



Portland General Electric Company

General Electric Company

July 30, 1979

Trojan Nuclear Plant
Docket 50-344
License NPF-1

Director of Nuclear Reactor Regulation
ATTN: Mr. A. Schwencer, Chief
Operating Reactors Branch #1
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

In accordance with our letter of June 19, 1979, we are providing the attached supplemental information justifying the heat removal adequacy of the air recirculation units in the Trojan Safety Train B Switchgear Room to remove energy generated by a potential fire. This information was originally requested in your Request for Additional Information of April 18, 1979. This information will be included in the next revision of the Trojan Nuclear Plant Fire Hazard Analysis, PGE-1012.

If you have any questions concerning this information, please contact me.

Sincerely,

C. Goodwin, Jr.
Assistant Vice President
Thermal Plant Operation and
Maintenance

CG/SML/4sb7A16
Attachment

c: Mr. Lynn Frank, Director w/attach
State of Oregon
Department of Energy

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ATTACHMENT 1

Request 3.2.2 Cable Tray Tests (Train B Switchgear Room)

The PGE letter of January 9, 1979 indicates that adequate test data is available in lieu of performing additional tests to obtain information related to switchgear room fire protection. PGE in 1012 (Page C-50) indicates that the results of the test would be used in performing an analysis to show the adequacy of the air recirculation units in the safety train B switchgear room to remove the energy generated by a fire. Identify when the results of this analysis will be provided using the available test data. This analysis should consider maximum temperatures that train A equipment in this room can withstand without malfunction in addition to the maximum allowable cable temperature identified in PGE 1012, Pages C-49 and C-50.

Alternatives acceptable to the staff in lieu of performing this analysis are:

- (a) Provide an alternate shutdown capability independent of cabling and equipment in this room to achieve safe shutdown,
- (b) Provide an automatic total flooding gas suppression system in this area, or
- (c) Install a 3-hr rated barrier to separate the train A cabling and equipment in the room from the train B cabling and equipment.

Response

The safety train B switchgear room, located at El. 61 and 65 ft of the Control Building, contains the following train B switchgear: 4-kV switchgear (A2), 480-V motor control centers (B22, B24 and B26), inverters (Y26 and Y28), battery chargers (D22 and D24), and the preferred instrument a-c buses (Y22 and Y24). It also contains the following train A switchgear: inverters (Y15 and Y17), battery chargers (D21 and D24), and the preferred instrument a-c buses (Y11 and Y13). All of the electrical equipment within this room was designed and manufactured to operate in a maximum ambient temperature of 104°F.

PGE has performed a thermal analysis to show the adequacy of the air recirculation units in the safety train B switchgear room to remove the heat generated by a postulated fire. The analysis has been done for the most severe case of heat generation, due to a fire in the most concentrated cable tray arrangement. This arrangement is shown on the attached Sketch 1. The arrangement of the air coolers with respect to the subject cable tray is shown on the attached Sketch 2. It is judged that none of the air coolers would be affected by the postulated fire.

