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 AUTH. NAME: AUTHOR AFFILIATION  
 HUNTER, R.S. Indiana & Michigan Electric Co.  
 RECIP. NAME: RECIPIENT AFFILIATION  
 DENTON, H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards addl info re masonry wall evaluation performed per  
 IE Bulletin 80-11. Partition Wall 12-4049-W4 deleted from  
 safety-related wall category.

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# INDIANA & MICHIGAN ELECTRIC COMPANY

P. O. BOX 18  
BOWLING GREEN STATION  
NEW YORK, N. Y. 10004

November 19, 1982  
AEP:NRC:0418F

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2  
Docket Nos. 50-315 and 50-316  
License Nos. DPR-58 and DPR-74  
NRC IE BULLETIN NO. 80-11 (MASONRY WALLS)  
REQUEST FOR ADDITIONAL INFORMATION

Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Washington, D. C 20555

Reference: (1) Letter No. AEP:NRC:0418C, dated October 30, 1981.  
(2) Letter No. AEP:NRC:0418E, dated August 20, 1982.

Dear Mr. Denton:

This letter and its Attachments provide additional information on the masonry wall evaluation performed as per the requirements of the NRC IE Bulletin No. 80-11 for the Donald C. Cook Nuclear Plant.

Attachment 1 revises our response to Question No. 5 of Mr. S. Varga's letter of July 13, 1982 contained in Attachment 1 to Reference 2.

Attachment 2 contains our responses to the four questions included with Mr. S. Varga's letter of October 4, 1982.

Furthermore, our review of the masonry walls data prompted by the preparation of Attachment 2 to this letter, has uncovered that one wall, No. 12-4049-W4, listed in our earlier response (Reference 1) was incorrectly classified as a safety-related wall. This wall is a partition wall between Unit 1 and Unit 2 and is located in the Turbine Building. As such we are deleting wall No. 12-4049-W4 from the safety-related wall category (Item 34 in Attachment "B" to Reference 1).

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This document has been prepared following Corporate Procedures which incorporate a reasonable set of controls to insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,



R. S. Hunter  
Vice President

RSH/os

cc: John E. Dolan - Columbus  
M. P. Alexich  
R. W. Jurgensen  
W. G. Smith, Jr. - Bridgman  
R. C. Callen  
G. Charnoff  
Joe Williams, Jr.  
NRC Resident Inspector at Cook Plant - Bridgman

ATTACHMENT 1 TO AEP:NRC:0418F

The compressive strengths of the masonry and the mortar listed in the response to Item 5 of Reference 2 are modified as follows:

Compressive strength of masonry:

Hollow masonry units - 1000 psi (ASTM Specification C90)

Solid masonry units - 1200 psi (ASTM Specification C145)

Compressive strength of mortar (ASTM Specification C270):

Type N mortar (used with hollow units) - 750 psi

Type M mortar (used with solid units) - 2500 psi

ATTACHMENT 2 TO AEP:NRC:0418F

The following are Indiana & Michigan Electric Company's responses to the four items included in Mr. Varga's letter of October 4, 1982. Item numbers noted in this Attachment are the same ones as those in Mr. Varga's letter.

Response to Item 1

The masonry walls were erected as per AEP's Architectural Specification No. DCC-A139-QCS which did not require written documentation for field inspection during construction. However, Pearson Construction Company, Inc. of Benton Harbor, Michigan, who was the construction contractor for the masonry walls at the D. C. Cook Plant at the time of plant construction has provided a verification letter (attached) stating that the Dur-O-wal reinforcement had been installed in the masonry walls as per the AEP drawings and specifications.

Response to Item 2

Verification for proper anchorage and bonding of the Dur-O-wal reinforcement cannot be provided as the masonry walls were erected as uninspected construction. To account for this lack of inspection, reduced allowable stresses were used for concrete and mortar in the reevaluation. However, as noted in response to Item 4 noted below, with the exception of 5 walls listed in Table 3 of this Attachment, the walls can resist the seismic loads without the benefit of reinforcement provided by the Dur-O-wal.

Response to Item 3

Dur-O-wal reinforcing is a metallic reinforcing element and is made out of ASTM standard A82 steel for "Cold Drawn Steel Wire for Concrete Reinforcement." The yield strength of this steel is 70,000 psi. Although the Dur-O-wal is most often used to control cracking in the concrete masonry walls, it is capable of carrying tensile stresses existing in the wall in the direction of the reinforcement. However, as indicated in the response to item 4, in the majority of the walls, the tensile stresses existing in the masonry walls is lower than the tensile capacity of the mortar and thus the masonry wall design is not dependent on the reinforcing strength of the Dur-O-wal.

Response to Item 4

The total number of safety-related walls that were reanalyzed is one hundred and sixteen (116). Out of this total number of walls, seventeen (17) walls are encapsulated walls (see Table 1). The remaining ninety-nine walls (99) are listed in Table 2. This table provides a summary of the stresses in the 99 listed safety-related walls.

