U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/82-19(DETP); 50-455/82-14(DETP)

Docket Nos. 50-454; 50-455 Licenses No. CPPR-130; CPPR-131

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

Facility Name: Byron Nuclear Power Station, Units 1 and 2

Inspection At: Byron Site, Byron, IL

Inspection Conducted: September 16-17 and 21-22, 1982

R. Mendez

Inspector: R. Mendez 10/29/82

C.C. Williams

Approved By: C. C. Williams, Chief 10/29/82
Plant Systems Section

Inspection Summary

Inspection on September 16-17 and 21-22, 1982 (Reports No. 50-454/82-19(DETP); 50-455/82-14(DETP))

Areas Inspected: Routine unannounced inspection to observe cable installation activities and review of as-built raceway installation. The inspection involved a total of 28 inspector-hours onsite by one NRC inspector, including four inspector-hours during off-shifts.

Results: Of the two areas inspected, two apparent items of noncompliance were identified in one area; failure to perform adequate inspections - Paragraph 2.c; and failure to identify and document nonconforming conditions - Paragraph 2.d. One apparent item of noncompliance was identified in the other area; failure to control design - Paragraphs 2.e and 2.f.

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*P. T. Myrda, Quality Assurance Supervisor
*R. B. Klingler, Quality Control Supervisor
*J. Binder, Project Electrical Supervisor
A. A. Jaras, Project QAD Supervisor
R. W. Orr, Quality Assurance Engineer
*H. J. Kaczmarek, Quality Assurance Engineer
R. G. Gruber, Quality Assurance Engineer
M. A. Stanish, Quality Assurance Superintendent
*G. Sorensen, Project Construction Superintendent
*V. Schlosser, Project Manager
*J. T. Westermeier, Project Engineer

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

*Denotes those present at the exit interview.

2. Observation of Electrical Work Activities

The inspector selected nine Class 1E cables from essential systems important for the safe operation of the plant which included Essential Safety Features (ESF) and the Reactor Trip Systems (RTS). Cables were selected at random from each of the segregation types (control, power and instrumentation) and were generally longer than 250 feet. For each cable, the inspector compared the design with the actual installation relative to routing and identification.

a. The installation of the following cables were reviewed and inspected:

(1) Cable Inspected: 1AF032

Equipment Connected: AUX FW Valve 1AF005B to Control System Cabinet 1PA34J

Routing Nodes: C, 1713Q, 1R279, 1R280, 11718N, 11717N, 11716N, 11662N, 11659N, 11656N

(2) Cable Inspected: 1VA156

Equipment Connected: 480V ESF MCC 131x3 to Cubicle Cooler Fan 1VA03CD

Routing Nodes: 1688A, 1689A, 1C219B, 1580R, 1R22C, 1517A, 1516A, 1514A, 1515A, 1568A

(3) Cable Inspected: 2SX089

Equipment Connected: 480V ESF MCC 232X1 to Main Control Board ESF2DM06J

Routing Nodes: 2702AA, 2701R, 2698R, 2R256, 2R256, 2R257, 2R258, 21733J, 21735J, 21737J, 21772J, 21770J, 21767J

(4) Cable Inspected: 1RY200

Equipment Connected: I&C Rack Protection 1PA01J to Electrical Penetration 1SI05E

Routing Nodes: 1R401, 11891F, 11890F, 11889F, 11888F, 11887F, 11886F, 1188F, 1R319, 1827D, 1828D, 1973D, 1829D, 1823D

(5) Cable Inspected: 1MS116

Equipment Connected: I&C Rack Protection 1PA02J to Electrical Penetration 1SI06E

Routing Nodes: 11624H, 11623H, 11620H, 11417H, 11418H, 11464H, 11485H, 11467H, 1R264, 11468H

(6) Cable Inspected: 1RC598

Equipment Connected: 6900V SWGR 158 CUB 5 to Safeguards Test Cabinet 1PA11J

Routing Nodes: C, 11994C, 12065C, 12136C, 1WW12A, 12137C, 12138M, 12138MX, 1C228D, 12062MX, 12062M, 1R573, 12034M, 11892CX, 11892C, 12012C, 1R473

(7) Cable Inspected: 2SX345

Equipment Connected: 4160V ESF SWGR 241 CUB 21 to Main Control Board OPM01J

Routing Nodes: 21425B, 21426B, 21427B, 21428B, 21432B, 21433B, 21344B, 21335, 21333B, 21331B, 21330B, 21329B, 21340B, 2R217, 22018C, 1924C, 21925C, 21925C, 21949C, 21960C, 21961C, 22021C, 22022C, 22023C, 21964C, 21966C, 22025C, 2R479

(8) Cable Inspected: 1VE034

Equipment Connected: 480V ESF MCC 132X5 to Exhaust Fan 1VE05C

Routing Nodes: 11461E, 1R368, 1908E, 1909E, 1910E, 1911E, 1912E, 1704E, 1914E, 1915E, 1916E, 1703E, 1R356, 1R339, 11520L, 11519L, 11518L

(9) Cable Inspected: 1SX001

Equipment Connected: 4160V ESF SWGR 141 CUB 2 to Essential Service Water 1SX01PA-M

Routing Nodes: 1982A, 1981AC, 1981A, 1980A, 1979A, 1978A, 1977A, 1R356, 1708M, 1R252, 1680A, 1681A, 1682A, 1683A, 1685A, 1686A, 1687A, 1689A, 1C219A, 1580R, 1R330, 1R219, 1502F

b. The inspector determined the following for Cables 1RY200, 1MS116, 1RC598, 2SX345, 1AF032, 1SX089:

(1) The size and type cables pulled were as specified on the applicable cable pull cards.

