U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-454/80-02; 50-455/80-02

Docket No. 50-454; 50-455 License No. CPPR-130; CPPR-131

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

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

Inspection At: Byron Site, Byron, IL

Inspection Conducted: February 7-8, 1980

Inspectors: C C Williams for:
J. E. Konklin 3-4-80

C E Jones
C. E. Jones 3-4-80

P. A. Barrett
P. A. Barrett 3-4-80

Accompanying Personnel: Z. C. Cordero

Approved By: C. C. Williams
C. C. Williams, Chief 3-4-80
Projects Section 2

Inspection Summary

Inspection on February 7-8, 1980 (Report No. 50-454/80-02; 50-455/80-02)
Areas Inspected: Licensee corrective actions on previous inspection findings; licensee actions relative to reported 10 CFR 50.55(e) deficiency on containment tendon anchor-heads; storage of safety-related mechanical and electrical materials and components; electrical cable installation activities. The inspection involved a total of 36 inspector-hours on site by three NRC inspectors.
Results: No items of noncompliance were identified.

DETAILS

Persons Contacted

Principal Licensee Employees

*G. Sorensen, Project Superintendent
*J. McIntire, QA Supervisor
*J. Mihovilovich, Lead Structural Engineer
*R. Tuetkin, Lead Mechanical Engineer
*G. Smith, Lead Electrical Engineer
*M. Pendleton, Station Construction Structural Engineer
*R. Aken, QA Electrical Coordinator
*J. Porter, QA Mechanical Coordinator
*M. Stanish, QA Structural Coordinator
*M. Gorski, QA Mechanical Engineer

Hatfield Electric

*W. Gratza, QC Manager

The inspectors also contacted other licensee and contractor personnel.

*Denotes those attending the exit interview.

Meeting at S&L Offices on February 6, 1980

Attendees

E. Gallagher, NRC
W. Key, NRC
J. Keiny, Inryco
D. Waitkus, Inryco
J. Westermeier, CECo
W. Segresell. CECo
S. Petrovich, CECo
J. Woods, CECo
O. Zaben, S&L
R. Netzel, S&L

Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (454/79-01-02; 455-79-01-02) - Documented instructions or procedures had not been established to assure that all design changes would be accomplished. Hatfield Procedure No. 7, Revision 3, Issue 2 specifies the necessary requirements to control design changes and document revisions, including any necessary reinspection. Additional instructions to clarify the new requirements of Procedure No. 7 were issued in a written "Notice to All General Foremen and Foremen", dated April 11, 1979. The licensee confirmed that the cited problem effected only Hatfield Electric Company.

(Closed) Followup Item (454/79-03-01; 455/79-03-01) - Temporary installations of permanent Class 1E cables. All 27 of the safety-related cables installed in the identified temporary condition have been removed. The licensee stated that these removed cables will not be used in safety-related, Class 1E, systems. The pertinent cable pull (installation) cards are being marked to reflect the above changes. The licensee also indicated that the practice of using Class 1E cables in noncontrolled temporary conditions was isolated to the 27 backfeed cables.

(Closed) Followup Item (454/79-11-01; 455/79-11-01) - Licensee actions to assess the full scope of bulletins. This concern is addressed in IE Item 454/79-15-01; 455/79-15-01; therefore, this item is closed.

(Closed) Unresolved Item (454/79-11-02; 455/79-11-02) - QC inspection criteria were not established for installation of cables. During this inspection, the RIII inspector reviewed Hatfield Procedure No. 10, Revision 3, Issue 3, Appendix E, dated September 7, 1979. Appendix E specifies the acceptance criteria for QC verification of all Class 1E cables. The criteria verification will be documented on the applicable Cable Pan Verification Checklist (Form HP-102 Revision 1), the Cable Installation Inspection Checklist (Form HP-103 Revision 1), and/or the pull card. The only backfitting to be considered was the backfeed cables which were removed as identified in this Report 80-02, Item 454/79-03-01; 455/79-03-01.

