LA-3606-MS

C.3

LOS ALAMOS SCIENTIFIC LABORATORY
of the
University of California
LOS ALAMOS • NEW MEXICO

Gamma-Ray Energy Deposition in the Molten Plutonium Burnup Experiment (MPBE) Reactor Structure

UNITED STATES
ATOMIC ENERGY COMMISSION
CONTRACT W-7405-ENG. 36

Printed in USA. Price $3.00. Available from the Clearinghouse for Federal Scientific and Technical Information, National Bureau of Standards, United States Department of Commerce, Springfield, Virginia

LA-3606-MS
UC-80, REACTOR
TECHNOLOGY
TID-4500

LOS ALAMOS SCIENTIFIC LABORATORY
of the
University of California
LOS ALAMOS • NEW MEXICO

Report written: May 1966

Report distributed: January 12, 1967

Gamma-Ray Energy Deposition in the Molten Plutonium Burnup Experiment (MPBE) Reactor Structure

by

Donald J. Dudziak and Morris E. Battat

ABSTRACT

In order to determine thermal stresses, heat removal requirements, and thermal expansions, the spatial distribution of neutron and gamma-ray energy deposition in a reactor must be known. Such distributions have been determined for the Los Alamos Molten Plutonium Burnup Experiment (MPBE), using both Monte Carlo and point kernel integration techniques to calculate gamma-ray transport. Neutron transport was calculated using both the diffusion theory and S_4 approximations in two dimensions. Preliminary calculations determined the total gamma-ray and neutron energy escape from the reactor vessel and, thus, the reactor room heat load from these sources. More detailed calculations provided point values of the absorbed dose in iron, carbon, nickel, tantalum, and sodium at 70 selected spatial points throughout the reactor system.

CONTENTS

1. INTRODUCTION

In the design of any reactor system, considerations of thermal stress, heat removal requirements, and thermal expansion require a detailed knowledge of the gamma-ray absorbed dose spatial distribution. Such calculations have been performed for the proposed Los Alamos Molten Plutonium Burnup Experiment (MPBE).[1] This paper presents the calculational method, as well as the results of calculations performed to date. These methods and results are discussed in the next two sections.

Section 2 presents a preliminary analysis which was performed using two-dimensional diffusion theory to determine the neutron flux distributions. Efforts were concentrated on determining gamma-ray absorbed doses in regions far from the core, such as the pressure vessel and borated graphite shields. In this preliminary study, the only gamma-ray sources considered were the capture gamma rays produced in selected regions of the system, not including the core. It is expected that the radiations originating in the core will be important only for regions close to the core. However, for those regions far from the core, the energy deposition due to neutron moderation and to gamma rays from inelastic scattering may be nearly as important as that due to the capture gamma rays. Final design calculations will account for such sources. The bulk of these calculations was performed by the Monte Carlo technique. However, the total energy deposition outside the pressure vessel was determined by point kernel integration, in addition to Monte Carlo calculations.

Section 3 presents a detailed analysis of the spatial distribution of absorbed dose rates in the MPBE reactor. The shielding model and the neutronics model were both as detailed as practicable. Neutron flux distributions were determined from a two-dimensional S_4 calculation, while the gamma-ray transport calculations used point kernel integration. Any future design calculations will use these detailed models to refine the results presented in Section 2.

2. PRELIMINARY ENERGY DEPOSITION CALCULATIONS

2.1 Calculational Method and Model

The neutron flux distribution in the MPBE reactor was based on a two-dimensional (R-Z geometry) diffusion theory CRAM[2] calculation in which only the regions below the mid-height of the core were considered, it being assumed that the top half was the mirror image of the bottom half. For the CRAM problem, a 35 x 27 (R-Z) mesh was specified, and Hansen and Roach's[3] 16-group cross-section set was employed. The calculated neutron flux distribution, together with macroscopic capture cross-section data, was then used to compute the gamma-ray volumetric source at each mesh point in the system. Data appropriate to thermal neutron capture[4] were assumed in specifying gamma-ray spectra; for each region, spectrum weighting according to relative elemental capture rates was included. At this point, sufficient data concerning spatial and energy distributions of the gamma-ray sources were available for the energy deposition calculations.

Before proceeding to a discussion of the calculational details, the geometry and specifications of the model employed will be presented. Figure 1 shows the idealized model used in the calculations, together with pertinent dimensions. The region labelled "Hom. Reg." includes the core module reflector (margin), the core-sleeve liner, the movable reflector segments, and the core sleeve; the materials in these regions were combined and specified as a single region. The regional material specifications used in the problem were as follows:

Core - 37.4 v/o fuel, 47 v/o Na, 9.3 v/o Ta, 6.3 v/o SS

Hom. Reg. - 52 v/o Ni, 20 v/o Na, 28 v/o SS

Side Refl. - 82 v/o Ni, 18 v/o Na

SS Therm. Shield - 80 v/o SS, 20 v/o Na

Bottom & Top Shields, Top Handles - same as SS Thermal Shield

Borated SS Therm. Shield - 80 v/o SS (1 w/o B), 20 v/o Na

Vessel - SS

Borated Graphite - 1.28 g/cc C (0.93 w/o B)

Top & Bottom Refl. - 47 v/o Ni, 46.7 v/o Na, 6.3 v/o SS

Gas Space - 44.4 v/o Na, 38.4 v/o void, 10.5 v/o Ta, 6.7 v/o SS

As mentioned previously, the gamma-ray source data were based on a neutronics calculational model in which symmetry about the core midheight was assumed. In applying the gamma-ray source data to the model shown in Fig. 1, certain assumptions had to be made. For the side reflector, thermal shield, vessel, and bottom shield, the captures in each region were assigned the values obtained from the corresponding CRAM problem. However, it was necessary to estimate the axial source distribution for Z values greater than 21 inches above the core midplane (see Fig. 1); an exponential variation was assumed. The calculated source distribution data needed no modification for the bottom shield and vessel bottom, but the CRAM capture figures were halved, since the problem was normalized to 20-MW-power production over the entire core height (14 inches).

2.2 Point Kernel and Monte Carlo Calculations

In calculations of energy deposition and energy escape, two quite different, but fortunately complementary, techniques are available -- point kernel integration and Monte Carlo.

Point kernel calculations, using the QAD code, provide a simple and inexpensive means of determining total energy escape and energy deposition at a very few selected points. Briefly, the QAD code takes a source specified as a function of energy and position, represents it as a finite number of point sources, and finds the gamma-ray energy flux from these sources at any specified detector point. More precisely, this code takes arbitrary second-degree surfaces for boundaries, which are defined by input parameters. The code then integrates a point kernel over any arbitrary cylindrical, rectangular, or spherical region, using a three-dimensional quadrature specified as input. The source term is specified at the input source mesh points (which determine the quadrature points) as a separable function of the spatial coordinates. This procedure is described in Section 3.2.1.2. Within the accuracy limitations always associated with buildup factors, the point kernel calculations provide relatively accurate predictions of energy fluxes at points far removed from the source region (deep penetrations), where Monte Carlo calculations are at their worst. In addition, the point kernel integrations were employed to predict energy fluxes at a transducer location on the reactor pit wall. This technique, in contrast to the Monte Carlo, inherently determines point fluxes, and so is most useful for this type of calculation.

On the other hand, for regions close to the source region, Monte Carlo calculations (MCG code, an adaptation of a neutronics Monte Carlo code[5]) supply a wealth of information on energy deposition, including a detailed spectral breakdown and specification of the physical processes involved (Compton scatter or photoelectric effect plus pair production). This detail, as well as information such as total photon crossings by energies at a boundary or total flux at a boundary, to which Monte Carlo is admirably suited, is either inherently absent from a point kernel integration or requires a prohibitive amount of effort to extract. For example, the buildup factor approach to scattered photons precludes the possibility of extracting information concerning the spectral distributions of the photons at any point of interest. In addition, the Monte Carlo player is always kept aware of the relative error in his calculation, whereas the error due to the use of buildup factors is a more elusive quantity. The printout obtained from the MCG code gives the relative error of each of the physical quantities tallied; relative error is defined as the standard deviation of the mean divided by the mean.

2.3 Results

The Monte Carlo (MCG) results for the energy deposition due to capture gamma rays originating in the side reflector, vessel, and shield regions are summarized in Table I. The blank spaces in the table indicate that the statistical accuracy for the calculated heat deposition in the particular region was poor, and hence the results were not dependable. However, as will be seen later, the QAD results can be used with confidence to fill in some of the missing information in Table I. It should be mentioned that for the MCG calculations, most of the regions considered were divided into several subregions; a detailed breakdown of the results is available.

One of the purposes of this study was to obtain a value for the total energy escape into the regions outside the pressure vessel, in order to determine heat removal requirements for these regions. The capture gamma contribution to the total energy escape calculated by QAD and MCG is shown in Table II. The agreement between QAD and MCG is excellent. Also shown in Table II are the neutron contributions to the total energy escape. As can be seen from Table I, the capture gamma-energy deposition in the borated graphite regions (side and bottom) is 2.85 kW. This does not include the contribution from the bottom shield, since MCG calculations were not performed for this source region. However, the QAD results (Table II) give 0.26 kW for the bottom shield contribution to regions outside the pressure vessel. Using the latter result, the capture gamma energy deposition in the borated graphite is in the range from 2.85 to 3.11 kW. Based on the 3.51-kW figure shown in Table II, the amount deposited outside the borated graphite (i.e., in the reactor pit walls) is 0.4 to 0.66 kW. To this must be added 0.2 kW due to the neutrons, thus giving between 0.6 and 0.9 kW available for deposition in the reactor pit walls. If 0.9 kW is distributed uniformly over an area defined by a cylindrical strip 42 inches high (three times the core height) and at a radius of 11 feet (reactor pit radius), the energy current obtained is about 4 mW/cm^2. Although the 42-inch height assumed in arriving at the 4-mW/cm^2 figure may appear to be small, it is not too unrealistic. For the sources which contribute to the incident energy current in the reactor pit wall, well over half of the source intensity is contained in a 42-inch-high region, centered about the core midheight. In any event, it is surprising that the deposition of 0.9 kW in the walls of a massive concrete structure should be only one-fifth of what is considered acceptable.

3. DETAILED SPATIAL DISTRIBUTION OF GAMMA-RAY ENERGY DEPOSITION IN THE MPBE REACTOR STRUCTURE

3.1 Summary

The absorbed gamma dose rate has been determined for five materials of interest -- iron, carbon, nickel, tantalum, and sodium -- at 70 spatial points within the MPBE reactor. The term "reactor" as used in this section refers to all components within an envelope defined radially by the borated-graphite outer radius, below by the outside of the vessel bottom wall, and above by a horizontal plane 185 cm above the core midplane. Figure 2 shows the cylindrical-geometry model used for all the calculations reported below. It represents the reference MPBE design as of February 1966.

Gamma energy flux and absorbed dose rate distributions were determined, using the QAD code, by a point kernel quadrature integration over the distributed sources considered. The only sources considered were capture, prompt-fission, and equilibrium-fission-product gamma rays. Capture gamma-ray sources include gamma rays from decay of product nuclei with half-lives of the order of hours or less. Also, the only source regions considered were those for which an S_4, two-dimensional neutronics (DDK)[6] calculation was available. These regions are bounded by and inclusive of the stainless steel side thermal shield (not including the borated stainless steel shield), the upper reflector, and the bottom reflector. In Fig. 2, these regions are defined by $R \leq 79.4$ and $-53.8 \leq Z \leq 92.5$ cm. Hopefully, these neutronic calculations will be extended in the future to permit additional capture-gamma source regions to be considered.

The calculated absorbed dose rates in iron are presented in Table III for the 70 detector points chosen. The spatial coordinates are relative to the center of the core (see Fig. 2). Further detailed breakdowns for several of the source region contributions to these dose rates can be found in Appendices A and B. Figures 3 through 11 give the total absorbed dose rate in iron for several axial traverses. Figures 12 through 20 also give the detailed contributions to the absorbed dose rate in iron for these same axial traverses. Also, in Appendix A are the calculated absorbed dose rates in carbon, nickel, tantalum, and sodium from several source regions. A word of caution: Calculated absorbed dose rates for detector points outside or near (within ≈2 mean free paths of) the boundary of the source regions considered may be lower than reality. This is because some source regions in proximity to the point are neglected. However, additional absorbed dose rates in several regions (e.g., the side reflector, thermal shields, and pressure vessel) may be crudely estimated at the detector points by using the results of Section 2. Attention is especially drawn to the large energy deposition rate (14.2 kW) in the borated stainless steel thermal shield from the $^{10}B(n,\alpha)^{7}Li$ reactions.

Gamma sources which have not yet been considered are those from inelastic scatter. It is conjectured that these sources will be no larger than those sources which were considered. Inelastic-scatter gamma rays will hopefully be determined when time permits, and any absorbed dose rates from them will be additive to those presented in this report.

3.2 Calculational Model and Method

Figure 2 shows in detail the model used for this study. Dimensions for the model were current as of February 1966. Material compositions of all regions within the envelope defined by R = 79.4 cm, Z = -53.8 cm, and Z = 92.5 cm were determined from the DPC[7] calculation which was used to prepare the input for the DDK calculation. For all regions outside this envelope, the material compositions are those determined for the reference design of February 1966. All calculations of gamma-ray flux and absorbed dose rate were performed with the QAD code. Although the calculation is inherently three dimensional, all the specified detector points (points at which fluxes and absorbed dose rates are determined) were in the $\phi = 0$ plane, where we use cylindrical coordinates (R, ϕ, Z). The results in Appendix A have the coordinates given in this order.

If a point kernel integration scheme is used, a reasonable buildup factor must be chosen to adjust the uncollided results. Buildup factors are probably the principal intrinsic source of error in point kernel calculations because one material must be chosen to represent the entire reactor. From the common materials for which buildup factor data are readily available, iron was chosen as being most representative of the MPBE reactor as shown in Fig. 2. Thus, data from Goldstein and Wilkins[8] for the infinite-medium, point-isotropic, iron energy absorption buildup factor (henceforth abbreviated B_{ea}) were used as the basis for the buildup factor data in QAD. Reference 8 gives tabulated values of B_{ea} as a function of initial gamma energy and of gamma-ray mean free paths (symbolized as $\mu_o r$) at this initial energy. Unfortunately, QAD accepts B_{ea} data only in the form of the coefficients of a third-order polynomial fit to B_{ea} as a function of $\mu_o r$, at a fixed energy:

$$B_{ea}(\mu_o r;E_o) \approx \sum_{i=0}^{3} [\beta_i(E_o)](\mu_o r)^i .$$

The values of $\beta_i(E_o)$ were tabulated by Capo[9] for various values of E_o of interest to the aircraft nuclear propulsion project. However, only three of these values corresponded to any of the ten initial energies used for MPBE (see Table IV). Values of B_{ea} were, therefore, logarithmically interpolated from Ref. 8 for the required values of E_o, with $\mu_o r$ held constant in each case. The resulting values of B_{ea} $(\mu_o r;E_o)$ were fit by third-order polynomials in $\mu_o r$ by use of the PFIT code in the LASL computer code library. Table IV presents the initial gamma energies used in the QAD calculations and the corresponding polynomial coefficients $\beta_i(E_o)$. Energy fluxes at each initial gamma-ray energy are converted to absorbed dose rate in material k by the factor

$$1.602 \times 10^{-13}(\text{W-sec/MeV}) \cdot \chi_{ea}^{k}(\text{cm}^2/\text{g}),$$

where

$\chi_{ea}^{k} \overset{\Delta}{=}$ energy absorption mass attenuation coefficient -- a function of the gamma-ray energy.

Thus, for an uncollided energy flux ψ_j (MeV/cm^2-sec) of gamma rays at energy E_j, the uncollided absorbed dose rate at energy E_j in material k is given by

$$H_j(\text{W/g}) = 1.602 \times 10^{-13}\, \chi^k_{ea,j}\, \psi_j,$$

and the total absorbed dose rate as calculated by QAD is then simply

$$H(\text{W/g}) = 1.602 \times 10^{-13} \sum_{j=1}^{10} B_{ea,j}\, \chi^k_{ea,j}\, \psi_j.$$

Values of χ^k_{ea} and χ^m were determined for the ten gamma-ray energy groups by the SIGMAD code. This code computes gamma-ray attenuation coefficients from the data of Grodstein[10] and Storm, et al.,[11] and from an analytical expression for the Compton scatter component. Here,

$\chi^m \triangleq$ total mass attenuation coefficient for attenuating material m -- a function of gamma-ray energy.

3.2.1 Gamma-Ray Sources

3.2.1.1 Volume-Integrated Sources

As was mentioned previously, only capture, short-lived product nuclei decay, prompt-fission, and equilibrium-fission-product (EFP) gamma rays were considered, the principal source omitted being inelastic scatter gamma rays. Capture gamma-ray sources integrated over the volume of each source region were determined from the DDK edit, with two exceptions that will be explained later. With these same two exceptions, the prompt-fission and EFP sources were determined from the core power and two assumed power spatial distributions.

Total (volume-integrated) capture rates, as determined from the DDF edit, are normalized to 1 fission neutron, so they must be renormalized. The renormalizing factor assumes an average fission neutron yield ($\bar{\nu}$) of 3.0 for ^{239}Pu and is given by

$$K = [3.1 \times 10^{10}(\text{fission/W-sec})][2 \times 10^{7}(\text{W})][3(\text{neutrons/fission})]$$
$$= 18.6 \times 10^{17}(\text{neutrons/sec}).$$

The assumption that $\overline{\nu} = 3.0$ is supported by the DDK calculation, which determined a value of 2.994 for $\overline{\nu}$. In general, to determine the spectral distribution of the capture sources in a region, each element in the region must be considered separately. For any given region, let

$C^i \triangleq$ captures in material i per fission neutron,

$E_j \triangleq$ representative energy for the jth gamma-ray energy group (MeV),

$f_j^i \triangleq$ the photon yield in energy group j from capture in material i (photons/capture),

and

$Y_j^i \triangleq$ the energy yield in energy group j from capture in material i (MeV/capture).

Then for any energy group j, the total gamma source for the region is

$$S_t(E_j) = K \sum_i Y_j^i \, C^i \text{ (MeV/sec).}$$

In some regions, one particular material dominates the capture source, so for simplicity all captures were assumed to be in that material. A case in point is the gas space, where $C^{Ta} = 0.02396$ and $C^{TOTAL} = 0.02514$. Wherever possible, the effective capture gamma-ray energies determined recently[12] were used to simplify the calculations.

