

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-454/84-63; 50-455/84-43

Docket No. 50-454; 50-455

License No. CPPR-130; CPPR-131

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

Facility: Byron Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: August 28-31, 1984

Inspectors: *R. Mendez*  
R. Mendez

*9/28/84*  
Date

*A. Gautam*  
A. Gautam

*9/28/84*  
Date

Approved By: *C. C. Williams*  
C. C. Williams, Chief  
Plant Systems Section

*9/28/84*  
Date

Inspection Summary

Inspection on August 28-31, 1984 (Report No. 50-454/84-63; 50-455/84-43(DRS))

Areas Inspected: Licensee action on previously identified items, review of a circular and one 10 CFR 50.55(e) item; review of plant modifications and equipment qualifications; and observation of electrical termination activities. The inspection involved a total of 68 inspector-hours by two NRC inspectors including 8 inspector-hours during offshifts.

Results: In the areas inspected, no items of noncompliance were identified.

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## DETAILS

### 1. Persons Contacted

#### Commonwealth Edison Company (CECo)

R. Tuetken, Start-up Coordinator  
\*K. J. Hansing, Quality Assurance Superintendent  
M. E. Lohmann, Assistant Project Superintendent  
\*J. Bergner, QA Supervisor  
\*J. W. Rappeport, QA Engineer  
\*E. Sager, Field Engineer  
F. Mazini, QA Engineer

The inspector also contacted and interviewed other licensee and contractor personnel, including craft persons, technical and engineering staff members.

\*Denotes those persons present at the exit on August 31, 1984.

### 2. Licensee Action on Previous Inspection Findings

(Closed) Open Item (50-454/84-17-01; 50-455/84-12-01): This item was in reference to instrument cables not being seismically supported on the structure mounting the class 1E instruments, as required by the instrument installation drawings. During a walkdown of instrument cable supports in the containment it was observed that most cable supports had subsequently been attached to the respective instrument mounting structures, and that these support installations were close to completion. Based on this review this item is closed.

(Open) Unresolved Item (50-454/84-17-03; 50-455/84-12-03): This item applied to all class 1E electrical equipment using mounting bolts for anchoring, and identified a lack of prescribed instructions for the torquing of these mounting bolts in the field. Mounting bolts included bolt and nut assemblies used to mount 480V MCCs to mounting channels, as well as embedded J bolts used to mount battery chargers. The NRC concern was that "as installed" torque values on these bolts in the field were not commensurate with configurations analysed in the seismic analysis of this equipment. An engineering analysis was required to clearly establish required torque values in the field. Discussions were held with Messrs. David Alias, Walter J. Gorszko and other members of his group to clarify this issue. Since no analysis was available at the site during this review, it was determined that this issue would be followed up during subsequent inspections on site, or at the licensee's downtown office. Pending review of an engineering analysis for required seismic torque values this item remains open.

(Closed) Unresolved Item (50-454/84-17-04; 50-455/84-12-04): This item identified a lack of qualification for Allen bolts used to mount auxiliary cabinets 1PA31J and 1PA32J. An analysis by Tanssig Associates, Inc., Report No. 58072, August 3, 1984 was reviewed for the metallurgical

testing of three 1/2"-13 UNC socket head cap screws. This analysis apparently confirmed that these screws (Allen Bolts) conform to the mechanical requirements of ASTM A574 in regard to tensile strength and loading. Based on this review this item is closed.

(Closed) Unresolved Item (50-454/84-23-02): It was previously identified that instrument racks 1PL56J and 1PL75J were installed with 1/4 inch concrete expansion anchors (CEA's). Systems Control Corporation letter to Sargent and Lundy (S&L) had established traceability of the instrument racks per test reports 44359-1 and 44757-1, indicating that prototype tests were performed on one rack. The results of the tests stated that the rack had withstood the seismic tests without structural degradation with the rack welded to a shaker table. Information was not readily available showing the acceptability of installation of the racks with 1/4 inch CEA's. On May 3, 1984, S&L issued a letter which stated that the analysis for the worst case model (instrument rack 1PL75J) with respect to the seismic qualifications was valid. In addition, the inspector reviewed S&L standard DC-ST-03-BY/BR, Table 38.1 which provides the maximum allowable loads for each size CEA. Table 38.1 is based on normal, operating based earthquake (OBE) loads and safe shutdown earthquake (SSE) loads. It appears that proper review had been established to seismically qualify the installation of the two racks.

(Open) Unresolved Item (454/84-37-02): It was previously identified that Hatfield nonconformance report (NCR) 122 was dispositioned use "as-is", although thirteen 1/2 inch CEA's were determined not to meet the minimum embedment depth. Discussions with S&L regarding this issue indicated that CEAs which do not meet the minimum embedment depth are regarded as having strength characteristics of the next smaller size CEA. S&L stated that the maximum allowable loads are then based on the next smaller size CEA. S&L indicated that the allowable loads of the installation identified in NCR 122 may have been calculated based on 3/8 inch CEAs (no documentation to support this contention was presented). The minimum embedment depth for a 3/8 inch CEA per S&L standard BY/BR/CEA is three inches. The embedment depths for the thirteen CEAs in question ranged from 2.79 to 3.16 inches. It appears, however, that calculations based on a three inch CEA may not be valid. Load calculations regarding this issue could not be verified since the calculations are kept in S&L's corporate office. The licensee is to provide adequate information at the site to resolve this issue. Pending further review of this issue to determine whether the NCR was properly reviewed and dispositioned, this item remains open.