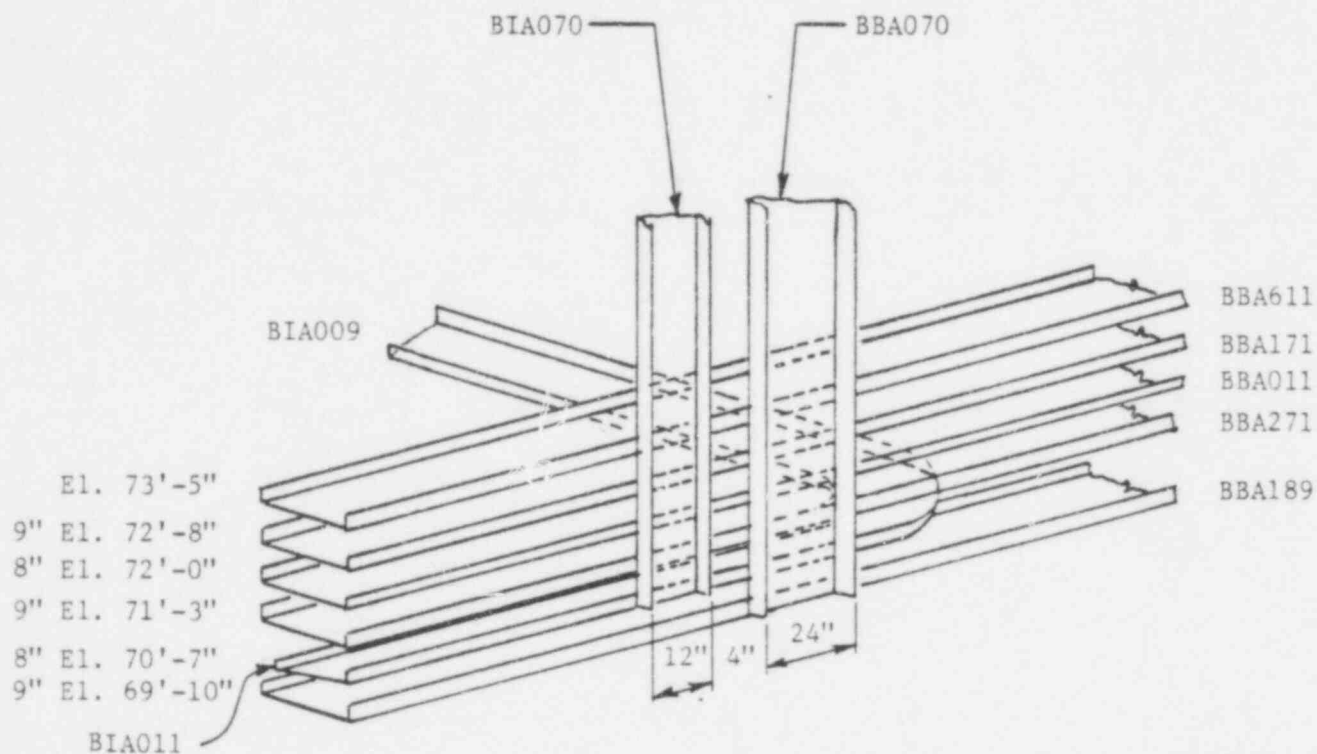
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In order to conduct the thermal analysis, the following assumptions were made (the referenced reports were used as guide documents only):

1. It takes 5 min after the fire source ignition for a fire to start in the bottom tray and then begin to vertically propagate to the next tray.
(Ref: SAND 78-0518, Page 27 and SAND 77-1424, Page 15)
2. The average rate of vertical cable flame spread was estimated to be 3 in./min.
(Ref: Table 14 of NUREG/CR-0346)
3. The average horizontal cable flame spread rate was assumed to be 1 in./min, based on the Browns Ferry fire.
(Ref: Brookhaven National Lab. Report, BNL-NUREG-23392, Page 5)
4. During a cable fire, for the first 10 min, approximately 20 percent of the cable is consumed (BNL-NUREG-23392, Pages 6 and 7).
5. Average initial room temperature was assumed to be 75°F.
6. Combustible loading for each of the cable trays has been estimated to be 10.65 lb/ft.
7. As stated on Page A-7 of the Trojan Fire Hazard Analysis, PGE-1012, a total heat release rate of 12,250 Btu/lbm for the electrical cable insulation and jacketing (EPR) has been used in the analysis.
8. The net heat load for the subject room due to the electrical equipment and lighting is approximately 277,700 Btu/hr.
9. It has been established that each air recirculation unit could remove up to 250,000 Btu/hr in case of a postulated fire in the switchgear room.
10. The worst-case cable tray configuration was considered burned.
11. Five air recirculation units are operating.

Based on these assumptions, it was calculated that the switchgear room temperature will reach 104°F in approximately 21 min and 180°F within 25 min (Sketch 3). Other equipment operability scenarios were analyzed but were found to give similar conservative results. It must be considered that the detection system will alarm and responding operations personnel will be available and extinguishing a possible fire within minutes of fire initiation. Also, upon actuation, the new smoke exhauster system will significantly reduce the switchgear room temperature. The air recirculation units are thus judged adequate to remove energy released by the postulated fire and thus preserve safe shutdown equipment and cable functionality.