Values of f_j^i were determined for six energy groups, principally from the data of Troubetzkoy and Goldstein.[13] The discrete gamma-ray energies and intensities from Table II of Reference 13 were used, wherever available, to find a weighted average energy in each group. Photons in a group which were not accounted for in the line-spectra tabulation were then assigned the median energy of the group in the weighting process. In other words, the weighted average energy per photon for material i in the jth group, $\overline{E}_j^i$, is given by

$$\overline{E}_j^i = \left\{ \sum_\nu E_{j\nu}^i \, f_{j\nu}^i + \left[f_j^i - \sum_\nu f_{j\nu}^i \right] \hat{E}_j \right\} \left[f_j^i \right]^{-1}$$

where

$E^i_{j\nu} \triangleq$ the energy of the νth line in group j for capture in material i (MeV),

$\hat{E}_j \triangleq$ the median energy of group j (MeV),

and

$f^i_{j\nu} \triangleq$ the photon yield at the energy of the νth line in group j, for capture in material i (photons/capture).

In some cases, insufficient line-spectra data were available to enable the use of this weighting scheme, so $\overline{E}^i_j$ was assigned the group median energy, or a value was estimated from the curves of the differential capture spectra in Ref. 13. Decay gamma rays from product nuclei with half-lives of the order of hours or less were included in the detailed capture spectra. Specifically, ^{24}Na, ^{65}Ni, and $^{182}Ta^m$ decay are included. For sodium, the decay gamma rays provide 4.14 MeV to the total energy release of 11.86 MeV. In any case,

$$Y^i_j = f^i_j \overline{E}^i_j .$$

In Table V, all the capture sources are summarized by region and energy group.

Turning now to the fission sources, let us consider first the core. The total fission rate at 20 MW is

$$[2 \times 10^7 (W)][3.1 \times 10^{10} (\text{fission/W-sec})] = 6.2 \times 10^{17} (\text{fission/sec}),$$

and the prompt fission source is then simply

$$S_T(E_j) = [6.2 \times 10^{17} (\text{fission/sec})][Y(E_j)(\text{MeV/sec})].$$

From Ref. 12,

$$Y(1.25 \text{ MeV}) = 4.92 \text{ (MeV/fission)}$$

and

$$Y(4.0 \text{ MeV}) = 2.31 \text{ (MeV/fission)}$$

constitute the effective prompt fission spectrum. This spectrum is for ^{235}U fission, but as Goldstein [(14)] points out, experimental evidence reveals no observable difference among the prompt-fission spectral shapes of ^{235}U, ^{233}U, and ^{239}Pu. The yields quoted above are for the prompt-fission source only. Goldstein notes that to a reasonable approximation, the EFP gamma rays have the same spectral shape as the prompt-fission gamma rays. If one includes the gamma rays due to radiative capture in ^{239}Pu (a value dependent upon $\alpha = \sigma_c/\sigma_f$, and therefore, upon the neutron spectrum) as being equivalent to approximately 1.8 MeV/fission, then the sum of the gamma-ray energy yields for EFP's (5.5 MeV/fission) and ^{239}Pu capture is equal to the yield for prompt fission.

In summary of the above argument, the EFP and ^{239}Pu capture gamma-ray sources are conservatively accounted for by simply doubling the yields given above for prompt fission.

Fission and capture sources in the bottom reflector control and fuel-follow ends were determined from an interaction rate calculation using the DDK converged-flux dump and macroscopic fission cross sections for these regions. The macroscopic fission and capture cross sections were determined from the DDK edit, using Hansen and Roach's cross sections(3) expanded to a table length of 12. This expansion is performed by a FORTRAN code called XSTRA, which adds capture, fission, and total scatter cross sections to the table. The interaction rates were determined by a FORTRAN code called VOLS, which uses the DDK flux dump and cross-section data.

3.2.1.2 Source Distributions

Preliminary calculations of absorbed dose rates from core fission sources were performed with two trial spatial distributions. Both distributions were for a core region extending to the hexagonal sleeve (i.e., displacing the margin), for reasons to be explained below. Based upon the power density distributions given by Hannum and Kirkbride(1) for MPBE, the fission source spatial distribution function was first approximated by a cosine in both R and Z. Thus, the radial and axial source functions for QAD are, respectively,

$$S(R) = \cos \xi_1 (R - \xi_2), \qquad 0 \leq R \leq 23.1,$$

$$S(Z) = \cos \zeta_1 (Z - \zeta_2), \qquad -17.4 \leq Z \leq 16.5,$$

where

$\xi_1 = 0.03982$ radians/cm,

$\zeta_1 = 0.0476$ " ,

and

$\xi_2 = \zeta_2 = 0.$

Observe that the edge-to-center flux ratio is radially

$$\cos (0.03982)(23.1) = 0.606;$$

and the minimum axially

$$\cos (0.0476)(17.4) = 0.676.$$

In all cases, including capture sources, the source spatial distribution function was assumed to be azimuthally constant, so $S(\phi) = 1.0$ was used. Observe that there is no normalization of $S(R)$, $S(Z)$, or $S(\phi)$, because the source is internally normalized by QAD to the proper volume-integrated source (see Section 3.2.1.1).

For the second trial spatial distribution, the fission source was assumed to be uniformly distributed over the core volume. As would be expected, this spatial distribution predicted higher heating rates for all regions outside the core than did the cosine distributions. The questionable applicability of the power density distributions from Reference 1 to the core model being considered, in addition to a natural desire for conservatism in shielding calculations, led to the adoption of the uniform fission source distribution for further calculations. This distribution was also used for the core capture sources.

As was mentioned above, the core was assumed to extend all the way to the hexagonal sleeve, displacing the margin. This assumption may be conservative, but it was introduced for the following two reasons:

(1) There is a distinct possibility of using mixed cores (carbide, oxide, and/or liquid plutonium) in the MPBE vessel for an irradiation facility. In such a case, it is highly probable that the core will need to be extended to the hexagonal sleeve to achieve criticality.

(2) As might be inferred from its name, the margin region is designed to allow for a margin of uncertainty in the calculations predicting the core critical radius. Extending the core to the hexagonal sleeve in the shielding model simply adopts the maximum error in core radius allowed for in the mechanical design.

The margin region, however, was not overlooked. Unfortunately, the neutronic calculations from which the capture sources are constructed were not performed specifically for the shielding study. Thus, some esthetically unpleasant, but practically reasonable, adjustments had to be made. The core capture sources were determined from a DDK calculation for the reference design core, which has a nickel margin region. For a core extending to the hexagonal sleeve, intuition suggests that the core leakage might be less, and, therefore, the core captures greater. To conserve total captures in the combined core and margin regions, the margin capture source was then superimposed on the core in the region given by $19.2 \leq R \leq 23.1$ (see Fig. 2). The margin volume-integrated capture source and source distribution were constructed from the reference DDK calculation. Because all volume-integrated capture source and source distribution determinations were from the reference DDK calculation, an inconsistency always exists between the model used to calculate the source and the model used for the QAD shielding calculations. The predicted absorbed dose rates outside the hexagonal sleeve (>2 mean free paths or ≈4 cm) should then be most realistic for the February 1966 MPBE core design (i.e., with a 19.2 cm equivalent cylindrical radius), but should also be a reasonable approximation for the mixed cores or for liquid plutonium cores which extend into the margin.

All capture-source spatial distribution functions were determined from spatially dependent interaction-rate calculations performed with the VOLS code. These calculations used the DDK absorption cross sections and converged-flux dump, except that the calculations for the bottom reflector control and fuel-follow-end regions used capture cross sections. The determination of the capture cross sections was explained previously (Section 3.2.1.1).

The input source mesh for S(R), S(Z), and S(ϕ) was in most cases determined by considerations of adequacy of the quadrature, rather than accuracy of representation of the source spatial distribution function. Several difficulties with the quadrature were encountered for detector points close to a quadrature point. Although singular points were avoided by placing the ϕ-coordinate of all the quadrature points off the $\phi = 0$ plane, irregularities were noted in the dose rate values for detector points in the vicinity of the Z = 16.5 cm plane, for $23.1 \leq R \leq 42.25$ cm. Calculations were redone for these points with a new quadrature, and the corrected values were used for Table III.

In transforming from the reference DDK problem to the shielding model, the mid-points of the DDK mesh intervals were used for some of the coordinates of the volumetric source [units of (MeV/cm^3-sec)]. These mesh intervals are specified by I and J, the R- and Z-coordinate channel numbers, respectively. The volumetric source, as calculated by the VOLS code, is an average value over the subregion defined by I and J. Table VI presents the values of R and Z corresponding to the mid-points of the I and J channels, respectively. Also in Table VI are the transformed values of Z for the shielding model of Fig. 2.

As can be seen from Fig. 2, the margin control region was assumed to be all nickel. Such an assumption is conservative in the sense of underpredicting the gamma-ray <u>attenuation</u> of this region. However, the sources were determined from the three DDK regions representing the margin control and, therefore, were predominantly tantalum capture sources. These sources were then superimposed on the shielding model with their proper magnitude and spatial distribution as determined from the DDK problem.

3.3 Results

3.3.1 Selection of Detector Points and Absorbing Materials

Most of the first 67 detector points were chosen to get a representative sample of absorbed dose rates. Other points were added to this selection, in order to obtain reasonably smooth curves of the absorbed dose rate as a function of Z at various radii. The final three points at R = 110.0 cm were chosen to predict absorbed dose rates in instruments in the void space outside the pressure vessel. Figures 3 through 11 show the absorbed dose rate in iron, H(Z), as a function of Z for R = 0.0, 11.55, 23.1, 26.9, 30.7, 42.25, 53.8, 92.2, and 110.0 cm. Detailed curves of the contributions from each source region are given in Figs. 12 through 20 for these same radii. Appendix A provides tables of the detailed contributions of several sample source regions to the absorbed dose at each detector point. The data for all source regions are available on computer listings in the authors' files. Appendix B gives a summary of the data for absorbed dose in iron for those detector points not appearing in any of the curves of Figs. 12 through 20.

Iron was selected as the absorbing material typical of the MPBE reactor structure. However, in order to include almost every material for which absorbed doses may be of interest, calculations were also performed to determine the dose rates in carbon, nickel, tantalum, and sodium. These five materials cover a wide range of atomic numbers, the extremes being 6 (carbon) and 73 (tantalum). From these dose rates, a crude estimate of absorbed dose rates in a material k may be obtained by using the values for the material with the atomic number nearest to that of material k. In general, the absorbed dose rate in a given gamma-ray flux increases with atomic number, so it will be known whether the estimate is conservative or not. More precise estimates can, of course, be obtained with increased effort by using the builtup gamma-ray fluxes (see the sample data in Appendix A). Briefly, the procedure is to find (see Section 3.2)

$$H^k(W/g) = 1.602 \times 10^{-13} \sum_j B_{ea,j}\, \chi^k_{ea,j}\, \psi_j, \qquad (1)$$

where

$B_{ea,j}\, \psi_j$ = the builtup gamma-ray energy flux as given in Appendix A.

It is important to understand that, regardless of the absorbing material considered for a particular detector point, the builtup gamma-ray energy flux is determined for the actual materials present in the model of Fig. 2. Observe that the absorbing material enters in Eq. (1) via the $\chi^k_{ea,j}$ factor only. If one assumes an infinite electron linear stopping power (-dE/dx) for all the shielding and absorbing materials, then Eq. (1) describes the absorbed dose rate in an infinitesimally small sample of the absorbing material at the detector point. There is then no perturbation of the gamma flux; however, because of the infinite stopping power, the energy deposition in the absorbing material is characteristic of that material alone -- not its surrounding medium.

3.3.2 Precautions

The absorbed dose rates at detector points outside the envelope enclosing all the source regions are incomplete and may be a gross underestimation of the actual values. Even points inside (within about two mean free paths, ≈4 cm) the envelope R = 79.4 cm, Z = -53.8 cm, and Z = 92.5 cm may be underestimated by up to a factor of two. However, the Monte Carlo gamma-ray study (Section 2 of this report) gives total power (kW) deposited in several regions from capture sources in the borated stainless steel thermal shield, vessel side, vessel bottom, and bottom shield. These heating calculations were based upon an older model and a diffusion-type (CRAM) neutronics calculation. Assumptions concerning the spatial distribution of the absorbed dose rate would have to be made before using the results of the Monte Carlo study. Note from Table I that the vessel heating is primarily from the vessel capture source, i.e., self-heating. Also from Table I, one can infer the total gamma-ray power released (i.e., gamma-ray source power) by capture sources in the following four regions of interest:

Region	Total Source Power (kW)
Borated SS Thermal Shield	16.35
Vessel Side	10.4
Vessel Bottom	2.59
SS Thermal Shield	222.0

In addition to the 16.35 kW of gamma-ray power released in the borated stainless steel thermal shield, there are 14.2 kW from the $^{10}B(n,\alpha)^{7}Li$ reactions (including the 0.48-MeV photon emitted in 94 percent of these reactions).

It should be kept in mind that none of the heating calculations performed thus far have considered inelastic-scatter gamma-ray sources.

REFERENCES

1. W. H. Hannum and L. D. Kirkbride, "The Molten Plutonium Burnup Experiment," LA-3384-MS, January 1966 (p. 56).

2. A. Hassitt, "A Computer Code to Solve the Multigroup Diffusion Equations," UKAEA, TRG Report 229(R), 1962.

3. G. E. Hansen and W. H. Roach, "Six and Sixteen Group Cross Sections for Fast and Intermediate Critical Assemblies," LAMS-2543, November 1961.

4. "Reactor Physics Constants," ANL-5800, Second Ed., July 1963 (p. 631).

5. R. R. Johnston, "A General Monte Carlo Neutronics Code," LAMS-2856, March 1963.

6. W. J. Worlton and B. G. Carlson, "The DDK Code," an unpublished Los Alamos Scientific Laboratory code.

7. W. H. Hannum and B. M. Carmichael, "DPC, A Two-Dimensional Data Preparation Code," LA-3427-MS, June 1965.

8. H. Goldstein and J. E. Wilkins, Jr., "Calculation of the Penetration of Gamma Rays," NYO-3075, June 1954.

9. M. A. Capo, "Polynomial Approximation of Gamma Ray Buildup Factors for a Point Isotropic Source," APEX-510, November 1958.

10. G. W. Grodstein, "X-Ray Attenuation Coefficients from 10 keV to 100 MeV," NBS Circular 583 (1957).

11. E. Storm, E. Gilbert, and H. Israel, "Gamma-Ray Absorption Coefficients for Elements 1 through 100 Derived from the Theoretical Values of the National Bureau of Standards," LA-2237, 1958.

12. D. J. Dudziak, Trans. Am. Nucl. Soc. 9, 349 (1966).

13. E. Troubetzkoy and H. Goldstein, "A Compilation of Information on Gamma-Ray Spectra Resulting from Thermal-Neutron Capture," ORNL-2904, January 1961.

