

U. S. ATOMIC ENERGY COMMISSION  
DIRECTORATE OF REGULATORY OPERATIONS

REGION I

POOR ORIGINAL

RO Inspection Report No.: 50-289/73-16

Docket No.: 50-289

Licensee: Metropolitan Edison Company

License No.: CPPR-40

P. O. Box 542

Priority: \_\_\_\_\_

Reading, Pennsylvania 19603

Category: B

Location: Middletown, Pennsylvania (Three Mile Island 1)

Type of Licensee: PWR 831 MWe (B&W)

Type of Inspection: Routine, Unannounced

Dates of Inspection: September 27-28, October 1-2, 1973

Dates of Previous Inspection: September 19-21, 1973

Reporting Inspector: *Seth A. Folsom* for  
Seth A. Folsom, Reactor Inspector

10/25/73  
DATE

DATE

Accompanying Inspectors: NONE

DATE

DATE

Other Accompanying Personnel: NONE

DATE

Reviewed By: *E. F. Heishman* for

10/25/73  
DATE

E. F. Heishman, Acting Chief, Facility Construction  
and Engineering Support Branch

1449 273  
7910180 808

SUMMARY OF FINDINGS

Enforcement Action

.....

Licensee Action on Previously Identified Enforcement Matters

Not Inspected

Unusual Occurrences

None identified

Design Changes

None identified

Other Significant Findings

A. Current Findings

1. The licensee had replaced all of the valve motor operator switches of the types which the vendor had found to be defective. This item is resolved. (Details, Paragraph 10)
2. The use of 300% motor overload heaters, or heater bypasses, following pre-operational testing is being considered by the licensee. This item is unresolved. (Details, Paragraph 11)
3. A number of diode failures have occurred on 480 - volt circuit breakers. This item is resolved. (Details, Paragraph 15)
4. Cracked end caps found on the overcurrent trip devices in engineered safety systems were replaced. The program was not in accordance with DOL requirements.\* This item is unresolved. (Details, Paragraph 16)
5. The vendor of the hydraulic seismic restraints has notified the licensee that some of the inner seal material on the restraints may be deficient and may require replacement. This item is unresolved. (Details, Paragraph 17)

\* DOL letter of September 28, 1973 50-289

B. Status of Previously Reported Unresolved Items

1. The containment tendon tensioning program has been completed. The condition of the concrete was examined beneath two of the bearing plates which had exhibited significant displacement during tensioning. This item remains unresolved pending review of the result of the investigation. (Details, Paragraph 3)
2. The tendon filler material has been changed to minimize seepage through the concrete, and the site directives have been revised to specify the new material. This item is resolved. (Details, Paragraph 4)
3. The buttonhead microanalysis has been received at the site, and was audited by the inspector. No deficiencies were observed. This item is resolved. (Details, Paragraph 5)
4. The tendon tensioning subcontractor has furnished evidence that buttonheading die drawings are not required at the site. This item is resolved. (Details, Paragraph 6)
5. The CRDM components were returned to the vendor for 100% inspection and the deficient tubes were replaced. This item is resolved. (Details, Paragraph 7)
6. The installation drawing has been revised to include seismic mounting information on electrical cabinets. This item is resolved. (Details, Paragraph 8)
7. The architect engineer's approval of the seismic documentation on the VBB distribution panel was made available to the inspector. This item is resolved. (Details, Paragraph 9)
8. The procedures for installation and QC inspection of hydraulic seismic restraints have been revised. This item is resolved. (Details, Paragraph 12)
9. The river bottom dredging operation at the river pump intake is now scheduled for completion in November, 1973. This item remains unresolved. (Details, Paragraph 13)
10. Two motor-operated valves were wetted during pre-operational testing, in addition to the Building Spray Pump Motors previously reported. This item remains unresolved. (Details, Paragraph 15)

Management Interview

A management interview was held at the site on October 2, 1973.