(Closed) Unresolved Item (454/79-14-03; 455/79-14-03) - Two Field Change Requests (No. 277 and No. 281) were neither retained by the Hatfield QC inspection group nor referenced on the applicable drawings. During this inspection, the RIII inspector checked the control of FCR No. 277, FCR No. 281, and their respective drawings, No. 6E-0-3275 Revision 6 and No. 6E-03022 Revision K. The checks were made at the QC office, the general foreman's and the foreman's distribution points. The only identified discrepancy was that FCR No. 277 was closed (incorporated) on December 10, 1979, but was not yet recalled from the field by Hatfield Document Control. Therefore, FCR No. 277 should still have been marked as open (unincorporated) on the three applicable foremen's drawings (No. 6E-0-3275 Revision G), but were not. FCR No. 277 and a marked drawing No. 6E-0-3275 Revision G were available at the general foreman's desk. The licensee stated that this discrepancy would be immediately resolved and that measures would be taken to assure that appropriate controls would be implemented at the foremen's distribution points.

Reference IE item 454/79-01-02; 455/79-01-02 as addressed in this report. The RIII inspector has no further questions at this time.

SECTION I

Prepared by J. E. Konklin

Reviewed by C. C. Williams, Chief

1. Containment Post - Tensioning Anchor Head Deficiencies - Reported per 10 CFR 50.55(e)

CECo made an initial notification to Region III on November 29, 1979 of a reportable deficiency per 10 CFR 50.55(e) regarding the failure of two field anchor-heads installed on horizontal post-tensioning tendons in the Unit 1 containment. Subsequent to that notification, two additional field anchor-heads have failed on the Unit 1 containment, the latest on January 18, 1980. CECo, Sargent & Lundy, and the post-tensioning equipment supplier, Inland-Ryerson, have instituted a substantial anchor-head testing and evaluation effort to determine the causes of and required corrective actions for the anchor-head problems. The final report on the 50.55(e) item is due to Region III in March 1980.

During this inspection, the Region III inspector, and the accompanying personnel, discussed with the licensee the status of the anchor-head evaluation effort and the associated tendon detensioning program at the site. The Region III personnel also reviewed applicable anchor-head material certifications, heat treating records, receipt inspection reports, and acceptance documentation; applicable detensioning procedures, detensioning sequences and checklists, and lift-off loads for selected tendons; and observed the detensioning and anchor-head removal activities for one containment dome tendon.

The procedures reviewed include the following:

a. Blount Brothers Corporation QA-QC Work Procedure No. 56, Issue 3, Revision 2, dated November 30, 1979, "Post-Tensioning Tendon Field Anchorhead Replacement", with Addendum A containing the inspection checklist form.

   Procedure No. 56 relates to the detensioning and field anchor-head replacement on horizontal tendons from one heat treatment lot of the PY heat, and includes the detensioning sequence for 16 heads from the PY heat plus 32 other tendons requiring detensioning to maintain symmetrical containment loading.

b. Blount Brothers Corporation QA-QC Work Procedure No. 60, Issue 3, Revision 2, dated December 10, 1979, "Detensioning of Horizontal Tendons for Field Anchorhead Replacement".

Procedure No. 60 relates to the tensioning of all horizontal tendons with anchor-heads from the PY heat, plus other tendons required to maintain symmetrical loading.

c. Blount Brothers Corporation QA-QC Work Procedure No. 61, Issue 2, Revision 1, dated December 18, 1979, "Detensioning of Vertical Tendons for Field Anchorhead Replacement".

Procedure No. 61 relates to the detensioning of all vertical tendons with anchor-heads from the PY heat, plus other tendons required to maintain symmetrical loading.

d. Blount Brothers Corporation QA-QC Work Procedure No. 62, Issue 2, Revision 1, dated January 25, 1980, "Detensioning of Vertical, Dome and Horizontal Tendons for Field Anchorhead Replacement", with Addendum A dated January 25, 1980, Addendum B dated January 22, 1980, and Addendum C dated January 30, 1980.

Procedure No. 62, with addenda, refers to the detensioning of dome, vertical and horizontal tendons with anchorheads from the PY, PZ and PC heats.

The field anchor-heads installed in the Unit 1 containment were fabricated from four heats of materials supplied by the Earle M. Jorgensen Co. of Los Angeles. The Region III personnel reviewed the following material certifications for the four heats:

(1) Jorgensen CMTR dated December 14, 1977, for Heat No. 18115, with the Inryco approval dated April 4, 1978, and designated Heat Code PC by Inryco.

(2) Jorgensen CMTR of December 14, 1977 (erroneously dated December 14, 1978) for Heat No. 20919, with the Inryco approval dated March 17, 1978, and designated Heat Code NX by Inryco.