14. H. Goldstein, Fundamental Aspects of Reactor Shielding, Addison-Wesley, Reading, Mass., 1959 (pp. 58-63).

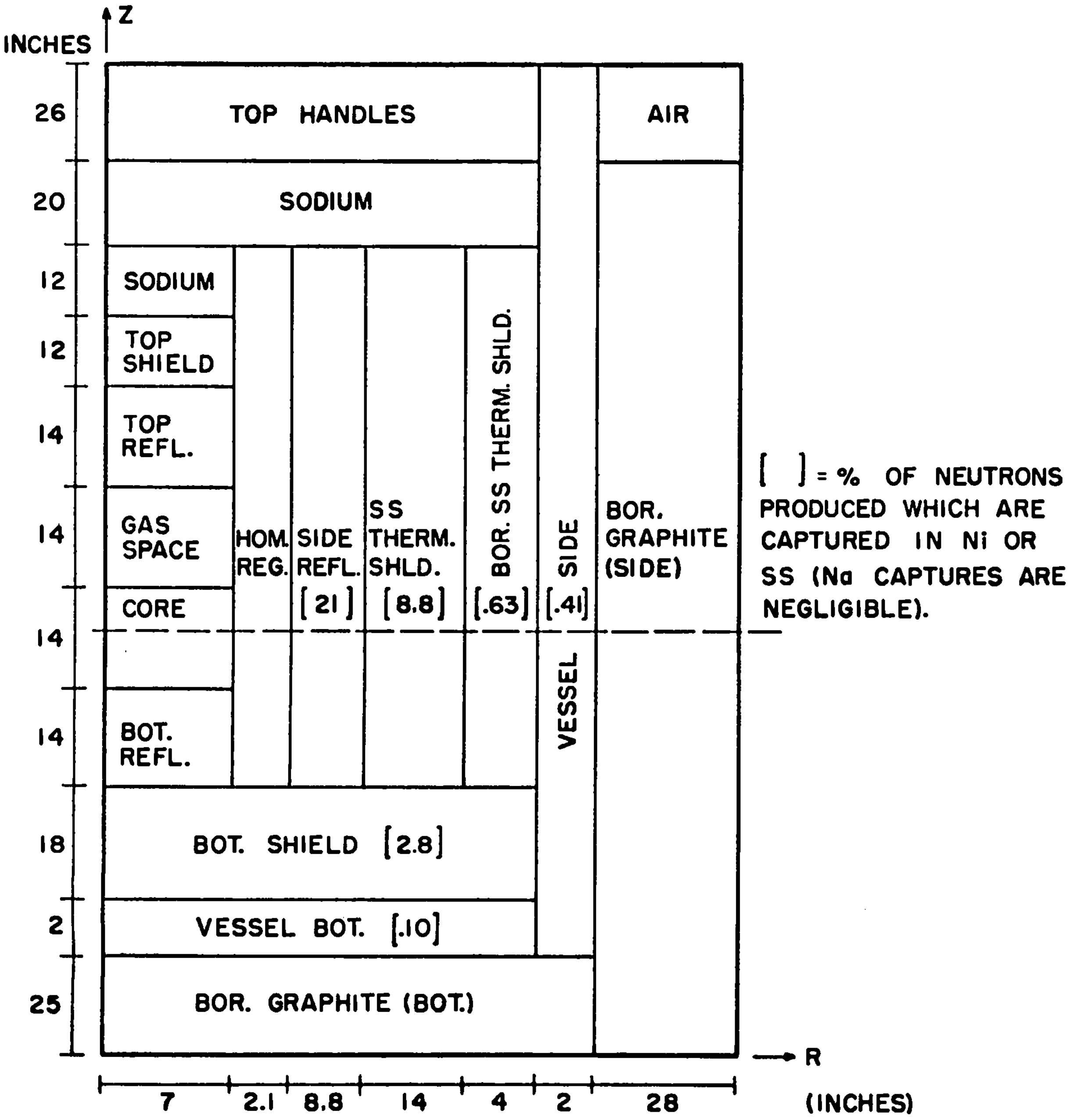

Fig. 1. Idealized Model for Preliminary Calculations

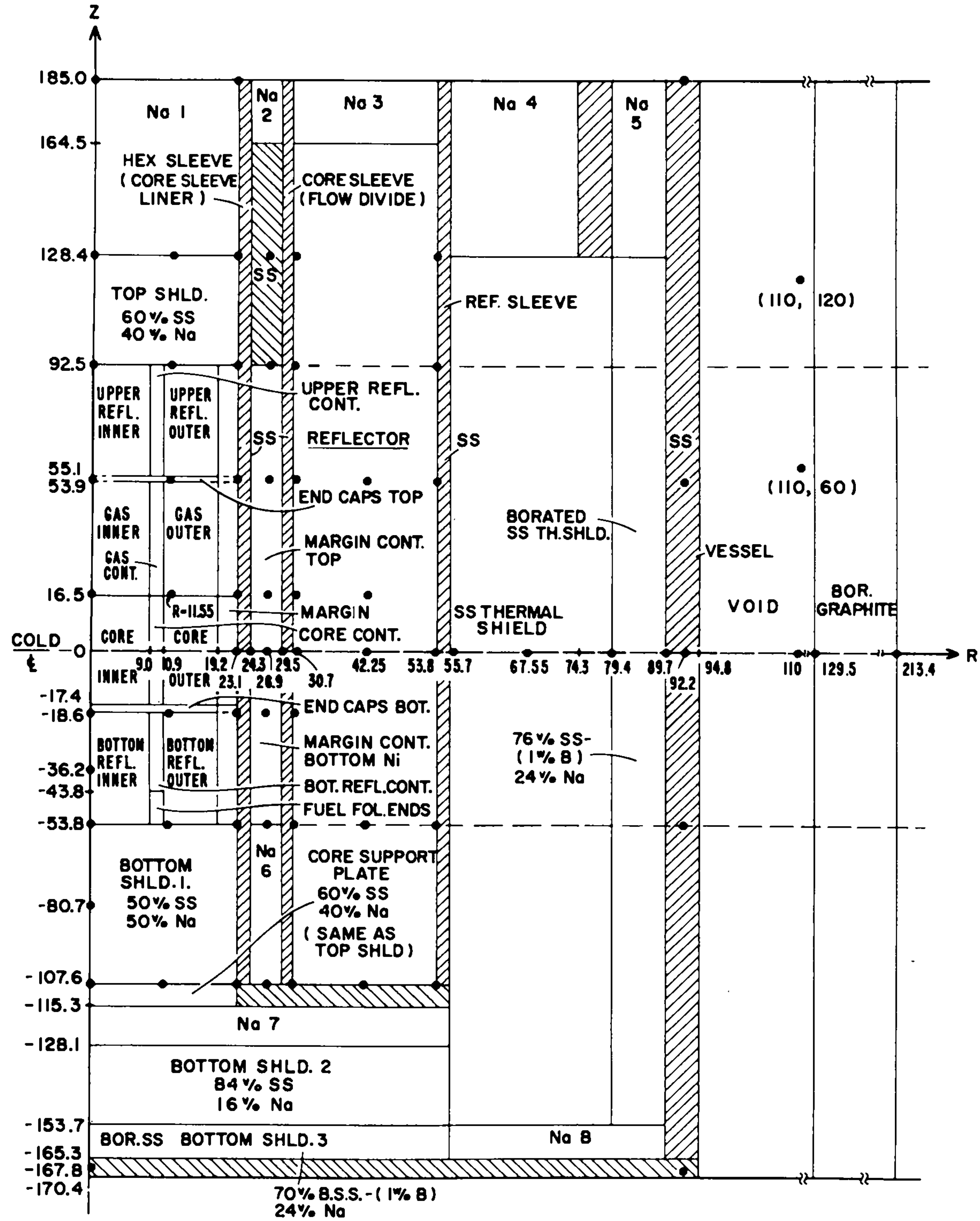

Fig. 2. MPBE Reactor Shielding Model

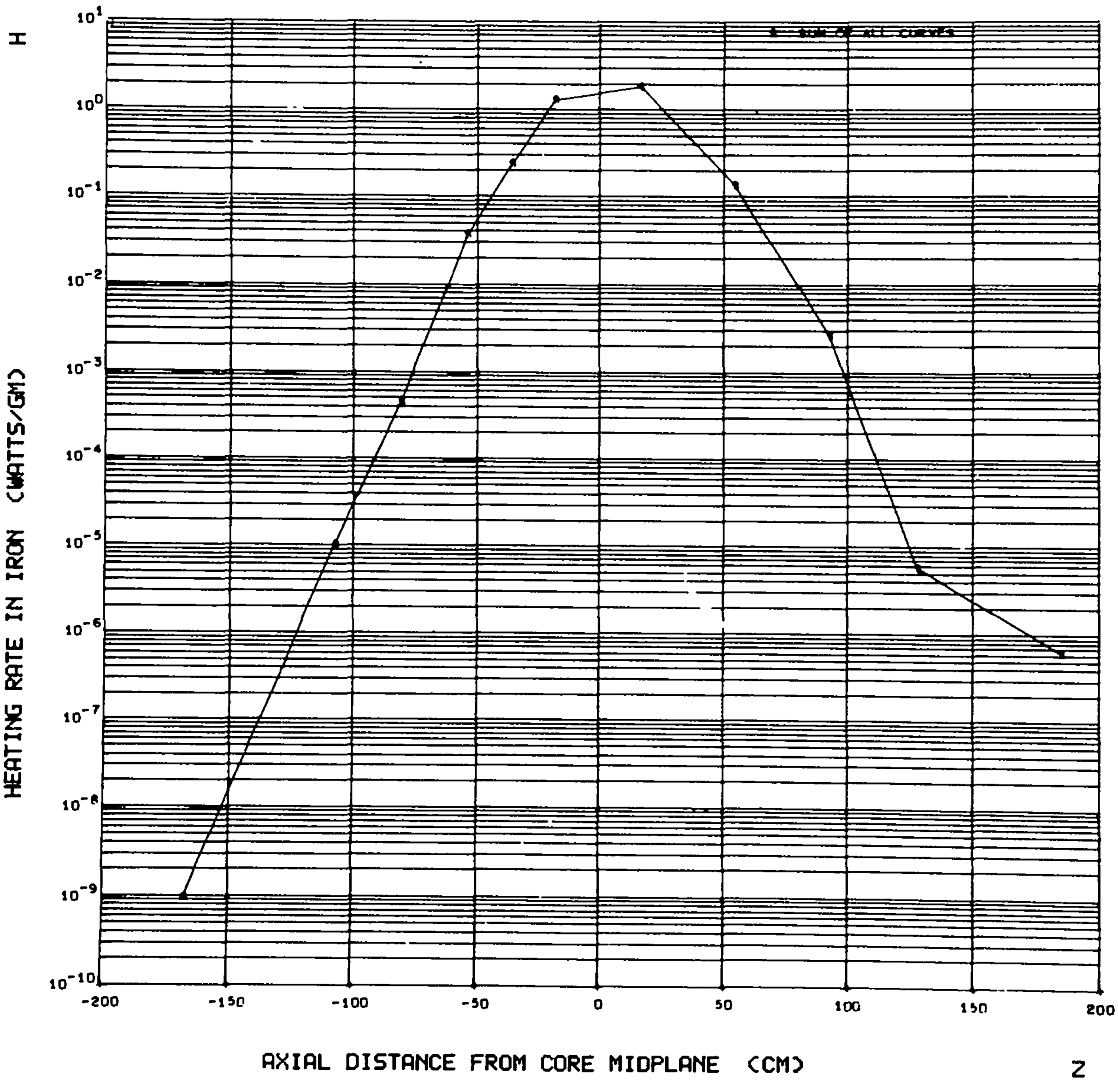

Fig. 3. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 0.0 cm

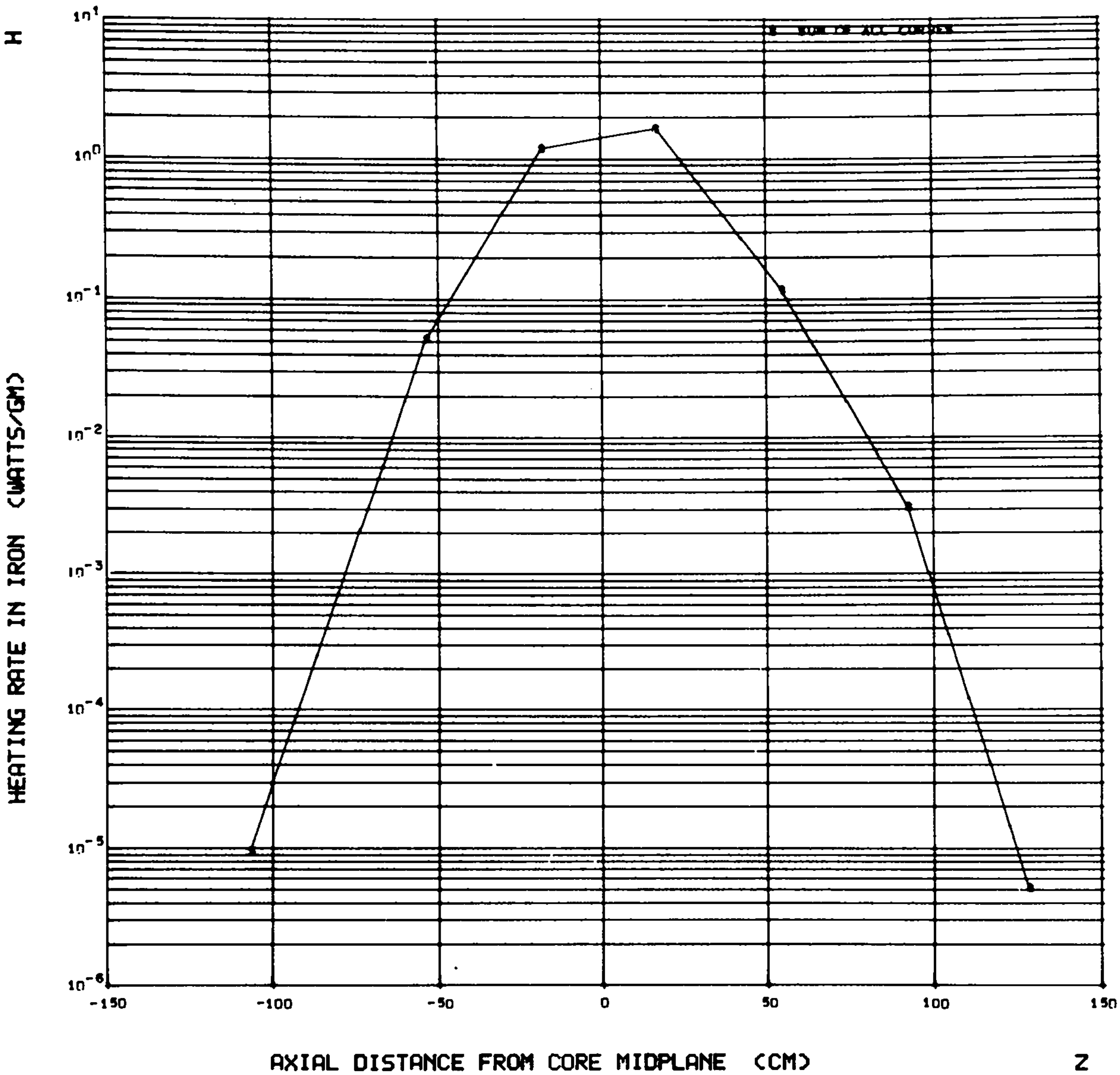

Fig. 4. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 11.55 cm

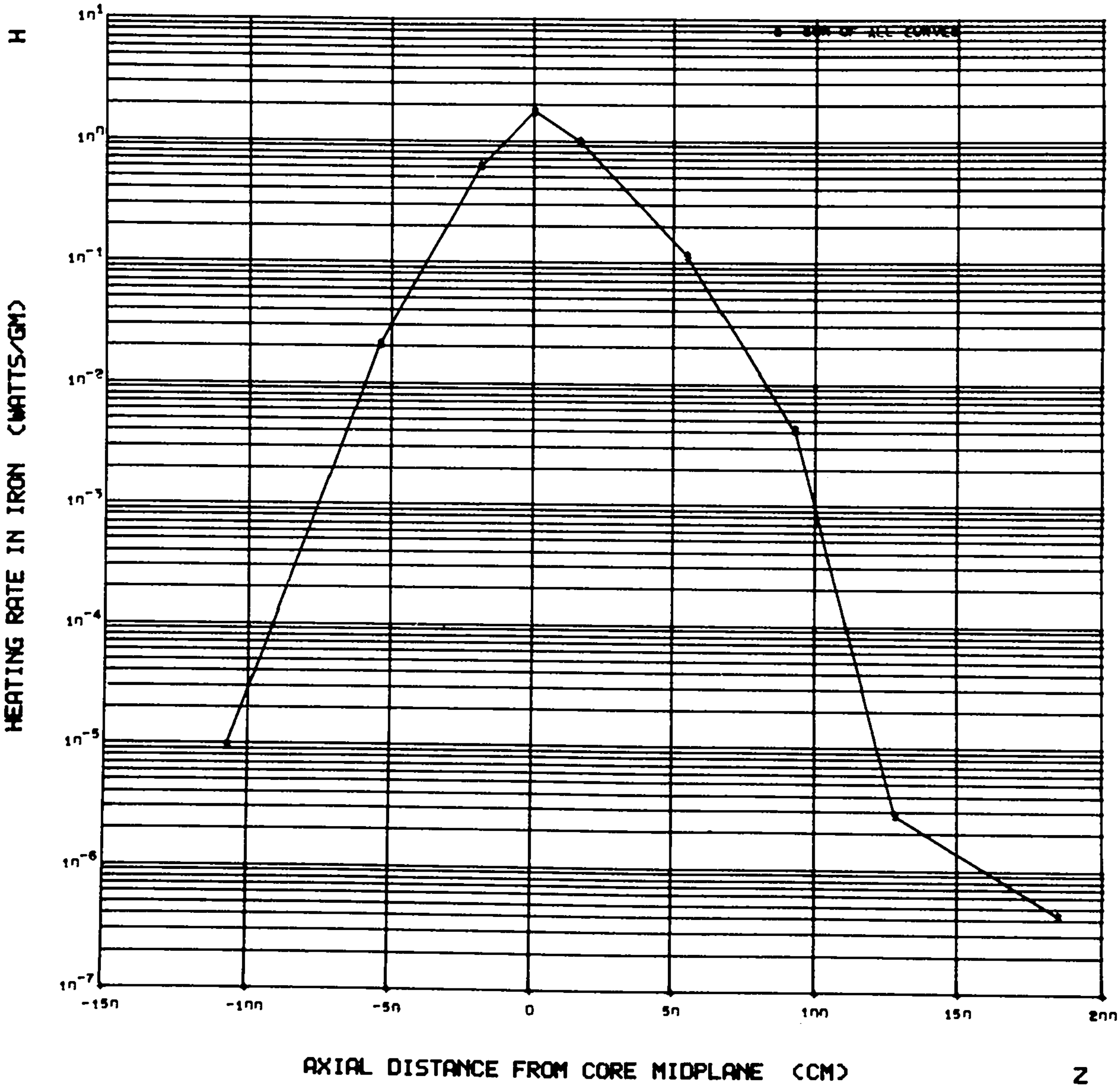

Fig. 5. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 23.1 cm

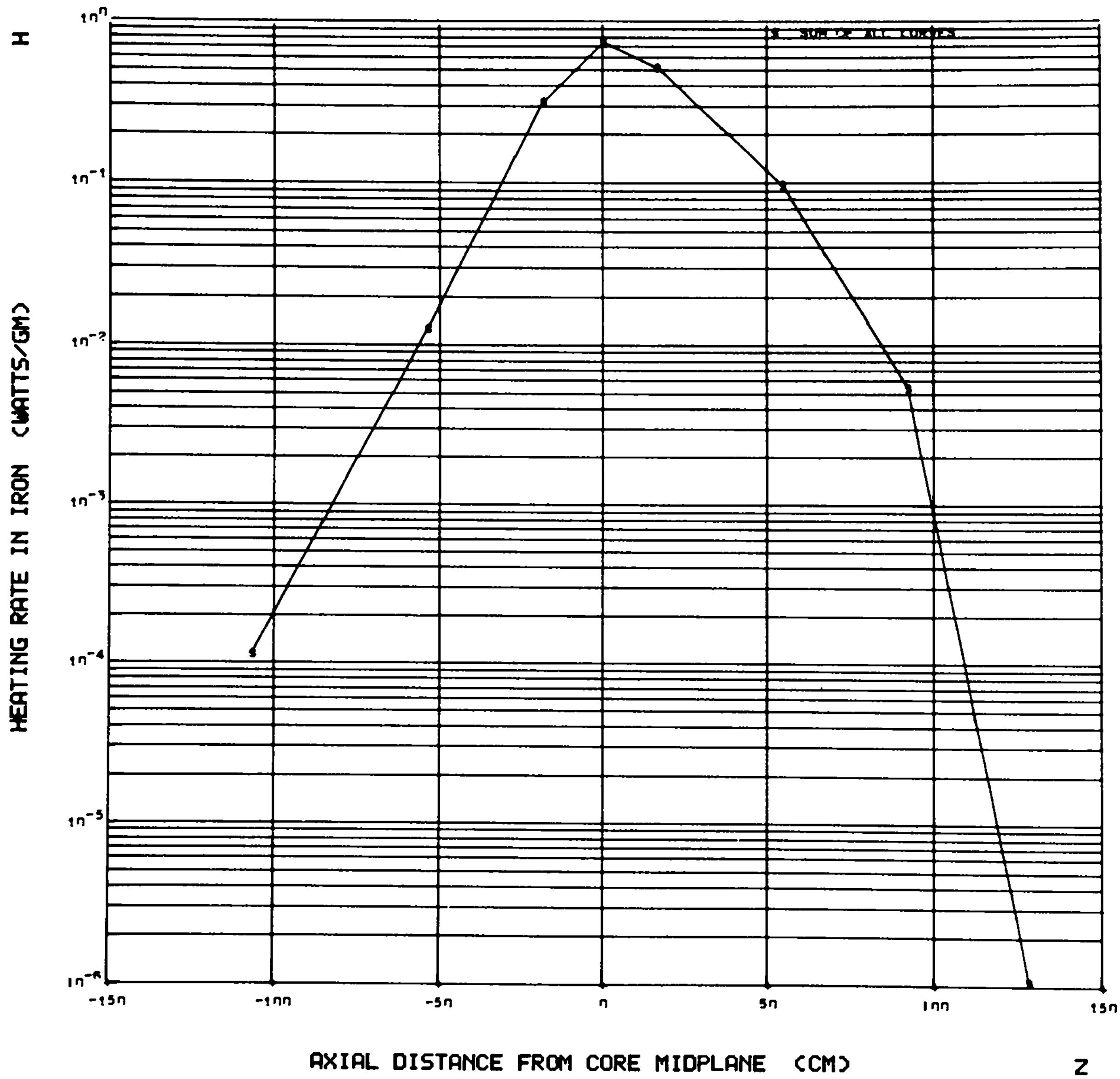

Fig. 6. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 26.9 cm

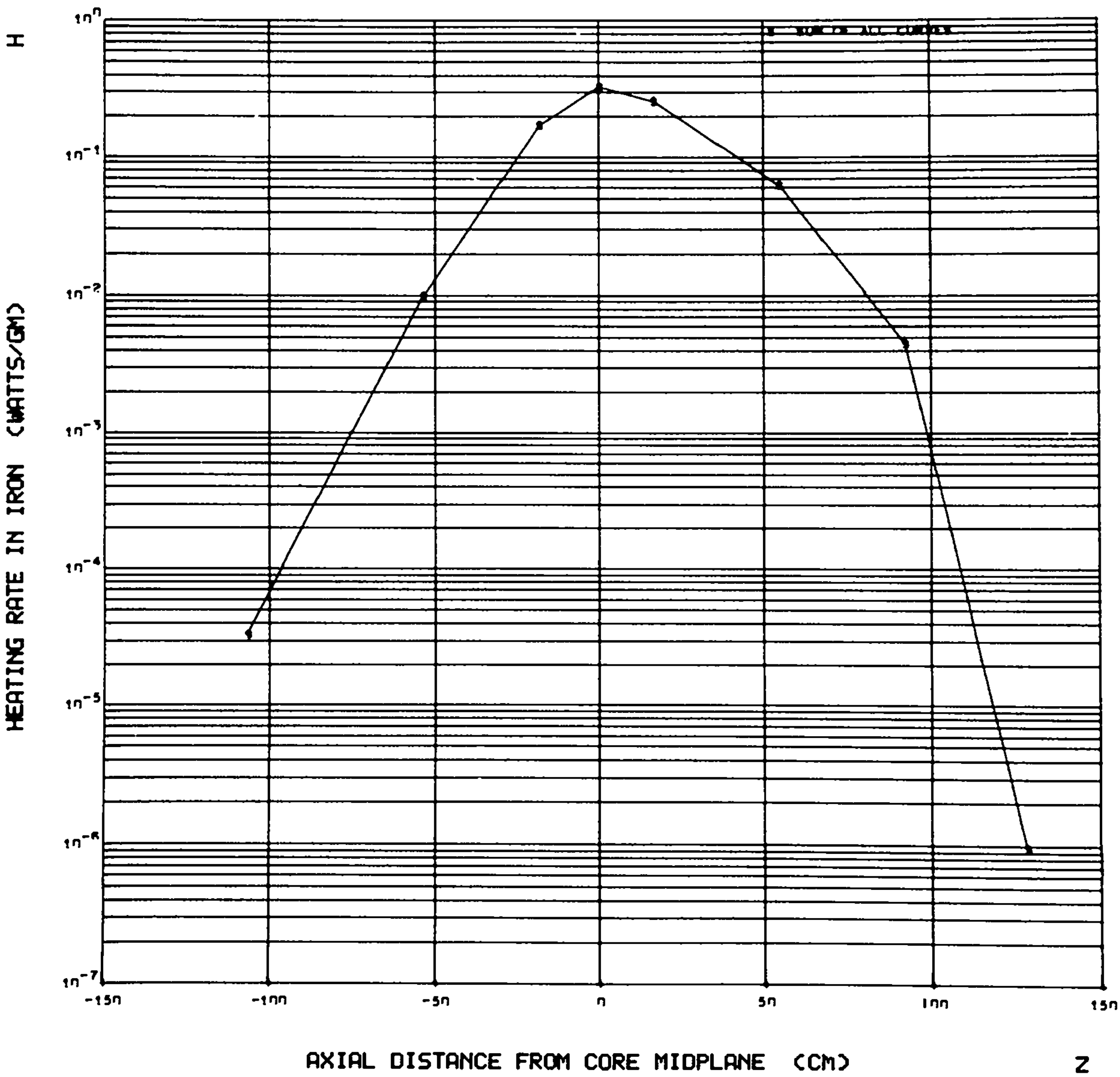

Fig. 7. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 30.7 cm

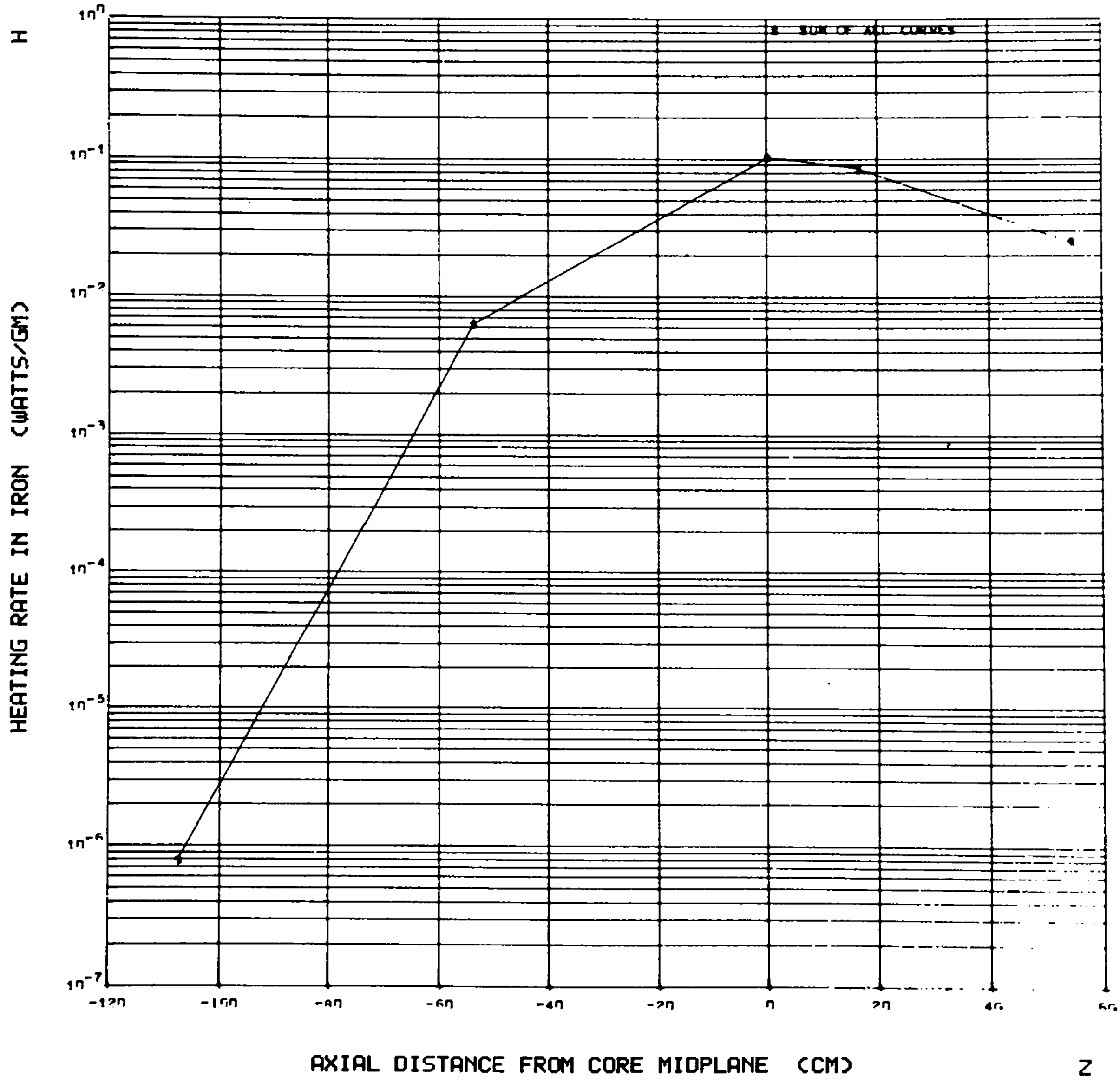

Fig. 8. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 42.25 cm

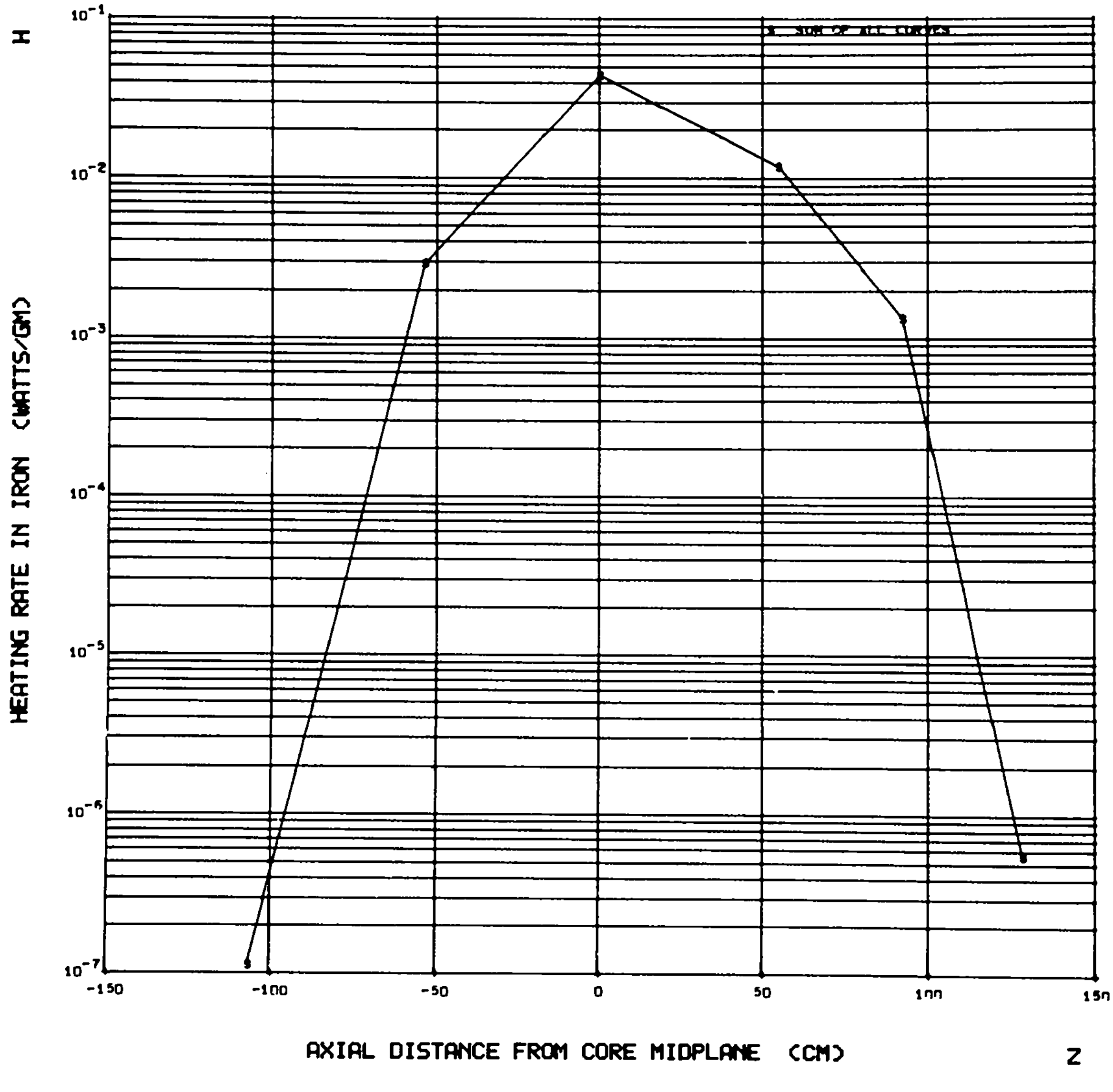

Fig. 9. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 53.8 cm

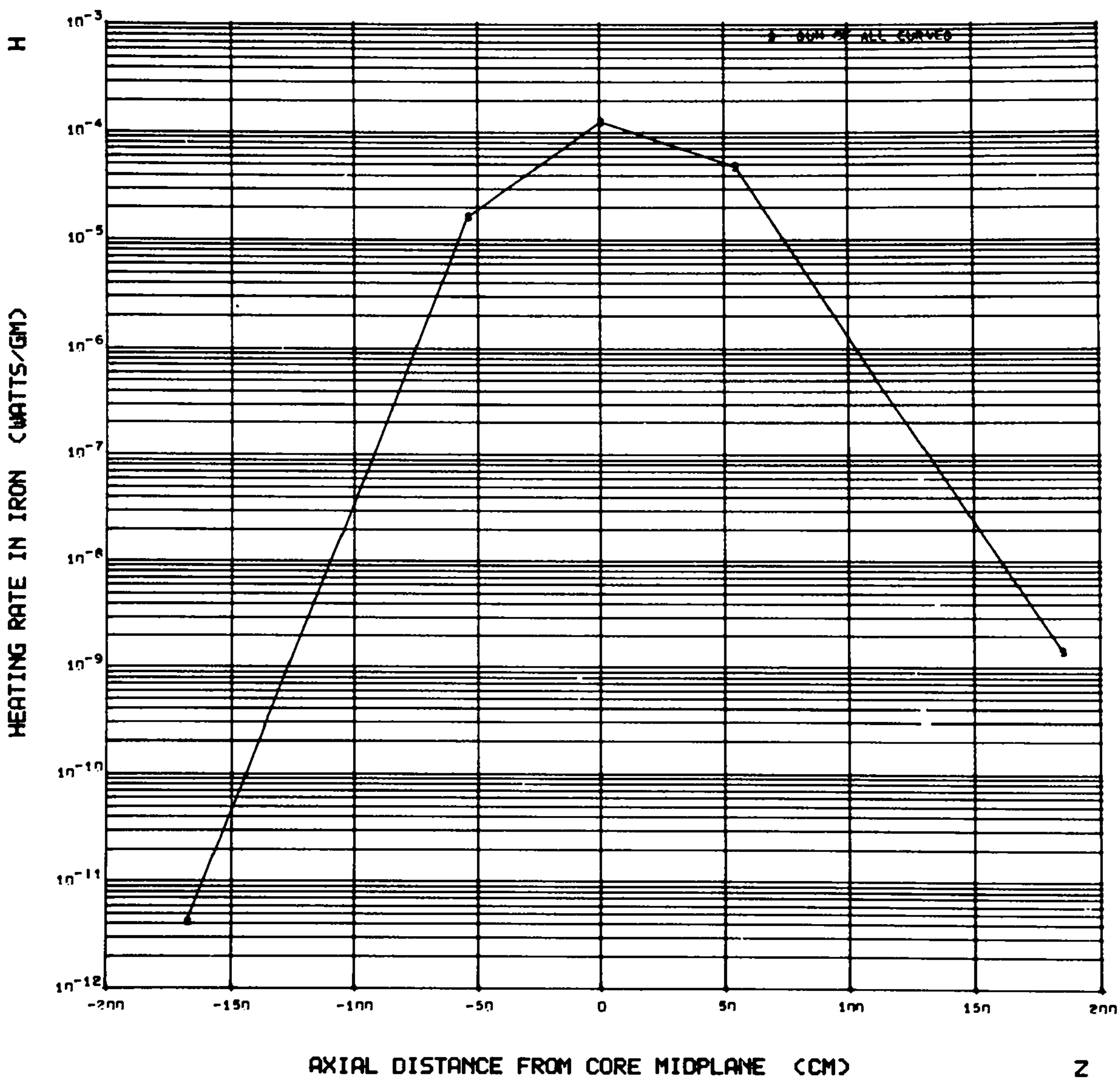

Fig. 10. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 92.2 cm

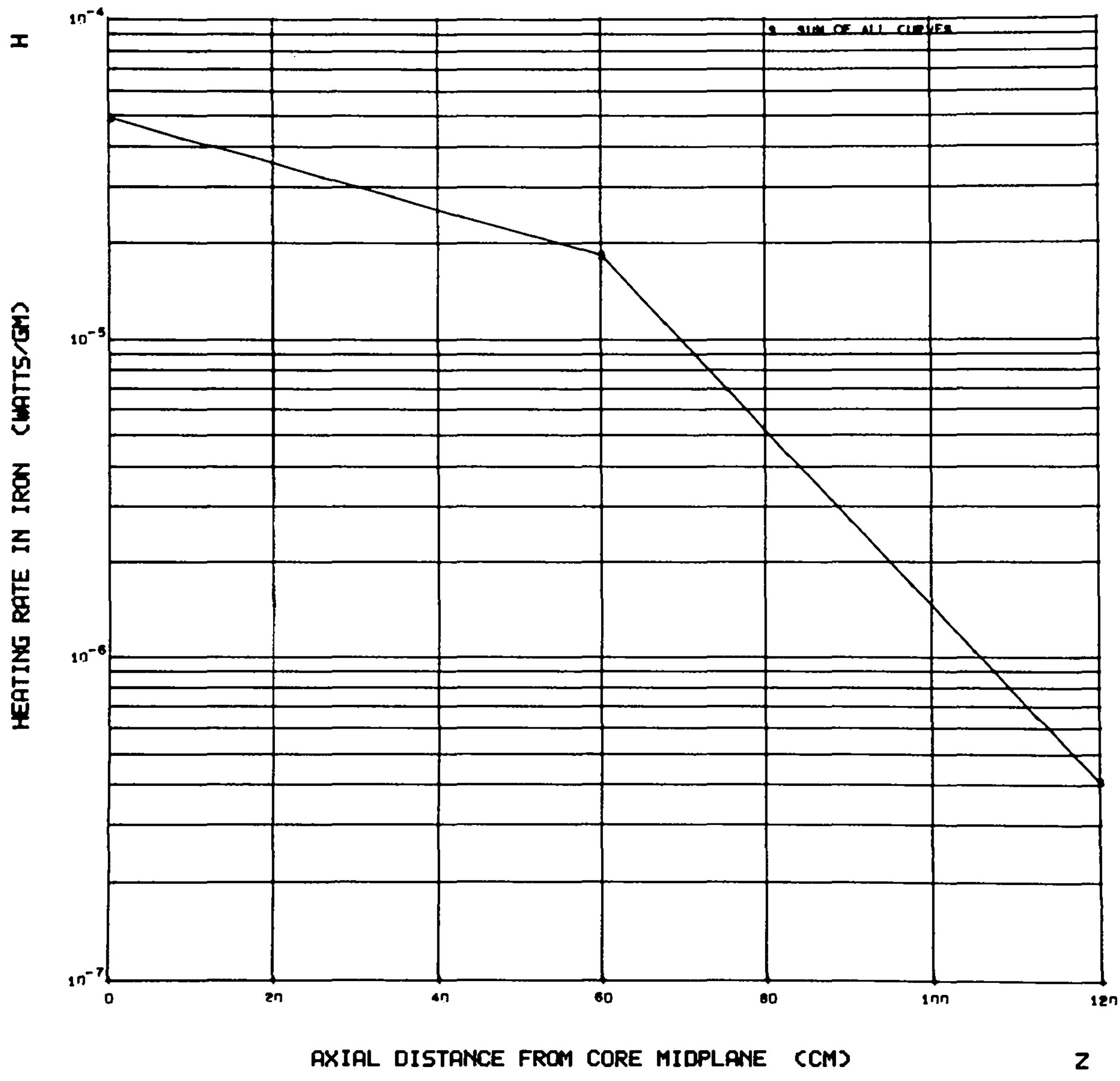

Fig. 11. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 110 cm

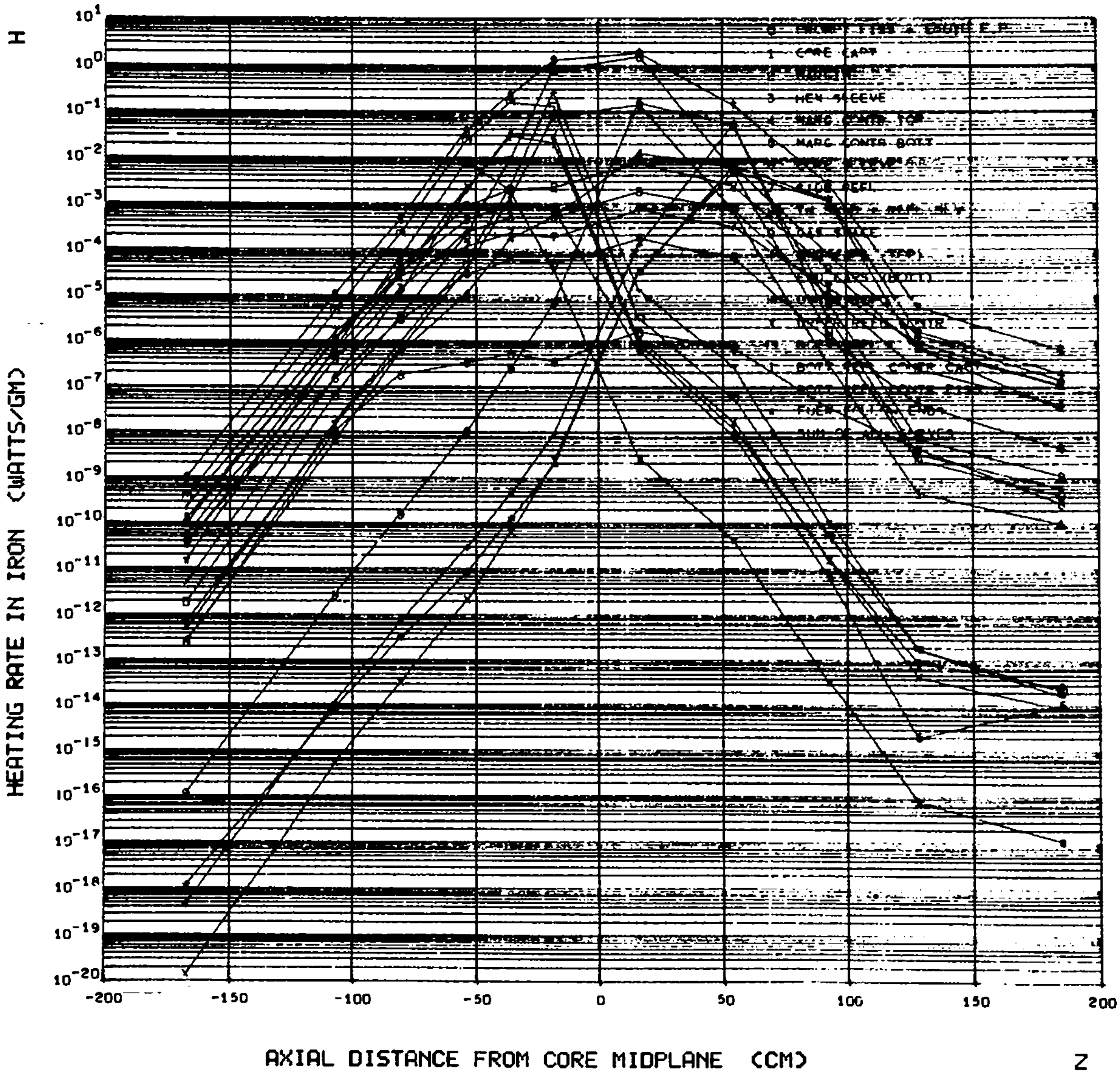