Personnel Attending

General Public Utilities Service Corporation (GPUSC)

Mr. B. G. Avers, Manager, Quality Assurance  
Mr. W. T. Gunn, Site Project Manager  
Mr. G. L. Roshy, Quality Assurance Engineer  
Mr. W. S. Shepherd, Project Engineer, Unit 2  
Mr. M. J. Stromberg, Site Quality Assurance Auditor  
Mr. J. E. Wright, Quality Assurance Site Manager  
Mr. J. H. Wright, Resident Engineer

United Engineers & Constructors (UE&C)

Mr. V. E. Cichocki, Quality Assurance/Quality Control Coordinator  
Mr. N. A. Vitale, Assistant Quality Control Supervisor

Burns & Roe

Mr. D. L. Mc Afee, Quality Assurance Engineer, Mechanical

Gilbert Associates (GAI)

Mr. R. H. Fleming, Site Coordinator

The following subjects were discussed:

- A. The inspector stated that the following items had been resolved during the inspection:
1. Replacement of deficient Limitorque valve operator switches. (Details, Paragraph 10)
  2. Tendon filler material leakage. (Details, Paragraph 4)
  3. Buttonhead microanalysis documentation. (Details, Paragraph 5)
  4. Buttonheading die drawings. (Details, Paragraph 6)
  5. CRDM tubing deficiency. (Details, Paragraph 7)

6. Seismic mounting documentation for electrical cabinets. (Details, Paragraph 8)
  7. Seismic documentation approval for the VBB panel. (Details, Paragraph 9)
  8. Hydraulic seismic restraint installation and QC procedures. (Details, Paragraph 12)
- B. The inspector asked for confirmation of the estimate of 95% construction completion. The licensee concurred.
  - C. The inspector stated that he had observed the operations involved in lifting and replacing the two containment bearing plates. No deficiencies were identified. This item remains unresolved pending review of the documentation. The licensee acknowledged this information. (Details, Paragraph 3)
  - D. The inspector asked whether the use of 300% motor overload heaters, or heater bypasses, on valve motors following pre-operational testing was being considered. The licensee stated that this proposal was being reviewed. This item is unresolved. (Details, Paragraph 11)
  - E. In reply to the inspector's question, the licensee stated that dredging of the river pump intake area was scheduled for completion in November, 1973. (Details, Paragraph 13)
  - F. The licensee stated that he had previously reported water damage to Building Spray Pump Motors, and that subsequently it had been found that two motor operated valves had been water damaged at the same time. The inspector stated that this item would remain unresolved. (Details, Paragraph 14)
  - G. The inspector requested information on the status of suppression diode replacement on 480 volt circuit breakers. The licensee stated that replacement with another type diode was underway. This item remains unresolved. (Details, Paragraph 15)

1449 277

- H. The licensee stated that the criteria for rejection of end caps on time delay dashpots was being reconsidered following the receipt of the Directorate of Licensing, September 24, 1973 letter. The inspector stated that this item would remain unresolved. (Details, Paragraph 16)
- I. The licensee stated that the hydraulic seismic restraint vendor had informed him that the seals in these restraints may be deficient, and replacement may be required. The inspector stated that this item would remain unresolved. (Details, Paragraph 17)
- J. The inspector reiterated his previous request for advance notification of:
1. Code hydrostatic primary test
  2. Receipt of nuclear fuel elements.
  3. Integrated leak rate test of containment

The licensee concurred.

1449 278

DETAILS

1. Persons Contacted

General Public Utilities Service Corporation (GPUSC)

Mr. B. G. Avers, Manager, Quality Assurance  
Mr. W. T. Gunn, Site Project Manager  
Mr. R. W. Heward, Jr., Project Manager  
Mr. G. L. Kopp, Quality Assurance Specialist  
Mr. S. Levin, Project Engineer, Unit 1  
Mr. P. Lavine, Quality Assurance Engineer  
Mr. G. L. Roshy, Quality Assurance Engineer  
Mr. W. S. Shepherd, Project Engineer, Unit 2  
Mr. M. J. Stromberg, Site Quality Assurance Auditor  
Mr. J. E. Wright, Quality Assurance Site Manager  
Mr. J. H. Wright, Resident Engineer

United Engineers & Constructors

Mr. V. E. Cichocki, Quality Assurance/Quality Control Coordinator  
Mr. J. Fleming, Startup Engineer, Electrical  
Mr. N. A. Vitale, Assistant Quality Control Supervisor

Burns & Roe

Mr. D. L. Mc Afee, Quality Assurance Engineer, Mechanical

Gilbert Associates (GAI)

Mr. R. H. Fleming, Site Coordinator  
Mr. D. D. Krause, Structural Engineer  
Mr. K. E. Nodland, Project Engineer, Civil

2. Construction Schedule

The licensee estimated construction as 95% complete, as of October 1, 1973. The expected date of fuel loading remains unchanged, March 1, 1974.