(3) Jorgensen CMTR dated July 20, 1978 for Heat No. 18381, with the Inryco approval dated August 8, 1978, and designated Heat Code PY by Inryco.

(4) Jorgensen CMTR dated April 25, 1978 for Heat No. 18214, with the Inryco approval dated August 8, 1978, and designated Heat Code PZ by Inryco.

The Region III personnel then selected a shipment of 120 anchor-heads from Jorgensen Heat Nos. 18115 and 20919 (Inryco Heat Codes PC and NX) and traced the anchor-heads through the documentation involved in heat-treatment, shipment, and acceptance, including the following documentation:

(1) Certificate of Heat Treatment, dated July 14, 1978, by Downey Steel Treating Division of Sunbeam Appliance Service Company, for Part Nos. NX 21 through 40.

(2) Certificates of Heat Treatment, dated July 21, 1978, by Downey Steel Treating Division, for Part Nos. NX 41 through 50 and NX 126 through 135.

(3) Certificate of Heat Treatment, dated June 16, 1978, by Downey Steel Treating Division, for Part Nos. PC 25 through 44, PC 106 through 125, and NX 171 through 190.

(4) Certificate of Heat Treatment, dated June 27, 1978, by Continental Heat Treating Division of Tower Industries, for Part Nos. NX 001 through 020, and NX 191 through 210.

(5) Certificate of Heat Treatment, dated June 14, 1978, July 14, 1978, July 7, 1978, and June 16, 1978, by Downey Steel Treating Division, for Part Nos. PC 86 through 105, NX 296 through 315, PC 46 through 52 and 58 through 60, and NX 341 through 360.

(6) Western Concrete Constructors delivery tickets dated July 28, 1978, for shipment to Inryco of six heat treat boxes of 20 anchor-heads each, with Part Nos. specified.

(7) Inryco Shipping Release to CECo, dated August 8, 1978, for 120 field anchor-heads (170 WIE) to Item No. 21T781523, with S&L acceptance dated August 30, 1978.

(8) Inryco Certificate of Conformance, dated August 7, 1978, for Field Ancho Heads, Item No. 21T781-523.

(9) S&L letter of August 31, 1978 to CECo, transmitting and noting acceptance of the documentation for 120 field anchor-heads, designated 170 WIB, from Inryco.

On February 8, 1980, the inspector and the accompanying RIII personnel observed the work activities involved in the detensioning of Unit 1 dome tendon No. D2-13T.

No items of noncompliance were identified.

SECTION II

Prepared by E. Gallagher

Reviewed by D. W. Hayes, Chief

1. Reportable Deficiency per 50.55(e) on Unit 1 Containment Prestressing System Anchor-Heads - Meeting on February 6, 1980.

The licensee notified the NRC Region III office on November 29, 1979 of a significant construction deficiency in accordance with the requirements of 10 CFR 50.55(e). It was reported that two Unit 1 containment prestressing system field anchor heads had failed. The first head failed 13 days after stressing and the other after one day of stressing. The steel anchor heads are provided at each end of the 170 wire tendon to serve as termination and achorage for the tendon.

The two anchor heads were identified as PY-136 and PY-134 (PY Heat Code). Subsequently, anchor head PY-142 was also found to have failed. Steps were taken in the field to detension horizontal tendons containing the failed heads as well as minimize the asymetric loads in the Containment Building.

The licensee submitted the first interim report on December 26, 1979 as required by the 30 day reporting requirement.

A meeting was held on February 6, 1979 with the licensee, Sargent & Lundy engineers, and Inryco to discuss the current status and preliminary findings of the metallurgical investigation into the causes of the failures. During this meeting the licensee informed the NRC that a fourth field anchor head had failed. This head was identified to be from a different heat (PZ heat code) PZ-040.

The licensee informed the NRC of the following:

a. Metallurgical tests are being performed on all seven heats of material supplied for the field anchor heads. Both Inryco and Battelle are performing independent examinations.

b. Preliminary indications are that the material properties and heat treatment are suspect causes for the failures.

c. Inryco considered submitting a 10 CFR Part 21; however, was assured by the supplier, Jorgensen Steel Company of Seattle, Washington, that no other nuclear sites have been supplied material from the subject heats of material. Inryco therefore, has not reported in accordance with Part 21.

d. Next interim report is due March 1, 1980.

e. Detensioning in a planned sequence is proceeding on the Unit 1 containment in order to remove the suspect anchor head heats of material.

f. NRC RIII office would be informed prior to proceeding with any prestressing operations.

g. A subsequent meeting would be held to report the final findings and remedial actions at a later specified date.

