

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report No. 50-454/84-37(DRS)

Docket No. 50-454

License No. CPPR-130

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

Facility Name: Byron Station, Unit 1

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: May 14 through 17, 1984; May 21 through 23, 1984;
May 30 and 31, 1984; June 2 through 8, 1984; June 11
through 15, 1984; June 18 through 21, 1984; July 12
and 13, 1984

Inspectors: *R. Mendez*
R. Mendez

7/31/84
Date

E. Christnot
E. Christnot

7/30/84
Date

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

7/30/84
Date

Inspection Summary

Inspection on May 14 through July 13, 1984 (Report No. 50-454/84-37(DRS))

Areas Inspected: Review of the licensee's as-built program and the installation of electrical and instrumentation equipment to as-built drawings; review of as-built hanger, conduit tray installation and cable terminations. The inspection involved a total of 138 inspector-hours including 20 inspector-hours during off-shifts.

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

DETAILS

1. Persons Contacted

Commonwealth Edison Company (CECo)

*R. Tuetken, Startup Coordinator
*M. E. Lohmann, Assistant Construction Superintendent
*J. O. Binder, Project Electrical Supervisor
*R. J. Moravec, Project Construction Supervisor
*R. B. Klingler, Project QC Supervisor
*J. L. Bergner, QA Supervisor
E. L. Martin, QA Supervisor
T. Mitaraj, QA Engineer
J. W. Zid, QA Engineer
M. Dellabetta, QA Engineer

Hatfield Electric Company (HECo)

D. L. Heider, QA/QC Manager
S. Hubler, Lead QC Inspector

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

*Denotes those persons at one of the exit meetings on June 15, June 21, or July 13, 1984.

2. Licensee Action on Previous Inspection Findings

(Open) Unresolved Item (50-454/84-23-02): It was previously identified that safety related instrument rack 1PL56J was installed with 1/2 inch concrete expansion anchors (CEA's) on three legs and with 1/4 inch CEA's on the fourth leg. Additionally instrument rack 1PL75J was installed primarily with 1/4 inch CEA's. Systems Control Corporation letter to Sargent and Lundy (S&L) dated December 6, 1979 establishes traceability of the Class 1E panels per Wyle Laboratories test reports 44359-1 44757-1. The results of the tests were recorded on Seismic Simulation Test Report number 44757. On September 18, 1979 Wyle Laboratories performed a prototype test on a local instrument panel and subjected it to various tests. The results of the tests state that the panel had withstood the seismic tests without structural degradation. The tests, however, were performed while the panel was welded to the shaker table. Information as to whether S&L had evaluated and qualified the installation of the 1/4 inch CEA's to be compatible with the seismic qualification tests was not available. This item remains unresolved pending further review of the qualification tests.

3. Review of As-Builts (Module 37051)

Observation of As-Built Electrical and Instrument Installation

a. The scope of this inspection included:

- (1) Reviewing the licensee's as-built program for procedures governing generation and completion of as-built design and construction drawings/documents.
- (2) Reviewing the schedule for completion of as-built documents and the status of this schedule.
- (3) Review of field electrical and instrumentation installations against current as-built documents.

b. Observation of As-Built Conduit Hanger Installation

The inspectors examined selected hangers which support Class 1E conduit and which carry cables essential to the safe operation of the plant. The inspectors reviewed specifications and drawings pertaining to conduit supports to determine if the as-built condition reflects the latest design documents. The hangers were checked for size, hanger type, location and to determine whether the hangers were supporting the conduits designated on their respective drawings. The following hangers and their pertinent specifications, QC inspections, traveller packages and drawings were included in the inspection:

(1) Hanger Installations Observed and Examined

Hanger number WH3, TS3-6, WV-12, CSL2-1, TS6-1, WV-1, WCP4-4, WV-11, WV-12, WV-13, WV-15, WV-16, WV-19, WS-6, WS-502, WS-17, VTA-1, WCP4-A, WV-24, WV-25, WA-16, WS-5, WS-501, WS-23, WS-18, WH-500, CC-36, WS-13, SFC-1, CC-402, CC-6, STCC-1, CC-4, CC-16, CS-1, STS-1, WS-588, WS-589, WS-590, WS-503, WS-504, WV-505, WS-506, WS-132, WA-500, CC-7, CC-8, WS-507, WA-9, HBT-3, CC-13, CC-14, WS-518, WV-2, CP-21, CC-19, CC-104, CC-105, CC-111, CC-142, CC-15, HBT-500, WA-11, CC-15, CC-44, CC-47, CC-44, CC-46, CC-628, CSL2-601, WV-601, WV-602, CC-128, WH-17, CC-127, WH-16, CS-74, FC-1, WV-9, STH-3, STH-4, STH-5, STH-6, STH-10, STH-12, WH-4, STB-1, STHB-1, STHB-2, WA-8, and TH-1.