Fig. 12. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 0.0 cm

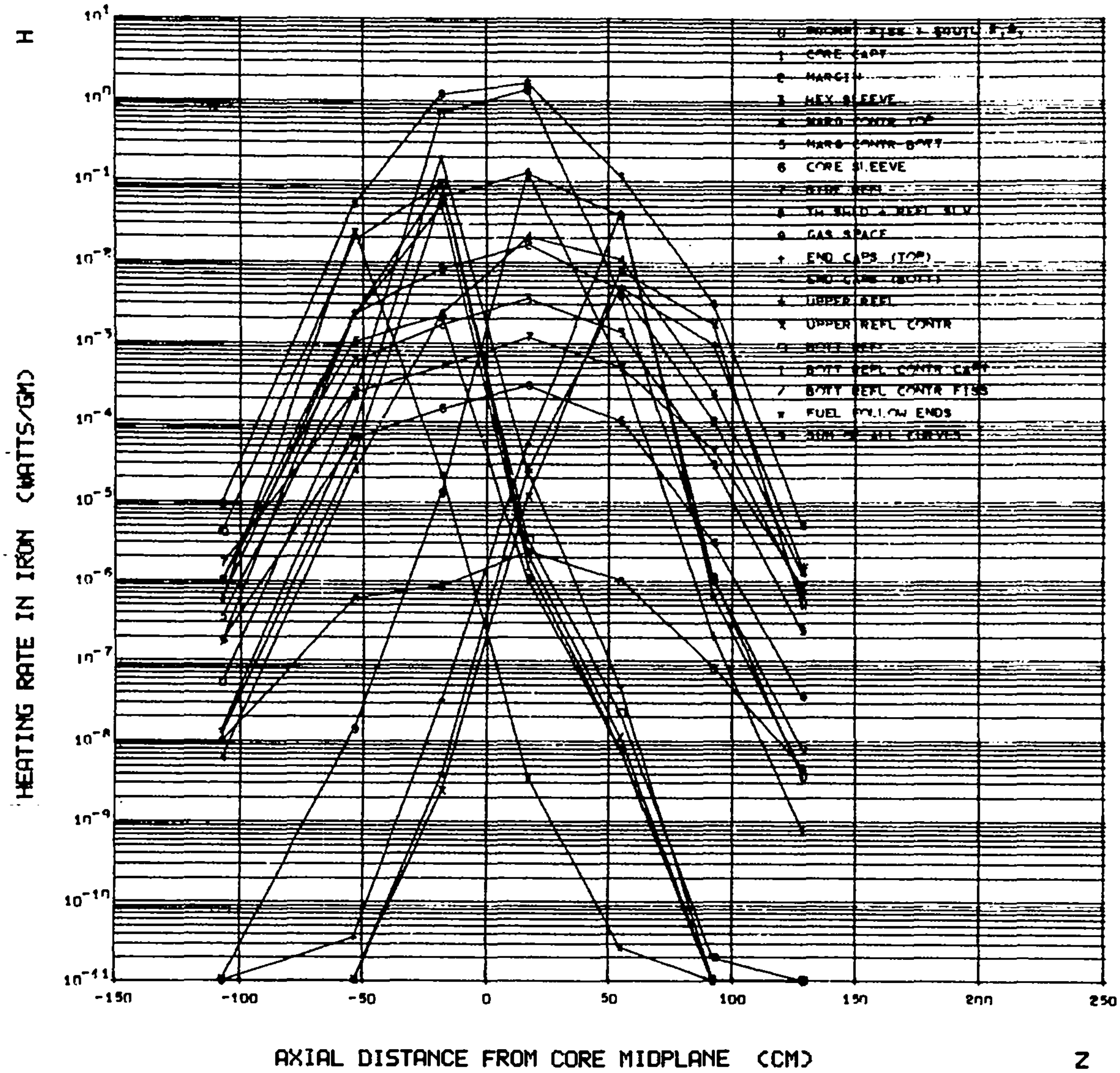

Fig. 13. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 11.55 cm

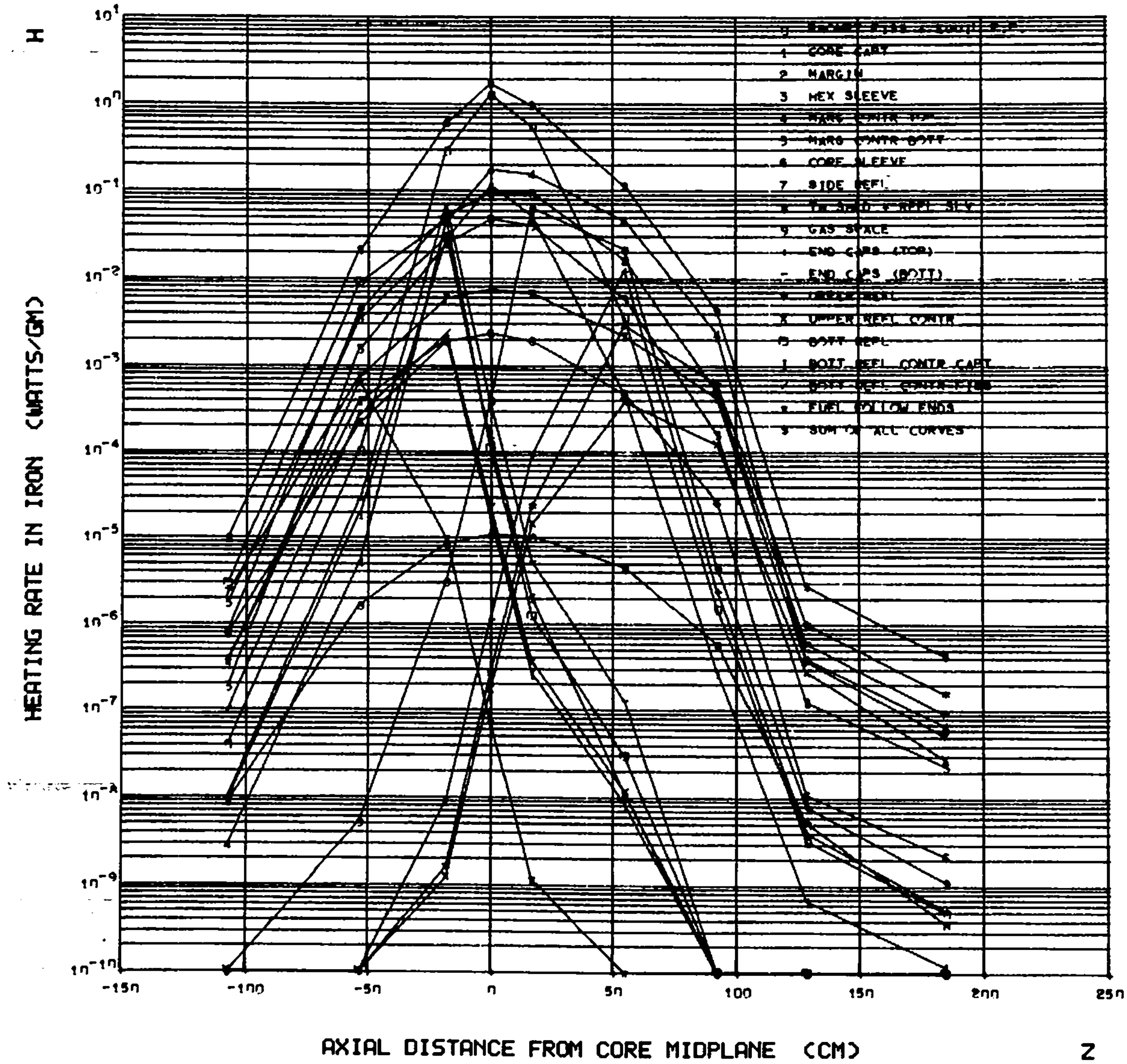

Fig. 14. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 23.1 cm

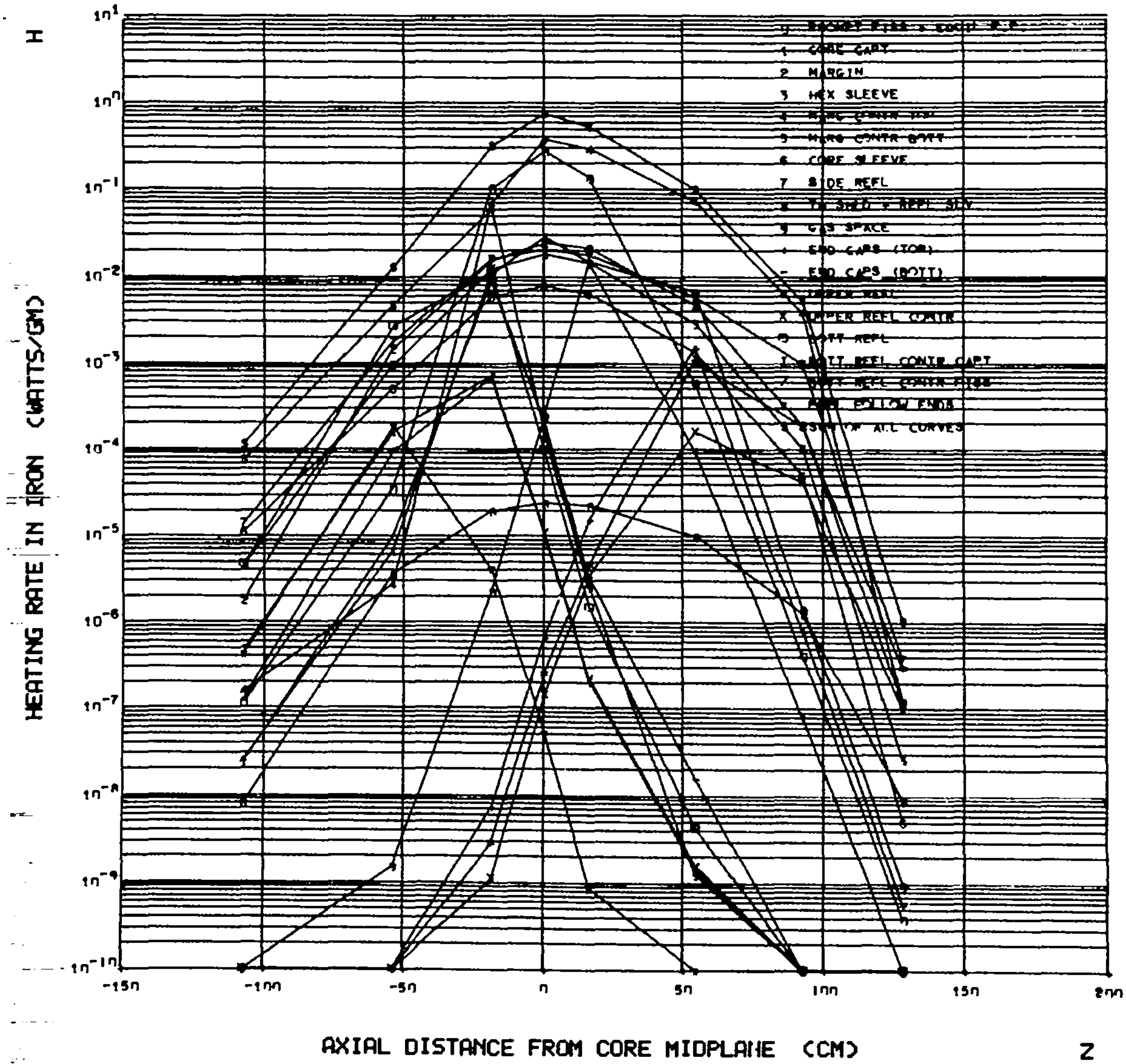

Fig. 15. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 26.9 cm

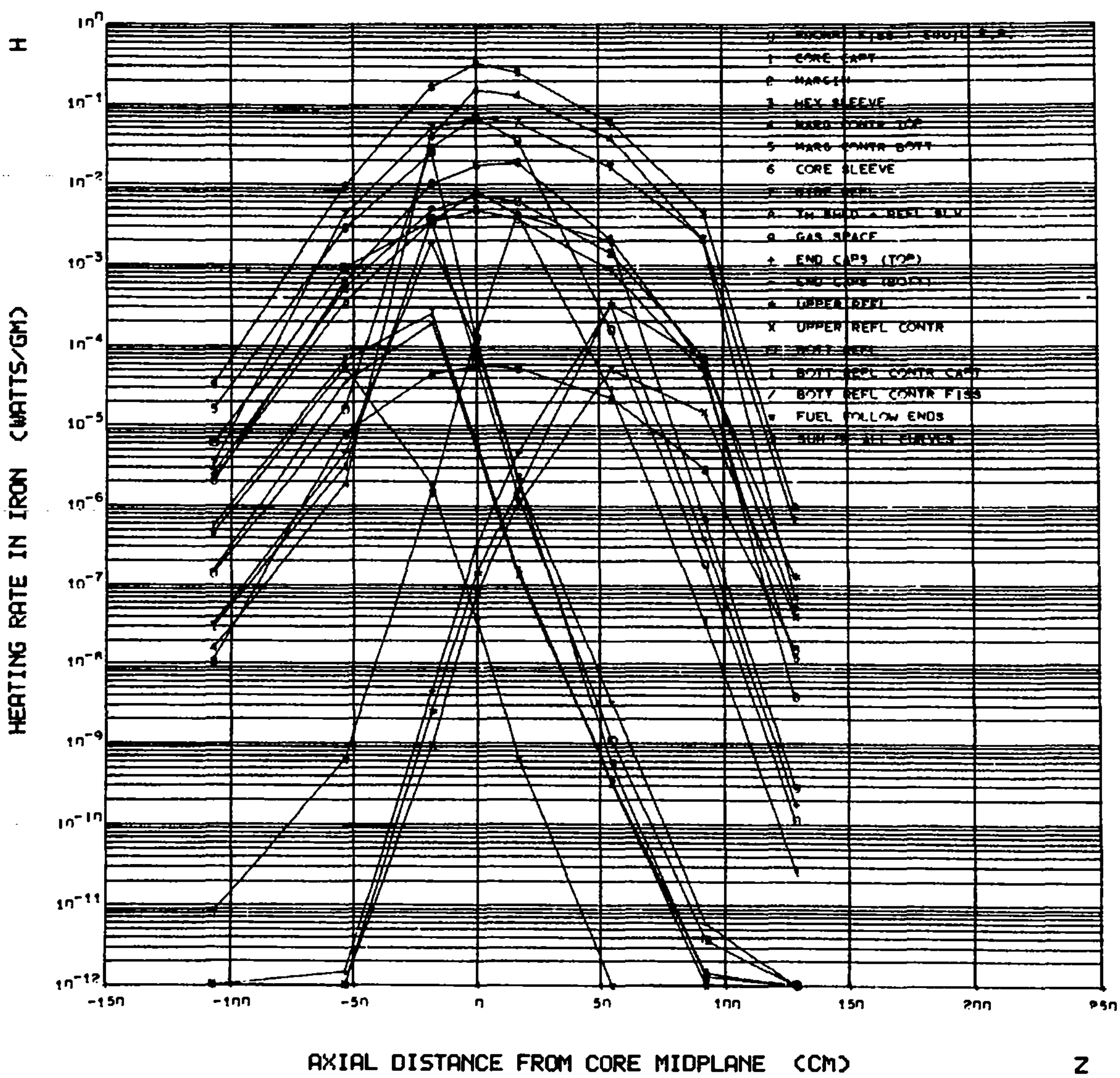

Fig. 16. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 30.7 cm

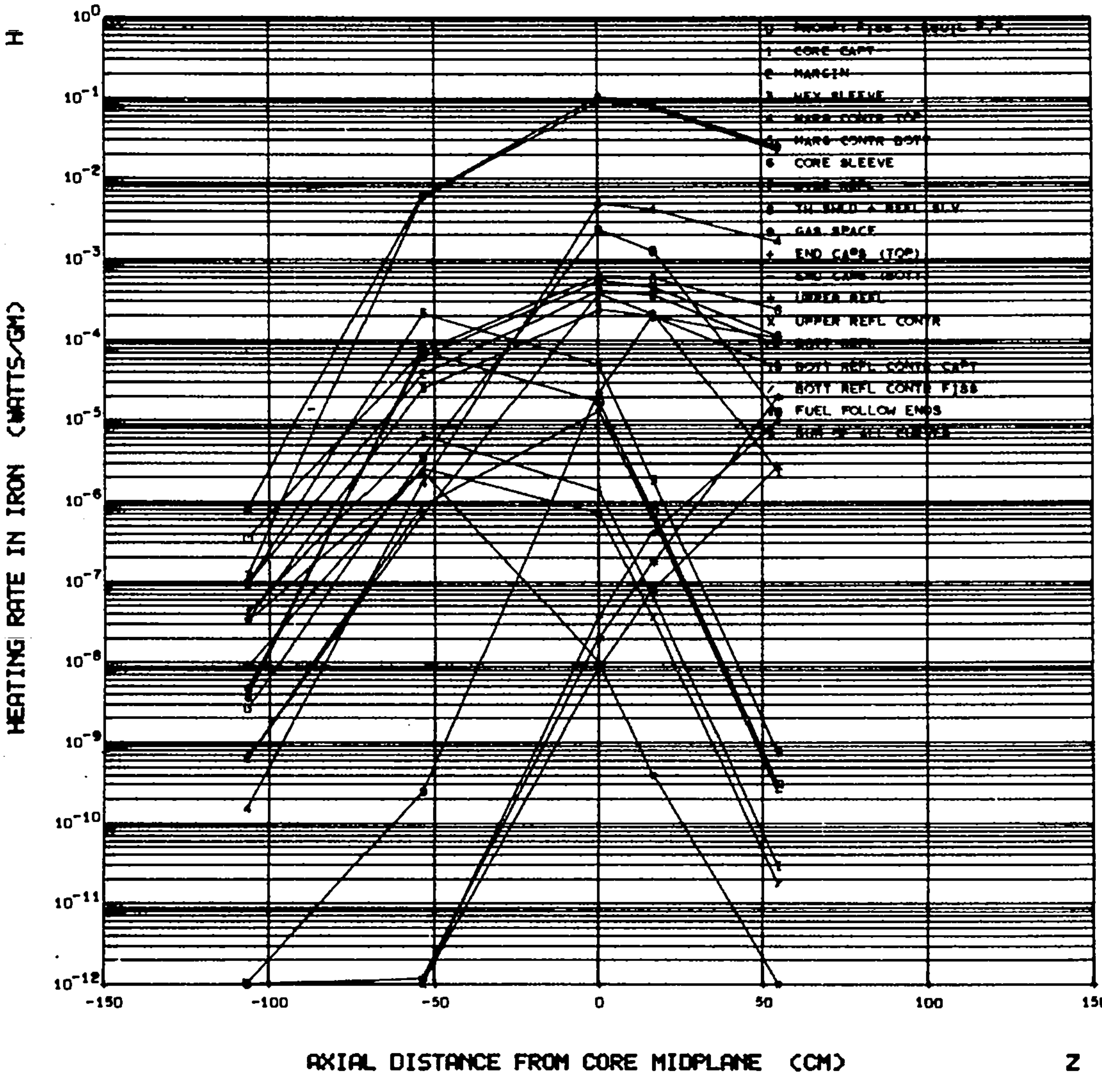

Fig. 17. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 42.25 cm

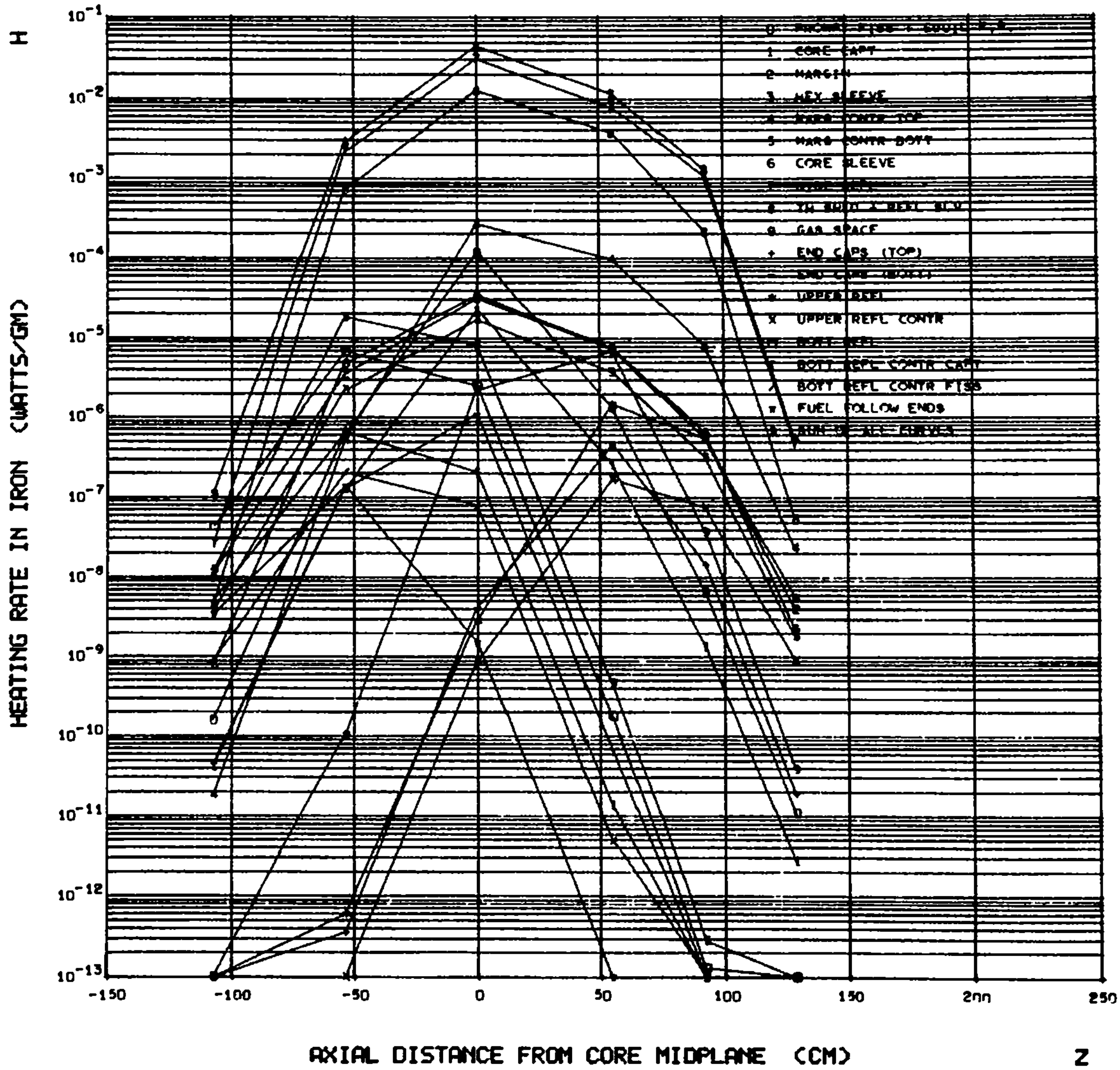

Fig. 18. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 53.8 cm

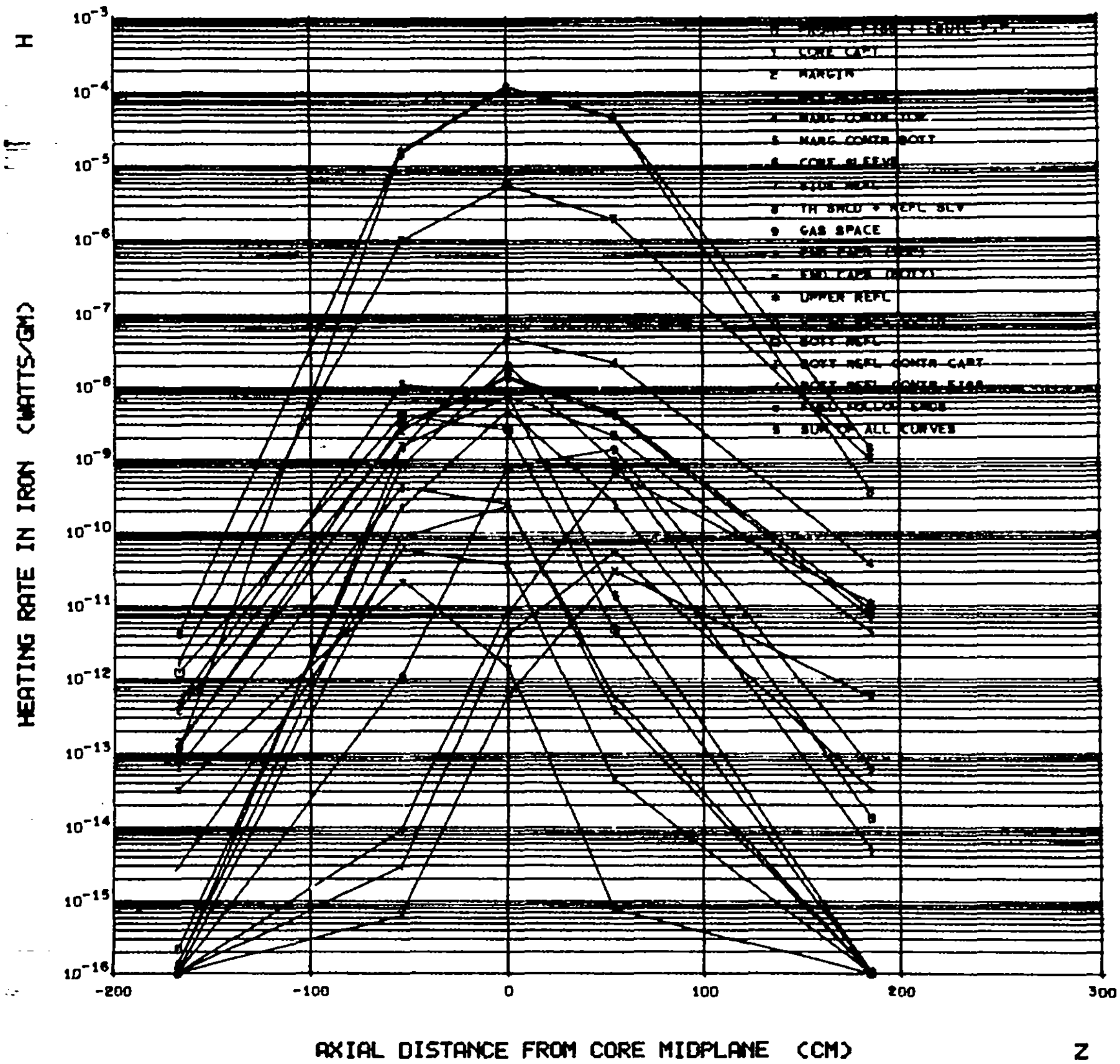

Fig. 19. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 92.2 cm

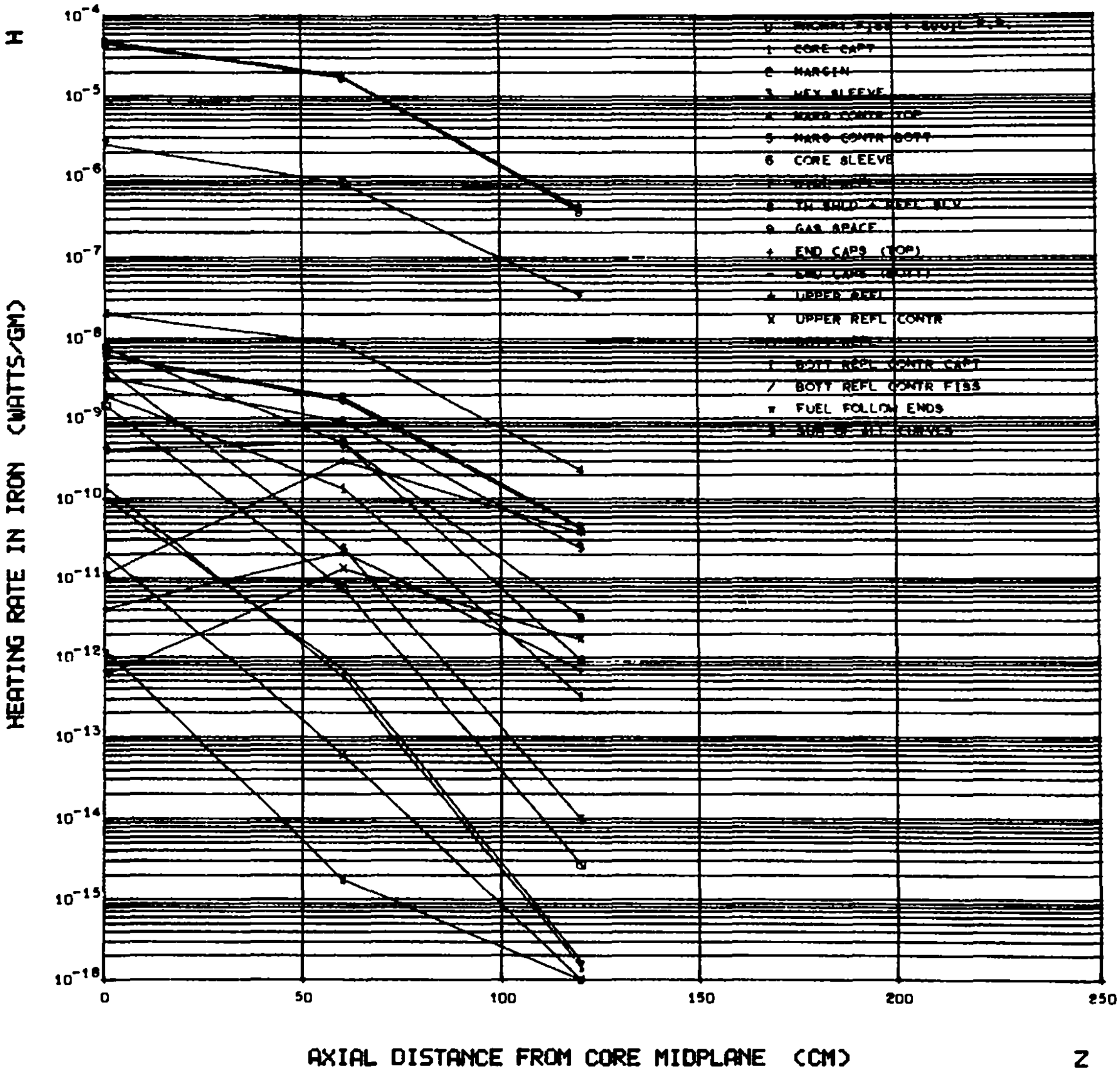

Fig. 20. Heating in MPBE Structure due to Capture and Fission Gamma Rays
R = 110 cm

TABLE I

RESULTS OF MONTE CARLO CAPTURE GAMMA HEATING CALCULATIONS[(a)]
(20-MW Reactor Power)

Source	kW Deposited in Region									
	Side Reflector	SS Thermal Shield	Bor. SS Thermal Shield	Vessel Side	Vessel Bottom	Borated Graphite (Side)	Borated Graphite (Bottom)	Bottom Shield	Pit Walls	Other Internal Regions