This item is considered unresolved pending submittal and evaluation of the licensee's final 5.55(e) report (454/80-02-01).

SECTION III

Prepared by P. A. Barrett

Reviewed by D. W. Hayes, Chief
Engineering Support Section 1

1. Observation of Electrical Cable Installations

a. The RIII inspector observed the in-process installation of Unit 1 control cable No. 1VA 138 and part of control cable No. 1CC045. The tray internals for the cables were free of hazardous debris and sharp edges. Cable supports (grips) were being appropriately installed. The trays and cables were identified (tagged). The cables had no apparent damage. Appropriate attention was given by the pulling crews to train (assist around tray bends) and protect the cables. The cables routings were as specified on the Cable Pull Cards.

b. During the installation of cable No. 1CC045, the RIII inspector observed cable tray No. 11885F KIR (Reactor Protection System Channel) installed approximately three feet vertically from tray No. 11885C CIE (Essential Safety Feature Train). The RIII inspector inquired as to the separation criteria for this situation. The licensee indicated that the location of these trays was the upper spreading room, elevation 463 feet. The licensee also provided drawings 6E-0-3390 Revision V, Note 13, 6E-1-4027A Revision A, and 6E-1-4027B, Note B, which indicated that the trays were installed per design. For the above conditions, there is no apparent conflict with Regulatory Guide 1.75, Revision 1 and IEEE Standard 384-1974.

No items of noncompliance were identified.

2. Established Measures to Prevent Exceeded Cable Pull Tensions

The RIII inspector reviewed the guidelines documented in a September 11, 1979 memorandum and Sargent & Lundy Standard STD-EB-146, dated September 22, 1978, paragraph 7.4.1. The guidelines define when tensiometers are to be used during cable installation. The licensee indicated that except for pulls made with a machine, the guidelines criteria will be designed into the raceway systems. There will essentially be no field routed conduits. Thus, there should never be a need to use a tensiometer on cables that are hand pulled.

No items of noncompliance were identified.

SECTION IV

Prepared by C. E. Jones

Reviewed by C. C. Williams, Chief
Projects Section 2

1. Warehouse Storage - Electrical Contractor

The inspector reviewed Hatfield Electric Company's approved procedure No. 14, Revision 2, Issue 2, dated October 2, 1978 titled "Handling and Storage of Safety-Related Material and Equipment" prior to performing the inspection. No attempt was made during this inspection to inspect installed equipment.

a. Warehouse No. 2 used by the elctrical contractor contained shelf items in general that required short term storage. The licensee stated that certifications were obtained on all items, thus allowing them to be used at any plant location.

The warehouse was heated. Nonconforming material was stored in a locked, segregated section of the warehouse.

b. The inspector also observed the storage in Warehouse No. 3. This heated warehouse contained larger items than stored in No. 2 warehouse and contained both mechanical and electrical equipment. The heavier units were stored on pallets and in some instances had been protected from dust with a plastic cover. The equipment was properly stored.

A total of five Material and Equipment Receiving and Inspection Reports (MRR's) were selected at random and checked against the items received. No discrepancies were noted.

One caution tag identified an inverter that had been stripped of certain components for use in Unit 1. A review of documentation indicated replacement parts were on order for repair of the Unit 2 inverter.

2. Warehouse Storage - Mechanical Equipment

The inspector reviewed the mechanical contractor's Site Implementation Procedure No. 3.801, Revision 2, dated July 31, 1979 and titled "Storage of Mechanical Components and Materials". This equipment was in storage in Warehouse No. 4. Valves, snubbers, pipe hangers, pipe fittings and miscellaneous equipment were stored in this location. The equipment was properly stored. Two MRR's were reviewed and observed to be acceptable.

No items of noncompliance or deviations were noted.

Exit Interview

The inspectors met with site staff representatives (denoted under Persons Contacted) at the conclusion of the inspection on February 8, 1980. The inspectors summarized the purpose and findings of the inspection. The licensee acknowledged the findings reported herein.