



GAGE-BABCOCK & ASSOCIATES, INC.

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PAUL D. SMITH, P.E., President
BERT M. COHN, P.E., Senior Vice President

June 12, 1979
File 7917-2

Greg Harrison
Division of Systems Safety
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Greg:

Fire Test of Cable Trays
Zimmer Nuclear Power Station

On June 6, 1979, I witnessed a fire test of cable trays at Portland Cement Association laboratories, Skokie Illinois. The intent of the test was to verify the resistance to fire exposure achieved with three 1 in. layers of Kaowool wrapped around cable trays. Testing was conducted of four sections of loaded cable trays in the PCA beam furnace, following the ASTM E119 fire test procedure.

The protected trays successfully resisted the effects of the exposure fire for a period of not less than 90 min. At that time, one bottom tray right over the burners recorded a maximum temperature of about 400°F (TC #9 in tray #4 -- see enclosure), and electrical failure in some cables occurred at about the same time.

Temperatures in the other bottom tray were somewhat lower, presumably because one end was not sealed, and reached 400°F (at TC #7) at 1 hr. 45 min., shortly after the test had been stopped. The two upper trays reached temperatures not exceeding 250°F average at the end of 90 min.

Sincerely,

Bert M. Cohn

1345 017

7911190 530

FIRE TEST THERMOCOUPLE LOCATIONS

For the drawing showing the recommended thermocouple locations for each tray in the fire tests to be performed at Portland Cement Association, please note the following:

1. Thermocouples 1,2,3,4,5,6,7,8 and 9 are to be attached to the cables on the bottom of the tray.
2. Thermocouple 14 is to be attached to a cable on the top of the tray.
3. Thermocouples 10 and 11 are to be placed behind the first inch and second inch of Kaowool wrap on the tray.
4. Thermocouple 12 is to be attached to the metal tray itself.
5. Thermocouples 13 and 15 are to be attached to the outer wrap of Kaowool.
6. Thermocouple 16 is to be located inside the seal, between the lid and the tray.
7. Thermocouples 17 and 18 are to be attached to the unistrut supports.

All four cable trays will have the same thermocouple locations.

1345 018

Cross-Reference

CG&E

CABLE TRAY FIRE TEST

TRAY 1

<u>Location</u>	<u>T/C Number</u>
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10 -
11	11 -
12	12 -
13	13
14	14
15	15
16	16
17	17 -
18	18 -

TRAY 2

<u>Location</u>	<u>T/C Number</u>
1	19
2	20
3	21
4	22
5	23
6	24
7	25
8	26
9	27
10	28 -
11	29 -
12	30 -
13	31
14	32
15	33
16	34
17	35 -
18	36 -