1449 279

3. Bearing Plate Displacement

Containment bearing plate displacement during tendon tensioning was measured by means of dial indicating gauges. Several of the bearing plates on the vertical tendons were displaced (in relation to the surrounding concrete) more than 0.100 inch, and one was displaced 0.143 inch. The Inland-Ryerson tensioning specification permitted a maximum 0.25 inch displacement. The latitude permitted by the specification was questioned by the inspector, and the licensee was asked to provide evidence of sound concrete beneath the bearing plates which had exhibited displacement. The licensee contended that basic inaccuracies on the means of displacement measurement obviated any valid conclusions as to the condition of the concrete beneath the bearing plates.

In a letter dated September 27, 1973, the Directorate of Licensing designated vertical tendons V79 and V105, for investigation. The investigation required lifting the top bearing plates and examining the condition of the underlying concrete. The licensee concurred with this recommendation.

The inspector reviewed the detailed procedure for lifting and replacing the two bearing plates, and observed each step of its implementation. The procedure included:

- a. Draining of filler material
- b. Detensioning of V79 and V105 and adjacent tendons
- c. Removal of concrete at perimeter of V79 and V105
- d. Cutting of tendon sleeve
- e. Lifting of bearing plate
- f. Examination of underlying concrete
- g. Placement of bearing plates in epoxy-grout
- h. Setting of epoxy grout (48 hours)
- i. Re-welding of tendon sleeve
- j. Re-tensioning all tendons

No filler material flowed out of the lower tendon end, it being essentially solid at ambient temperature. The bearing plates were readily removed following sleeve cutting. The surface of the underlying concrete had pockmarks approximately of 2 inch diameter & 1/8 inch depth over 25% of the area. The surface irregularity was caused by entrapment of water between the top surface of the concrete and the bottom surface of the bearing plate. The water had evaporated leaving a light film of laitance on the surface of the craters. There were no

cracks or voids observed in the surface of the concrete. There was no evidence of crushing from the initial tensioning. Photographs and a silicone mold impression of the surfaces were taken.

A grout mixture of Colma Quartzite and Colma-Dur Epoxy was used beneath and surrounding the replaced bearing plates. Test cubes of this material made at the site exhibited compression strengths ranging between 8,200 - 10,200 psi at 48 hours.

There was no evidence of displacement in the two bearing plates during re-tensioning of the tendons. The licensee's QC documentation of the tendon lifting and replacement was examined by the inspector. No deficiencies were observed. This item remains unresolved until the AEC review of the investigative work has been completed.

4. Filler Material Specification

The composition of the filler material had been changed to reduce seepage into the containment concrete. The new material, Visconorust 2090-P2, has been approved, for use, beginning August 30, 1973, as designated in the Inland-Ryerson Field Greasing Procedure, dated September 5, 1973. This item is resolved.

5. Buttonhead Microanalysis

At a previous inspection\* it was found that a Deficiency Report referenced a microanalysis of tendon buttonheads, which had not been received at the site. During this inspection the inspector examined a Magnetic Inspection Laboratory report to Inland-Ryerson dated May 18, 1973, referencing "five samples submitted for metallurgical examination". The report included metallographs and the statement (in part) "... fissures of this type can be expected". This item is resolved.

6. Buttonheading Die Drawings

At a previous inspection\* the tendon installation subcontractor was requested by the inspector to show him the buttonheading die drawings. At this inspection the subcontractor stated that he had been unable to obtain the drawings as there was no need for them at the site. The sub-contractor attested that the dies were furnished complete and were not modified or otherwise repaired in the field. Wear was not a factor in die replacement, only cracking. This item is resolved.

\* RO:I Report No. 50-289/73-05

7. CRDM Tubing

The CRDM tubing had been found to contain internal scratches, called "hot tears" which were formed during the extrusion of the tubing. All CRDM's were returned to the vendor for 100% inspection, and the defective tubing replaced. The inspector examined UE&C Deficiency Report No. 114, April 20, 1972. The disposition included the statement "... tubes have been reworked by Diamond Power, Tubes and related certification have been examined and both found acceptable". This was reviewed, approved and signed on November 1, 1972 by the Licensee's representatives. This item is resolved.

8. Seismic Mounting of Cabinets

At a previous inspection\* there was no documentary evidence to show that the vendor's recommended mounting method had been followed in the installation of electrical panels and cabinets to provide seismic protection. The licensee has affirmed that the specified mounting method has been used. At this inspection the revised architect-engineer installation RK-1 drawing was examined by the inspector. The drawing included the vendor's recommended mounting method. This item is resolved.

