing conditions have been addressed, that all comments have been

resolved and that the review was conducted in accordance with the departmental standard.

The inspector determined that S&L standard EDSI-73, Revision 04-29-85, stated that the vendor is responsible for the technical adequacy of the base design provided on the drawing submitted, that S&L is only responsible for technically reviewing any interface information added to the vendor produced drawings. However, the inspector concluded that this standard did not apply to the DG drawings that have been reviewed and issued prior to the issuance date of Standard EDSI-73.

Based on this review, the inspector determined that CECo, CB and S&L engineers failed to identify the design error during the initial design reviews that should have been conducted prior to equipment installation. Consequently, these switches existed in the Diesel Generator circuitry since Byron's receipt of operating license (October 31, 1984 for Unit 1 and November 6, 1986 for Unit 2), rendering the Diesel Generators inoperable and in violation of Technical Specification since the units started operating.

The inspector informed the licensee that failure to identify design errors during the design review process is considered a violation of 10 CFR 50, Appendix B, Criterion III (454/87027-01(DRS); 455/87025-01(DRS)).

- b. The inspector reviewed QA audits which were conducted by CECo at the Cooper Industries (CI) facilities during the period from 1979 to 1986. The review indicated that Audit No. G-86-12 conducted in August, 1986 identified serious problems with CI's QA program. As a result of these findings, CECo removed CI industries from the Quality Approved Bidders List on May 1, 1987. The inspector expressed the concern that additional vendor design errors might exist in the DG system possibly compromising safety. The licensee informed the inspector that during a recent system design description review and spare parts review which was performed by S&L on Byron Units 1 and 2 all safety-related components were examined. Several design problems were identified and corrected in each unit. No other deficiencies were noted. Based on this review the licensee believes that all safety-related components in Byron Units 1 and 2 are qualified.

#### 4. Observation of Maintenance Surveillance Activities

The inspector witnessed surveillance and calibration activities conducted on Auxiliary Feed Pump 2B Crank Case Pressure Switch 2PSH-AF154.

The following items were considered during this review: calibration was accomplished in accordance with an approved procedure and test report; appropriate authorization signatures were obtained prior to starting the calibration; test instrumentation was within its calibration interval; the task was accomplished by qualified personnel; test results conformed with acceptance criteria and tolerances.



The inspector reviewed the following associated documents:

- Calibration of Auxiliary Feed Pump 2B Crank Case Pressure Switch (AF) Test Report Package BIP 2400-008, dated July 9, 1987.
- Calibration of Pressure Switch Procedure No. BIP 2400-008, Revision 2.
- Maintenance Alteration Log BAP 400-TS, Revision 8.

No violations or deviations were identified.

5. Training

The effectiveness of the licensee's training program was reviewed by the inspector during the witnessing of the licensee's performance of routine surveillance and maintenance activities. Personnel appeared to be knowledgeable of the task being performed.

No violations or deviations were identified.

6. Exit Interview

The Region III inspector met with licensee representatives (denoted under Paragraph 1) at the conclusion of the inspection on July 9, and on August 21, 1987. The inspector summarized the purpose and findings of the inspection. The licensee acknowledged this information. The inspector 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 documents/processes as proprietary.