(2) The latest approved drawings and work procedures appeared to have been used.

(3) Raceways were free of hazardous debris and sharp edges.

(4) The cables and raceway were properly identified and undamaged.

(5) The cables were routed as specified within the tolerances allowed by specifications.

c. The inspector determined that Cables 2SX345, 1VA156, 1VE034 were not routed as specified according to their respective cable pull cards. Hatfield Electric Company Procedure No. 10 requires that if a cable cannot be physically routed according to the routing shown on the cable pull card, cable installation will be reported to CECo's Project Construction Department. Contrary to these requirements, the three subject cables were pulled and accepted by QC despite exceeding the specification tolerances of Drawing 6E-0-3000A. Furthermore, discrepancies in routing points were not identified on the applicable inspection reports although each had been signed off by QC. It should be noted that while the sample of cables reviewed was small (9 cables), approximately 30% of the cables inspected contained routing errors.

The following examples of routing discrepancies were noted:

(1) The pull card for Cable 2SX345 specified routing points 22025C and 2R479. The cable was correctly routed through Section 22025C but was then routed first through Cable Tray Section 22104C before entering Cable Riser 2R479.

(2) The node points for Cable 1VA156 were specified as 1689A and C219B. Routing was not in accordance with the cable pull card, since the cable first enters Section 1694A before entering Conduit C219B.

(3) Two routing points of Cable 1VE034 were delineated as 1R339 and 1520L. However, the cable was routed correctly through 1R339 but entered Section 11520M before entering Section 11520L.

The failure to accurately route cables in accordance with design instructions including failure to accurately report as-built conditions through QC inspections; represents a potential for more significant nonconformances during ongoing construction. This is considered to be in noncompliance with 10 CFR Appendix B, Criterion X, as described in the Appendix of the report transmittal letter (50-454/82-19-01; 50-455/82-14-01).

d. The inspector observed Class 1E Cables 1CV270, 1VC113, 1FW270, 1RY058 and associated Cables 1MS147, 1MS148 all within six inches or less from the top of Non-class 1E Tray 12121D C1B, with associated Cable 1MS148 in actual contact with non safety cables. Hatfield Electric Company Procedure No. 10 requires that separation of Class 1E and Non-class 1E cables be not less than twelve inches in free air. Additionally, in the licensee's response to item of noncompliance 81-16-01 and 81-12-01 for Byron Units 1 and 2 respectively, the licensee made a commitment that all cable separation problems for Unit 1 be identified and a log established by March 1982, and by June 1982 for Unit 2. However, the licensee could not provide documented evidence in their log book that the subject cables had been previously identified.

This failure to establish measures to assure that the aforementioned nonconforming condition (which could impact on safety) is promptly identified and corrected is considered to be in noncompliance with 10 CFR Appendix B, Criterion XVI, as described in the Appendix of the report transmittal letter (50-454/82-19-02; 50-455/82-14-02).

e. The licensee's FSAR Section 8.3.1.4.2.1 commits to compliance with IEEE 384-1974, which delineates methods of acceptable separation between Class 1E and Non-class 1E cable trays, and states that minimum separation between enclosed raceways be at least one inch. Contrary to this requirement the inspector observed the following instances of safety related trays in physical contact with non safety trays:

(1) 1697H CIE and 1713D CIB
(2) 1694A PIE and 1713D CIB
(3) 11972C CIE and 11972D CIB

Additionally, the inspector observed the following three instances where safety and non-safety trays are apparently separated by less than one inch:

(1) 11913C CIE and 120560 CIB
(2) 11520L P2E and 11621E PIB
(3) Power Cable 1SX001 and 1713C PIB

This failure to assure that applicable regulatory requirements and the design basis are translated into specifications and instructions and that deviations from such standards be controlled is considered to be in noncompliance with 10 CFR 50, Appendix B, Criterion III as described in the Appendix of the report transmittal letter (50-454/82-19-03A; 50-455/82-14-03A).

f. During inspection of the upper cable spreading room area, the inspector observed that Class 1E raceway Section 12031C C1E and cables inside the tray were supporting a section of an HVAC duct. It appeared the HVAC duct was braced against the inside of the Class 1E tray. Although, the raceway and the HVAC duct were installed independently to the correct elevations as specified per their respective drawings, it appeared that lack of design interface and design review caused the apparent non-conforming condition.