Side Reflector	528.	29.	----	----	----	----	----	----	----	43.
SS Thermal Shield	10.7	201.	5.3	0.4	----	0.2	----	----	0.01	4.4
Borated SS Thermal Shield	0.2	2.4	11.7	1.6	----	0.4	----	----	0.05	----
Vessel Side	----	----	1.5	6.3	----	1.8	----	----	0.2	0.6
Vessel Bottom	----	----	----	----	1.59	0.03	0.42	0.51	0.04	----
Bottom Shield	- - - - - - - - - - Not Calculated - - - - - - - - - -									
Total of all Sources	538.9	232.4	18.5	8.3	1.59	2.43	0.42	0.51	0.30	48.0

(a) In the borated SS thermal shield, add 14.2 kW due to $^{10}B(n,\alpha)$ interactions. Corresponding figures for side and bottom borated graphite regions are 15.5 and 3.1 kW, respectively. It was assumed that the 0.48-MeV photon emitted in 94% of the $^{10}B(n,\alpha)$ events was deposited locally.

TABLE II

HEAT DEPOSITION OUTSIDE PRESSURE VESSEL
(20-MW Reactor Power)

A. Capture Gamma Contribution (kW)

Source	QAD	MCG
Side Reflector	0.011	----
SS Thermal Shield	0.196	0.21
Borated SS Thermal Shield	0.447	0.456
Vessel Side	2.141	2.0
Vessel Bottom	0.453	0.49
Bottom Shield	0.260	Not Calculated
Total	3.51	

B. Neutron Interactions in Borated Graphite

$^{10}B(n,\alpha)$ contribution (see Table I) = 18.6 kW
Neutron moderation (estimated) = 15. kW

C. Neutron Escape through Outer Boundary of Borated Graphite = 0.2 kW

D. Total of Above - 37.3 kW

TABLE III