(2) Hanger Inspection Reports Reviewed

Report number HP-203 - HE270, HE 367, HE 1458, HE 1678, HE 3055, 1852, 1850, 1851, 2012, 469, 656, 656P, 469, 261, 180, 183, 55, 179, 203, 3677, 1232, 3606, 3604, 2895, 3853 and 261.

(3) Conduit Installations Observed

Conduit Number CIA-5177, 5178, 7180, 7181, 7417, 7418, 7404, 7130, 7126, 7435, and 7455. Conduit number IC 176E and 176F. Conduit number CIR-3440, 5207, 5236 and 5304. Conduit number COX 0203, 0204, 0241, 0246, 0247, 0242, 0245, 0249 and 0250.

The inspectors observed that junction box 1JB-782A, which junctions conduits CIA-7417, 7404, 7435 and 7130, had the supports cut and removed. The licensee's representative showed the inspectors form #HP-7A-1-1858, dated May 2, 1984, which indicated that the supports for junction box 1JB-782A were being reworked.

(4) Hanger Traveler Packages Reviewed

Traveler numbers 6000, 8033, 8099 and 16221.

(5) Drawings Examined

- (a) Drawing No. 6E-1-3531A, revision K, "Category 1 - Conduit Supports Reactor Building Plan Elevation 401'-0","
- (b) Drawing No. 6E-1-3531C01, revision 2, "Category 1 Conduit Support Schedules Reactor Building Plan Elevation 401'-0","
- (c) Drawing No. 6E-1-3531C02, revision W, "Category 1 Conduit Support Schedules Reactor Building Plan Elevation 401'-0","
- (d) Drawing No. 6E-1-3352A, revision AU, "Category 1 Conduit Supports Auxiliary Building Plan El. 426'-01, Cols. Q-W, 10.7-15,"
- (e) Drawing No. 6E-1-3352C01, revision AF, "Category 1 Conduit Support Schedules Auxiliary Building Plan Elevation 426'-0", Cols. Q-W 10.7-15,"
- (f) Drawing No. 6E-1-3352C02, revision AG, "Category 1 Conduit Support Schedules Auxiliary Bldg. Plan Elev. 426'-0", Cols. Q-W 10.7-15,"
- (g) Drawing No. 6E-1-3352C03, revision Y, "Category 1 Conduit Support Schedules Auxiliary Building Plan Elevation 426'-0", Cols. Q-W, 10.7-15,"
- (h) Drawing No. 6E-1-3352C04, revision S, "Category 1 Conduit Support Schedules Auxiliary Building Plan Elevation 426'-0", Cols, Q-W, 10.7-15,"
- (i) Drawing No. 6E-1-3352CT1, revision Y, "Conduit Tabulation Auxiliary Building, Plan Elevation, Cols. Q-W, 10.7-15,"
- (j) Drawing No. 6E-1-3352CT2, revision C, "Conduit Tabulation Auxiliary Building Plan Elevation 426'-0", Cols. Q-W, 10.75-15."

- (6) The installation of the above hangers [Section 3.b.(1) and (2)] appeared to be in accordance with Drawing No. 6E-0-3393U, "Category 1 Conduit Supports Erection Tolerances and Miscellaneous Details" which states that supports may be located within a six inch radius of their design locations. However, minor discrepancies were observed in the identification of WA and WS type hangers. In certain instances WA hangers were specified on some drawings but cross referenced as WS hangers on other drawings. This was determined to have been identified on an FCR and drawing 6E-0-33937 which states that WA and WS hangers were interchangeable.

No deficiencies were identified by the NRC inspectors in this area (3.b above).

