

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

IE Inspection Report No:	<u>50-320/76-15</u>	Docket No:	<u>50-320</u>
Licensee:	<u>Metropolitan Edison Company</u>	License No:	<u>CPPR-66</u>
	<u>Box 542</u>	Priority:	<u>--</u>
	<u>Reading, Pennsylvania 19603</u>	Category:	<u>B</u>
		Safeguards Group:	<u>--</u>
Location:	<u>Middletown, Pennsylvania (TMI-2)</u>		
Type of Licensee:	<u>PWR 959 MWE (B&W)</u>		
Type of Inspection:	<u>Routine, Unannounced</u>		
Dates of Inspection:	<u>October 13-15, 1976</u>		
Dates of Previous Inspection:	<u>September 13-17, 1976</u>		
Reporting Inspector:	<u>L. Narrow</u>	<u>10/29/76</u>	DATE
	L. Narrow, Reactor Inspector		
Accompanying Inspectors:	<u>S. Eelson</u>	<u>10/29/76</u>	DATE
	S. Eelson, Reactor Inspector		
	<u>A. Varela</u>	<u>10/29/76</u>	DATE
	A. Varela, Reactor Inspector		
			DATE
Other Accompanying Personnel:	<u>None</u>		DATE
Reviewed By:	<u>R. R. Keimig</u>	<u>10/29/76</u>	DATE
	R. R. Keimig, Chief Construction Projects Section Reactor Construction and Engineering Support Branch (Acting)		

7904250-608

SUMMARY OF FINDINGS

Enforcement Action

Items of Noncompliance

None.

Licensee Action on Previously Identified Enforcement Items

None.

Design Changes

None.

Unusual Occurrences

None.

Other Significant Findings

A. Current Findings

1. Unresolved Items

- a. 76-15-01 - Provide for inspection of rebar in chipping concrete. (Details, Paragraph 3)
- b. 76-15-02 - Provide complete records to support preventive maintenance of electrical equipment. (Details, Paragraph 7.b)

2. Acceptable Items

- a. Deviation Reports (DR's) for instrumentation, electrical and structural work, and corrective actions taken. (Details, Paragraph 4)
- b. Audits of instrumentation and structural installation. (Details, Paragraph 5)

- c. Installation of electrical components. (Details, Paragraph 6)
- d. Review of electrical quality records. (Details, Paragraph 7)
- e. Observation of post-tensioning activities for dome tendons. (Details, Paragraph 8)
- f. Review of quality records of vertical and horizontal tendons. (Details, Paragraph 12)

B. Previously Reported Unresolved Items

The following items have been resolved:

- 1. Welding of supports for core flood tank CF-T-1B. (Details, Paragraph 9)
- 2. Nonconforming weld surfaces on core flood piping. (Details, Paragraph 10)
- 3. The licensee reported use of nonqualified cable in safety related circuits. (Details, Paragraph 11)

C. Deviations

None.

Exit Interview

An exit interview was held at the site on October 15, 1976.

Persons Present

General Public Utilities Service Corporations

R. F. Fenti, QA Auditor
S. Levin, Project Engineer
P. A. Levine, QA Auditor
M. J. Stromberg, Sr. Site Auditor

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United Engineers and Constructors

J. J. Carrabba, Construction/QC Superintendent
D. C. Lambert, Field Supervisor QC
J. Spinak, Lead QC Engineer

Burns & Roe

G. T. Harper, Jr., Site Project Engineer

A. Scope of Inspection

The inspector stated that the inspection was conducted to review the status of outstanding items and the QC program for instrumentation, structural, and electrical work.

B. Inspection Findings

The inspector summarized the results of the inspection as listed in the Summary of Findings. In each case the licensee acknowledged the information.

