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May 5, 1975

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U.S. ATOMIC ENERGY COMMISSION
Regulatory Mail Section

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Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Dresden Station Unit 3 Proposed Amendment to Facility Operating License DPR-25 and Dresden Station Special Report No. 40, Supplement A, NRC Docket No. 50-249

Dear Mr. Rusche:

Pursuant to 10CFR50.59, Commonwealth Edison requests an amendment to DPR-25, Appendix A, Technical Specifications. The purpose of this amendment is to incorporate operating limits on the bases of the AEC Order of Modification of License dated December 27, 1974, concerning emergency core cooling analysis in conformance with 10CFR50.46. The proposed amendment in this submittal supersedes entirely the proposed amendment submitted August 22, 1974. The proposed amendment is indicated on the attached revised Technical Specification pages 81B, 81C-1, 81C-2, 82, 85A, and 85B.

The proposed amendment provides appropriate operating limits in conformance with 10CFR50.46 for Dresden Unit 3 Reload No. 3, which was described in a submittal dated January 21, 1975. The analysis used to determine these limits is described in the attached Dresden Station Special Report (S.R.) No. 40, Supplement A, which supersedes entirely S.R. No. 40 submitted August 22, 1974.

This proposed amendment has received Onsite and Offsite review and approval.

Three (3) signed originals and 37 copies are submitted for your approval.

Very truly yours,

R. L. Bolger
R. L. Bolger
Assistant Vice-President

DOCKETED USNRC
MAY 15 1975
U.S. NUCLEAR REGULATORY COMMISSION
Mail Section

Att.

SUBSCRIBED and SWORN to
before me this 6th day
of May 1975.

Nancy M. Hollingsworth
Notary Public

5344

3.5 LIMITING CONDITION FOR OPERATION	4.5 SURVEILLANCE REQUIREMENT

I. Average Planar LHGR

During steady state power operation, the average linear heat generation rate (LHGR) of all the rods in any fuel assembly, as a function of average planar exposure, at any axial location, shall not exceed the maximum average planar LHGR shown in Figure 3.5.1. If at any time during steady state power operation, it is determined that the limiting value for the average planar LHGR is being exceeded, action shall be taken to restore operation to within the prescribed limits.

J. Local LHGR

During steady state power operation, the linear heat generation rate (LHGR) of any rod in any fuel assembly, at any axial location, shall not exceed the maximum allowable LHGR as calculated by the following equation:

$$LHGR_{max} \leq LHGR_{d} \left[1-\left(\frac{\Delta P}{P}\right)_{max}\left(\frac{L}{LT}\right)\right]$$

$LHGR_d$ = Design LHGR = 17.5 Kw/ft. 7x7 fuel

= 13.4, 8x8 fuel

$\left(\Delta P/P\right)_{max}$ = Maximum power spiking penalty = 0.036 for 7x7 fuel and 0.026 for 8x8 fuel

LT = Total core length = 12 ft.

L = Axial position above bottom of core

I. Average Planar LHGR

Daily during reactor power operation, the average planar LHGR shall be checked.

J. Local LHGR

Daily during reactor power operation, the LHGR shall be checked.

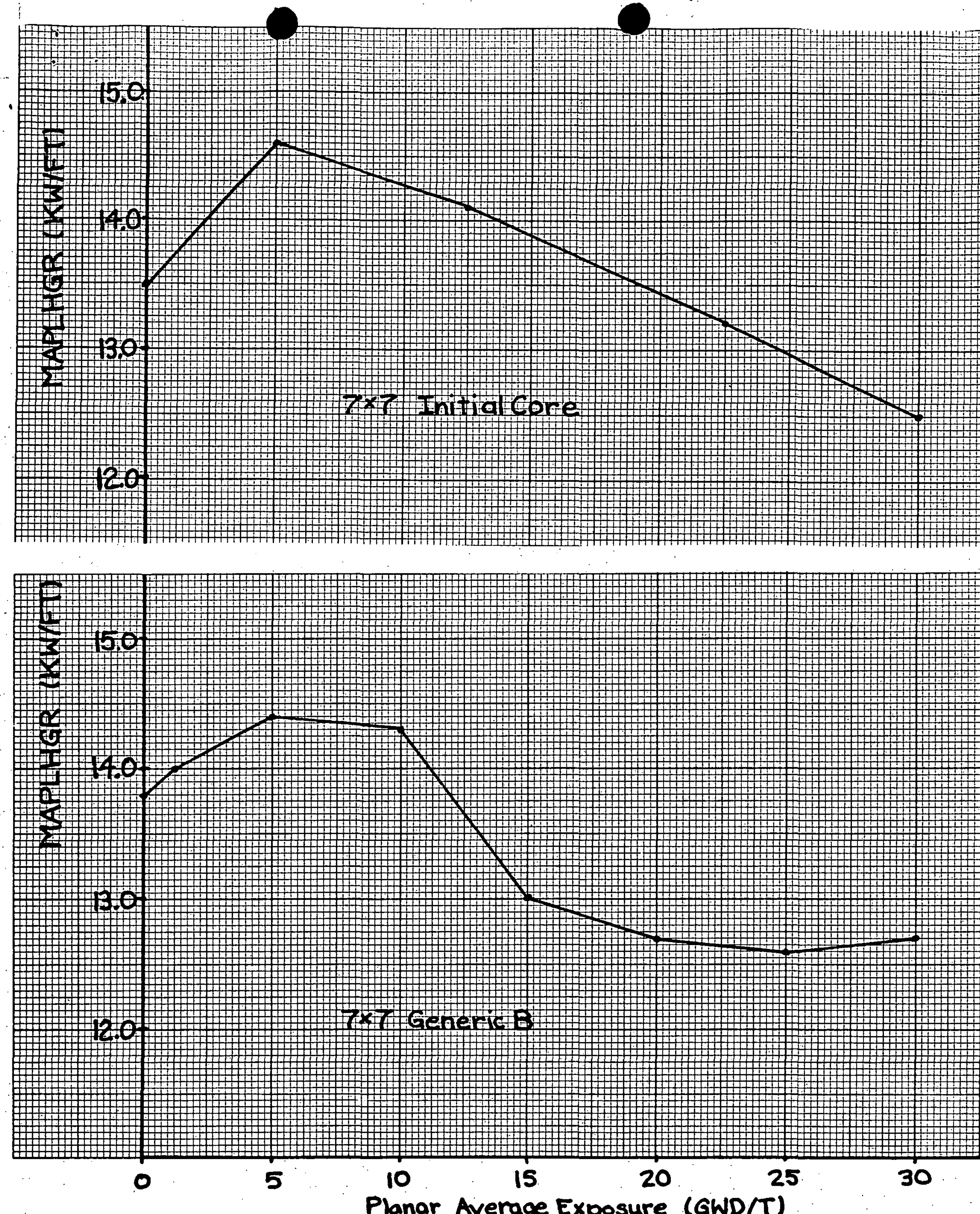
MAPLHGR (KW/FT)
15.0
14.0
13.0
12.0
7×7 Initial Core
MAPLHGR (KW/FT)
15.0
14.0
13.0
12.0
7×7 Generic B
0
5
10
15
20
25
30
Planar Average Exposure (GWD/T)