D. C. COOK NUCLEAR PLANT  
AEP:NRC:0418F

Table 3 is a summary of the rebar stresses for those five safety-related hollow block walls that were qualified by the Dur-O-wal reinforcing. These walls are qualified based on the strength of the Dur-O-wal reinforcement, because the allowable tensile stress in the mortar was reduced to account for the uninspected construction. If the maximum allowable tensile stress of the mortar is used, which is permitted under inspected construction, then the calculated stresses will be within the allowable limits. To confirm the existence of the Dur-O-wal reinforcing in the above five (5) walls, we are currently initiating efforts to scan these five walls using metal detectors or other suitable methods.

If we cannot verify the existence of the Dur-O-wal reinforcement from this inspection we will inform your office of the corrective actions to be taken.



D. C. Cook Nuclear Plant  
AEP:NRC:0418F

TABLE 1

List of Encapsulated Walls

IE Bulletin 80-11

<u>Wall No.</u>	<u>No. of Walls</u>
12-4026-W1 through W6	6
12-4026-W8 through W11	4
12-4026-W16, W18	2
12-4028-W3, W6, W9	3
12-4029-W3, W5	<u>2</u>
	17

TABLE 2

Masonry Wall Mortar Stress Summary(I. E. Bulletin 80-11)

<u>Wall Number</u>	<u>Allowable Tensile Stress in Mortar (Uninspected) (PSI)</u>	<u>Max. Calculated Tensile Stress In Mortar For Worst Wall (PSI)</u>	<u>Total Number Walls</u>
<u>Solid Concrete Masonry Units</u>			
12-4025-W1, 2, 3, 4, 9 thru 16, 21 thru 28	49.9	23.9	20
12-4026-W7, 12 thru 15, 17, 19 thru 24	49.9	29.1	12
12-4027-W1, 7, 10 thru 15, 18, 19	49.9	15.1	10
12-4027-W5	49.9	43.8	1
12-4028-W2, 4, 5, 8, 12, 18, 23, 26	49.9	20.7	8
12-4028-W24, 27, 28 .	49.9	24.7	3
12-4028-W10, 11	49.9	26.0	2
12-4028-W13, 14	49.9	45.0	2
<u>Hollow Concrete Masonry Units</u>			
12-4029-W1, 2, 4, 6, 7, 8	18.2	6.8	6
12-4031-W2, 3	18.2	14.8	2
12-4031-W1	18.2	31.0*	1
1-4033-W1, 4	18.2	14.2	2
1-4033-W2, 3	18.2	24.5*	2
1-4034-W1 thru 11	18.2	3.3	11
12-4035-W1, 2	18.2	13.3	2
2-4036-W1, 4	18.2	14.2	2
2-4036-W2, 3	18.2	24.5*	2
2-4037-W1 thru 11	18.2	3.3	11

99

NOTES: 1) The allowable stresses are derived per Table 10.1 of ACI-531-79 "Building Code Requirements for Concrete Masonry Structures."

The mortar strengths used are  $m_o = 2500$  psi for Type M mortar used with the solid masonry units and  $m_o = 750$  psi for Type N mortar used with the hollow masonry units.

2) Masonry stresses are calculated for uncracked section.

\*) Walls 12-4031-W1, 1-4033-W2, 3 and 2-4036-W2, 3 which exceed reduced allowables are summarized in Table 3.

TABLE 3  
Summary of Rebar Stresses for Walls Qualified by Dur-O-wal

(I. E. Bulletin 80-11)

<u>Wall Number</u>	<u>Allowable Tensile Stress (KSI)</u>	<u>Max. Calculated Tensile Stress In Rebar (KSI)</u>	<u>Total Number Walls</u>
12-4031-W1	60.0	43.9	1
1-4033-W2, 3	60.0	35.4	2
2-4036-W2, 3	60.0	35.4	<u>2</u>
			5

NOTE: Rebar stresses are calculated based on cracked masonry section.

PEARSON CONSTRUCTION COMPANY, INC.  
GENERAL CONTRACTORS

240 WEST BRITAIN AVENUE

BENTON HARBOR, MICH. 49022



September 22, 1982

American Electric Power Co.  
2 Broadway  
New York, New York 10004

Attention: Mr. Bill Robinson  
Room 940

Re: Donald C. Cook Nuclear Plant  
Bridgman, Michigan  
Our Job No. 7082

Gentlemen:

Following your telephone inquiry of September 22nd, I checked with our mason foreman, and he confirmed that we did install the Dur-O-Wal block reinforcing in the masonry walls on this project wherever called for on the drawings and as indicated in the specifications.

If you need any further information regarding this item, please feel free to contact the undersigned.

Very truly yours,

PEARSON CONSTRUCTION COMPANY, INC.

Paul Scott, P.E.

PS/lb

cc: File

