Met-Ed / GPU

Metropolitan Edison Company
Post Office Box 542
Reading Pennsylvania 19603
215 929-3601

May 18, 1979
GQL 0692

Director of Nuclear Reactor Regulation
Attn: R. W. Reid, Chief
Operating Reactors Branch No. 4
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
Fire Protection Program

The TMI-1 Fire Protection Safety Evaluation Report (FPSER) under Item 3.2.2, Cable Separation, specified that a study or test be performed on the asbestos board fire barriers which protect TMI-1 cable trays and conduits. The purpose of this study or test is to verify the effectiveness of the presently installed design in preventing the spread of a cable tray fire to other trays and in preventing damage to redundant cables in event of an exposure fire. The results of the test are to be submitted by July 15, 1979, along with proposals for modifications, should the test results indicate that modifications are necessary.

Attached please find a description of the test for your information. If you have any comments, please return them as soon as possible to Mr. W. S. Stanley of my staff at (215) 921-6587.

Sincerely,

J. G. Herbein
Vice President
Generation

JGH:WS:mrm

Attachment

A006
S 1/1

7906010212

Description of Asbestos Board Fire Barrier Test

This test is designed to simulate cable tray and conduit configurations as installed at TMI-1. The test is in two parts - the first to investigate tray-to-tray fire spread, the second to investigate the effects of an exposure fire.

Please note that a 60% fill by volume, as used below in the test description, is determined as follows:

$$\% \text{ fill} = \left(\sum_{i=1}^{n}(d_i^2)/wh\right) \times 100$$

where d_i is the diameter of cable i

w is the width of a cable tray

and h is the depth of a cable tray

Design

The layout of the cable trays, conduit and asbestos barriers is shown in the accompanying Drawing S-112178 Sheet 1 Rev. BB.

Test 79-1 Tray-to-Tray Fire Spread

For the first test, Tray A shall be randomly filled to approximately 60% by volume with cable laid the full length of the tray. Trays E and C will be filled with one layer of 9 conductor #10 AWG and #12AWG, respectively. A length of 9 conductor #12AWG will be run in each conduit. See Drawing S-112178 Sheet 2 Rev. BB for the method by which cable will be laid in Trays E and C.

The cable in Trays E and C and in the conduit shall be energized to detect fire-induced short circuits. Drawing S-112178 Sheet 3 Rev. BB shows the cable intraconnection for the short circuit test connection.

Thermocouples (maximum temperature: 2500°F) will be placed as indicated on Drawing S-112178 Sheet 4 Rev. BB.

The fire load shall consist of two bundles of oil-soaked burlap, one bundle placed in the center and one in the south end of Tray A. Each bundle shall consist of a 24" x 24" piece of 9 oz/sq.yd. burlap folded into a 4" x 4" x 6" bundle and wrapped with fine copper wire to retain its shape. Each bundle shall be soaked with 160 $\pm$ 5g of oil.

Test Procedure

1. Energize the test circuits
2. Start temperature recorders
3. Ignite bundles with a propane torch
4. Start timer
5. Record temperature until the applied flame has been allowed to burn itself out naturally

Test Procedure: (cont'd)

6. If a short circuit test lamp lights, record the time elapsed from the beginning of the test
7. After the fire has burned itself out, record the general condition of the cables in the cable trays and the condition of the Marinite barrier.

Test 79-2 Exposure Fire Test

Trays A and C shall be randomly filled to approximately 60% by volume with cable laid the full length of the tray. As part of the 60%, a layer of 9 conductor #10AWG will be laid on top of the cable in Tray A and a layer of 9 conductor #12AWG will be laid on top of the cable in Tray C for the short circuit test. Tray E will be provided with one layer of 9 conductor #10AWG laid as shown in drawing S-112178 Sheet 2 Rev. BB for the short circuit test. A length of 9 conductor #12AWG will be run in each conduit as in the first test.

The thermocouples will remain in the same locations as those in the first test.

The fire load shall consist of 9-8' x 2"x 4" spruce studs randomly placed on the floor beneath the centerline of Tray A; a 1.5' x 1.5' x 1.5' cardboard box of tightly packed rags and paper of known weight, strewn over the studs; and one gallon of lube oil of known grade and type, poured over the wood, paper and rags.