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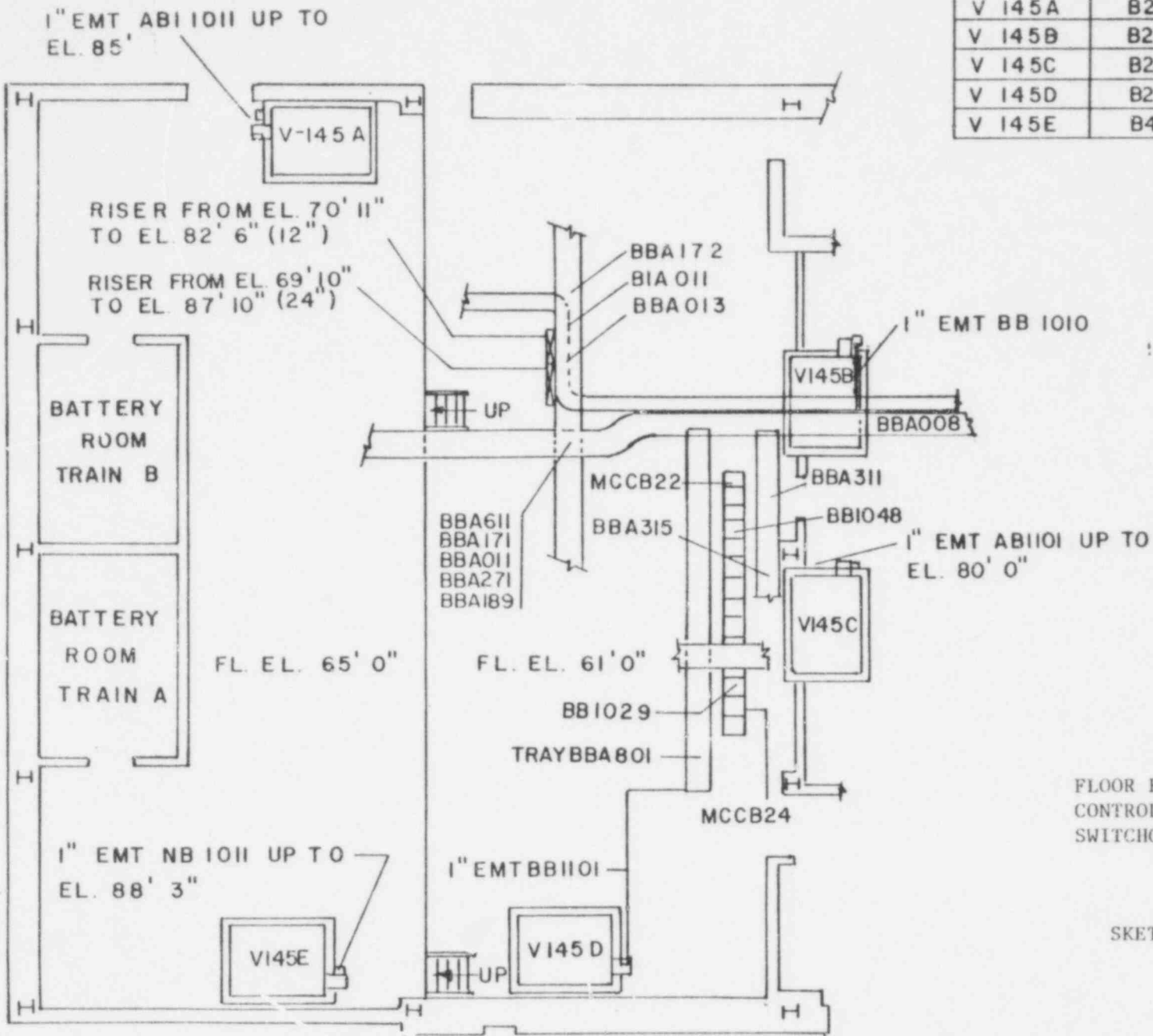


ISOMETRIC OF CABLE TRAY SECTIONS III & VI ON
 DRAWING E-133 SWGR. "B" ROOM - CONTROL BUILDING
 EL. 61'-1"

SKETCH NO. 1

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EQUIPMENT	SOURCE	SOURCE LOCATION
V 145 A	B21	EL. 69' TURB. BLDG.
V 145 B	B22	EL. 61' CONTR. BLDG.
V 145 C	B23	EL. 69' TURB. BLDG.
V 145 D	B24	EL. 61' CONTR. BLDG.
V 145 E	B47	EL. 69' TURB. BLDG.