Figure 3.5.1-1

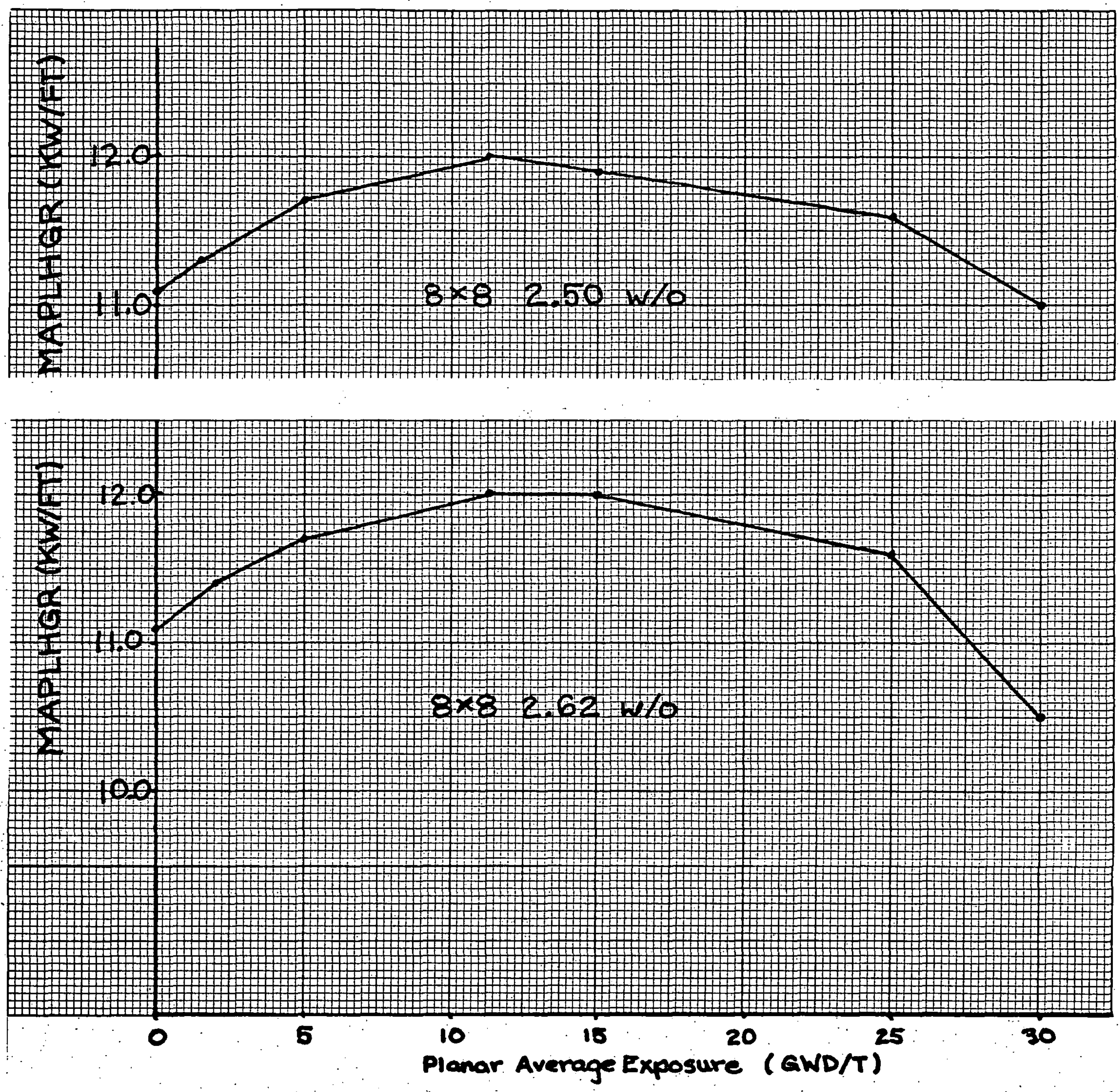
MAPLHGR (KW/FT)
12.0
11.0
8×8 2.50 w/o
MAPLHGR (KW/FT)
12.0
11.0
10.0
8×8 2.62 w/o
0
5
10
15
20
25
30
Planar Average Exposure (GWD/T)

Figure 3.5.1-2

3.5 Limiting Conditions for Operation Bases

A. Core Spray and LPCI Mode of the RHR System - This specification assures that adequate emergency cooling capability is available.

Based on the loss of coolant analyses included in References (1) and (2) in accordance with 10CFR50.46 and Appendix K, core cooling systems provide sufficient cooling to the core to dissipate the energy associated with the loss of coolant accident, to limit the calculated peak clad temperature to less than 2200°F, to assure that core geometry remains intact, to limit the core wide clad metal-water reaction to less than 1%, and to limit the calculated local metal-water reaction to less than 17%.