4. Review of Cable Tray Loading and Installation

a. The inspectors made field observations, reviewed the design basis and verification regarding cable tray loading. Tray loading was considered in three aspects; cable ampacity or thermal loading, physical weight loading and physical tray capacity. Section 8.3.1.4.1.1 of the Byron FSAR delineates the requirements for limiting the number of cables in a particular section of raceway by holding the allowable conductor temperatures to within the cable rating. Section 8.3.1.4.1.1 further requires that the quantity of cable in trays to be limited by the net usable cross section area or below the level of the top of the siderail of the tray. The third criterion for tray loading deals with the physical weight limitations in Section 3.10.3.2.1 of the Byron FSAR. This section limits the total dead weight of the cables and trays to 45 pounds per square foot. This reduces to 31 lbs. per sq. ft. for the cables and 14 lbs. per sq. ft. for the tray. The following cable tray routing points (nodes) were selected for their relative high design index (DI):

- (1) 11341B - division 1 control cable - DI of 1.43
- (2) 11350K - division 2 power cable - DI of 1.35
- (3) 11487M - division 2 power cable - DI of 1.40
- (4) 11516M - division 2 power cable - DI of 1.40
- (5) 11521M - division 2 power cable - DI of 1.36
- (6) 1807S - division 1 power cable - DI of 1.35
- (7) 1913F - division 2 control cable - DI 1.50

b. The thermal or ampacity loading of the cables was considered first. The method for determining ampacity is not performed on a tray node with all the cables considered together but rather on an individual cable basis. Each cable's maximum allowable ampacity is compared against the maximum full load current of the cable which is limited by the allowable conductor temperatures. The conductor temperatures are held within the cable rating by assigning conductor ampacities which include the effect of derating factors. The following nodes and cables were reviewed:

	<u>Node</u>	<u>Cables</u>	<u>Allowable Ampacity</u>	<u>Full Load Current</u>
(1)	11350K	1AP153	334 amps	275 amps
(2)	11350K	1DV011	121 amps	75 amps
(3)	11487M	1AP153	325 amps	275 amps
(4)	1487M	1VP023	325 amps	275 amps
(5)	11516M	1AP690	325 amps	275 amps

	<u>Node</u>	<u>Cables</u>	<u>Allowable Ampacity</u>	<u>Full Load Current</u>
(6)	11516M	1VP023	325 amps	275 amps
(7)	11521M	1AP690	330 amps	270 amps
(8)	11521M	1DG099	28 amps	26 amps
(9)	1807S	1AP144	307 amps	144 amps

This method appears acceptable since in each instance the full load current is below the allowable ampacity.

- c. Physical weight tray loading was considered. The weights for the following nodes were as follows:

	<u>Node</u>	<u>Weight</u>
(1)	11341B	21.2 lbs
(2)	11487M	32.5 lbs
(3)	11516M	32.5 lbs
(4)	11350K	31.6 lbs
(5)	11521M	31.7 lbs
(6)	1807S	26.5 lbs
(7)	1913F	21.1 lbs

Four of the nodes exceeded the 31 lbs per sq. ft. static weight load. In these instances Cable Tray Loading Violations - Structural (CTLV-S) were issued to identify routing points with cable weights greater than the design limit. S&L instruction PI-BB-17 allows static loading greater than 31 lbs per sq. ft. if they are controlled and approved.

- d. The physical method involving tray loading was considered last. The design basis for this method utilized the 2 inch depth of fill in a 4 inch deep cable tray. Unless the DI exceeds 1.25 no action is taken. The 1.25 DI represents approximately 50% of the usable cross sectional area in a 4 inch deep tray. Cable Tray Loading Violations are issued to identify routing points with a DI greater than 1.25. This ensures that the heat loading and static weight loading are controlled. Four tray nodes were checked to determine the number of cables. The following four nodes were compared against the S&L cable tag index:

	<u>Node</u>	<u>Field Count</u>	<u>Cable Tab Report</u>
(1)	11350K	17	16
(2)	11487M	17	17
(3)	11521M	22	17
(4)	1807S	35	35

In two nodes, 11350K and 11521M, the inspector counted a different number of cables than those listed in the cable tab report. As a result of time constraints this issue could not be resolved. This item is considered open pending further review (454/84-37-01).

e. Cable Tray and Hanger Installations Observed

- (1) The following reports and hanger installations were reviewed by the inspectors:

<u>HECo Inspection Report Number [HP-9A]</u>	<u>Hanger Number</u>	<u>HECo Inspection Report Number [HP-9A]</u>	<u>Hanger Number</u>
3669	H020	956	H36
3681	H032	957	H37
3683	H034	958	H38
3684	H035	959	H39
3694	H045	960	H40
3682	H033	961	H41
3725	H076	962	H42
3712	H063	963	H43
3734	H085	973	H539
3791	H582	3967	H025
3750	H101	3970	H028
3711	H062	3971	H029
3730	H081	3973	H031
882	H13	3976	H034
881	H14	4012	H071
880	H15	4013	H072
951	H31	4014	H073
952	H32	4016	H075
953	H33	4017	H076
954	H34	3974A	H032
955	H35	3968A	H026