### 3. Licensee Action on a Circular

(Closed) Circular (50-454/79-05-CC; 50-455/79-05-CC): "Moisture Leakage in Standard Conductors." This circular notified licensees of a potential for water penetration between an electrical conductor and its loosely fitting insulation when subjected to a differential pressure across the conductor ends. The circular listed six areas where the possibility of steam/moisture incursion could exist. These included the following: terminal block/junction boxes, sensor transmitters, motors, electric motor operated valves and limit switches, splices and penetrations. The circular explained that since qualification of Class 1E equipment is done on a component basis, the "as-installed" configuration of the equipment had not been fully considered. The circular recommended that the licensee

conduct a detailed review and analyses of the "as-installed" connections of Class 1E electrical equipment and instrumentation transmitters with standard conductors which could affect the operability of safety-related equipment during a LOCA. On November 5, 1979 Sargent and Lundy issued a letter to J. T. Westermeier which documented a review of the circular. However, the review was performed utilizing preliminary design documents rather than examining the "as-installed" conditions. On July 23, 1984, S&L issued a supplemental response to the circular. This review of moisture leakage in standard conductors, addressed the original six areas identified in the circular and also included examination of conduit/equipment enclosures, solenoid operated valves and stem mounted limit switches. The results of S&L analyses indicate that connection and termination designs prevent moisture incursion since the terminations are exposed to the same pressure at both ends. Review of this circular by the licensee appears acceptable.

4. Licensee Action on a 10 CFR 50.55(e) Item

(Open) 10 CFR 50.55(e) (454/83-09-EE): "Seismically Induced Chatter in Relays Within Printed Circuit Cards." During seismic testing it was determined that NTC cards exhibited contact bounce and consequently did not meet seismic requirements. A solution to this problem was to install a jumper wire which would bypass the input test relay causing the problem. On September 4, 1984, Westinghouse issued a letter to Commonwealth Edison stating that the NTC cards were not required for plant operation but were needed for channel test purposes. Additionally, the letter stated that since no other problems were discovered in the seismic testing, the interim nature of the modification would not compromise the safety of the plant. A permanent solution regarding the contact bounce in the input test relay is expected by the end of 1984.

5. Functional Areas Inspected

a. Review of Cable Terminations

The inspector reviewed cable terminations in Main Control Board (MCB) 2PM06J. The termination points for the cables are designated on Sargent and Lundy (S&L) wiring diagrams. The information contained in the wiring diagrams includes the equipment number, cable identification number, cable division, terminal block and terminal block point. In addition the cables were inspected for protection, segregation and electrical separation. The following drawings and cable terminations were reviewed:

6E-2-4054S, Revision F, "Internal-External Wiring Diagram MCB Engineered Safety Features Section A2 Part 10 (2PM06J).

6E-2-4054Y, Revision E, "Internal-External Wiring Diagram MCB Engineered Safety Features Section A2 Part 10 (2PM06J).

6E-2-4054X, Revision E, "Internal-External Wiring Diagram MCB Engineered Safety Features Section A2 Part 9 (2PM06J).

6E-2-4054G, Revision D, "Internal-External Wiring Diagram MCB Engineered Safety Features Section A1 Part 7 (2PM06J).

6E-2-4054T, Revision E, "Internal-External Wiring Diagram MCB  
Engineered Safety Features Section A2 Part 5 (2PM06J).

<u>Cable Identification</u>	<u>Cable Type</u>
2AF010	2/C #10
2AF100	9/C #14
2AF121	12/C #14
2AF160	2/C #14
2CC018	7/C #14
2CC033	3/C #14
2CC042	4/C #14
2CC174	4/C #14
2SI002	2/C #10
2SI009	2/C #10
2SI379	2/C #14
2SI457	12/C #14
2SI500	2/C #14
2SI521	2/C #14
2CV086	2/C #14
2RH002	2/C #14
2RH009	2/C #14

The installation and terminations of the above listed cables appeared to be in accordance with applicable procedures, instructions and drawings. No problems were identified in this area.

b. Independent Review

(1) Equipment Installation

- (a) Hatfield Electric (HECo) equipment installation records were reviewed for preparation and completion in response to earlier concerns identified in NRC Report No. 50-454/84-23; 50-455/84-16 and NRC letter to CECo dated August 1, 1984. It was observed that equipment installation (EI) drawing numbers used as the reference for verifying location, dimensions and mounting detail were missing on various reports. After discussions with the licensee a program was implemented to include the EI drawings and revisions on the inspection reports. In addition to this HECo held a training session for 12 QC inspectors on August 30, 1984 to train them on these requirements in Procedure 12, Revision 8. This matter is considered closed.
- (b) General Electric 125V DC distribution panels 1DC05E and 1DC06E were reviewed for seismic mounting configurations. It was observed that mounting channels had additional holes drilled through them, not shown on the GE seismic bolting drawings 212TS6201 Revision 2. The inspector's concern here is that such modifications to the mounting channels may affect the seismic qualification of this equipment. Pending an engineering analysis this is an unresolved matter (50-454/84-63-01; 50-455/84-43-01).