ABSORBED DOSE RATES IN IRON AT 70 REPRESENTATIVE POINTS IN MPBE

R[a] (cm)	Z[a] (cm)	H[b] (W/g)
0	-168.0	9.52 -10
	-108.0	1.02 - 5
	- 80.7	4.49 - 4
	- 53.8	3.74 - 2
	- 36.2	2.36 - 1
	- 18.6	1.31 + 0
	16.5	1.85 + 0
	54.5	1.37 - 1
	92.5	2.68 - 3
	128.0	5.65 - 6
	185.0	6.28 - 7
11.55	-108.0	9.66 - 6
	- 53.8	5.29 - 2
	- 18.6	1.21 + 0
	16.5	1.66 + 0
	54.5	1.15 - 1
	92.5	3.08 - 3
	128.0	5.15 - 6
23.1	-108.0	9.66 - 6
	- 53.8	2.11 - 2
	- 18.6	6.18 - 1
	0.0	1.75 + 0
	16.5	9.84 - 1
	54.5	1.13 - 1
	92.5	4.21 - 3
	128.0	2.78 - 6
	185.0	4.25 - 7
24.3	0.0	1.25 + 0
26.9	-108.0	1.15 - 4
	- 53.8	1.27 - 2
	- 18.6	3.20 - 1
	0.0	7.51 - 1
	16.5	5.20 - 1
	54.5	9.70 - 2
	92.5	5.38 - 3
	128.0	1.05 - 6
29.5	0.0	4.50 - 1
30.7	-108.0	3.33 - 5
	- 53.8	9.86 - 3
	- 18.6	1.73 - 1
	0.0	3.33 - 1
	16.5	2.61 - 1
	54.5	6.21 - 2
	92.5	4.40 - 3
	128.0	9.55 - 7
42.25	-108.0	7.88 - 7
	- 53.8	6.31 - 3
	0.0	1.04 - 1
	16.5	8.53 - 2
	54.5	2.49 - 2
53.8	-108.0	1.13 - 7
	- 53.8	2.95 - 3
	0.0	4.45 - 2
	54.5	1.18 - 2
	92.5	1.32 - 3
	128.0	5.57 - 7
55.7	0.0	3.63 - 2
67.55	0.0	1.57 -22
79.4	0.0	3.04 - 3
89.7	0.0	2.47 - 4
92.2	-168.0	4.28 -12
	- 53.8	1.65 - 5
	0.0	1.24 - 4
	54.5	4.84 - 5
	185.0	1.42 - 9
129.5	0.0	3.61 - 5
213.4	0.0	1.46 - 6
110.0	0.0	4.93 - 5
	60.0	1.83 - 5
	120.0	4.09 - 7

(a) Coordinates are relative to the core center (see Fig. 2).