- (2) The following cable tray nodes were observed by the inspectors:

Cable Tray Node Number 1316M, 1R106, 1317M, 1318M, 1979A, 1980A, 1981A, 1982A, 1979B, 1980B, 1981B, 1982B, 1983B, 1984B, 1985B, 1134K, 11355K, 11356K, 11357K, 11358K, 11359K, 11367L, 11368LK, 11369L, 11370L, 11371L, 11372L, 11373L, 11365L, 11364L, 11363L, 11378M, 11379M, 11380M, 11382M, 11383M, 11384M, 11385M, 11386M, 11381M, 11121A, 11122A, 11123A, 11124A, 11125A, 11126A, 11128A, 11130A, 11132A, 11121B, 11122B, 11123B, 11124B, 11125B, 11126B, 11128B, 11130B, and 11132B.

The inspector observed that nodes 11367L, 11365L, 11364L, 11383L, 11381M, 11125A and 11125B were not listed in the cable tray schedule because no cables are present at these nodes.

f. Drawings Examined

- (1) Drawing No. 6E-0-3507, revision AT, "Electrical Installation Essential Service Cooling Tower OB Plan - Switchgear Room Elevation 874'-6",
 (2) Drawing No. 6E-1-4639D, revision H, "Internal/External Wiring Diagram 480V ESF Unit Substation 132Z (1AP89E) section 3,"

- (3) Drawing No. 6E-1-4098G, revision P, "Internal/External Wiring Diagram Remote Shutdown Control Panel 1PL05J Part 8,"
- (4) Drawing No. 6E-1-4639E, revision H, "Internal/External Wiring Diagram 480V ESF Unit Substation 132Z (1AP98E) section 4,"
- (5) Drawing No. 6E-0-4044AA, revision J, "Internal/External Wiring Program Main Control Panel General Services - OPM01J-Part 1,"
- (6) Drawing No. 6E-1-3351, revision BK, "Electrical Installation Auxiliary Building Plan El. 426'-0" Cols. L-Q, 6-10,"
- (7) Drawing No. 6E-0-3393U, revision Y, "Conduit Supports Erection Tolerances and Miscellaneous Details,"
- (8) Drawing No. 6E-0-3302C01, revision AJ, "Category 1 Conduit Support Schedules Auxiliary Building Plan Elevation 346'-0", Cols. L-Q, 15-21,"
- (9) Drawing No. 6E-0-3302A, revision BF, "Category 1 Conduit Supports Auxiliary Building Plan El. 456'-0", Cols. L-Q, 15-21,"
- (10) Drawing No. 6E-0-3339A, revision AC, "Category 1 Conduit Supports Auxiliary Building Sections and Details,"
- (11) Drawing No. 6E-3339C02, revision L, "Category 1 Conduit Support Schedules Auxiliary Building Plan El. 414'-0",
- (12) Drawing No. 6E-0-3507A, revision 2, "Category 1 Conduit Supports Essential - Service Cooling Tower OB Switchgear Room - El. 847'-6",
- (13) Drawing No. 6E-0-3507C01, revision Z, "Conduit Category 1 Conduit Support Schedule Essential Service Cooling Tower OB, Switchgear Rm. El. 847'-6",
- (14) Drawing No. 6E-1-3382D01, revision Z, "Electrical Installation Auxiliary Building Sections and Details,"
- (15) Drawing No. 6E-1-3372, revision AB, "Electrical Installation Auxiliary Building Floor Plan Elevation 451'-0", Col. Q-W, 10-15,"
- (16) Drawing No. 6E-1-524C02, revision AC, "Category 1 Conduit Support Schedules Reactor Building Plan Elev. 390'-0",
- (17) Drawing No. 6E-1-3524C05, revision AM, "Category 1 Conduit Support Schedules Reactor Building Plan El. 390'-0",
- (18) Drawing No. 6E-1-3524A, revision BG, "Category 1 - Conduit Supports Reactor Building Plan Elev. 390'-0" Loop 4,"
- (19) Drawing No. 6E-0-3071HA, revision J, "Cable Support Hangers Auxiliary Equipment Room - Auxiliary Building - Fl. El. 463'-5", Cols. L-Q, 10-13,"
- (20) Drawing No. 6E-0-3071HA02, revision H, "Category 1 Hanger Tabulation Auxiliary Building Section,"
- (21) Drawing No. 6E-0-3375C03, revision V, "Category 1 Conduit Support Schedules Auxiliary Floor Plan Elevation 451'-0",
- (22) Drawing No. 6E-0-3375A, revision V, "Category 1 Conduit Supports Auxiliary Building Plan Elevation 415'-0" Cols. S-V.9, 15-21,"
- (23) Drawing No. 6E-0-3391E, revision AK, "Electrical Installation Electrical Equipment Details, Sheet 3,"
- (24) Drawing No. 6E-1-3522, revision AP, "Electrical Installation Reactor Building Plan El. 390'-0", Loop 2,"
- (25) Drawing No. 6E-1-3531, revision AK, "Electrical Installation Reactor Building Plan El. 401'-0",