The allowable repair times are established so that the average risk rate for repair would be no greater than the basic risk rate. The method and concept are described in Reference (3). Using the results developed in this reference, the repair period is found to be less than 1/2 the test interval. This assumes that the core spray and LPCI subsystems constitute a 1 out of 3 system, however, the combined effect of the two systems to limit excessive clad temperatures must also be considered. The test interval specified in Specification 4.5 was 3 months. Therefore, an allowable repair period which maintains the basic risk considering single failures should be less than 45 days and this specification is within this period. For multiple failures, a shorter interval is specified and to improve the assurance that the remaining systems will function, a daily test is called for. Although it is recognized that the information given in reference 3 provides a quantitative method to estimate allowable repair times, the lack of operating data to support the analytical approach prevents complete acceptance of this method at this time. Therefore, the times stated in the specific items were established with due regard to judgment.

Should one core spray subsystem become inoperable, the remaining core spray and the entire LPCI system are available should the

(1) Dresden Station Special Report No.40, Supplement A, "Unit 2 and 3 Loss of Coolant Accident Analyses in Conformation with 10CFR50, Appendix K."

(2) NEDO-20566, General Electric Company Analytical Model for Loss-of-Coolant Analysis in Accordance with 10CFR50 Appendix K.

(3) APED-"Guidelines for Determining Safe Test Intervals and Repair Times for Engineered Safeguards" - April 1969, I.M. Jacobs and P.W. Marriott.

3.5 Limiting Condition for Operation Bases (Cont'd)

I. Average Planar LHGR

This specification assures that the peak cladding temperature following a postulated design basis loss-of-coolant accident will not exceed the 2200°F limit specified in 10CFR50 Appendix K considering the postulated effects of fuel pellet densification.

The peak cladding temperature following a postulated loss-of-coolant accident is primarily a function of the average LHGR of all the rods in a fuel assembly at any axial location and is only dependent secondarily on the rod to rod power distribution within a fuel assembly. Since expected local variations in power distribution within a fuel assembly affect the calculated peak clad temperature by less than ±20°F relative to the peak temperature for a typical fuel design, the limit on the average planar LHGR is sufficient to assure that calculated temperatures are below the 10CFR50, Appendix K limit.

The maximum average planar LHGRs shown in Figure 3.5.1 are based on calculations employing the models described in Reference (1). Power operation with LHGRs at or below those shown in Fig. 3.5.1 assures that the peak cladding temperature following a postulated loss-of-coolant accident will not exceed the 2200°F limit. These values represent limits for operation to ensure conformance with 10CFR50 and Appendix K only if they are more limiting than other design parameters. The maximum average planar LHGRs plotted in Fig. 3.5.1 at higher exposures result in a calculated peak clad temperature of less than 2200°F. However the maximum average planar LHGRs are shown on Fig. 3.5.1 as limits because conformance calculations have not been performed to justify operation at LHGRs in excess of those shown.

J. Local LHGR

This specification assures that the maximum linear heat generation rate in any rod is less than the design linear

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(1) Dresden Station Special Report No. 40, Supplement A, "Unit 2 and 3 Loss of Coolant Accident Analyses in Conformance with 10CFR50 Appendix K."

3.5 Limiting Condition for Operation Bases (Cont'd)

heat generation rate even if fuel pellet densification is postulated. The power spike penalty specified is based on that presented in Ref. (2) and assumes a linearly increasing variation in axial gaps between core bottom and top, and assures with 95% confidence, that no more than one fuel rod exceeds the design LHGR due to power spiking. An irradiation growth factor of 0.25% was used as the basis for determining $\Delta P/P$ in accordance with Refs. (5) and (4).

K. Reporting Requirements

The LCO's associated with monitoring the fuel rod operating conditions are required to be to be met at all times, i.e. there is no allowable time in which the plant can knowingly exceed the limiting values for average planar LHGR or LHGR. It is a requirement, as stated in Specifications 3.5.I and J that if at any time during steady state operation, it is determined that the limiting values of average planar LHGR or LHGR are exceeded, action shall be taken immediately to restore operation to within the prescribed limits. It must be recognized that there is always an action which would return any of the parameters to within the prescribed limits, namely power reduction. Under most circumstances, this will not be the only alternative. Therefore, the only way to have a reportable Abnormal Occurrence associated with these Technical Specifications is to know-

Therefore, the only way to have a reportable Abnormal Occurrence associated with these Technical Specifications is to knowingly allow them to be beyond the prescribed limits without taking the necessary action to restore the parameters to with prescribed limits.

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(2) Fuel Densification Effects on General on General Electric Boiling Water Reactor Fuel," Section 3.2.1, Supplement 6, Aug. 1973.

(3) J.A. Hinds (GE) Letter to V.A. Moore(USAEC), "Plant Evaluation with GE GEGAP-III," Dec. 1973.

(4) USAEC Report, "Supplement 1 to the Technical Report on Densification of General Electric Reactor Fuels," Dec. 14, 1973.

(5) GE Planning and Development Memorandum #45, "Length Growth of BWR Fuel Elements", R.A. Proebsthe, October 1, 1973.

DRESDEN STATION

SPECIAL REPORT NO. 40

SUPPLEMENT A

APRIL 1975

Prepared by General Electric Co.
for Commonwealth Edison Co.

Discussion

This report includes the table of input parameters for the loss of coolant accident analysis at Dresden Station Unit 3, and the report includes figures of peak cladding temperature, maximum local metal water reaction, and maximum average planar linear heat generation rate versus exposure for each fuel type to be used in Dresden Unit 3 during the next fuel cycle (cycle 4). The discussion of the analysis provided in Quad-Cities Station Special Report No. 15 Supplement C, is applicable to Dresden Unit 3; therefore, that information is incorporated by reference and not repeated in this report.

Quad-Cities Station Special Report No. 15 Supplement C is strictly applicable to Dresden Unit 3. The only information not included in the Quad-Cities report are the parameters and results applied for Dresden Unit 3 fuel types which are provided in this report. The analyses contained in Quad-Cities Special Report No. 15 Supplement C are actually based on a core power level of 2578 MW_t which is 102% of 2527 MW_t. Analyses at this power level are directly applicable to Dresden Unit 3 and slightly conservative for the Quad-Cities Units (102.6% of 2511 MW_t).