Test Procedure:

1. Energize the test circuits
2. Start temperature recorders
3. Ignite the fire load with a propane torch
4. Record temperatures until the applied flame has naturally burned itself out
5. If a short circuit test lamp lights, record the time elapsed from the beginning of the test
6. After the fire has burned itself out, record the general condition of the cables in the trays and the Marinite barrier

METROPOLITAN EDISON COMPANY
THREE MILE ISLAND UNIT I

MARINITE FIRE SEPARATION TEST

MADE	CHKD	DRAWING NO.	SH. NO.	RE
BLB		S-112178	1	BF

SQ LOR | END INTERF 1 2

GILBERT ASSOCIATES, INC
ENGINEERS AND CONSULTANTS
READING, PA.

SCALE NONE

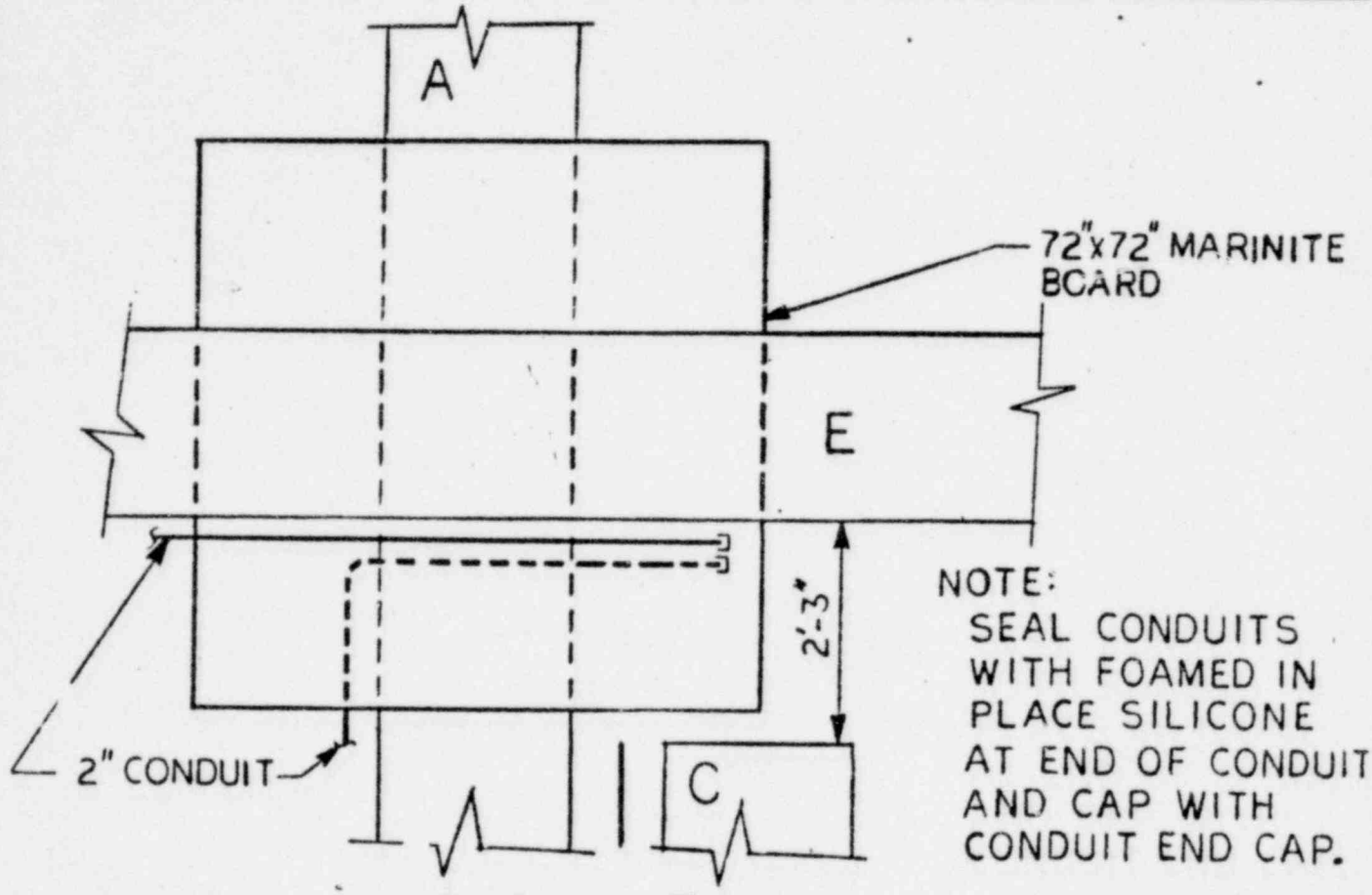
W.O 04-4692-094

REV	MADE	CH	SQL	APP	DATE	REV	MADE	CH	SQL	APP	DAT
BB	CRM				3/8/79						

ENGINEER APPROVAL | DEPT | DATE

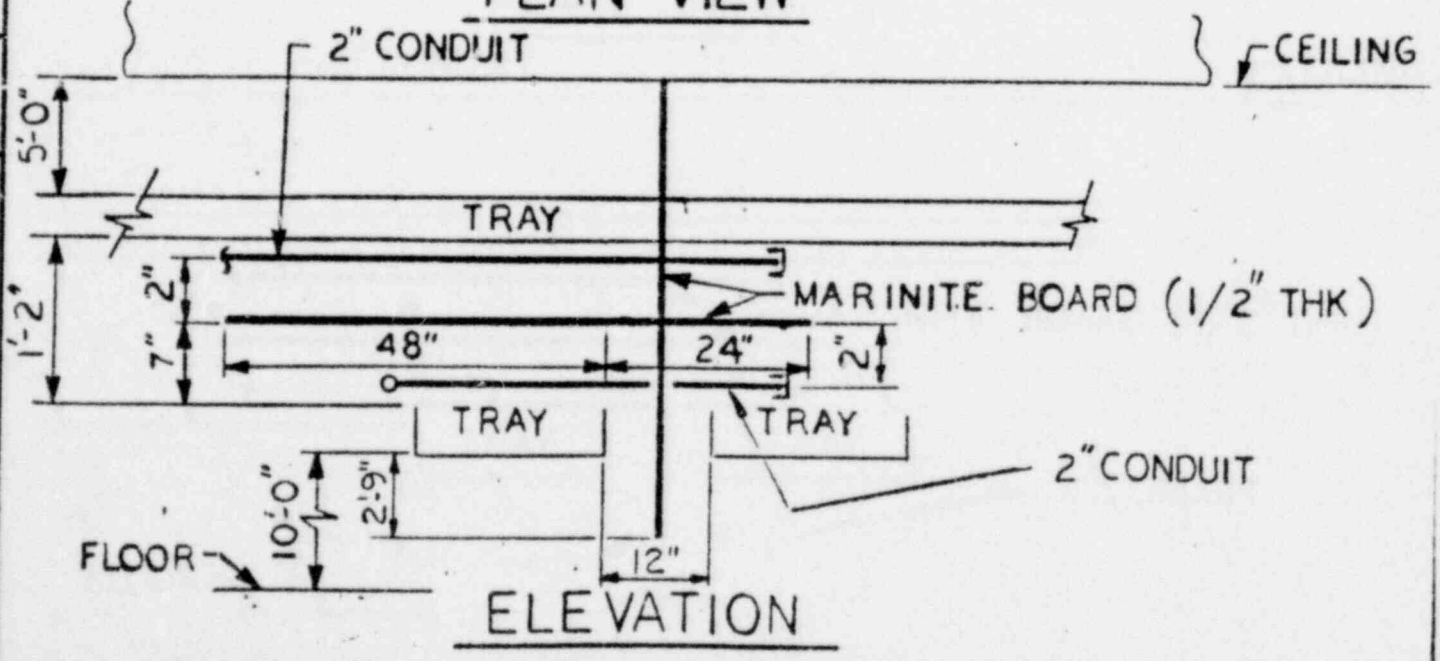
CONSTRUCTION
BIDDING PURPOSES
RELEASED FOR

DATE	ENGR.
3-15-79	



NOTE:
SEAL CONDUITS WITH FOAMED IN PLACE SILICONE AT END OF CONDUIT AND CAP WITH CONDUIT END CAP.