- (26) Drawing No. 6E-0-3331A, revision AW, "Category 1 Conduit Supports Auxiliary Building Plan El. 401'-0", Cols. L-Q, 10-15,"
- (27) Drawing No. 6E-0-3331C03, revision V, "Category 1 Conduit Support Schedules Auxiliary Building Plan El. 401'-0", Col. L-Q, 10-15," and
- (28) Drawing No. 6E-0-3393H, revision T, "Category 1 Conduit Supports Supplementary Styles, Types and Details."

5. Review of Hanger Calculations

The inspector reviewed calculations for selected conduit hangers. Design basis for calculating loads and determining the size and type of hanger are designated on S&L's General Drafting Standard (GDS) 3.63. Drawing standard 6E-0-3393B provides the maximum load tables for each hanger type to be used. In addition, the inspector reviewed control of the reduced maximum load calculations (RML) on hangers. The RML is not required when the load weight is less than the maximum allowable load. The RML results in a conservative factor of 20% and 35% depending on the center of gravity lengths. The following calculations were reviewed:

<u>Hanger Calculation</u>	<u>Date Performed</u>
E-2072	February 17, 1983
E-2039	August 18, 1983
E-2040	November 14, 1982
E-2043	June 7, 1982
E-2044	June 7, 1982
E-2045	June 7, 1982
E-2046	June 7, 1982
E-2047	May 28, 1982
E-2048	June 7, 1982
E-2052	June 7, 1982
E-25, 804	June 11, 1984

No deficiencies were identified in this area.

6. Review of Nonconformance Reports

- a. The inspector reviewed a selected number of HECO nonconformance reports (NCR's) for proper review closure and corrective action to prevent reoccurrence. In addition, the NCR's and related FCR's were reviewed to determine whether design changes from the original design reflects the as-built installation and whether these changes were incorporated into as-built drawings. Also, where applicable, changes for as-is acceptance were reviewed for proper disposition.
- b. The following Nonconformance Reports (NCR) were reviewed.
 - (1) NCR No. 101, issued February 27, 1980, closed April 24, 1980
 - (2) NCR No. 102, issued February 14, 1980, closed August 1, 1980
 - (3) NCR No. 103, issued March 6, 1980, closed January 8, 1980
 - (4) NCR No. 104, issued March 11, 1980, closed July 1, 1980
 - (5) NCR No. 105, issued March 13, 1980, closed April 7, 1981