TABLE 1

SIGNIFICANT INPUT PARAMETERS TO THE
LOSS-OF-COOLANT ACCIDENT ANALYSIS

PLANT PARAMETERS:

Core Thermal Power . . . . 2578 MWt which corresponds to 102 % of licensed core power

Vessel Steam Output . . . . 9.96 X 10^6 Lbm/h which corresponds to 102 % of licensed core power

Vessel Steam Dome Pressure . . . . 1020 psia

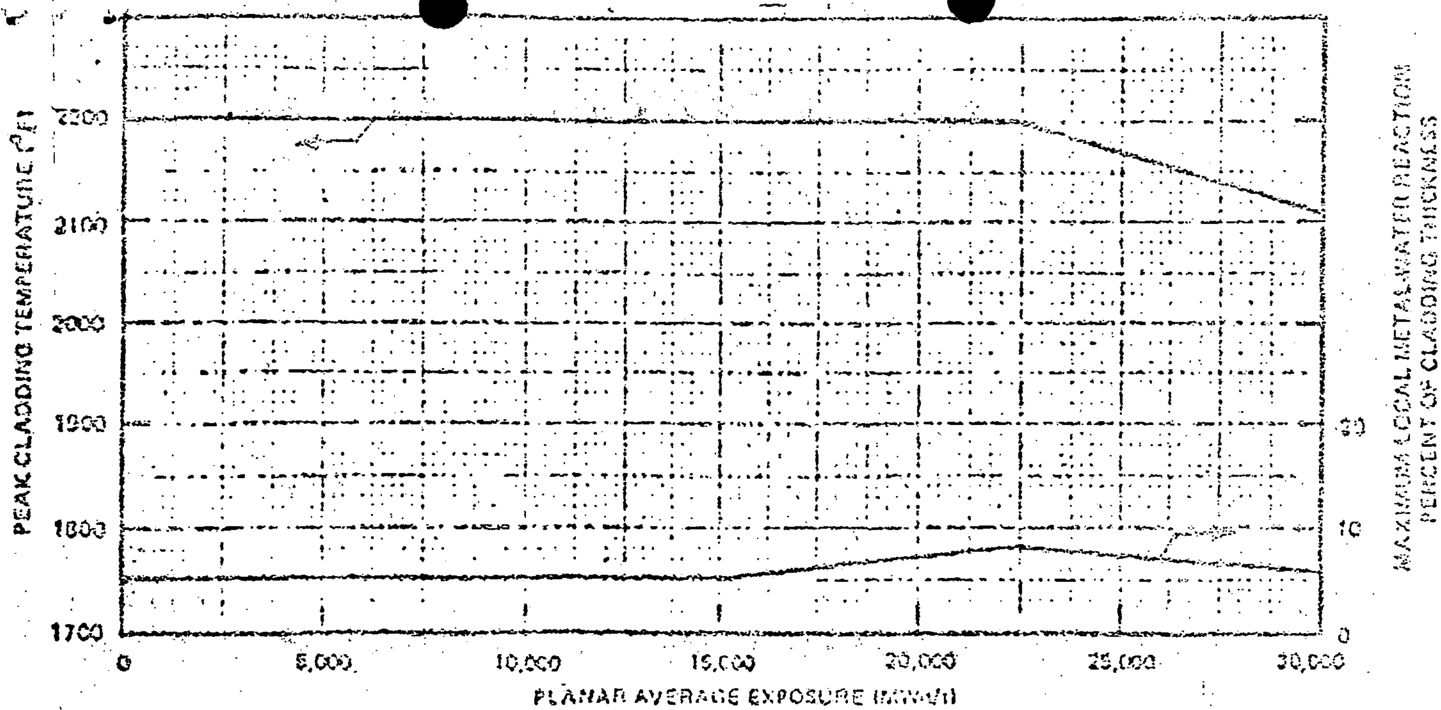
Recirculation Line Break Area For Large Breaks . . . . (DBA) 4.2, (85%) 3.6, (60%) 2.5, and 1 ft^2

Recirculation Line Break Area For Small Breaks . . . . 1 ft^2, 0.07 ft^2, 0.03 ft^2

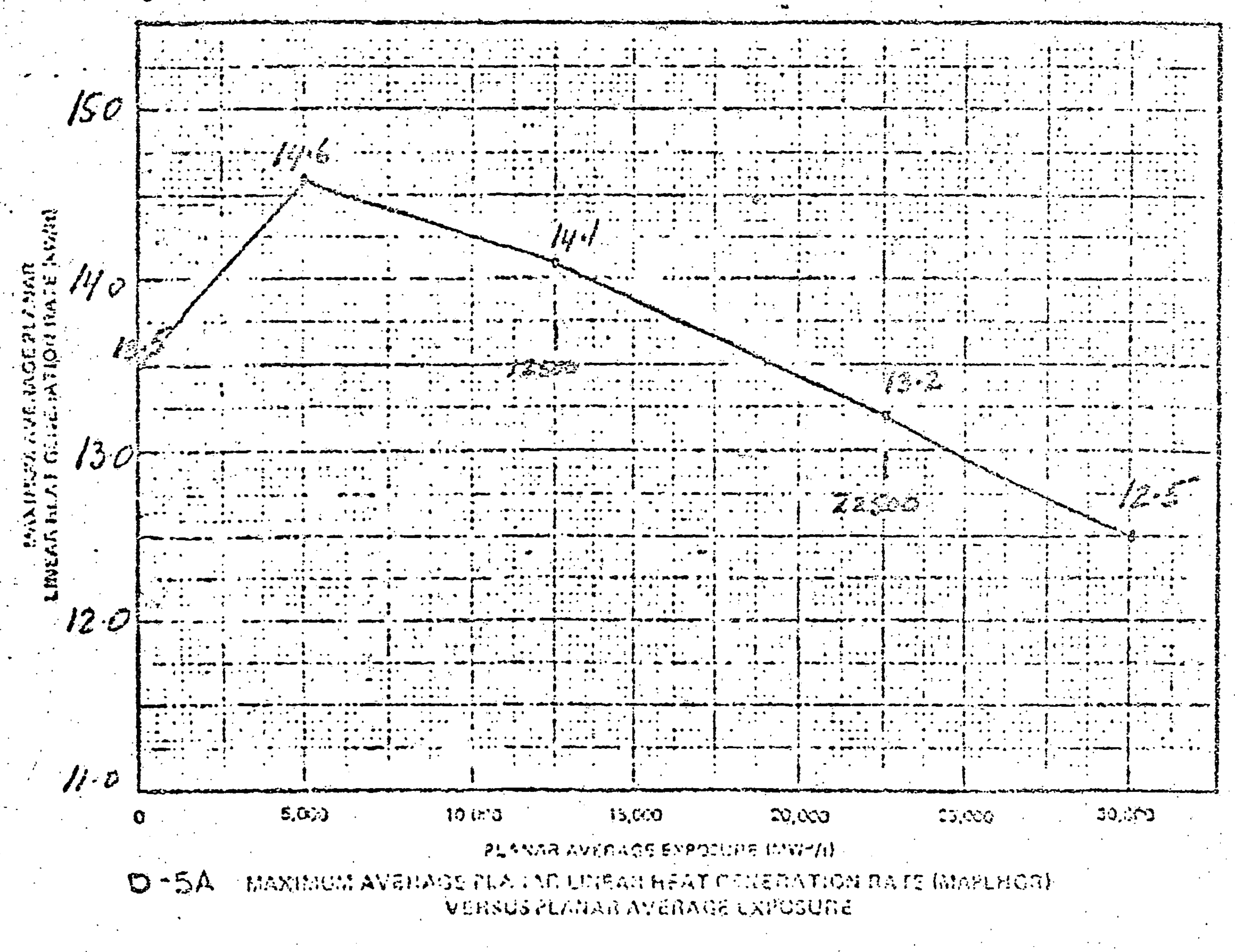
FUEL PARAMETERS:

FUEL TYPE	FUEL BUNDLE GEOMETRY	PEAK TECHNICAL SPECIFICATION LINEAR HEAT GENERATION RATE (kw/ft)	DESIGN AXIAL PEAKING FACTOR	INITIAL MINIMUM CRITICAL POWER RATIO
Initial Core	7 X 7	17.5	1.57	1.18
Reload 1 Generic B	7 X 7	17.5	1.57	1.18
Reload 2 & 3 (8D250)	8 X 8	13.4	1.57	1.18
Reload 3 (8D262)	8 X 8	13.4	1.57	1.18

A more detailed list of input to each model and its source is presented in Section II of Reference 1.



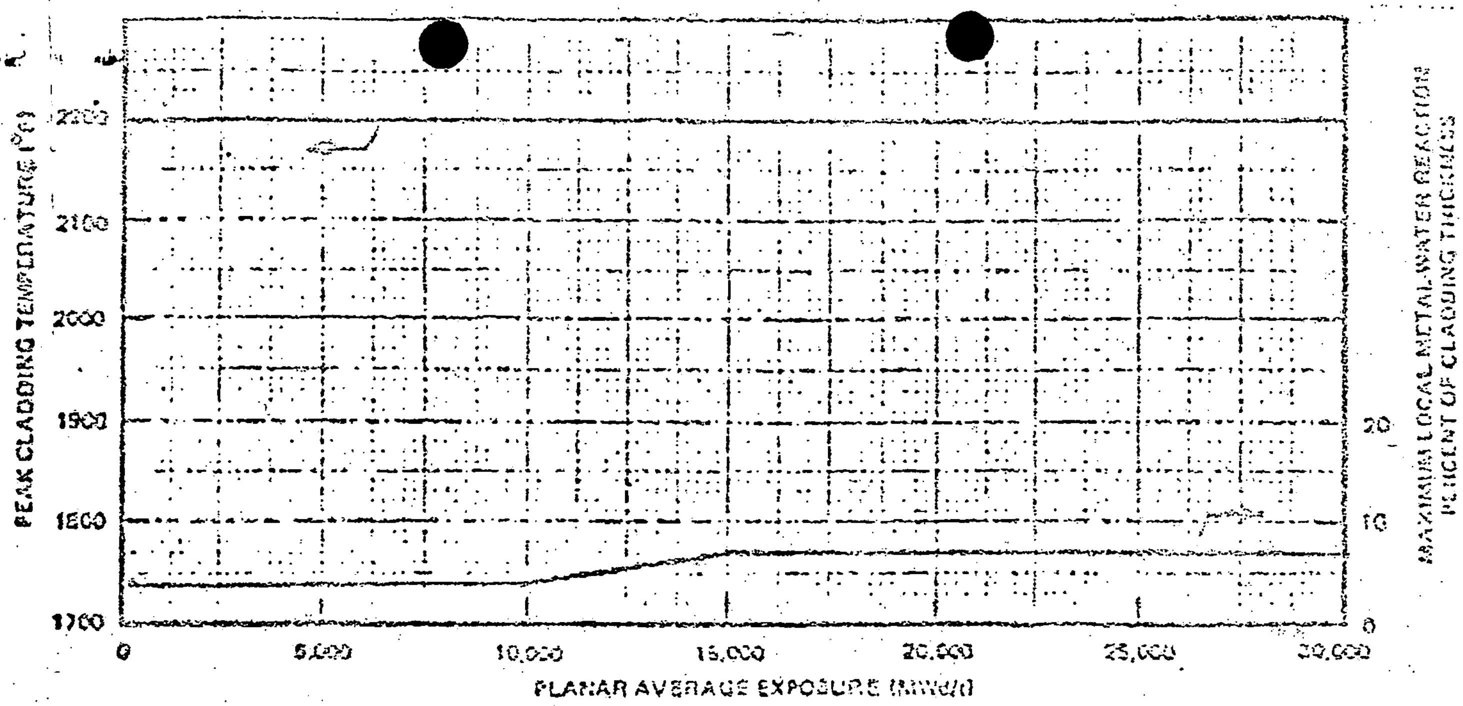
D-4A PEAK CLADDING TEMPERATURE VERSUS PLANAR AVERAGE EXPOSURE



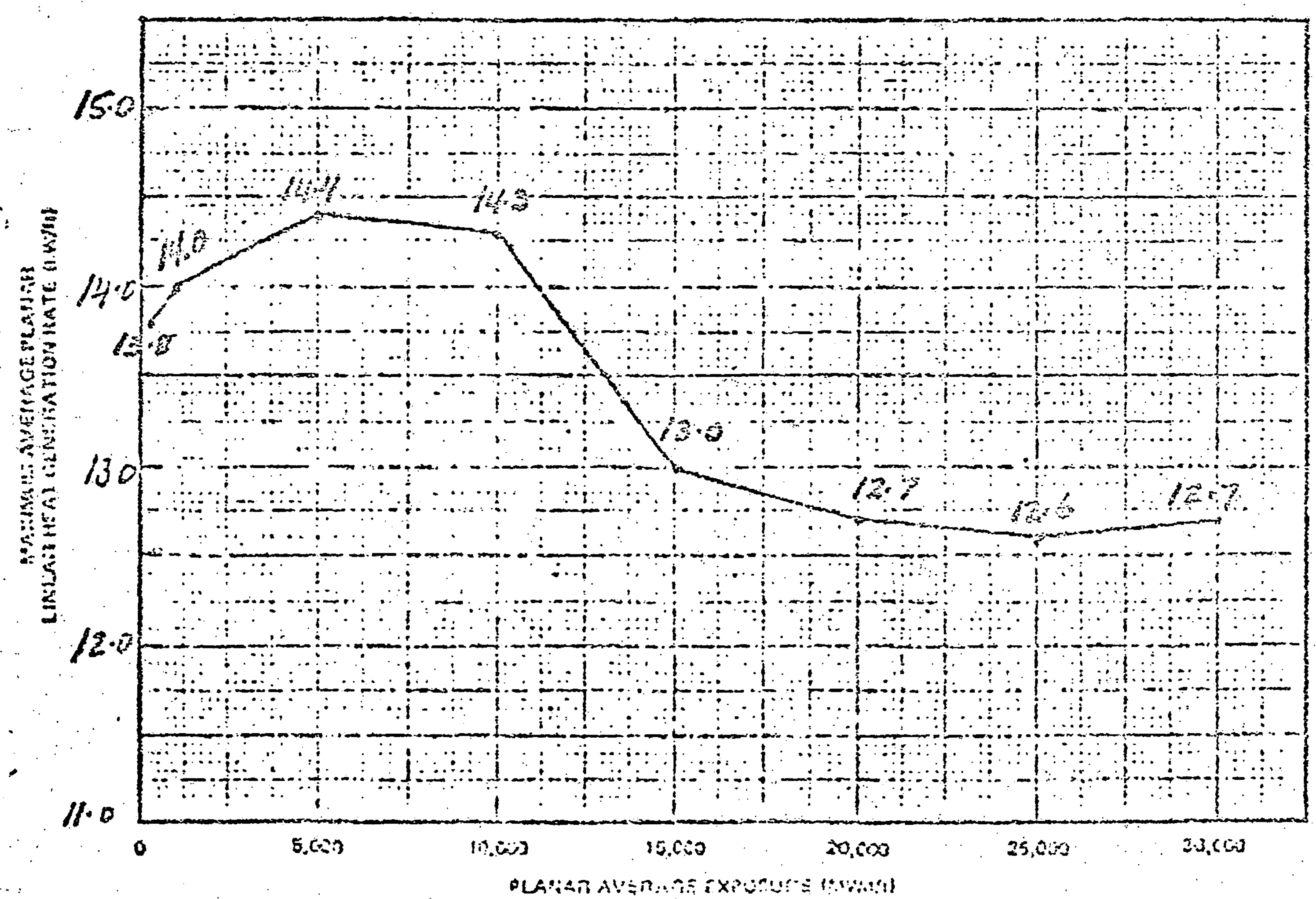
D-5A MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS PLANAR AVERAGE EXPOSURE