TRAY 3

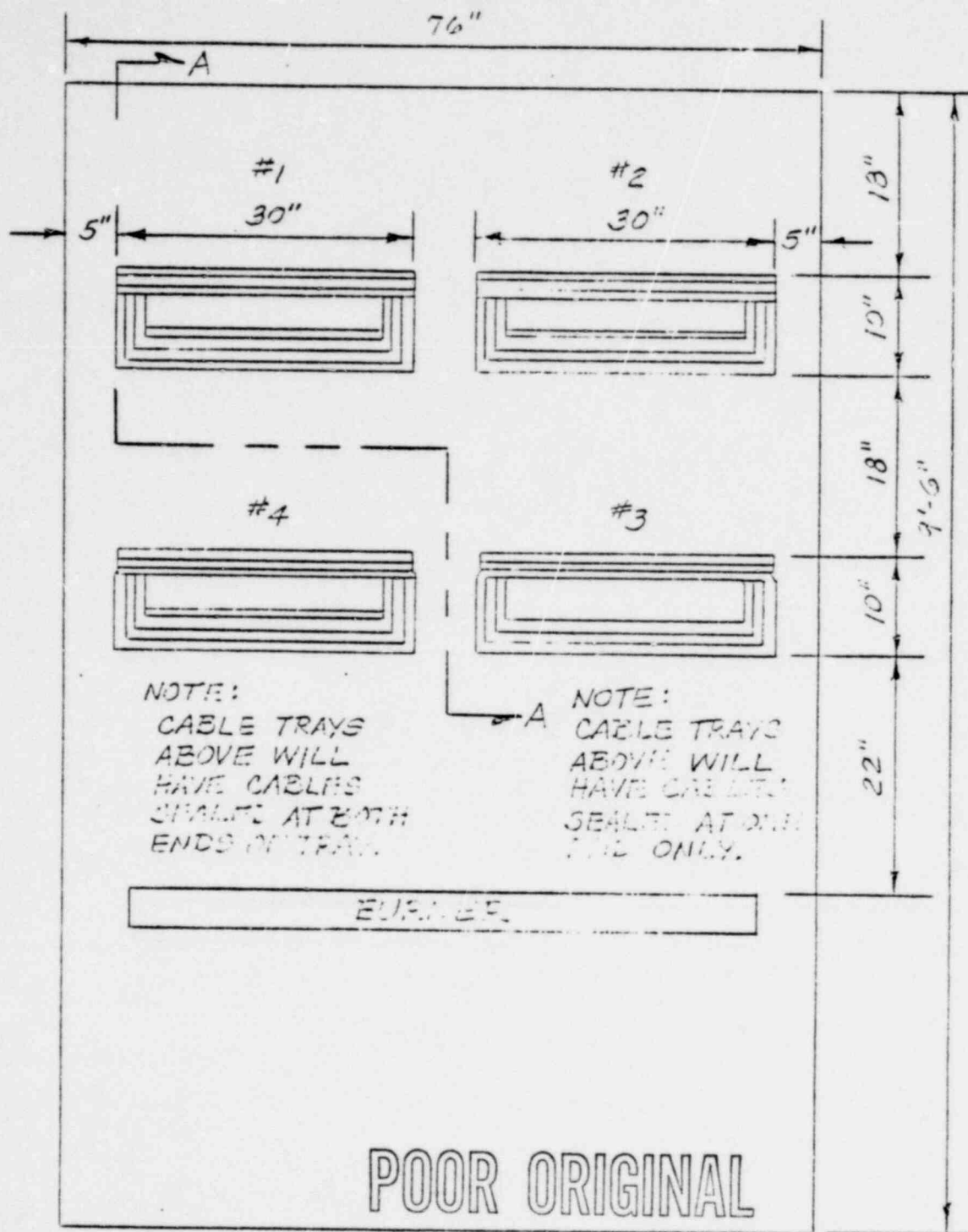
<u>Location</u>	<u>T/C Number</u>
1	37
2	38
3	39
4	40
5	41
6	42
7	43
8	44
9	45
10	46 -
11	47 -
12	48 -
13	49
14	50
15	51
16	52
17	53 -
18	54 -

TRAY 4

<u>Location</u>	<u>T/C Number</u>
1	55
2	56
3	57
4	58
5	59
6	60
7	61
8	62
9	63
10	64 -
11	65 -
12	66 -
13	67
14	68
15	69
16	70
17	71 -
18	72 -

1345 020

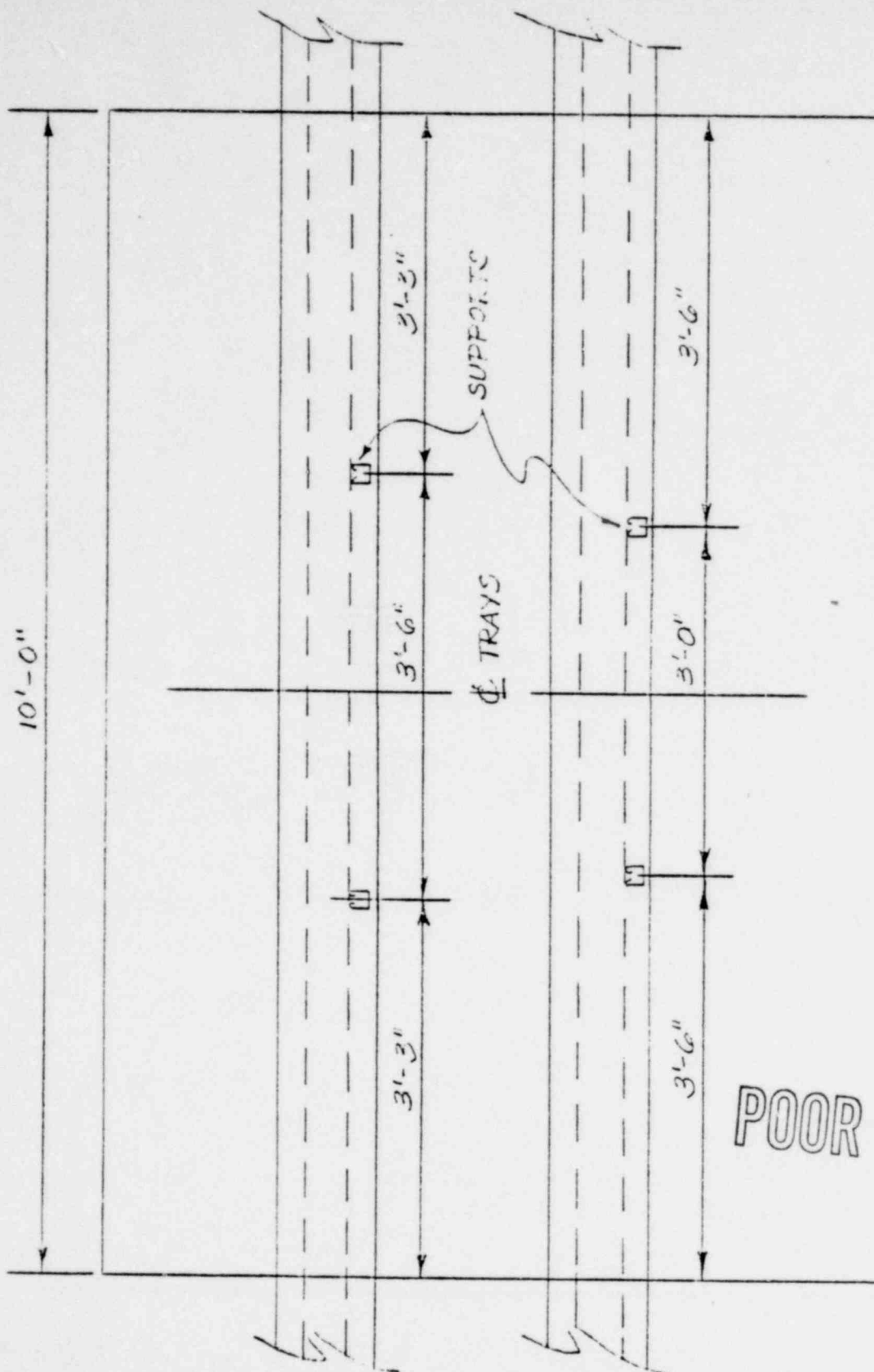
- Denotes Thermo Couple
Installed by R. E. Kramig & Co.