- (6) NCR No. 106, issued March 18, 1980, closed November 25, 1980
- (7) NCR No. 107, issued March 21, 1980, closed March 26, 1980
- (8) NCR No. 108, issued March 28, 1980, closed July 21, 1980
- (9) NCR No. 109, issued March 26, 1980, closed April 6, 1981
- (10) NCR No. 110, issued May 9, 1980, closed June 25, 1980
- (11) NCR No. 111, issued May 19, 1980, closed July 28, 1980
- (12) NCR No. 112, issued May 20, 1980, closed July 30, 1980
- (13) NCR No. 113, issued June 16, 1980, closed April 8, 1981
- (14) NCR No. 114, issued June 12, 1980, closed July 16, 1980
- (15) NCR No. 115, issued June 20, 1980, closed May 21, 1981
- (16) NCR No. 117, issued August 11, 1980, closed May 28, 1981
- (17) NCR No. 118, issued October 13, 1980, closed May 14, 1981
- (18) NCR No. 119, issued October 14, 1980, closed January 8, 1981
- (19) NCR No. 120, issued October 15, 1980, closed January 14, 1981
- (20) NCR No. 121, issued October 15, 1980, closed November 26, 1980
- (21) NCR No. 122, issued November 10, 1980, closed April 1, 1981
- (22) NCR No. 123, issued November 10, 1980, closed May 14, 1981
- (23) NCR No. 124, issued November 13, 1980, closed May 28, 1981
- (24) NCR No. 125, issued November 13, 1980, closed August 1, 1981
- (25) NCR No. 552, issued January 13, 1983, closed April 5, 1984
- (26) NCR No. 555, issued January 20, 1983, closed August 13, 1983
- (27) NCR No. 564, issued January 24, 1983, closed January 21, 1984
- (28) NCR No. 567, issued January 24, 1983, closed January 21, 1984
- (29) NCR No. 571, issued January 27, 1982, closed October 27, 1983
- (30) NCR No. 572, issued February 3, 1983, closed April 19, 1983
- (31) NCR No. 573, issued February 14, 1983, closed April 19, 1983
- (32) NCR No. 374, issued February 14, 1983, closed February 15, 1983
- (33) NCR No. 575, issued February 17, 1983, closed April 4, 1984
- (34) NCR No. 805, issued December 20, 1983, closed June 6, 1984
- (35) NCR No. 814, issued January 3, 1984, closed May 1, 1984
- (36) NCR No. 815, issued January 4, 1984, closed May 14, 1984
- (37) NCR No. 816, issued January 4, 1984, closed May 14, 1984
- (38) NCR No. 834, issued January 18, 1984, closed May 14, 1984
- (39) NCR No. 835, issued January 16, 1984, closed February 2, 1984
- (40) NCR No. 837, issued January 19, 1984, closed March 15, 1984
- (41) NCR No. 841, issued February 27, 1984, closed May 2, 1984
- (42) NCR No. 846, issued January 31, 1984, closed May 4, 1984
- (43) NCR No. 848, issued February 7, 1984, closed February 17, 1984
- (44) NCR No. 849, issued February 7, 1984, closed May 3, 1984
- (45) NCR No. 850, issued February 8, 1984, closed May 10, 1984
- (46) NCR No. 864, issued February 21, 1984, closed June 9, 1984
- (47) NCR No. 867, issued February 22, 1984, closed May 2, 1984
- (48) NCR No. 873, issued February 24, 1984, closed May 2, 1984

c. For the above NCR's, the review process and disposition appeared adequate. Several NCR's were discussed with the licensee.

- (1) NCR 125 [Section 6.b.(24)] involved the splicing of Class 1E cables in a junction box. Field Change Request (FCR) No. 6143 was issued to accept as-is, the splicing of the cables. The inspector observed the cable splice in the junction box. The cables were determined to be spliced in accordance with the manufacturer's instructions. In addition records indicate that QC inspections were performed.

- (2) NCR 105 [Section 6.b.(5)] pertained to a conduit hanger WA-9 which was installed outside the tolerance set by specification. The inspector reviewed the drawings listed on the FCR. The latest drawing revisions no longer include hanger WA-9. Review of prior drawings, however, indicate that the drawings had been modified and that the hangers had been deleted. This is documented on an FCR.
- (3) NCR 122 [Section 6.b.(21)] involved the acceptance by S&L of 13 half inch diameter CEA's which did not meet the minimum embedment depth. Standard BY/BR/CEA establishes the minimum requirement for the embedment depth for CEA's. The standard further states that where conflicts arise BY/BR/CEA take precedence. This standard establishes a minimum embedment depth of four inches for half inch CEA's. These thirteen CEA's range from 2.72 to 3.16 inches in depth or 70% to 79% of the minimum embedment depth.

The inspector reviewed the NCR packages, but could not determine a basis for accepting the CEA's as-is. It could not be determined that this depth was established as part of the pullout characteristics of the half inch CEA to qualify it to 70% of the minimum embedment length. This item remains unresolved pending review of tests to qualify the CEA's.
(454/84-37-02)

7. Instrument Panel Installation

The inspector reviewed the completed as-built installation of safety related instrument racks. The inspector reviewed applicable specifications, work procedures and traveler packages to determine whether instrument panels were being installed in accordance with licensee commitments. The inspector reviewed instrument records and verified location and orientation for the following instrument racks, instruments and selected instrument sensing lines and hangers.

