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Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
MIDLAND DOCKET NO 50-329, 50-330
RELATIONSHIP OF OBSERVED CONCRETE CRACK WIDTHS
AND SPACING TO REINFORCEMENT RESIDUAL STRESSES
FILE: 0485.16 SERIAL: 17320

REFERENCES:
(1) J W COOK LETTER TO H R DENTON, EVALUATION OF FEEDWATER ISOLATION VALVE PITS AT MIDLAND PLANT, SERIAL 15493 DATED JANUARY 25, 1982
(2) J W COOK LETTER TO H R DENTON, EVALUATION OF AUXILIARY BUILDING CONTROL TOWER AND ELECTRICAL PENETRATION AREAS AT MIDLAND PLANT, SERIAL 15527 DATED JANUARY 29, 1982
(3) J W COOK LETTER TO H R DENTON, EVALUATION OF THE EFFECT ON STRUCTURAL STRENGTH OF CRACKS IN THE WALLS OF THE DIESEL GENERATOR BUILDING, SERIAL 15978 DATED FEBRUARY 16, 1982
(4) J W COOK LETTER TO H R DENTON, EVALUATION OF CRACKING IN SERVICE WATER PUMP STRUCTURE AT MIDLAND PLANT, SERIAL 16009 DATED MARCH 2, 1982
(5) J W COOK LETTER TO H R DENTON, LIMIT ANALYSIS TO EVALUATE SERVICE WATER PUMP STRUCTURE EAST AND WEST WALL CAPACITIES, SERIAL 17137 DATED MAY 7, 1982
(6) J W COOK LETTER TO H R DENTON, EFFECTS OF CRACKS ON SERVICEABILITY OF CONCRETE STRUCTURES AND REPAIR OF CRACKS, SERIAL 16884 DATED APRIL 30, 1982
(7) D G EISENHUT LETTER TO J W COOK DATED MAY 25, 1982

ENCLOSURE: OBSERVED CRACKS IN WALLS OF MIDLAND PLANT STRUCTURES

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References 1 through 5 above transmitted a series of reports which presented an evaluation of the effect on structural strength of cracks observed in the feedwater isolation valve pits, the auxiliary building control tower and electrical penetration areas, the diesel generator building, and the service

water pump structure. These five reports were provided as the result of discussions with the NRC Staff and its consultants at meetings held on December 10. 1981 and January 11, 1982 During these meetings, Consumers Power also agreed to provide the NRC with an evaluation of the effects of cracks on the longterm serviceability of concrete structures and with recommendations on sealing cracks. Our longterm report on serviceability was forwarded with the enclosure to the correspondence of Reference 6.

As the result of the NRC Staff's review of the reports listed as references 1 through 6, additional information was requested in Enclosure 8 of the NRC's May 25, 1982 correspondence (Reference 7). NRC Staff members requested more detailed information on the relationship between observed cracks and the potential for residual stresses in reinforcement. In addition, information on the significance of crack width and spacing for multiple cracks was requested.

In response to these requests, we are providing the enclosed report entitled, "Observed Cracks in Walls of Midland Plant Structures", by Messrs W G Corley and A E Fiorato of Construction Technology Laboratories, a division of the Portland Cement Association. This report presents a discussion of the observed cracks in Midland Plant structures with particular reference to the relationship between observed crack widths and residual steel stresses implied by the observed cracks. The significance and evaluation of spacing and width of multiple cracks is also discussed.

Based on the detailed technical discussion presented in the enclosed report, we believe that sufficiently conservative acceptance criteria for the crack monitoring program have been established. These criteria provide a sound basis for using observed crack width and crack spacing as a measure of the condition of the structures during the implementation of remedial measures. Although measured displacements are recommended for use as the primary means of monitoring behavior of the structure, periodic visual inspection to monitor cracks will supplement displacement data. We believed that the displacement and crack monitoring program will provide a safe and reasonable method for assessing the condition of each structure during the underpinning operations.

RBD 6/15

RBD/RLT/mkh

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CONSUMERS POWER COMPANY
Midland Units 1 and 2
Docket No 50-329, 50-330

Letter Serial 17320 Dated June 14, 1982

At the request of the Commission and pursuant to the Atomic Energy Act of 1954, and the Energy Reorganization Act of 1974, as amended and the Commission's Rules and Regulations thereunder, Consumers Power Company submits additional information responding to NRC requests concerning the relationship ofthe observed concrete crack widths and spacing for Midland structures to the reinforcement stresses. The submittal documents our response to information requested by the NRC Staff in Enclosure 8 of the NRC's May 25, 1982 correspondence.

CONSUMERS POWER COMPANY

By R B DeWitt 6/15
R B DeWitt, Vice President
Nuclear Operations

Sworn and subscribed before me this 15th day of June 1982.

Helen L. Dempski
Notary Public
Jackson County, Michigan

My Commission Expires Dec 14, 1983

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