(b) CAUTION: These values are from capture and fission gamma rays only, and do not include all possible source regions (see text).

TABLE IV

POLYNOMIAL COEFFICIENTS FOR THE INFINITE MEDIUM,
POINT ISOTROPIC, IRON ENERGY ABSORPTION BUILDUP FACTORS

E_o (MeV)	β_0	β_1	β_2	β_3
1.0	1.030878	1.028302	1.19886-1	-1.3804-3
1.25	1.062174	8.113624-1	1.01795-1	-1.3756-3
2.0	1.015755	7.145707-1	4.39420-2	-6.8561-4
3.0	9.927456-1	5.629327-1	2.47765-2	-2.9570-4
4.0	9.468204-1	5.088215-1	4.87998-3	4.4996-4
5.0	9.749004-1	3.949325-1	1.02794-2	2.1285-4
5.5	9.980870-1	3.213020-1	1.35838-2	5.8648-5
7.0	9.928957-1	2.475239-1	1.32622-2	3.6702-5
8.0	9.975268-1	2.046681-1	1.04000-2	1.4357-4
9.0	9.924577-1	1.884341-1	8.00012-3	2.7266-4

TABLE V

CAPTURE AND FISSION GAMMA-RAY SOURCES

Total Source by Region and Energy

[S_T (MeV/sec) x 10^{-17}]

Region Nos.[a] (Fig. 2)	Description	Energy 1.0	1.25	2.0	3.0	4.0	5.0	5.5	7.0	8.0	9.0
1,2,3,4	Core (PF+EFP)	----	61.0	----	----	28.6	----	----	----	----	----
1,2,3,4	Core (capture)	1.20	----	2.08	1.94	0.204	2.17	0.374	0.153	0.349	0.0335
4,(17),(18), (21),(30),(33)	Margin	0.0083	----	0.876	0.0122	----	0.0135	0.0177	0.0296	4.34	0.072
(5)	Hex sleeve	----	----	0.508	----	----	----	----	----	1.53	----
6	Margin control (top)	2.70	----	4.19	4.33	5.78	----	0.722	----	1.56	----
34	Margin control (bottom)	----	----	0.288	----	----	----	----	----	1.48	----
(7)	Core sleeve	----	----	0.266	----	----	----	----	----	0.799	----
(8)	Side reflector	----	----	4.07	----	----	----	----	----	20.93	----
(9),(10)	Thermal Shield + Reflector sleeve	----	----	1.72	----	----	----	----	----	5.18	----
15,16,17	Gas space	0.482	----	0.692	0.772	1.03	----	0.129	----	----	----
18	End capsules (top)	0.0326	----	0.0468	0.0522	0.0696	----	0.0087	----	----	----
30	End capsules (bottom)	0.191	----	0.274	0.306	0.408	----	0.0509	----	0.245	
19,21	Upper reflector	----	----	0.0476	----	----	----	----	----	0.245	----
20	Upper reflector control	0.0378	----	0.0543	0.0605	0.0807	----	0.0101	----	----	----
31,33	Bottom reflector	----	----	0.479	----	----	----	----	----	2.46	----
32	Bottom reflector control (capture)	----	----	0.114	----	----	----	----	----	0.584	----
32 35	Bottom reflector control (fission)	----	0.665	----	----	0.312	----	----	----	----	----
35	Fuel follow ends	0.00653	0.0624	0.00938	0.0105	0.0432	----	0.00174	----	----	----

[a] Parentheses enclosing a region number indicate that only a portion of that region as shown in Fig. 2 is included in the source region being described.

TABLE VI

RADII AND HEIGHTS CORRESPONDING TO MIDPOINTS OF THE I's AND J's

I	R (cm)	J	Z_{DDK} (cm)	$Z_{QAD} = Z_{DDK} - 53.8$ (cm)
1	1.54	1	5.12	-48.7
2	4.63	2	13.4	-40.4
3	7.72	3	19.8	-34.0
4	9.74	4	26.2	-27.6
5	10.7	5	32.6	-21.2
6	12.6	6	36.4	-17.4
7	15.5	7	39.3	-14.5
8	18.3	8	43.6	-10.2
9	20.5	9	48.0	- 5.8
10	22.0	10	52.3	- 1.5
11	23.9	11	56.7	2.9
12	26.1	12	61.0	7.2
13	28.3	13	65.4	11.6
14	30.1	14	69.7	15.9
15	34.6	15	74.5	20.7
16	42.2	16	82.6	28.8
17	49.9	17	93.4	39.6
18	58.1	18	104.3	50.5
19	66.9	19	110.3	56.5
20	75.7	20	114.5	60.7
		21	121.7	67.9
		22	128.9	75.1
		23	136.0	82.2
		24	143.2	89.4

APPENDIX A

INDIVIDUAL CONTRIBUTIONS TO THE ABSORBED DOSE RATE AT 70 DETECTOR POINTS FROM 7 SOURCE REGIONS

The tables below are copies of the computer listing of the QAD calculations for 7 sample source regions; viz.,

Table Number	Source Region
VII	Core (prompt fission and EFP source)
VIII	Bottom reflector
IX	Bottom reflector control (capture source)
X	Bottom reflector control (fission source)
XI	Upper reflector
XII	Upper reflector control
XIII	Fuel-follow ends (capture and fission source)

TABLE VII

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2 04/06/66 Q00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC DIRECT BEAM	ENERGY FLUX MEV PER SQ CM SEC WITH BUILDUP	HEATING RATE IN CARBON WATTS PER GM DIRECT BEAM	HEATING RATE IN CARBON WATTS PER GM WITH BUILDUP	HEATING RATE IN IRON WATTS PER GM DIRECT BEAM	HEATING RATE IN IRON WATTS PER GM WITH BUILDUP
0.	0.	-1.68E 02	1.9636E 01	4.9001E 02	5.9909E-14	1.4950E-12	7.0395E-14	1.7567E-12
0.	0.	-1.08E 02	1.4588E 06	1.7010E 07	4.4511E-09	5.1902E-08	5.2298E-09	6.0964E-08
0.	0.	-8.07E 01	1.1054E 08	9.3731E 08	3.3759E-07	2.8624E-06	3.9641E-07	3.3526E-06
0.	0.	-5.38E 01	9.0894E 09	5.7398E 10	2.7966E-05	1.7660E-04	3.2670E-05	2.0281E-04
0.	0.	-3.62E 01	4.9573E 11	2.5834E 12	1.5865E-03	8.2678E-03	1.8040E-03	8.9610E-03
0.	0.	-1.86E 01	7.3792E 13	2.1105E 14	2.7202E-01	7.7803E-01	2.8154E-01	7.8171E-01
0.	0.	1.65E 01	1.7695E 14	4.0794E 14	6.6231E-01	1.5269E 00	6.7875E-01	1.5286E 00
0.	0.	5.45E 01	2.7148E 11	1.5208E 12	8.9561E-04	5.0172E-03	9.9767E-04	5.2921E-03
0.	0.	9.25E 01	5.1475E 07	4.5444E 08	1.5729E-07	1.3886E-06	1.8463E-07	1.6236E-06
0.	0.	1.28E 02	4.4749E 04	6.4997E 05	1.3654E-10	1.9831E-09	1.6043E-10	2.3299E-09
0.	0.	1.85E 02	7.5645E 03	1.1816E 05	2.3080E-11	3.6052E-10	2.7119E-11	4.2360E-10
1.15E 01	0.	-1.08E 02	1.2316E 06	1.4595E 07	3.7581E-09	4.4534E-08	4.4156E-09	5.2313E-08
1.15E 01	0.	-5.38E 01	9.9209E 09	6.2044E 10	3.0577E-05	1.9123E-04	3.5678E-05	2.1881E-04
1.15E 01	0.	-1.86E 01	6.3304E 13	1.8548E 14	2.3288E-01	6.8231E-01	2.4135E-01	6.8576E-01
1.15E 01	0.	1.65E 01	1.5781E 14	3.6347E 14	5.9066E-01	1.3605E 00	6.0532E-01	1.3621E 00
1.15E 01	0.	5.45E 01	2.0406E 11	1.1421E 12	6.7332E-04	3.7683E-03	7.4995E-04	3.9772E-03
1.15E 01	0.	9.25E 01	3.6261E 07	3.1346E 08	1.1082E-07	9.5799E-07	1.3007E-07	1.1195E-06
1.15E 01	0.	1.28E 02	7.3173E 04	1.0292E 06	2.2326E-10	3.1402E-09	2.6233E-10	3.6893E-09
2.31E 01	0.	-1.08E 02	9.0646E 05	1.0927E 07	2.7658E-09	3.3341E-08	3.2497E-09	3.9166E-08
2.31E 01	0.	-5.38E 01	4.7088E 09	3.0174E 10	1.4477E-05	9.2765E-05	1.6921E-05	1.0676E-04
2.31E 01	0.	-1.86E 01	2.7725E 13	8.2528E 13	1.0185E-01	3.0317E-01	1.0565E-01	3.0485E-01
2.31E 01	0.	0.	1.5527E 14	3.4553E 14	5.8259E-01	1.2964E 00	5.9612E-01	1.2975E 00
2.31E 01	0.	1.65E 01	6.1964E 13	1.5150E 14	2.3093E-01	5.6461E-01	2.3732E-01	5.6580E-01
2.31E 01	0.	5.45E 01	1.8738E 11	1.0454E 12	6.1762E-04	3.4459E-03	6.8839E-04	3.6396E-03
2.31E 01	0.	9.25E 01	4.8278E 07	4.2024E 08	1.4752E-07	1.2841E-06	1.7316E-07	1.5014E-06

TABLE VII (Cont.)

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2 04/06/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	7.3930E-14	1.8449E-12	9.8337E-14	2.4540E-12	6.1068E-14	1.5239E-12
0.	0.	-1.08E 02	5.4924E-09	6.4024E-08	7.3054E-09	8.5145E-08	4.5371E-09	5.2900E-08
0.	0.	-8.07E 01	4.1630E-07	3.5201E-06	5.5355E-07	4.6744E-06	3.4405E-07	2.9150E-06
0.	0.	-5.38E 01	3.4296E-05	2.1263E-04	4.5481E-05	2.7943E-04	2.8457E-05	1.7880E-04
0.	0.	-3.62E 01	1.8900E-03	9.3526E-03	2.4703E-03	1.1894E-02	1.6016E-03	8.2321E-03
0.	0.	-1.86E 01	2.9273E-01	8.1072E-01	3.6175E-01	9.8231E-01	2.6740E-01	7.5871E-01
0.	0.	1.65E 01	7.0514E-01	1.5848E 00	8.6580E-01	1.9154E 00	6.4932E-01	1.4875E 00
0.	0.	5.45E 01	1.0435E-03	5.5112E-03	1.3484E-03	6.8933E-03	8.9875E-04	4.9577E-03
0.	0.	9.25E 01	1.9388E-07	1.7045E-06	2.5775E-07	2.2615E-06	1.6028E-07	1.4134E-06
0.	0.	1.28E 02	1.6848E-10	2.4469E-09	2.2410E-10	3.2544E-09	1.3917E-10	2.0214E-09
0.	0.	1.85E 02	2.8481E-11	4.4487E-10	3.7883E-11	5.9173E-10	2.3526E-11	3.6749E-10
1.15E 01	0.	-1.08E 02	4.6373E-09	5.4938E-08	6.1680E-09	7.3065E-08	3.8307E-09	4.5391E-08
1.15E 01	0.	-5.38E 01	3.7450E-05	2.2934E-04	4.9633E-05	3.0079E-04	3.1103E-05	1.9340E-04
1.15E 01	0.	-1.86E 01	2.5097E-01	7.1123E-01	3.1042E-01	8.6194E-01	2.2901E-01	6.6543E-01
1.15E 01	0.	1.65E 01	6.2885E-01	1.4122E 00	7.7213E-01	1.7069E 00	5.7907E-01	1.3254E 00
1.15E 01	0.	5.45E 01	7.8441E-04	4.1421E-03	1.0135E-03	5.1828E-03	6.7565E-04	3.7243E-03
1.15E 01	0.	9.25E 01	1.3658E-07	1.1753E-06	1.8157E-07	1.5589E-06	1.1293E-07	9.7493E-07
1.15E 01	0.	1.28E 02	2.7550E-10	3.8744E-09	3.6645E-10	5.1532E-09	2.2758E-10	3.2008E-09
2.31E 01	0.	-1.08E 02	3.4129E-09	4.1131E-08	4.5395E-09	5.4703E-08	2.8193E-09	3.3983E-08
2.31E 01	0.	-5.38E 01	1.7764E-05	1.1195E-04	2.3584E-05	1.4728E-04	1.4733E-05	9.3978E-05
2.31E 01	0.	-1.86E 01	1.0987E-01	3.1619E-01	1.3598E-01	3.8332E-01	1.0018E-01	2.9571E-01
2.31E 01	0.	0.	6.1921E-01	1.3451E 00	7.5851E-01	1.6254E 00	5.7092E-01	1.2629E 00
2.31E 01	0.	1.65E 01	2.4661E-01	5.8688E-01	3.0335E-01	7.0956E-01	2.2857E-01	5.5021E-01
2.31E 01	0.	5.45E 01	7.2007E-04	3.7907E-03	9.3074E-04	4.7452E-03	6.1988E-04	3.4064E-03
2.31E 01	0.	9.25E 01	1.8184E-07	1.5762E-06	2.4174E-07	2.0912E-06	1.5033E-07	1.3070E-06

TABLE VII (Cont.)

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2 04/06/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC DIRECT BEAM	ENERGY FLUX MEV PER SQ CM SEC WITH BUILDUP	HEATING RATE IN CARBON WATTS PER GM DIRECT BEAM	HEATING RATE IN CARBON WATTS PER GM WITH BUILDUP	HEATING RATE IN IRON WATTS PER GM DIRECT BEAM	HEATING RATE IN IRON WATTS PER GM WITH BUILDUP
2.31E 01	0.	1.28E 02	6.3953E 04	9.0615E 05	1.9513E-10	2.7648E-09	2.2927E-10	3.2482E-09
2.31E 01	0.	1.85E 02	8.9211E 03	1.3971E 05	2.7219E-11	4.2627E-10	3.1982E-11	5.0085E-10
2.43E 01	0.	0.	8.0811E 13	2.0829E 14	2.9765E-01	7.6719E-01	3.0823E-01	7.7214E-01
2.69E 01	0.	-1.08E 02	3.1295E 06	3.1599E 07	9.5517E-09	9.6443E-08	1.1221E-08	1.1319E-07
2.69E 01	0.	-5.38E 01	1.4398E 09	1.0145E 10	4.4097E-06	3.1070E-05	5.1678E-06	3.6092E-05
2.69E 01	0.	-1.86E 01	8.1829E 12	2.9100E 13	2.8798E-02	1.0241E-01	3.0725E-02	1.0474E-01
2.69E 01	0.	0.	2.2689E 13	7.5901E 13	8.0569E-02	2.6953E-01	8.5452E-02	2.7466E-01
2.69E 01	0.	1.65E 01	1.1246E 13	3.7994E 13	3.9881E-02	1.3473E-01	4.2337E-02	1.3741E-01
2.69E 01	0.	5.45E 01	2.8144E 10	1.6932E 11	8.8465E-05	5.3222E-04	1.0184E-04	5.8899E-04
2.69E 01	0.	9.25E 01	1.1783E 07	1.1621E 08	3.5974E-08	3.5479E-07	4.2250E-08	4.1595E-07
2.69E 01	0.	1.28E 02	6.4270E 03	1.0877E 05	1.9609E-11	3.3187E-10	2.3041E-11	3.8994E-10
2.95E 01	0.	0.	7.5742E 12	3.0056E 13	2.6014E-02	1.0323E-01	2.8207E-02	1.0670E-01
3.07E 01	0.	-1.08E 02	3.6689E 06	3.7769E 07	1.1196E-08	1.1526E-07	1.3154E-08	1.3532E-07
3.07E 01	0.	-5.38E 01	6.1525E 08	4.6268E 09	1.8817E-06	1.4151E-05	2.2073E-06	1.6500E-05
3.07E 01	0.	-1.86E 01	1.9084E 12	8.2294E 12	6.4224E-03	2.7694E-02	7.0592E-03	2.8956E-02
3.07E 01	0.	0.	4.6165E 12	1.9443E 13	1.5617E-02	6.5775E-02	1.7106E-02	6.8520E-02
3.07E 01	0.	1.65E 01	2.3366E 12	9.8939E 12	7.8954E-03	3.3431E-02	8.6546E-03	3.4873E-02
3.07E 01	0.	5.45E 01	7.2466E 09	4.6114E 10	2.2434E-05	1.4276E-04	2.6096E-05	1.6192E-04
3.07E 01	0.	9.25E 01	4.7347E 06	5.0241E 07	1.4451E-08	1.5335E-07	1.6976E-08	1.7994E-07
3.07E 01	0.	1.28E 02	1.7061E 03	3.1766E 04	5.2052E-12	9.6919E-11	6.1163E-12	1.1388E-10
4.22E 01	0.	-1.08E 02	4.8395E 04	7.2129E 05	1.4765E-10	2.2007E-09	1.7350E-10	2.5857E-09
4.22E 01	0.	-5.38E 01	1.1955E 08	1.0028E 09	3.6519E-07	3.0633E-06	4.2875E-07	3.5853E-06
4.22E 01	0.	0.	1.2788E 11	6.8226E 11	4.0158E-04	2.1425E-03	4.6259E-04	2.3764E-03
4.22E 01	0.	1.65E 01	6.9194E 10	3.7341E 11	2.1698E-04	1.1709E-03	2.5019E-04	1.3023E-03
4.22E 01	0.	5.45E 01	4.6727E 08	3.5325E 09	1.4299E-06	1.0810E-05	1.6767E-06	1.2585E-05

TABLE VII (Cont.)