a. Instrument rack 1PL81JA Instruments

- (1) 1FT-CS011 - Containment Spray Pump 1A Discharge
- (2) 1FT-CS013 - Containment Spray Eductor 1A Suction
- (3) 1FT-CS015 - Containment Spray Eductor 1A Additive
- (4) 1FIS-610 - Residual Heat Removal Pump 1A Minflo
- (5) 1PT-614 - Residual Heat Removal Pump 1A Discharge
- (6) 1FT-618 - Residual Heat Removal Low Pressure 1A Return
- (7) 1FIS-646 - Residual Heat Removal Pump 1A CCW Lo

b. Instrument Panel 1PL81JB Instruments

- (1) 1FT-CS012 - Containment Spray Pump 1B Discharge
- (2) 1FT-CS014 - Containment Spray Eductor 1B Suction
- (3) 1FT-CS016 - Containment Spray Eductor 1B Additive
- (4) 1FIS-611 - Residual Heat Removal Pump 1B Minflo
- (5) 1FIS-647 - Residual Heat Removal CCW Lo

c. Instrument Panel 1PL84JA Instruments

- (1) 1FT-AF011 - Auxiliary Feedwater to SG 1A
- (2) 1FT-AF013 - Auxiliary Feedwater to SB 1B
- (3) 1FT-AF015 - Auxiliary Feedwater to SG 1C
- (4) 1FT-AF017 - Auxiliary Feedwater to SG 1D
- (5) 1FI-AF011 - Auxiliary Feedwater to SG 1A
- (6) 1FI-AF013 - Auxiliary Feedwater to SG 1B
- (7) 1FI-AF015 - Auxiliary Feedwater to SG 1C
- (8) 1FI-AF017 - Auxiliary Feedwater to SG 1D

d. Instrument Panel 1PL84JB Instruments

- (1) 1FT-AF012 - Auxiliary Feedwater to SG 1A
- (2) 1FT-AF014 - Auxiliary Feedwater to SB 1B
- (3) 1FT-AF016 - Auxiliary Feedwater to SG 1C
- (4) 1FT-AF018 - Auxiliary Feedwater to SG 1D
- (5) 1FIS-AF022 - Auxiliary Feedwater to SG 1A
- (6) 1FIS-AF024 - Auxiliary Feedwater to SG 1B
- (7) 1FIS-AF026 - Auxiliary Feedwater to SG 1C
- (8) 1FIS-AF028 - Auxiliary Feedwater to SG 1D

e. Instrument Panel 1PL85JB Instruments

- (1) 1PSL-AF055 - Auxiliary Feedwater Pump 1B Suction
- (2) 1PSL-AF056 - Auxiliary Feedwater Pump 1B Suction
- (3) 1PT-AF057 - Auxiliary Feedwater Pump 1B Discharge
- (4) 1PI-AF096 - Auxiliary Feedwater Pump 1B Recirculation
- (5) 1PI-AF058 - Auxiliary Feedwater Pump 1B Discharge
- (6) 1FT-AF129 - Auxiliary Feedwater Pump 1B Recirculation
- (7) 1PT-AF131 - Auxiliary Feedwater Sump 1B Suction
- (8) 1PI-AF151 - Auxiliary Feedwater Pump 1B Suction

f. The following Drawings were reviewed

- (1) Drawing No. M-819, revision R, "Instrumentation General Notes"
- (2) Drawing No. M-827, revision T, "Instrument Locations El. 346'-0" Auxiliary Building Byron/Braidwood Stations"
- (3) Drawing No. 6577-M-1PL81JA, revision 4, "1PL81JA Panel Component Location"
- (4) Drawing No. 6577-P-1PL81JA, revision 3, "1PL81JA Panel Piping Diagram"
- (5) Drawing No. 6577-M-1PL81JB, revision 4, "1PL81JB Panel Component Location"
- (6) Drawing No. 6577-P-1PL81JB, revision 4, "1PL81JB Panel Piping Diagram"
- (7) Drawing No. 6577-M-1PL84JA, revision 3, "1PL84JA Panel Component Location"
- (8) Drawing No. 6577-P-1PL84JA, revision 3, "1PL84JA Panel Piping Diagram"
- (9) Drawing No. 6577-M-1PL84JB, revision 3, "1PL84JB Panel Component Location"
- (10) Drawing No. 6577-P-1PL84JB, revision 3, "1PL84JB Panel Piping Diagram"

- (11) Drawing No. 6577-P-1PL85JB, revision 4, "1PL85JB Panel Component Location"
- (12) Drawing No. 6577-P-1PL85JB, revision 3, "1PL85JB Panel Piping Diagram"

g. The following Traveller Packages were reviewed:

- (1) Hanger Drawing No. M115-1FIS-0610
- (2) Hanger Drawing No. M115-1FIS-0611
- (3) Hanger Drawing No. M194-1FT-AF011
- (4) Hanger Drawing No. M195-1FT-AF012

h. The instrument racks [Section 7.a, b, c, d and e] were determined to be generally installed per the Powers-Azco-Pope drawings and the S&L mechanical drawing series M-829 (see below). Instrument location on the individual racks were installed in accordance with the vendor's drawing series 6577-M and 6577-P. The inspector reviewed a selected number of instruments and determined that they were installed per the manufacturer's instructions.