DETAILS

1. Persons Contacted

General Public Utilities Service Corporation

R. F. Fenti, QA Auditor
S. Levin, Project Engineer
P. A. Levine, QA Auditor
M. J. Stromberg, Senior Site Auditor
T. Hawkins, Assistant Test Superintendent

United Engineers and Constructors

J. Carrabba, Construction/QC Superintendent
R. Crofton, QC Engineer
G. L. Derk, QC Engineer, Mechanical
L. A. Dick, QC Engineer, Electrical
D. Lambert, QC Supervisor
R. W. Liscom, QC Engineer, Electrical
J. Rebok, QC Engineer, Receiving
J. Schmidt, Records Supervisor

Multi-Amp Corporation

J. A. Knox, Field Supervisor

Stressteel Corporation

H. Papworth, Superintendent
H. Williams, QA Manager

2. General

At a pre-inspection meeting with the licensee's representatives, the inspector discussed the scope of the inspection. The status of outstanding items was reviewed and the licensee's representative identified the items which had been corrected. The licensee's representative discussed progress of the work. He stated that post-tensioning would be complete in two or three weeks; that a second shift of electrical workers would start in January, 1977; and, that chemical cleaning of the main steam lines had been completed.

3. Inspection of Rebar

During a walk-through inspection of the facility the inspector observed that chipping of the concrete in the north wall of the fuel transfer canal for construction of the shield walls and slabs around the fuel transfer tubes had exposed the reinforcing steel and in some instances the surface of the steel had been marked by the chipping tools. The inspector was informed by the licensee's representative that inspection of this work had been performed in accordance with QC procedure QC-1-2 "General Construction and Structural Concrete," Section V "Field Inspection (Preplacement)." Checklists used for this inspection include "Inspector's Concrete Checkout Sheet" and "Concrete Placement Checklist Sheet." Neither the procedure nor the checklists require that the physical condition of the reinforcing steel be inspected nor establish criteria for permissible defects in the steel. The inspection records do not identify the chipping tool markings.

This item (76-15-01) is unresolved pending review by the NRC inspector of the licensee's evaluation of damage to the reinforcing steel and requirements for inspection of reinforcing steel for damage following its exposure by chipping.

4. Deviation Reports

a. Instrumentation

The inspector examined DR Nos. 0513, 0549, 0568, 0613, and 0628. In each case the DR adequately describes the deficiency and its disposition. Corrective action, to prevent recurrence of similar problems, is evaluated and prescribed if considered necessary. The disposition actions were verified; reinspections of the items were conducted. The DR's were complete, legible, reviewed by QC and readily retrievable.

b. Structural Welding

The inspector examined DR Nos. 0602 and 0622 together with QC Inspection Report (IR) Nos. 2352 and 2983 which reported nonconforming conditions. In each case the DR or IR was complete, legible and readily retrievable. DR No. 0602 and the IR's had been properly closed out. DR No. 0622 had been dispositioned but the disposition action was incomplete and the DR was not yet closed out.

c. Electrical

The inspector examined the Deficiency Reports (DR) related to electrical equipment and components. The following were included in the review:

<u>DR No.</u>	<u>Electrical Item</u>	<u>Date Closed Out</u>
0080	Pump motors NRP-2A+2B	6/7/73
0210	Pump motor EFP 2A	1/2/74
0220	Limiter torque motor CFV2A	8/13/74
0240	Battery boxes ELH2-1&2	5/20/74
0245	4160-volt bus 2-2E	5/7/76
0265	MCC 2-11 EA	5/23/74
0270	Cable tray ESB-14	7/15/74
0275	Reactor coolant evaporator	5/23/74
	motor	
0300	Power Strut tubing PS-204	10/2/75
0310	Axivane fan motor AH-E-11B	3/7/75

The DR records included the corrective action to be taken, the status of resolution, and had been approved by Quality Control Supervision.

No discrepancies were identified.

5. Audits

a. Instrumentation

The inspector examined the following reports:

- (1) GPU Audit Report No. 76-05 for an audit conducted during the period March 8, 1976 to April 7, 1976 to verify compliance with FSAR, specifications and procedures for procurement installation and inspection of instrumentation.
- (2) B&R Surveillance Inspection Report No. 61 for an inspection of installation of instrumentation conducted during August 2-31, 1976.

In each case, timely correction of deficiencies by the audited organization was actively followed by GPU and B&R. The inspector examined GPU Monthly Audit Status Report dated October 11, 1976 which shows the status of response and corrective action for each finding identified.

b. Structural Installation

The inspector examined GPU Audit Report Nos. 75-31 and 76-02. Copies of the reports are sent to GPU and the constructor's site management and to appropriate GPU and licensee management personnel.