9. Seismic Documentation on VBB Panel

At a previous inspection\* there was no evidence of architect-engineer approval of the vendor's seismic documentation on the VBB distribution panel. At this inspection the architect-engineer's letter to the licensee, dated July 2, 1973 was shown to the inspector. It included the statement, "... seismic approval for the 120-volt AC distribution panels seismic data is available at GAI for the DC panel boards. Seismic data ... is on file at GAI". This item is resolved.

10. Limitorque Switch Replacement

The torsion reset spring in the torque switches for certain Limitorque valve operators had been reported to be defective. The licensee, working with the vendor's representative, instituted a program of replacement of the switch types which were defective. The inspector examined the correspondence concerning this work, and the GPUSC Audit 73-40 entitled, "Installation, Status and Documentation for Limitorque Valve Operators", which included the statement "Replacement .. is complete, 37 (switches) were replaced". This item is resolved.

\* RO:I Report No. 50-289/73-05

11. Motor Overload Heaters

The existing design for overload protection (overload heaters) for the motor operators of safety related valves are designed to act at 120-125% of the design. The licensee was asked to consider the use of 300% motor overload heaters, or heater bypasses, on valve motors following pre-operational testing.\* The licensee stated that this proposal would be given active consideration. This item is unresolved.

12. Hydraulic Seismic Restraints-Installation

During a previous inspection\*\* it was found that the vendor's installation instructions, attached to each hydraulic seismic restraint, were not being followed. The forms employed in recording settings were not considered to fulfill the requirements. During this inspection, the inspector examined site directive MCP-15, Revision 2, August 24, 1973 which included the vendor's installation instructions. The Pipe Hanger Checkoff Sheet, Attachment A, had also been revised to include actual cold load and hot load settings. This item is resolved.

13. River Pumps Intake Silting

The dredging of the river bottom in the vicinity of the river pump intake, originally scheduled for completion in July 1973, was continuing during the inspection. The work is now scheduled for completion in November, 1973.

The Directorate of Licensing has requested the licensee add provisions for river bottom surveillance in the vicinity of the river pump intake to the Technical Specifications. This item remains unresolved.

14. Building Spray Pumps and Motor Operators Wetted

At a previous inspection\*\*, it was reported to the inspector that, on August 31, 1973, Building Spray Pump Motors No. 1A and 1B had been

\* DOL Letter of September 18, 1973, DN 50-289

\*\* RO:I Report No. 50-289/73-13

partially flooded during pre-operational flushing. At this inspection the licensee stated that further investigation of the incident had revealed that, in addition to the two pump motors, there were two motor-operated valves, BS-V-3B and DH-V-6A which had been water-damaged at the same time. The repair work on the pump and valve motors had not been completed. This item remains unresolved.

15. 480 - Volt Switchgear Malfunctions - Suppression Diodes

The licensee had notified Regulatory Operations on August 24, 1973 that a number of suppression diode failures has occurred during electrical testing of coil-operated 480-volt circuit breakers (Westinghouse DB-25 and DB-50).

The investigation revealed that voltage spikes in excess of the diode breakdown voltage shorted out the diodes. A design change was instituted to replace the Westinghouse IN 5405 diodes with GE type 6RS20AP10B2 thyrectors which are not subject to breakdown from voltage spikes. This item remains unresolved.

16. Deficient Overcurrent Trip Relay Devices

The licensee's test crews had found cracks in the end caps of the time delay dashpots in the overcurrent trip devices in engineered safety systems. Subsequently, Westinghouse notified the licensee to check the facility for cracked end caps on all Westinghouse Circuit Breakers Models DB-25 and DB-50.

The corrective action initiated required that the licensee, together with a Westinghouse representative, inspect all of the time delay dashpots at the site for cracks, contamination, corrosion and moisture. Six of the 115 installed circuit breakers had cracked end caps, and these were replaced.

The licensee received a letter from the Directorate of Licensing, dated September 24, 1973 which stated that the licensee's program of replacing cracked time delay end caps, when found, was not considered by Licensing to be acceptable. The letter stated that an acceptable resolution of the matter would be replacement of all end caps involved in the defective manufacturing process. The licensee stated that this proposal was being considered. This item continues to remain unresolved.

17. Hydraulic Seismic Restraints-Seals

The licensee's investigation into the hydraulic seismic restraints has resulted in a finding that the inner seals used in the Grinnell restraints may be deficient and require replacement. The study is continuing. This item is unresolved.

1449 285