i. During review of the instrument rack installation the inspector and licensee personnel measured the location of instrument rack 1PL84JB. Location for this rack is designated on the instrument location drawing No. M-828, sheet 9 which shows the dimensions from columns 12 and N. The distance from column N to the rack was determined to be 3'-10 3/4", drawing M-828 designates this distance to be 2'-11 1/2". The difference in the as-built installation from the instrument rack location drawings could not be readily explained since apparently no dimensional tolerances had been established. Revision R of drawing M-819, sheet 1, states in part, "Allow non-control panel locally mounted instruments a physical tolerance of ± 12 " from the drawing sealed location."

Revisions J and K of drawing M-819 originally applied to HVAC systems. The licensee stated that "HVAC" would be included in the next revision of M-819. An additional concern involved a complete omission of dimensions on the traveler package from column lines N and 15. Although, drawing M-828 designates the exact location of the instrument rack. The licensee was informed this was an apparent failure to establish an as-built drawing based on the as-built installation. Further, it was determined that racks 1PL81JA, 1PL81JB, 1PL84JA and 1PL85JB had not been QC inspected to determine the location of these instrument racks although the location was designated on the traveler packages which in addition reference the instrument location drawings M-827 and M-828. This item is considered unresolved pending a review of the need to establish a dimensional tolerance and whether the racks should be QC inspected for location (454/84-37-03).

8. Review of Instrument Cable Termination

a. The inspector reviewed cable terminations for selected safety related instrumentation. The termination points are designated on S&L wiring diagrams series. The terminations and cables were

inspected for protection, segregation and electrical separation. The following drawings were reviewed.

- (1) Drawing No. 6E-1-4101A, revision G, "Internal/External Wiring Diagram Auxiliary Building Local Instrument Rack 1P181JA"
- (2) Drawing No. 6E-1-4101B, revision F, "Internal/External Wiring Diagram Auxiliary Building Local Instrument Rack 1PL81JB"
- (3) Drawing No. 6E-1-4101E, revision C, "Internal/External Wiring Diagram Auxiliary Building Local Instrument Rack 1PL84JA"
- (4) Drawing No. 6E-1-4101F, revision C, "Internal/External Wiring Diagram Auxiliary Building Local Instrument Rack 1PL84JB"
- (5) Drawing No. 6E-1-4101H, "Internal/External Wiring Diagram Auxiliary Building Local Instrument Rack 1PL85JB"

b. The terminations for the following cables were reviewed.

	<u>Cable Identification</u>	<u>Cable Type</u>	<u>Segregation Code</u>
(1)	1CS067	4 TWPR #16	1K1E
(2)	1RH018	4/C #14	1C1E
(3)	1CS069	4 TWPR #16	1K2E
(4)	1RH022	4/C #14	1C2E
(5)	1AF077	4 TWPR #16	1K1E
(6)	1AF079	4 TWPR #6	1K2E
(7)	1AF304	12/C #14	1C2E
(8)	1AF061	4/C #14	1C2E

9. Review of Thermal Overloads

On a previous inspection the inspector had reviewed several schematic diagrams. During a subsequent review it was observed that thermal overload relays were not being bypassed. This is in apparent conflict with Regulatory Guide (RG) 1.106 to which Byron is committed, and requires that thermal overloads be bypassed under emergency conditions. S&L letter dated April 15, 1983 delineates the design basis in choosing the trip setpoint of the thermal overload protection devices with the following considerations:

- . variation in ambient temperature
- . inaccuracies in motor heat rates
- . setpoint drift

In the April 15, 1983 letter, the licensee addresses these concerns.

10. Open Items

Open items are matters, not otherwise categorized in this report, that need to be followed up on in future inspections. An open item disclosed during this inspection is discussed in Paragraph 4.d.

11. Unresolved Matters

Unresolved matters are items about which more information is required in order to ascertain whether they are acceptable, items of noncompliance or deviations. An unresolved item disclosed during the inspection is discussed in Paragraph 6.c.(3) and 7.i.

12. Exit Interview

The inspector met with licensee representatives (denoted under Persons Contacted) on and at the conclusion of the inspection on July 13, 1984. The inspector summarized the scope and findings of the inspection. The licensee acknowledged the information.