Report No. 76-02 covered an unannounced audit of anchor bolt repair which identified two findings. Corrective action was timely and was considered to be acceptable.

6. Installation of Electrical Components

The inspector examined the installation of the following items to determine whether the requirements of applicable specifications, work procedures, and inspection procedures were being accomplished.

a. Valve Operator Motors

The motor installation on valves DHV3 and NSV-100 had been completed prior to the inspection. Their installed condition was examined by the inspector and found to meet the requirements of Babcock and Wilcox Field Specification FS-III-11A. A QC inspection of these valves had been completed in accordance with the constructor's QC Inspection Report "Checklist for Installation of Valves for Nuclear System," Numbers W-899 and W-1007. These reports included verification of installation (per USAS B31.7 "Nuclear Power Piping"), orientation, and cleanliness.

No discrepancies were identified.

b. DC Bus and Associated Breakers

The 125/250 VDC bus No. EEH-2-1-DC and associated breakers had been installed, testing was complete, and the equipment had been turned over to the constructor's startup group. The inspector examined the installation which had been performed in accordance with the constructor's procedure ECP5-2, for handling and installation. The equipment was found to be clean, properly identified, grounded, and protected from nearby construction operations. Inspection had been completed by the constructor's QC in accordance with "Placement and Anchoring of All Items Under Scope of ECP5-2," May 26, 1973.

No discrepancies were identified.

c. Calibration and Trip Set Points

Installed electrical equipment was being calibrated and trip-set by a subcontractor, Multi-Amp Testing Services Corp. The inspector observed the testing work being performed on an installed electrical panel EEH-22-DC, in accordance with Multi-Amp Specification MAESCO 70-55, Revision 3, September 25, 1975. A Multi-Amp High Current DC Test Set (0-25,000 amperes range) equipped with a digital read-out timer was used in the testing. The inspector examined personnel records and interviewed Multi-Amp supervisory and testing personnel and determined that they were qualified to perform this work.

Per procedure, dated Multi-Amp stickers were being affixed to equipment on which electrical testing had been completed. Calibration and trip-setting records were examined on the following safety-related valve motors: 10DR, 11DR, 9BR, and 1CR. The records were found on Multi-Amp Form MAESCO No. 22, "Low Voltage Power Circuit Breaker Test Results," and included identification, test data, disposition, and approvals by the Multi-Amp Field Supervisor.

No discrepancies were identified.

7. Electrical Quality Records

The inspector reviewed the work and inspection records associated with selected safety-related electrical equipment and components. The purpose of this review was to determine whether the records reflected work accomplishment consistent with the requirements. The records on the following equipment and components were selected for review:

- 125-volt battery and racks, No. EE-H2-1.
- 125-volt DC bus and breakers, No. EE-H2-2DC.
- 125-volt distribution panel, No. DCC-1A.
- Electric motors, Nos. NRP-1A, B and NS-P-1A,B.
- Electric valve operators, Nos. DHV3, 1CV2, NR-V2A,B.
- Motor control centers, Nos. MCC2-11E, MCC-2-11EB, MCC2-21EB, and MCC 2-31E.
- Protection panels, Nos. 30 and 320.

Records reviewed in the following areas included:

a. Receiving Inspection and Material Certification Records

- UEFC Component Inspection Report, April 25, 1976.
- UEFC Receipt Inspection and Material Certification, consisting of documentation packages assembled for each equipment and component item. Included in each package are documentation checklists which include identification, documentation required and furnished, purchase orders, and reference drawings.

No discrepancies were identified.

b. Storage, Handling, and Installation Records

The inspector examined records for each of the selected electrical items, which confirmed that the required storage, handling, and installation requirements had been met.

Preventive Maintenance Cards had been completed for each equipment item, and included periodic checks for cleanliness, rotation, heaters activated, and desiccant condition. These records were found to be complete up to the date that the equipment was turned over to the constructor's test and startup group. Following turnover, these periodic checks were found to have been generally waived, based upon a statement in the constructor's Preventive Maintenance Specification SP-4 that preventive maintenance checks could be waived if the equipment had been operated within the month preceding the scheduled check. The inspector questioned this practice inasmuch as no records were maintained to establish dates of equipment operation. The licensee stated that this procedure would be reviewed.

