

U. S. ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I

RO Inspection Report No. 50-289/72-08

Subject: Metropolitan Edison Company

Three Mile Island Unit 1

License No. CPPR-40

Location: Three Mile Island (near Middletown)

Priority

Pennsylvania

Category B

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

Type of Inspection: Special, Unannounced (Ring Girder Repair)

Dates of Inspection: April 27-28, 1972

Dates of Previous Inspection: April 7, 1972

Principal Inspector:

S. A. Folsom, Reactor Inspector

Date

Accompanying Inspectors: *A. A. Varela*

6-19-72

(Inspection Performed By) A. A. Varela, Reactor Inspector

Date

Date

Other Accompanying Personnel: NONE

Date

Reviewed By:

E. M. Howard, Chief, Reactor Construction Br., RO:I

Date

Proprietary Information: NONE

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SECTION I

Enforcement Action

None

Licensee's Action on Previously Identified Enforcement Matters

None

Unresolved Items

Concrete voids have been identified in the South 180° section of the containment building ring girder. Construction joints are also mislocated. The licensee has not reported results of the investigation of these items to Licensing. (Section II, Paragraph 2)

Status of Previously Identified Unresolved Items

Repair is continuing on ring girder concrete voids in the North 180° section of the containment building. Repairs on Segments I and II, totalling 90°, have been completed and concrete excavation, rebar removal, and tendon conduit repair is underway on Segment III. This item remains unresolved. (Section II, Paragraph 1)

Design Changes

Not applicable.

Unusual Occurrences

None

Persons Contacted

Met Ed/GPU

M. Stromberg, Site QA Supervisor*
W. Gunn, Project Engineer
J. Wright, Resident Civil Engineer*
R. Neidig, Assistant Civil Engineer*
J. Connelly, Assistant Civil Engineer*

*Attended Management Interview

UE&C

R. Moyer, QC Supervisor*
D. Lambert, QC Engineer*
P. Dailey, QC Structural*
J. Malvin, Lead Inspector, Structural
W. Haugen, Ring Girder Repair Supervisor
R. Hawley, Assistant Ring Girder Repair Supervisor
J. McKee, Assistant Project Superintendent

Management Interview

- A. The inspector quoted from DL's letter of March 1, 1972 on conditions for approval of the North 180° ring girder repair and inquired when the licensee would provide a commitment to fully implement the six procedures outlined in the enclosure to the letter. The licensee answered that a reply could be expected in about a month and that it would commit Met Ed to five of the procedures but take exception to Item No. 2 regarding preparation and storage of six samples of concrete-epoxy-concrete joints.
- B. The inspector stated he observed wholesale rebar removal in Segment III on the North 180° ring girder repair for concrete excavation without attempt to salvage any. He inquired if GAI gave prior approval for rebar removal, and if approval documentation for replacement was available.

The licensee replied that the approved procedure CCP-9 provides for removal of rebar to give access necessary for removal of unsound concrete, and, since rebar replacements will conform to original design using cadweld splicing, special approval by GAI is not required.

- C. Regarding voiding and unconsolidation on the South 180° portion of the ring girder, the inspector asked when the licensee would present a report to DL on the conditions.

The licensee replied that the investigation following procedure CCP-9 is underway, using one-inch diameter drill cores for concrete soundness and modified by GAI to use two-inch diameter drill cores for construction joint location and bonding study. The li-

*Attended Management Interview

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censee added that, pending complete core analysis and further advice from GAT, no date could be given when the report to DL would be issued.

- D. The inspector recalled that during the inspection of March 9, 1972, apparent unsatisfactory cadwelding had been observed on the North 180° ring girder repair. At that inspection, the licensee agreed to review the cadwelding program for adequacy. The inspector stated that during this inspection, he found satisfactory evidence of program improvement; however, due to no cadwelding at this time, he would leave this as an open item.

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SECTION II

Additional Subjects Inspected Not Identified in Section I, Where No Deficiencies or Unresolved Items Were Found

None

Details of Subjects Discussed in Section I

1. North 180° Ring Girder Repair

a. Status of Repairs on Ring Girder North 180°

Repair work was observed to consist entirely of concrete excavation and rebar removal on three 30° Segment III areas. The most easterly area was farthest advanced and was jack-hammer probed about every four square feet for verification of sound concrete. Final concrete chipping with a 30 pound hand tool around stubs of reinforcing steel was observed in progress in the easterly and north areas. Heavy concrete excavation on the westerly Segment III was proceeding with the 60 pound jack-hammer between tendon conduits. Practically all rebar including most of the dome spirals were observed to have been removed to facilitate excavation. Excavation on Segment III, east area, was observed to have been taken to the depth from outside the face of the ring girder to vertical construction joint between pours 3 and 4.

b. Summary of Repairs Completed

See Page 6 for Tabulation.

