

APR 13 1971

J. B. Henderson, Chief, Reactor Construction
Branch, Division of Compliance, HQ

INQUIRY MEMORANDUM

METROPOLITAN EDISON COMPANY (THREE MILE ISLAND UNIT NO. 1), 289/71-A
CONCRETE POUR WHEN THE MEASURED SURFACE TEMPERATURE IN CONTACT WITH
THE CONCRETE WAS LESS THAN 32°F

On January 8, 1971, approximately 230 cubic yards of concrete was placed in a fuel handling building wall at elevation 331 to 346 feet running north and south from 17 feet west of the reactor centerline. At the time of this placement the measured surface temperature of the surfaces to be in contact with the concrete was below 32°F at the beginning of the scheduled pour.

The concrete placement under the conditions stated above is contrary to Volume II, Section 5 of the FSAR which invokes ACI 318-63 and 301-66. A CDN was issued by CO:I and answered by the licensee as the intended corrective action, which was considered adequate.

Subsequent to the issuance of the CDN and the licensee's reply, four core samples were removed from the fuel handling building wall along the joint between the concrete below 32°F and the 230 cubic yard scheduled pour for evaluation. These samples were designated TC1a, TC2a, TC3a and TC4a. The dimensions of samples No. TC1a and TC4a which were damaged during removal are not recorded in the PTL Test Report, PG-2642, dated March 19, 1971, nor other available documentation at Three Mile Island.

Sample No. TC2a was 3.75 inches in diameter and the capped length was 7-1/2 inches. The sample was tested for compressive strength and failed at 4050 psi. The direction of loading was parallel to the construction joint. The age of the sample was nine weeks. (Unit No. 1 FSAR, Volume II, states that Class I concrete will have a minimum strength of 5000 psi at 28 days.)

PTL Test Report No. FH-87, dated February 10, 1971, states that the test cylinders were seven-day moist cured and the balance of the curing period was in air. All ten of the test cylinders taken during the 230 cubic yard pour failed at greater than 5000 psi during the compressive strength tests on the 28 day old cylinders.

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Sample No. TC3a was 3.75 inches in diameter and the length was reported to be 8.12 inches. The splitting tensile strength of the sample was 395 psi. A double split occurred during the test simultaneously, one in the construction joint and another approximately 1/2 inch from, but parallel to the construction joint in the adjacent concrete. The age of the sample was nine weeks.

All four samples were examined under 10 power magnification at the bonded and fractured surfaces to determine any signs of freezing. There were no frost prints or other indications of freezing which would adversely affect the concrete bond.

The licensee stated that the wall was accepted on the basis of PTL's "Test and Evaluation Program", Order No. PG-2642, dated March 19, 1971, and a research paper by TYNES entitled "Investigation of Methods of Preparing Horizontal Construction Joints in Concrete", Technical Report No. 6-518, U.S. Army Engineers, Waleway's Experimental Station, published in July, 1959.

Since one sample was compression tested and one sample was tensile pulled, there appears to be no basis on which to accept or refute a one sample evaluation. Further, no sample cores were removed from the central portion of the five foot thick wall for evaluation, and cores were not taken from previously accepted concrete pours for comparison and evaluation. Apparently Met Ed has no plans to take additional samples for evaluation and/or comparison.

CO:I:DMH

E. M. Howard
Senior Reactor Inspector

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