END VIEW

PORTLAND CEMENT FIRE TEST
24" WIDE 4" DEEP TRAY WITH (3)
1" BLANKETS OF KNOX-001

1345 021



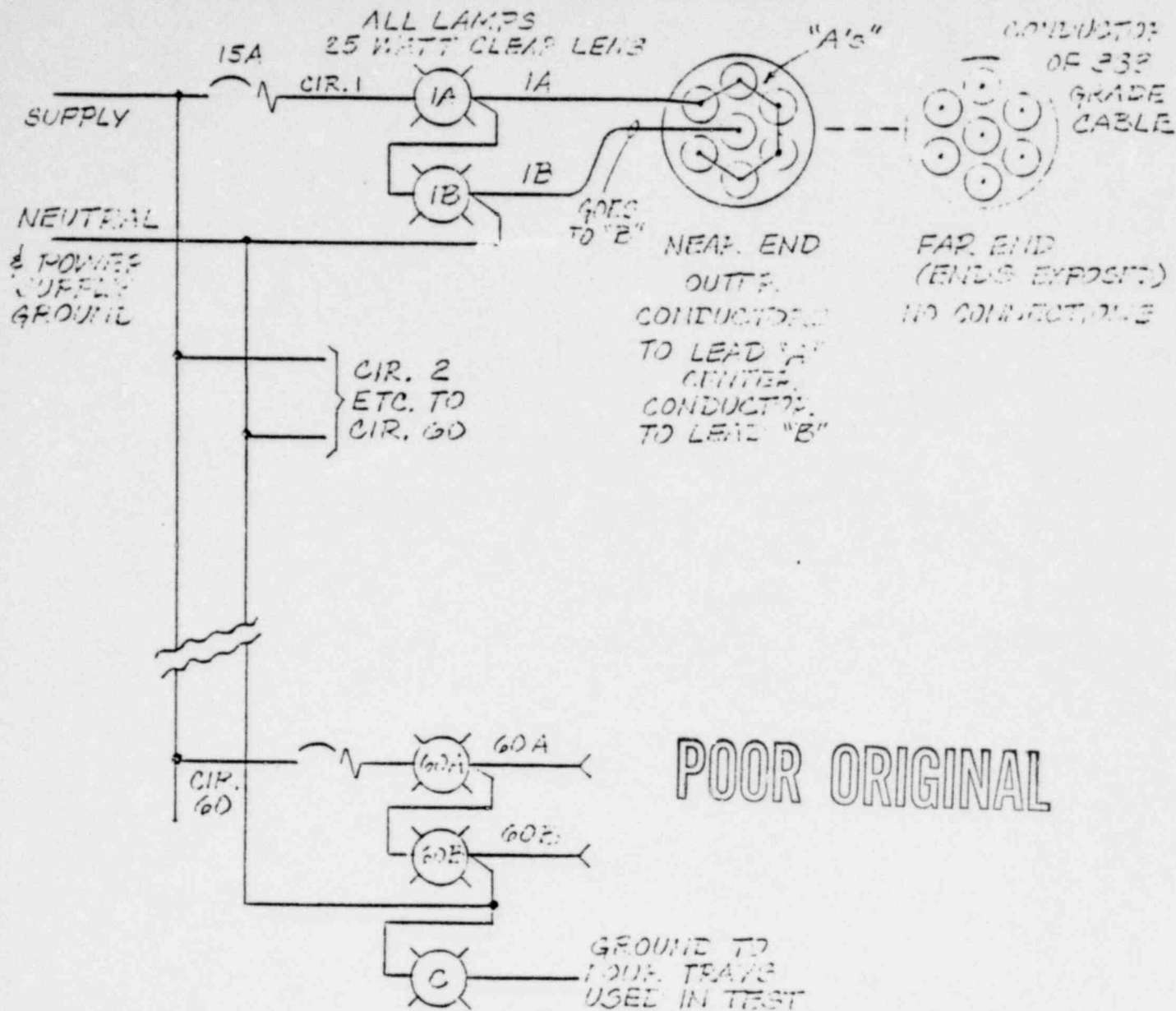
SECTION "A-A"