The inspector has the following concerns:

(1) There is no assurance that Class 1E cables have not been damaged as a consequence of the pressure applied by the duct and brace in contact with the cables.

(2) The HVAC duct is apparently not seismically qualified and should not be supported by the cable tray. Furthermore, the HVAC duct was apparently supported by a Class 1E tray without an engineering analysis being performed.

(3) Class 1E raceway Drawing 6E-0-30720 had not specified cable tray Section 12031C C1E to support the HVAC duct.

(4) As of September 22, 1982, this condition had not been identified and, consequently, no discrepancy report had been issued.

(5) Before installation the licensee had not identified the apparent conflict between design organizations in placing the tray and duct in the same space coordinates.

The failure to establish adequate and comprehensive measures among participating design organizations for the review and release of documents involving design interfaces is a further example of noncompliance as cited previously in Section 2.e of this report (50-454/82-19-03B; 50-455/82-14-03B).

g. The inspector observed the completed installation of associated Cables 1MS147 and 1MS148 at selected routing points. The inspector determined that the cables were installed in accordance with established procedures. Segregation was maintained throughout the routing with Division 1 Control Class 1E cables but separation was lacking in one instance. At cable tray Section 12031C C1E Cable 1MS148 was observed to be in contact with other nonsafety cables. In addition Cable 1MS147 was separated by less than the twelve inch requirement in free air as mentioned previously in an item of noncompliance Paragraph 1.f.

h. The commitments in paragraph of the Byron FSAR and the requirements in IEEE 384-1974 requires installed cables in raceway to be below the side rails of the cable tray. In addition, Hatfield Electric Company Procedure No. 10 requires that, "Cables will be trained neatly in rows to avoid excessive build up of overfill." This concern was previously cited as an item of noncompliance in Byron Report No. 80-25 and closed in Report No. 81-16. The inspector observed the following Class 1E raceway sections where apparent overfill existed: 11984C CIE, 11417V C2E, 11450Q C2E, 1696A CIE and 11455Q. Pending resolution of this concern, this item will remain open (50-454/82-19-04; 50-455/82-14-04).

i. The inspector observed cable tray separation problems between safety divisions and non-safety trays that violate the commitments of the licensee's FSAR and IEEE 1974. The licensee representatives have stated that all instances of inadequate tray separation will be identified and corrected prior to fuel load. It should be noted that the licensee has not been documenting instances where cable raceway separation problems occur. The following instances of inadequate separation between Class 1E and Non-class 1E trays were identified:

Cable Trays	Vertical Separation (in inches)
1687A PIe and 1715D C1B	2
1695A PIE and 1713C P1B	4
1693B CIE and 1609E K1B	3
1695F KIE and 1708E K1B	1 1/2
12065C CIE and 120640 C1B	4
11892MC CIE and 11893B K1B	4
11913C CIE and 12053D C1B	4
1908E C2E and 1952K C2B	3
1908 P2E and 1952K C2B	2
21688J C2E and 21690S K2D	4
1920E P2E and 1901C P2B	1 1/2
1920E C2E and 1901D C2B	1 1/2
1920E P2E and 1901D C2B	4
11632J C2E and 11631A C2B	2
12103C CIE and 1951B K1B	4
11951C CIE and 12103C C1E	4
11951C CIE and 11953D C1B	4
11583J C2E and 11547 C1B	3 1/2
11906CH CIE and 11906B K1B	2
11951C CIE and 12068D C1B	4
1824J PIE and 1866F P1B	1 1/2
21715J C2E and 21707V K2B	3
21736J C3E and 21737S K2B	3
22024C CIE and 21965D K1B	4
21966C CIE and 22024D K1B	4

This item will remain unresolved until metal tray covers or barriers are placed between the cable tray sections listed above before fuel load.

It is expected that the licensee will expiditiously identify all instances of the separation issues identified above. These identifications will be documented and maintained as appropriate until each issue is resolved (50-454/82-19-05; 50-455/82-14-05).

j. The inspector observed the in progress hand pull of Cable 2EF099 through cable tray, from the Auxiliary Safeguards Cabinet Train B to 4160 ESF SWGR. 242 Cub. 17. It was determined that the cable was adequately installed in accordance with established procedures. The latest approved pull card was used and the maximum pull tension of 66 pounds did not appear to be exceeded.

k. The inspector also observed the in progress installation of Cables 10G156, 10G162 and 1VG187 that were pulled through conduit with Dynamometer AP15088. Although, the maximum allowable pull tension of 747 pounds had been miscalculated by the QC inspector on the tension check sheet (actual maximum was 498 pounds), the highest reading recorded was only 78 pounds. The installation of the cables appeared acceptable and no other problems were identified.

3. Unresolved Items

Unresolved matters are items about which more information is required in order to ascertain whether they are acceptable items, violations or deviations. One unresolved item disclosed during this inspection is discussed in Section 2.i. of this report.

4. Exit Interview

The inspector met with licensee representatives (denoted in the Persons Contacted Paragraph) at the conclusion of the inspection on September 22, 1982. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the information.