POOR ORIGINAL

FLOOR PLAN
CONTROL BUILDING EL. 61'-0"
SWITCHGEAR "B" ROOM

SKETCH NO. 2

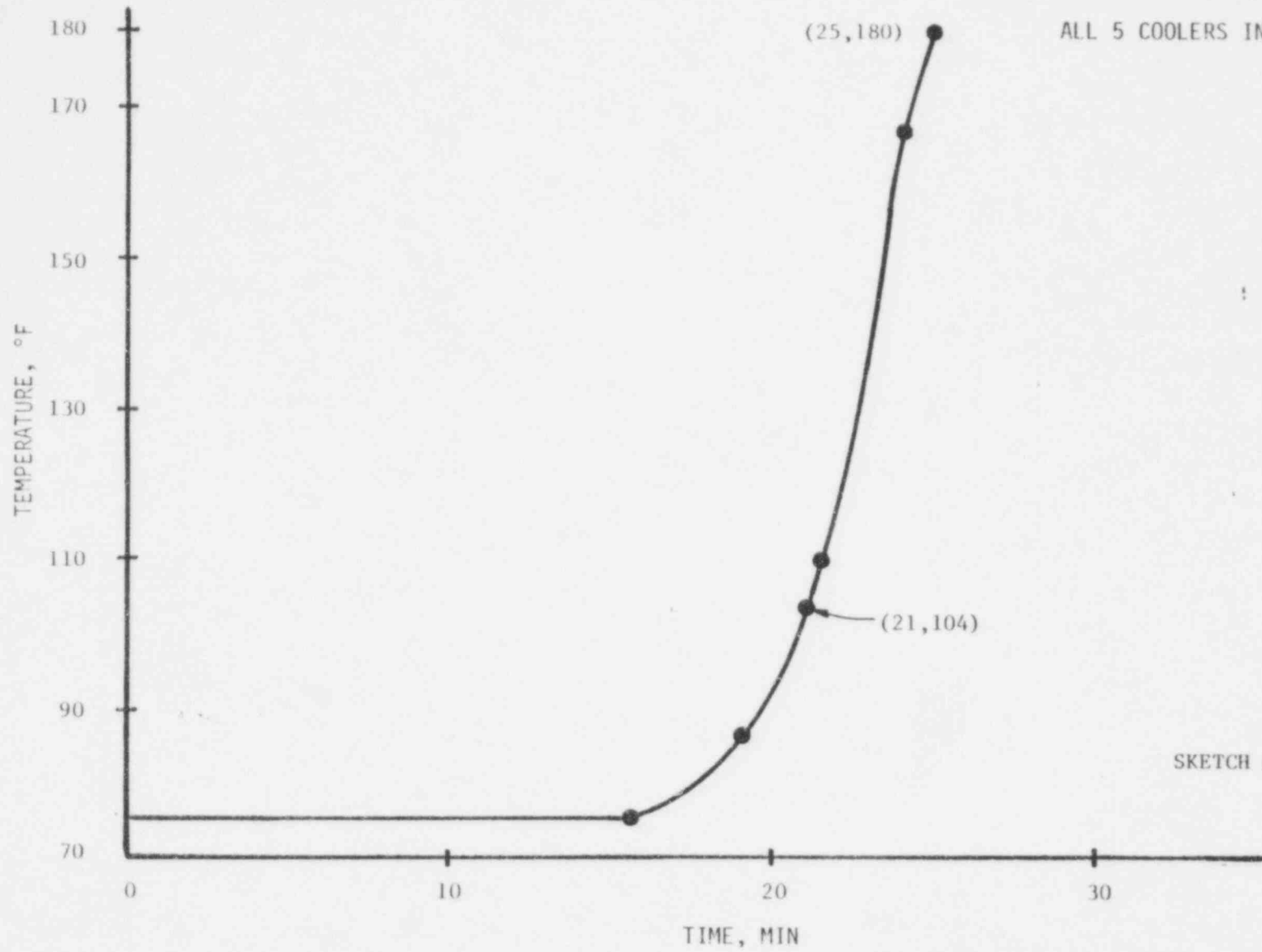
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TRAIN B SWITCHGEAR ROOM

ROOM TEMPERATURE DUE TO A
WORST CASE FIRE

ALL 5 COOLERS IN OPERATION



SKETCH NO. 3

TROJAN NUCLEAR PLANT