(2) Environmental Qualification of Electrical Equipment

A review was performed to verify implementation of the safety evaluation report issued by NRR in response to the NRR audit of June 19, 1983 thru June 23, 1983, in regard to CECO compliance to requirements outlined in 10 CFR 50.49 and the guidance in NUREG-0588 for the environmental qualification of electrical equipment.

The SER identified various unresolved issues and open items in regard to demonstrating qualification of electrical equipment in a harsh environment, non safety related equipment required by the TMI action plan, post accident monitoring equipment, equipment installed under the flood line in the containment, acceptance criteria for qualification testing and discrepancies in qualification summary sheets. Commonwealth Edison responded to specific sections of the SER through their December 5, 1983, submittal to NRR, which is apparently still under review by NRR.

The inspector reviewed Section 3.11.4.2 of the SER regarding safety related electrical equipment being located under the flood line in the containment. The licensee in their response had stated that all essential equipment had been relocated above the flood level. During a walkdown the inspector observed that level transmitters 1LT460, 1LT459, 1LT501, 1LT502, junction box 1JB202R, Asco pilot solenoids 1PS9354A, 1PS9355A, 1PS9356A and 1PS9357A had been raised above the 5' postulated flood level. It was also observed that safety related cable in junction boxes has not been relocated and remained below the flood level, however, the licensee reported that all class 1E cable was qualified for submergence. This shall be verified during a subsequent inspection. Qualification documentation for these items as well as other outstanding issues shall also be reviewed on an ongoing basis at the licensee's downtown office, after NRR's review of the licensee's response.

It was also observed that the licensee had not yet responded to Bulletin 79-01B and supplements, which for most plants has been superseded by 10 CFR 50.49. Discussions were held with the licensee and it was reported that a response to this bulletin is currently being processed. This matter shall be followed up on a subsequent inspection.

(3) Plant Modifications

- (a) The inspector reviewed a modification completed under a rework request in which two differential relays were removed from the circuit and a ground overcurrent relay was replaced for ESF Buses 141 and 142. Work was performed under Rework Request No. 2317 for Bus 141 Cubicles 14 and 16 and Work Request No. 2316 for Bus 142 Cubicles 15 and 17. In addition, modification inspection request numbers 7770, 7771, 7774 and 7775 indicate that the mounting and location

of the relays and terminations to the relays were in accordance with the applicable drawings. The inspector verified that the above changes were reflected in the latest revisions for Bus 141 of the schematic drawing, 6E-1-4030 AP25, "Reserve Feed from 416 ESF Switchgear Bus 241 to 4.16 KV ESF Switchgear Bus 141 ACB #1414".

- (b) The inspector observed the relay calibration of two CV type undervoltage relays PR10A and PR10C for A and C phases on Bus 142, Cubicle 5. Relay calibration was initiated by Work Request B05564 which required that the relay be set per the relay data sheets. The relay set points are obtained from the licensee's systems planning department which issues the relay setting order (RSO) cards for each individual relay. The inspector verified that the two relays were calibrated to be picked up at 1.8 seconds on the 82 volt tap and time lever 2 and in 2.3 seconds at the 41 volt tap in accordance with the typical time curves in Westinghouse Instruction Manual, I.L. 41-201J. In addition, certified test instruments were used and the instrument number and calibration due dates were recorded on the data sheets.
- (c) The inspector observed work in progress for a design change which added a transfer switch to the diesel control panel in order to isolate the control circuitry in the diesel operation room from the main control board. Engineering Change Notice (ECN) 22746 was issued to provide the electrical contractor with the wiring changes to Diesel Generator Panel 1PL07J. In addition, fuses were added in series with the switch contacts to prevent loss of control power in the event fuses located in the main control room were to be lost. Work involving this modification was initiated by Rework Request No. 2269, which required the electrical contractor to install and wire the components in accordance with wiring diagram 6F-1-4097A. Work appeared to be in accordance with available procedures, in addition Hatfield QC was verifying the W-2 switch terminations and related construction activities.

No items of noncompliance or deviations were identified in these areas.

#### 6. 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 5.b.(1)(b).

#### 7. Exit Meeting

The inspector met with licensee representatives (denoted under Persons Contacted) on August 31, 1984. The inspectors summarized the scope of the inspection. The licensee representatives acknowledged the findings reported in previous paragraphs.