POOR ORIGINAL

PORTLAND CEMENT FINE T.M.
 2+1" WIDE 4" DEEP TRAY WITH (2)
 1" BLANK OF FLOW

1345 022

LAMP MONITORING SCHEME



LEGEND

MODE	LAMP A	LAMP B	LAMP C	CABLE CONDITION
NORMAL	$\frac{1}{2}$ LIT	$\frac{1}{2}$ LIT	DARK	NO SHORTS
SHORT "A" TO "B"	FULL LIT	DARK	DARK	ANY OF OUR "A" SHORTED TO "B"
SHORT "A" TO TRAY	PARTLY LIT	PARTLY LIT	PARTLY LIT	"A" SHORTED TO TRAY

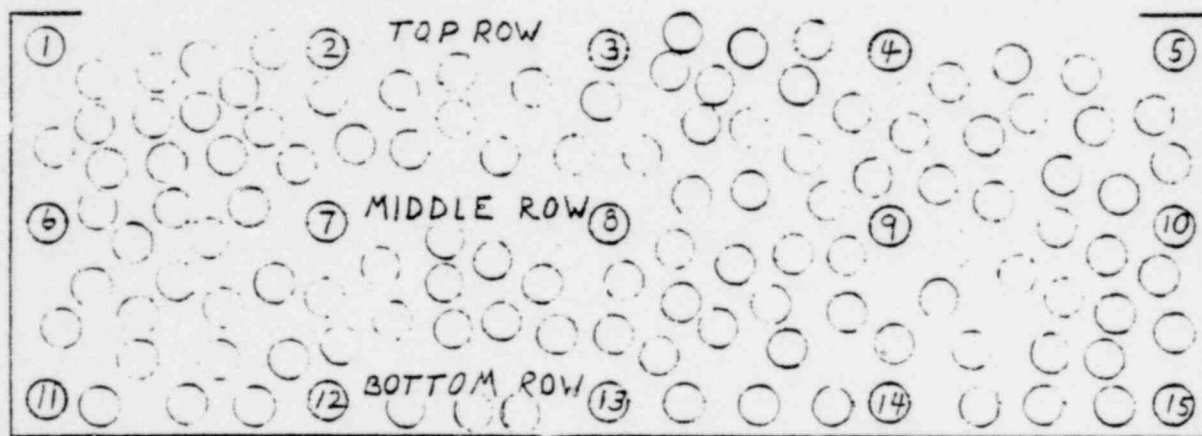
1345 023

PCA FIRE TEST

ZIMMER N.P.S.
LASALLE N.P.S.
SHOREHAM N.P.S.

SCHEMATIC DIAGRAM OF APPROXIMATE CABLE
LOCATIONS IN CABLE TRAYS FOR MEGGERING
AND LIGHT PANEL MONITORING

SAME ARRANGEMENT FOR EACH OF 4 TRAYS



15 CABLES. MEGGER BEFORE & AFTER TEST

POOR ORIGINAL

1345 024

FIRE PROTECTIVE CABLE TRAY FIRE TEST

POOR ORIGINAL

1345 025