PLAN VIEW



ELEVATION

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METROPOLITAN EDISON COMPANY
THREE MILE ISLAND UNIT 1

MARINITE FIRE SEPARATION TEST

MADE	CHKD	DRAWING NUMBER	REV
RP 7-1-79	---	S 112178 SH. NO. 2	BB

SQ LDR | ENG INTERP | GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.

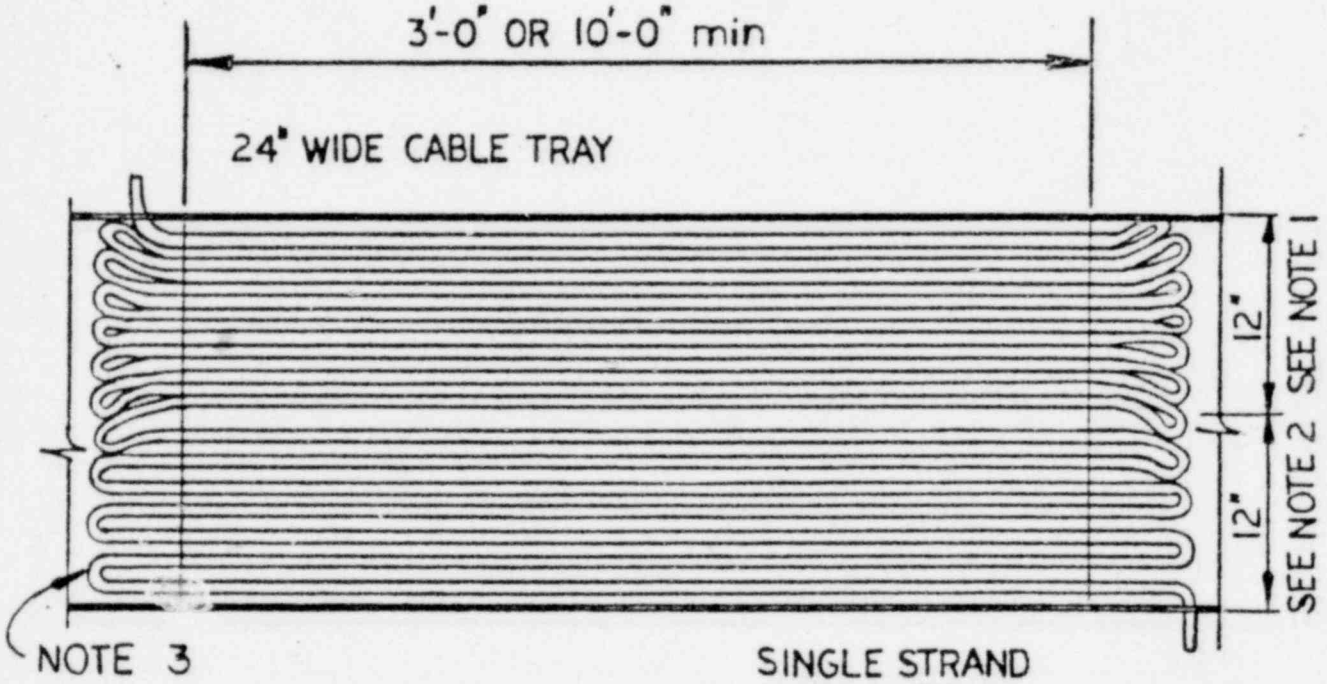
SCALE

W.O. 0446A2-094 ENGINEER APPROVAL DEPT DATE

REV	MADE	CH	SQL	APP	DATE	REV	MADE	CH	SQL	APP	DATE
BB	CRM				3/8/79						

STATUS OF DRAWING

DEFINITION	
☐ CONCEPTUAL	REPRESENTS GENERAL CONCEPTS BASED ON UNSUBSTANTIATED ASSUMPTIONS. GROSS CHANGES COULD ENSUE WITHOUT NOTICE.
☒ PRELIMINARY	REPRESENTS ACCEPTABLE DESIGN CONCEPTS. SUBJECT TO CHANGE WITHOUT NOTICE.
☐ APPROVED	REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.