PLANT DRESDEN 3

FUEL TYPE Initial Core



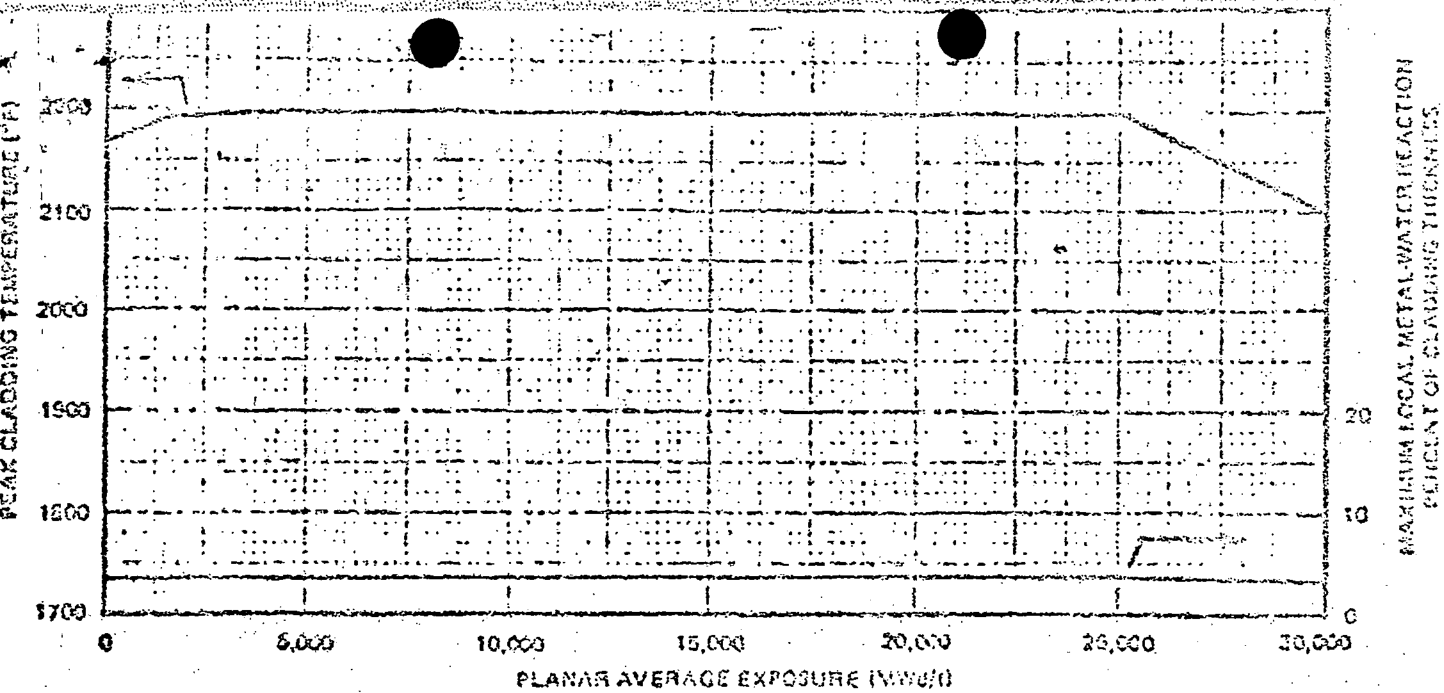
D-4B PEAK CLADDING TEMPERATURE VERSUS PLANAR AVERAGE EXPOSURE



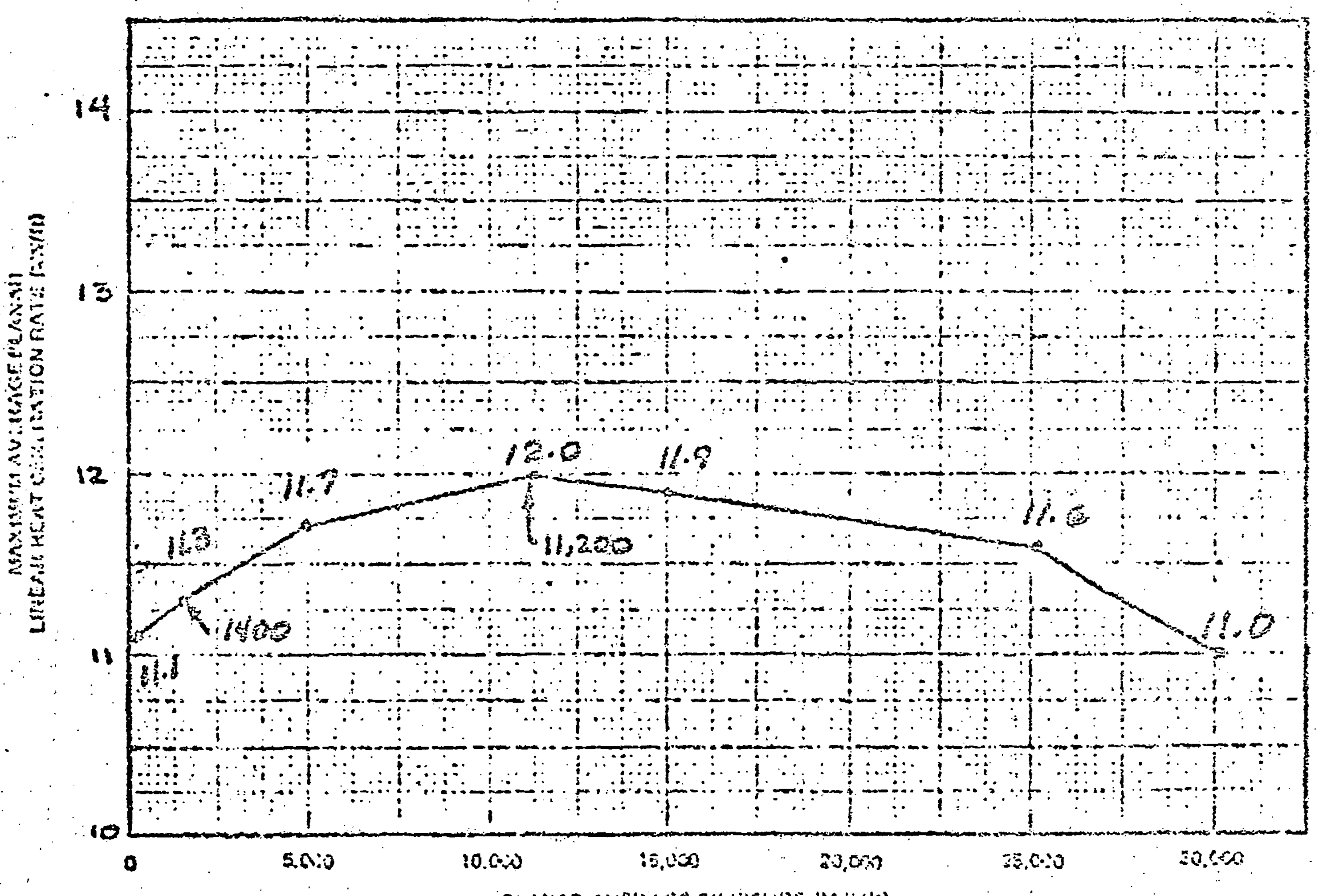
D-5B MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS PLANAR AVERAGE EXPOSURE