Except for the waiving of preventive maintenance checks following turnover, no discrepancies were identified in the storage, handling, and installation records.

This item (76-15-02) is unresolved.

c. Calibration and Trip Setting Records

The inspector reviewed the Multi-Amp Testing Services Corp. records applicable to the calibration and trip-setting of a number of the electrical equipment and components selected for record review. The data was found on Multi-Amp Forms MAESCO No. 22, "Low Voltage Power Circuit Breaker Test Results." Testing had been witnessed by the constructors QC.

<u>Electrical Item No.</u>	<u>Date Testing Completed</u>
EE-H2-1	9/27/76
EE-H2-2DC	9/27/76
DCC-1A	Scheduled 10/76
MCC2-11EB	9/8/76
MCC2-11E	6/1/76
MCC2-21EB	6/28/76
Panel 30	1/31/76
Panel 320	Not in scope
MCC2-31E	6/10/76

The records established that the specified calibrations and trip settings had been completed.

No discrepancies were identified.

8. Observation of Tendon Post-Tensioning

The inspector observed work performance and work in progress relative to containment dome structure post-tensioning activities during dome tendon installation, tensioning, and grouting. He ascertained, by independent evaluation of work, whether activities relative to containment structure prestressing activities are being accomplished in accordance with NRC requirements and SAR commitments. The following specifications, codes, standards and procedures form the basis for the inspector's evaluation of conformance:

- Burns and Roe structural Specification No. 2550-30, Rev. 10/31/75.
- ACI 318-63 Building Code Requirements for Reinforced Concrete.
- Stress Steel Installation and Field Quality Assurance Procedures, Rev. Oct. 1, 1976.

Specifically, the following activities were observed, noted and discussed with contractor, QC, and licensee QA personnel for dome tendons L-8, 9, 36, and L-37:

- a. Tendon handling and installation - Dome tendons number L-8, 9, 36 and L-37 were observed installed in conformance with Stressteel (S.S.) procedure section 6 and latest revisions in Appendix D dated August 18, 1976.
- b. Installation of dome tendon anchorage components for the above listed tendons was observed during placing of splay and wedge plates, placing three-piece cone wedges over the three-strand elements of the tendons and setting cone wedges in their respective wedge plate seats as required by S.S. procedure Appendix D, section 7.
- c. Anchorage fabrication - Work performed on the strand system which utilizes conical wedge anchors was observed. Inspection and documentation by S.S. QC on above dome tendons was noted during their fabrication to meet requirements of S.S. procedure section 8.
- d. Tendon tensioning - Observed work and inspection performance, including data recording, during tensioning of three of above dome tendons and measurement of jacking force and elongation as required by Section 9 of S.S. procedure and B&R specifications.
- e. Mechanical and corrosion protection was observed to have been provided for dome tendons delivered by truck to the job-site for conformance to S. S. procedure, section 6.
- f. Filling of tendon ducts with protective grout - Grout proportioning, mixing, testing, and pumping were observed for the above tendons. Verification and control of these operations were observed to conform to section 10 of S.S. procedure.

No discrepancies were identified in the above activities.

9. Structural Welding Records

Incomplete welding inspection of supports for Core Flood Tank CF-T-1B had been identified as an unresolved item. (Inspection Report 50-320/76-08)

The inspector examined IR Nos. W-2134 and W-2135 which document welding inspection of anchor bolts for the core flood tank support structure.

Visual inspection of fit-up through final pass had been performed and was reported to be acceptable. The welder, weld procedure and welding electrode used are identified. Liquid penetrant inspection of the final pass had been performed in accordance with procedure LPT-1-NP and the report of this inspection which was attached showed the results to be acceptable.

The inspector also examined IR W-2352 which documented inspection of all field welds on CF-T-1B as required by B&R drawing No. 4205 Rev. 4 and identified several discrepancies. IR W-2526 documented reinspection and correction of the reported discrepancies.

This item is resolved.

10. Nonconforming Weld Contours

Nonconforming weld contours had been identified as an unresolved item. (Inspection Report 50-320/76-09) The inspector examined IR Nos. W-2456, W-2495, and W-2505. IR No. W-2456 identified ten welds in the core flood and decay heat system which did not meet the requirements of ANSI B31.7. IR Nos. W-2495 and W-2505 document grinding of the welds reported on W-2456 and report that the weld surfaces meet the ANSI B31.7 requirements.