SINGLE STRAND
9 CONDUCTOR
NO. 10 OR 12 AWG CABLE

NOTES:

1. EACH CABLE CONTACTING ADJACENT CABLE.
2. EACH CABLE SEPARATED FROM ADJACENT CABLE BY ONE CABLE DIAMETER.
3. CABLE LOOP RADIUS SHALL BE NO LESS THAN 8 TIMES THE O.D. OF THE CABLE. ADAQUATELY SUPPORT THE LOOPS TO AVOID CABLE STRESS AND PROTECT CABLE LOOPS FROM FIRE.

GAI 4001

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METROPOLITAN EDISON COMPANY
THREE MILE ISLAND UNIT-1

MARINITE FIRE SEPARATION TEST

MADE	CHKD
RR 1-19-77	

DRAWING NUMBER	REV
S-112178 SHT. NO. 3	BB

SQ LDR | ENG INTERF 1. 2.

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

SCALE

*94672-094

ENGINEER APPROVAL DEPT DATE

REV	MADE	CH	SQL	APP	DATE	REV	MADE	CH	SQL	APP	DATE
BB	CRM				5/8/79						

STATUS OF DRAWING

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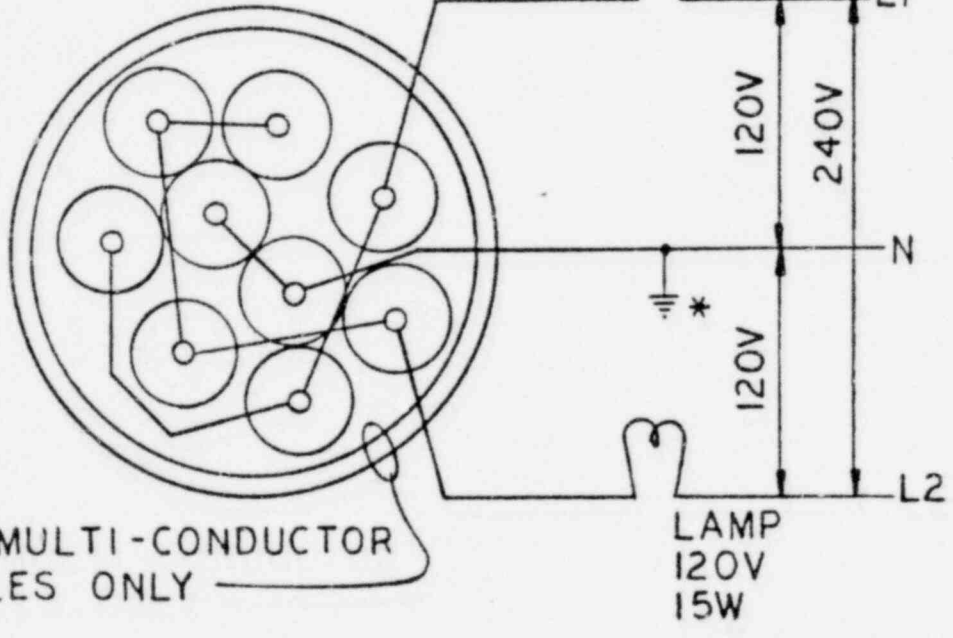

* GROUND CONNECTED TO CABLE TRAY

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METROPOLITAN EDISON COMPANY
THREE MILE ISLAND UNIT 1

MARINITE FIRE SEPARATION TEST

MADE	CHKD	DRAWING NUMBER	REV
LR 1-18-79	---	S 112178 SHT 4	BB

SQ LOR | END INTERF | GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.