PLANT DRESDEN 3

FUEL TYPE GENERIC B



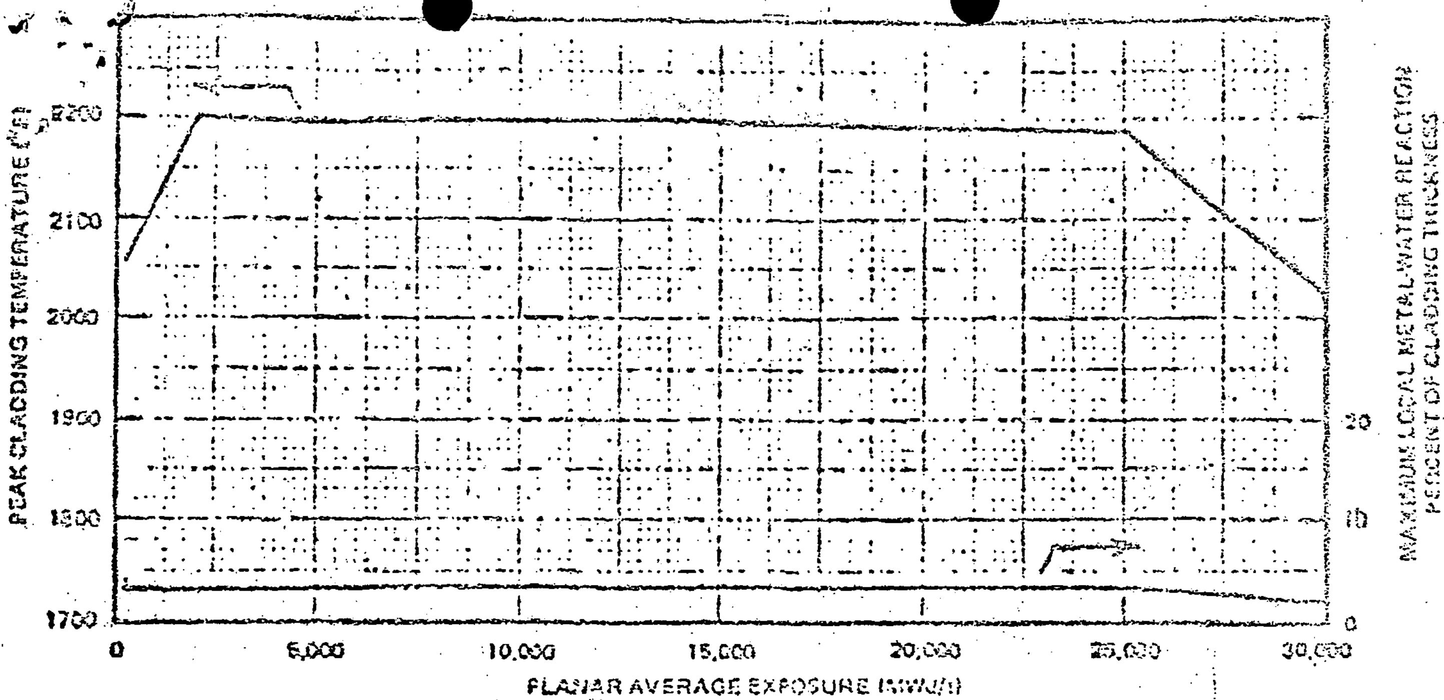
D-4C PEAK CLADDING TEMPERATURE VERSUS PLANAR AVERAGE EXPOSURE



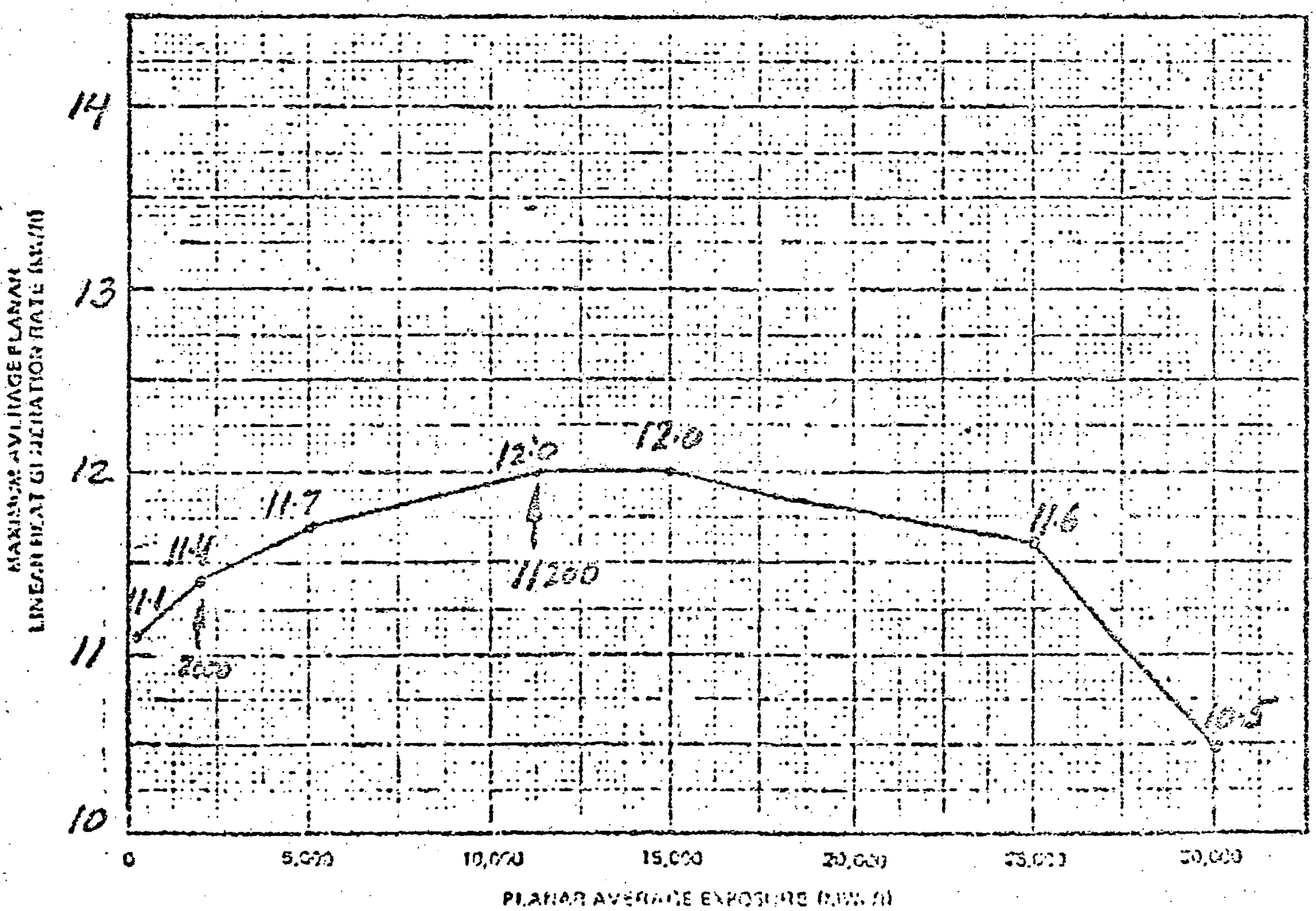
D-5C MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS PLANAR AVERAGE EXPOSURE

PLANT DRESDEN 3

FUEL TYPE RELOAD 2 (8D250)



D-4D PEAK CLADDING TEMPERATURE VERSUS PLANAR AVERAGE EXPOSURE



D-5D MAXIMUM AVERAGE PLANAR LINEAR HEAT GENERATION RATE (MAPLHGR) VERSUS PLANAR AVERAGE EXPOSURE

PLANT DRESDEN 3

FUEL TYPE 8D262 RELOAD 3