The inspector observed that the surfaces of welds 2-CF-11, 2-CF-12R1 and 2-CF-V4B had been ground smooth and conformed to the requirements of ANSI B31.7.

This item is resolved.

11. Non-Qualified Cable

On September 15, 1976 the licensee reported use of a non-qualified cable in a safety related circuit as a significant deficiency in accordance with 10 CFR 50.55(e).

A later evaluation of the circuit by B&R showed that the circuit (HH 2171) is not routed through high radiation area and that it should not be classed as safety related. The licensee reported this information to NRC:I on September 23, 1976 and stated that as a result of this evaluation this incident had been determined not to be significant.

The inspector examined DR No. 0638 and GPU Memo TMI-II-4502 which confirmed this evaluation as well as corrective action to prevent recurrence of this type of incident.

This item is resolved.

12. Post-Tensioning Quality Records

The inspector reviewed quality related records relative to containment structure prestressing activities to ascertain whether these records reflect work accomplishments consistent with NRC requirements and SAR commitments. Three truckloads of tendons, one each from the vertical, hoop and dome tendons were selected for review to determine whether applicable requirements of appropriate specifications, codes, standards and procedures, identified in paragraph A.2 above, have been met. Specifically, the following pertinent records were reviewed and discussed with Stressteel QC, QA and UELC surveillance personnel.

- a. Vendors notarized material records provided certification to ASTM A416-74 for wire used in fabricating $\frac{1}{2}$ "-270K weldless LoLax strand by supplier, Florida Wire and Cable (FWC). Records for vertical tendon V001, hoop tendon H001, and dome tendon D001 were reviewed. Chemical and physical test reports for each of seven wires were traced and, 24 hour stress relaxation test on the strands were identified.
- b. The 54 strands, composited into above tendons, were identified on receipt inspection records at Wilkes-Barre, Pa. plant of SS. The cross-referenced files were found to provide clear ready identification through the basic wire metallurgical heat numbers to the final tendon assembly of 54-7 wire strands.

- c. Tendons were selected for record review to ascertain whether work performance and inspection requirements were met in the following areas:

- tendon installation
- tendon tensioning
- final environmental protection

Documentary evidence for dome tendons designated D102, 103, 104, 106, and 107, hoop tendons H001 and 002, and vertical tendons V001 and 002 were found in conformance to SS's Installation and Field QA procedure in the following records:

- (1) Receiving/Storage of tendons, Form I-FQA-6.4
- (2) Placement of tendons, Form I-FQA-7.6
- (3) Placement of anchorages, Form I-FQA-8.4
- (4) Tensioning of tendon, Form I-FQA-9.4
- (5) Placement of grout cap, Form I-FQA-10.4
- (6) Control of tendon exposure, Form I-FQA-11.5
- (7) Daily pregrouting checklist, Form I-FQA-12.4.1
- (8) Tendon grouting, Form I-FQA-12.3.2

No deficiencies were found in these records.

- d. Pertinent records were reviewed to determine whether the materials used to encase the tendons in grout met applicable requirements, (physical and chemical analyses). The following records were found to conform to job specifications and QC procedures for tendons grouted in September and October 1976:

- (1) Portland Cement, Type II by Medina Cement Co., conformed to ASTM C-150, physical and chemical bin certification and user tested.
- (2) SIKA MIX #122 Grout Aid (PT) was certified for gel uniformity, expansion, water retention, bleed time, and amount of bleed within specified temperature limits.
- (3) Water and ice were in conformance with ASTM D-512, D-992, and D-516 as to chloride, nitrate, sulfide and sulfate content, and U.S. Public Health standards for potability.

- e. 10% of the pertinent records in grouting of dome tendons were reviewed. The formulation of above ingredients were found in conformance to SS Installation and Field QA Procedure Section 12 as to proportion, temperature, mix time, viscosity, pump pressure, and volume pumped. In addition, as required by specifications and procedures, records on grouting at dome vent pipe were reviewed.

No discrepancies were identified.