SCALE

94-4622-094

ENGINEER APPROVAL DEPT DATE

REV	MADE	CH	SQL	APP	DATE	REV	MADE	CH	SQL	APP	DATE
BB	CRM				3-8-79						

STATUS OF DRAWING

DEFINITION		REVIEWED AND APPROVED DESIGN. ANY PORTION MARKED "HOLD" RETAINS PRELIMINARY STATUS.
☒ PRELIMINARY		REPRESENTS ACCEPTABLE DESIGN CONCEPTS. SUBJECT TO CHANGE WITHOUT NOTICE.
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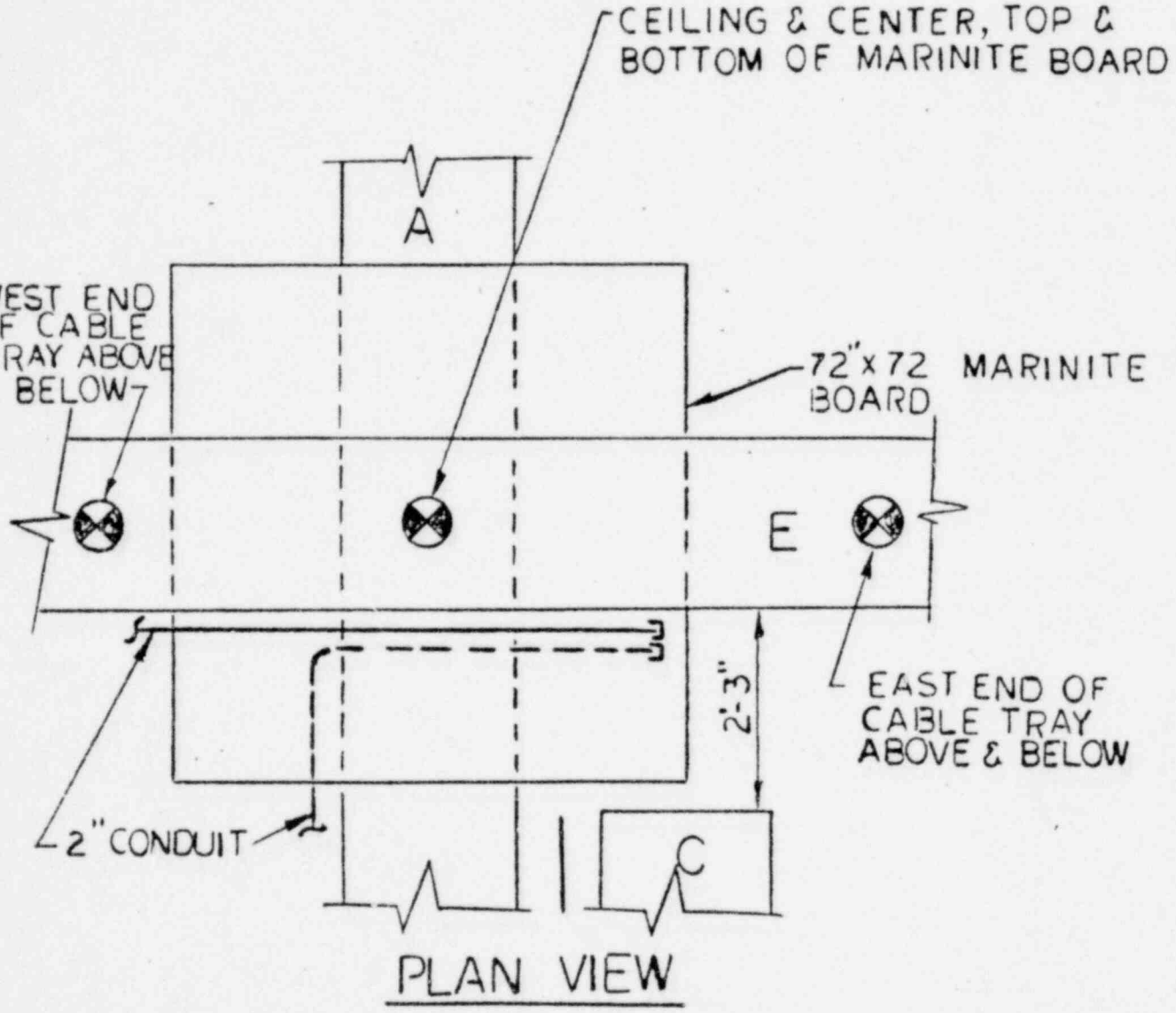

PLAN VIEW

THERMO COUPLE

GAI 4001