180° North Summary of Repairs Completed

<u>Date of Pour</u>	<u>Segment</u>	<u>Concrete Lift</u>	<u>Location*</u>	<u>Cadwelds</u>		<u>Welds</u>		<u>Spiral Replacements # of Hoops</u>	<u>Core Holes</u>	<u>Strair. Gages</u>	<u>Concrete Cubic Yards Placed</u>
				<u>In Place</u>	<u>Rejected</u>	<u>Butt</u>	<u>Nicks</u>				
3/2	15° I	1	180°/93°	122	12	8 ⁽²⁾	1 ⁽¹⁾	24	3	-	5
3/8	15° I	2	180°/93°	25	0	0	0	0	0	-	9
	30° III	0	93°/63°	-	-	-	-	-	-	-	-
2/16	30° II	1	63°/33°	53	0	0	22	0	9	-	15
3/20	30° II	2	63°/33°	266	0	0	0	32	0	-	7
3/29	30° II	3	63°/33°	66	10	0	0	0	0	-	8
	30° III	0	33°/03°	-	-	-	-	-	-	-	-
3/23	30° I	1	03°/333°	266	20	12 ⁽³⁾	0	47	8	2	7
3/27	30° I	2	03°/333°	53	0	0	0	0	0	-	7
	30° III	0	333°/303°	-	-	-	-	-	-	-	-
3/3	15° II	1	303°/288°	46	1	0	0	0	4	-	5
3/29	15° II	2	303°/288°	159	13	0	0	21	0	-	3
4/4	15° II	3	303°/288°	53	1	0	0	0	0	-	5

*Azimuth Counterclockwise

(1) Repair cut out to provide access for other work.

(2) Repairs cut out and replaced with full length bars or cadwelds after five were rejected.

(3) Repairs rejected on visual inspection and/or radiographs and replaced by cadwelds.

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2. Voids in South 180° Ring Girder

a. Investigation

In EO Report No. 50-289/72-07 (inspection of April 7, 1972) the inspector stated that UE&C has issued Deficiency Report No. 0447, dated April 5, 1972, on the South 180° portion of the ring girder where voids and unconsolidation were found. A supplement to the Deficiency Report was issued on April 12, 1972. The supplement states that the horizontal construction joint, which should have occurred at Elev. 446' - 9" varies by as much as two feet in elevation.

The inspector was informed at this inspection that a field change was issued to Construction Procedure No. CCP-9, Change No. 2, dated April 26, 1972. The reason for the change was due to the discovery of unconsolidated concrete in the outboard sections of the South 180° half of the ring girder pours 3 and 4. Exploratory steps in advance of a new (repair) section were undertaken. The exploratory method involves the following:

- (1) Remove debris and clean surface of exposed concrete by chipping from, and near surface areas, honecomb and dirt pocket inclusions.
- (2) Remove honeycomb within limits of guidelines set forth in "Attachment E" to CCP-9.
- (3) Conduct below surface verification of sound concrete by taking core drill samples.
- (4) Explore construction joints by drilling one-inch and two-inch diameter core holes between pours 2 and 3, and 3 and 4 to determine degree of bond at the construction joint, two-inch holes to penetrate only 24 inches in first phase.
- (5) Evaluation of cores, recommendations, and rate of continued sampling shall be made periodically by GAI.

The inspector was informed that, at a meeting on April 25, 1972, between Met Ed, UE&C, and GAI, the latter reviewed results of the investigation to date and specified drilling the two-inch holes deeper because poor bond was encountered in the first 24 inches drilled.

b. Inspection of Two-Inch Diameter Drill Cores - South 180°

See Page 8 for Chart.

<u>Drill Hole Location</u>	<u>Core Length*</u>	<u>Remarks and Bond Condition</u>
1. Below Upper #124 (Const. joint is mislocated ~7" low)	34"	Drilled and redrilled in two attempts due to joint not horizontal; both exhibit no bond due to laitance.
2. At Lower #334 (Const. joint is mislocated ~4" high)	37"	Outside 25" no bond due to unclean joint; inner 12" well bonded.
3. At Lower #329 (Const. joint is mislocated ~7" high)	38"	Entire length exhibits no bond due to laitance.
4. At Lower #315 (Const. joint is mislocated ~6" high)	36"	Drilled 12" horizontal, ran out of joint; redrilled twice off horizontal to follow joint; entire joint exhibits no bond due to laitance and dirt (wood, wire, and thin plastic film).
5. At Lower #301 (Const. joint is mislocated ~6" high)	46"	Drilled 24" horizontal, ran out of joint; redrilled off horizontal to follow joint; except for 4" in re-drill, all cores exhibit poor bond due to laitance.

*Measured from outside surface ring girder at construction joint.

- NOTE:
1. Total two-inch diameter holes drilled to date is ten. Total one-inch holes is 24.
 2. Following the last RO inspection on April 7, 1972, surface "dirt" pockets were chipped out of construction joints, and these exposed unclean joints. Drill program with two-inch diameter cores were undertaken to see if interior of joint was clean.
 3. These holes are aligned with tendons. They are not radial, but are horizontal.

3. Improvement in Cadweld Splice Quality Control Program

RO Inspection Report 72-04 identified unsatisfactory conditions observed in cadweld splicing. Although the applicant, at that time, stated that a number of deficiencies observed by the inspector had already been identified as rejectable by the contractor's inspectors, he acknowledged some difficulty in maintaining desired cadwelding quality. The applicant agreed to review the cadwelding quality control program for adequacy. On March 13, 1972, the inspector was informed that a Cadweld Rebar Splice Company representative had been called to the jobsite for retraining of cadweld operators, and that an additional cadweld inspector had been trained to provide full time inspection on both shifts. The following items were ascertained at this inspection which verify that the applicant has made a concerted effort to upgrade cadweld operators' technique, and cadweld inspection and quality control requirements.

- a. Conversation with UE&C assistant construction superintendent verified retraining of cadweld operators.
- b. Conversation with UE&C QC Supervisor, R. Moyer, verified that retraining of inspectors and QC personnel included a review of cadweld literature on the process of cadwelding and re-indoctrination on the items in the cadweld checklist of requirements.
- c. Specialized training of an additional cadweld inspector to provide full time inspection on the night shift.
- d. QC personnel and inspectors were present at retraining of cadweld operators