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2 04/06/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	2.4078E-10	3.4113E-09	3.2027E-10	4.5372E-09	1.9890E-10	2.8181E-09
2.31E 01	0.	1.85E 02	3.3588E-11	5.2599E-10	4.4677E-11	6.9963E-10	2.7745E-11	4.3450E-10
2.43E 01	0.	0.	3.2050E-01	8.0091E-01	3.9621E-01	9.7155E-01	2.9264E-01	7.4848E-01
2.69E 01	0.	-1.08E 02	1.1784E-08	1.1887E-07	1.5672E-08	1.5802E-07	9.7357E-09	9.8274E-08
2.69E 01	0.	-5.38E 01	5.4262E-06	3.7872E-05	7.2077E-06	5.0073E-05	4.4914E-06	3.1563E-05
2.69E 01	0.	-1.86E 01	3.2027E-02	1.0879E-01	4.0343E-02	1.3340E-01	2.8547E-02	1.0035E-01
2.69E 01	0.	0.	8.9030E-02	2.8520E-01	1.1174E-01	3.4886E-01	7.9736E-02	2.6384E-01
2.69E 01	0.	1.65E 01	4.4113E-02	1.4269E-01	5.5397E-02	1.7464E-01	3.9479E-02	1.3191E-01
2.69E 01	0.	5.45E 01	1.0679E-04	6.1574E-04	1.4051E-04	7.9264E-04	8.9628E-05	5.3308E-04
2.69E 01	0.	9.25E 01	4.4370E-08	4.3676E-07	5.9005E-08	5.8029E-07	3.6664E-08	3.6141E-07
2.69E 01	0.	1.28E 02	2.4198E-11	4.0952E-10	3.2186E-11	5.4471E-10	1.9988E-11	3.3828E-10
2.95E 01	0.	0.	2.9440E-02	1.1093E-01	3.7449E-02	1.3697E-01	2.5905E-02	1.0144E-01
3.07E 01	0.	-1.08E 02	1.3814E-08	1.4211E-07	1.8373E-08	1.8894E-07	1.1412E-08	1.1746E-07
3.07E 01	0.	-5.38E 01	2.3179E-06	1.7319E-05	3.0804E-06	2.2944E-05	1.9171E-06	1.4392E-05
3.07E 01	0.	-1.86E 01	7.3760E-03	3.0133E-02	9.4578E-03	3.7481E-02	6.4202E-03	2.7300E-02
3.07E 01	0.	0.	1.7868E-02	7.1283E-02	2.2864E-02	8.8459E-02	1.5596E-02	6.4773E-02
3.07E 01	0.	1.65E 01	9.0410E-03	3.6283E-02	1.1574E-02	4.5065E-02	7.8865E-03	3.2934E-02
3.07E 01	0.	5.45E 01	2.7386E-05	1.6960E-04	3.6237E-05	2.2136E-04	2.2799E-05	1.4401E-04
3.07E 01	0.	9.25E 01	1.7828E-08	1.8896E-07	2.3711E-08	2.5116E-07	1.4730E-08	1.5625E-07
3.07E 01	0.	1.28E 02	6.4234E-12	1.1960E-10	8.5440E-12	1.5908E-10	5.3059E-12	9.8793E-11
4.22E 01	0.	-1.08E 02	1.8221E-10	2.7155E-09	2.4236E-10	3.6119E-09	1.5051E-10	2.2432E-09
4.22E 01	0.	-5.38E 01	4.5025E-07	3.7643E-06	5.9864E-07	4.9968E-06	3.7216E-07	3.1189E-06
4.22E 01	0.	0.	4.8510E-04	2.4848E-03	6.3853E-04	3.2028E-03	4.0694E-04	2.1473E-03
4.22E 01	0.	1.65E 01	2.6238E-04	1.3620E-03	3.4555E-04	1.7583E-03	2.1994E-04	1.1745E-03
4.22E 01	0.	5.45E 01	1.7607E-06	1.3208E-05	2.3394E-06	1.7484E-05	1.4567E-06	1.0989E-05

TABLE VII (Cont.)

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2 04/06/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	2.3607E 03	4.3512E 04	7.2024E-12	1.3275E-10	8.4630E-12	1.5599E-10
5.38E 01	0.	-5.38E 01	1.9126E 07	1.8228E 08	5.8384E-08	5.5642E-07	6.8579E-08	6.5269E-07
5.38E 01	0.	0.	5.4588E 09	3.4665E 10	1.6768E-05	1.0648E-04	1.9611E-05	1.2279E-04
5.38E 01	0.	5.45E 01	4.0974E 07	3.7320E 08	1.2510E-07	1.1395E-06	1.4692E-07	1.3356E-06
5.38E 01	0.	9.25E 01	1.3061E 05	1.8050E 06	3.9850E-10	5.5072E-09	4.6823E-10	6.4699E-09
5.38E 01	0.	1.28E 02	1.3809E 02	3.0359E 03	4.2130E-13	9.2626E-12	4.9504E-13	1.0884E-11
5.57E 01	0.	0.	3.0667E 09	2.0264E 10	9.4037E-06	6.2138E-05	1.1011E-05	7.1957E-05
6.75E 01	0.	0.	1.6191E 08	1.3312E 09	4.9454E-07	4.0659E-06	5.8066E-07	4.7602E-06
7.94E 01	0.	0.	9.2822E 06	9.5232E 07	2.8327E-08	2.9062E-07	3.3279E-08	3.4120E-07
8.97E 01	0.	0.	8.8678E 05	1.0845E 07	2.7057E-09	3.3089E-08	3.1792E-09	3.8872E-08
9.22E 01	0.	-1.68E 02	1.4064E-03	6.0495E-02	4.2909E-18	1.8457E-16	5.0419E-18	2.1688E-16
9.22E 01	0.	-5.38E 01	1.4805E 04	2.3678E 05	4.5171E-11	7.2242E-10	5.3077E-11	8.4883E-10
9.22E 01	0.	0.	4.3155E 05	5.5685E 06	1.3167E-09	1.6990E-08	1.5471E-09	1.9961E-08
9.22E 01	0.	5.45E 01	1.6640E 04	2.6863E 05	5.0769E-11	8.1960E-10	5.9654E-11	9.6303E-10
9.22E 01	0.	1.85E 02	1.1309E-01	3.6964E 00	3.4505E-16	1.1278E-14	4.0544E-16	1.3252E-14
1.29E 02	0.	0.	1.1384E 05	1.5425E 06	3.4733E-10	4.7063E-09	4.0811E-10	5.5295E-09
2.13E 02	0.	0.	1.5650E 03	2.7180E 04	4.7749E-12	8.2926E-11	5.6106E-12	9.7439E-11
1.10E 02	0.	0.	1.5755E 05	2.1382E 06	4.8069E-10	6.5239E-09	5.6481E-10	7.6649E-09
1.10E 02	0.	6.00E 01	8.4092E 03	1.3978E 05	2.5657E-11	4.2647E-10	3.0147E-11	5.0110E-10
1.10E 02	0.	1.20E 02	9.7700E 00	2.5308E 02	2.9808E-14	7.7214E-13	3.5026E-14	9.0728E-13

TABLE VII (Cont.)

MPBE HEAT * PF+EFP SRC * REGS 1+2+3+4 * UNIFORM DISTR * NEW BDRY NBR 2   04/06/66   000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	8.8879E-12	1.6382E-10	1.1822E-11	2.1790E-10	7.3417E-12	1.3532E-10
5.38E 01	0.	-5.38E 01	7.2020E-08	6.8537E-07	9.5780E-08	9.1083E-07	5.9507E-08	5.6689E-07
5.38E 01	0.	0.	2.0588E-05	1.2877E-04	2.7319E-05	1.6959E-04	1.7068E-05	1.0794E-04
5.38E 01	0.	5.45E 01	1.5430E-07	1.4024E-06	2.0518E-07	1.8629E-06	1.2750E-07	1.1607E-06
5.38E 01	0.	9.25E 01	4.9174E-10	6.7946E-09	6.5407E-10	9.0370E-09	4.0620E-10	5.6134E-09
5.38E 01	0.	1.28E 02	5.1989E-13	1.1430E-11	6.9153E-13	1.5204E-11	4.2945E-13	9.4417E-12
5.57E 01	0.	0.	1.1561E-05	7.5488E-05	1.5350E-05	9.9644E-05	9.5756E-06	6.3066E-05
6.75E 01	0.	0.	6.0978E-07	4.9979E-06	8.1078E-07	6.6353E-06	5.0399E-07	4.1400E-06
7.94E 01	0.	0.	3.4950E-08	3.5831E-07	4.6484E-08	4.7641E-07	2.8873E-08	2.9617E-07
8.97E 01	0.	0.	3.3388E-09	4.0823E-08	4.4410E-09	5.4293E-08	2.7580E-09	3.3727E-08
9.22E 01	0.	-1.68E 02	5.2950E-18	2.2776E-16	7.0432E-18	3.0296E-16	4.3739E-18	1.8814E-16
9.22E 01	0.	-5.38E 01	5.5741E-11	8.9145E-10	7.4144E-11	1.1857E-09	4.6044E-11	7.3638E-10
9.22E 01	0.	0.	1.6248E-09	2.0963E-08	2.1612E-09	2.7881E-08	1.3422E-09	1.7318E-08
9.22E 01	0.	5.45E 01	6.2649E-11	1.0114E-09	8.3333E-11	1.3453E-09	5.1750E-11	8.3545E-10
9.22E 01	0.	1.85E 02	4.2579E-16	1.3917E-14	5.6637E-16	1.8512E-14	3.5172E-16	1.1496E-14
1.29E 02	0.	0.	4.2860E-10	5.8070E-09	5.7009E-10	7.7238E-09	3.5404E-10	4.7972E-09
2.13E 02	0.	0.	5.8923E-12	1.0233E-10	7.8377E-12	1.3612E-10	4.8672E-12	8.4529E-11
1.10E 02	0.	0.	5.9317E-10	8.0497E-09	7.8899E-10	1.0707E-08	4.8998E-10	6.6498E-09
1.10E 02	0.	6.00E 01	3.1661E-11	5.2626E-10	4.2113E-11	7.0000E-10	2.6153E-11	4.3472E-10
1.10E 02	0.	1.20E 02	3.6784E-14	9.5284E-13	4.8928E-14	1.2674E-12	3.0385E-14	7.8707E-13

TABLE VIII

MFBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	1.1107E 04	9.4228E 04	2.7190E-11	2.3068E-10	4.2594E-11	3.6131E-10
0.	0.	-1.08E 02	3.3253E 08	1.1943E 09	8.1611E-07	2.9312E-06	1.2750E-06	4.5427E-06
0.	0.	-8.07E 01	2.3813E 10	5.9147E 10	5.8993E-05	1.4653E-04	9.1252E-05	2.2061E-04
0.	0.	-5.38E 01	4.3611E 12	6.3532E 12	1.1299E-02	1.6460E-02	1.6661E-02	2.3452E-02
0.	0.	-3.62E 01	3.2532E 13	4.1900E 13	8.5132E-02	1.0965E-01	1.2420E-01	1.5573E-01
0.	0.	-1.86E 01	2.6881E 13	3.5339E 13	7.0218E-02	9.2310E-02	1.0264E-01	1.3104E-01
0.	0.	1.65E 01	1.4843E 08	8.2781E 08	3.7831E-07	2.1099E-06	5.6769E-07	2.9603E-06
0.	0.	5.45E 01	2.0013E 06	1.4199E 07	5.0296E-09	3.5685E-08	7.6616E-09	5.1739E-08
0.	0.	9.25E 01	1.3127E 03	1.3853E 04	3.2206E-12	3.3989E-11	5.0334E-12	5.2846E-11
0.	0.	1.28E 02	3.1610E 00	4.7228E 01	7.7397E-15	1.1564E-13	1.2122E-14	1.8104E-13
0.	0.	1.85E 02	3.4821E-01	5.7189E 00	8.5250E-16	1.4001E-14	1.3354E-15	2.1928E-14
1.15E 01	0.	-1.08E 02	2.9285E 08	1.0602E 09	7.1866E-07	2.6019E-06	1.1229E-06	4.0338E-06
1.15E 01	0.	-5.38E 01	3.4745E 12	5.1787E 12	8.9957E-03	1.3408E-02	1.3274E-02	1.9088E-02
1.15E 01	0.	-1.86E 01	1.8835E 13	2.5441E 13	4.9125E-02	6.6354E-02	7.1925E-02	9.4169E-02
1.15E 01	0.	1.65E 01	1.7426E 08	9.2955E 08	4.4405E-07	2.3686E-06	6.6652E-07	3.3257E-06
1.15E 01	0.	5.45E 01	8.2263E 05	6.2058E 06	2.0678E-09	1.5599E-08	3.1492E-09	2.2817E-08
1.15E 01	0.	9.25E 01	4.6846E 02	5.1400E 03	1.1496E-12	1.2613E-11	1.7962E-12	1.9599E-11
1.15E 01	0.	1.28E 02	2.9825E 00	4.5832E 01	7.3026E-15	1.1222E-13	1.1438E-14	1.7569E-13
2.31E 01	0.	-1.08E 02	2.0738E 08	7.6897E 08	5.0877E-07	1.8867E-06	7.9511E-07	2.9275E-06
2.31E 01	0.	-5.38E 01	1.6598E 12	2.4737E 12	4.2918E-03	6.3967E-03	6.3417E-03	9.1365E-03
2.31E 01	0.	-1.86E 01	9.7153E 12	1.3100E 13	2.5322E-02	3.4143E-02	3.7101E-02	4.8519E-02
2.31E 01	0.	0.	8.6199E 09	3.0766E 10	2.2189E-05	7.9197E-05	3.2946E-05	1.0957E-04
2.31E 01	0.	1.65E 01	6.0823E 07	3.5066E 08	1.5486E-07	8.9282E-07	2.3264E-07	1.2560E-06
2.31E 01	0.	5.45E 01	1.0849E 08	8.0006E 06	2.7243E-09	2.0091E-08	4.1535E-09	2.9199E-08
2.31E 01	0.	9.25E 01	9.2637E 02	1.0051E 04	2.2726E-12	2.4659E-11	3.5521E-12	3.8352E-11

TABLE VIII (Cont.)

MFBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	4.5970E-11	3.8995E-10	7.0747E-11	6.0010E-10	3.0499E-11	2.5874E-10
0.	0.	-1.08E 02	1.3759E-06	4.8994E-06	2.1150E-06	7.5052E-06	9.1455E-07	3.2752E-06
0.	0.	-8.07E 01	9.8406E-05	2.3749E-04	1.5062E-04	3.5914E-04	6.5872E-05	1.6205E-04
0.	0.	-5.38E 01	1.7911E-02	2.5152E-02	2.6824E-02	3.7047E-02	1.2405E-02	1.7859E-02
0.	0.	-3.62E 01	1.3342E-01	1.6698E-01	1.9880E-01	2.4556E-01	9.3118E-02	1.1883E-01
0.	0.	-1.86E 01	1.1027E-01	1.4051E-01	1.6446E-01	2.0657E-01	7.6856E-02	1.0003E-01
0.	0.	1.65E 01	6.1099E-07	3.1715E-06	9.2252E-07	4.6350E-06	4.1789E-07	2.2773E-06
0.	0.	5.45E 01	8.2541E-09	5.5557E-08	1.2548E-08	8.2535E-08	5.5854E-09	3.8949E-08
0.	0.	9.25E 01	5.4315E-12	5.7007E-11	8.3507E-12	8.7449E-11	3.6095E-12	3.8023E-11
0.	0.	1.28E 02	1.3083E-14	1.9538E-13	2.0133E-14	3.0081E-13	8.6612E-15	1.2968E-13
0.	0.	1.85E 02	1.4412E-15	2.3666E-14	2.2180E-15	3.6418E-14	9.5625E-16	1.5704E-14
1.15E 01	0.	-1.08E 02	1.2117E-06	4.3507E-08	1.8627E-08	6.6857E-08	8.0538E-07	2.9077E-06
1.15E 01	0.	-5.38E 01	1.4271E-02	2.0470E-02	2.1380E-02	3.0138E-02	9.8786E-03	1.4543E-02
1.15E 01	0.	-1.86E 01	7.7283E-02	1.0097E-01	1.1535E-01	1.4842E-01	5.3800E-02	7.1895E-02
1.15E 01	0.	1.65E 01	7.1737E-07	3.5631E-06	1.0833E-06	5.2093E-06	4.9055E-07	2.5571E-06
1.15E 01	0.	5.45E 01	3.3927E-09	2.4286E-08	5.1572E-09	3.6079E-08	2.2962E-09	1.7028E-08
1.15E 01	0.	9.25E 01	1.9383E-12	2.1142E-11	2.9798E-12	3.2423E-11	1.2883E-12	1.4107E-11
1.15E 01	0.	1.28E 02	1.2344E-14	1.8961E-13	1.8996E-14	2.9173E-13	8.1909E-15	1.2585E-13
2.31E 01	0.	-1.08E 02	8.5801E-07	3.1577E-06	1.3191E-06	4.8396E-06	5.7021E-07	2.1091E-06
2.31E 01	0.	-5.38E 01	6.8184E-03	9.8005E-03	1.0222E-02	1.4453E-02	4.7153E-03	6.9480E-03
2.31E 01	0.	-1.86E 01	3.9867E-02	5.2027E-02	5.9525E-02	7.6529E-02	2.7738E-02	3.7011E-02
2.31E 01	0.	0.	3.5434E-05	1.1727E-04	5.3240E-05	1.7015E-04	2.4420E-05	8.3079E-05
2.31E 01	0.	1.65E 01	2.5041E-07	1.3459E-06	3.7828E-07	1.9696E-06	1.7113E-07	9.6451E-07
2.31E 01	0.	5.45E 01	4.4750E-09	3.1358E-08	6.8057E-09	4.6840E-08	3.0263E-09	2.1946E-08
2.31E 01	0.	9.25E 01	3.8331E-12	4.1373E-11	5.8935E-12	6.3476E-11	2.5472E-12	2.7589E-11

TABLE VIII (Cont.)

MPBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 Q00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	2.6369E 00	4.0916E 01	6.4564E-15	1.0018E-13	1.0112E-14	1.5684E-13
2.31E 01	0.	1.85E 02	5.5333E-01	9.1230E 00	1.3547E-15	2.2335E-14	2.1220E-15	3.4981E-14
2.43E 01	0.	0.	8.8189E 09	2.9392E 10	2.2339E-05	7.4452E-05	3.3744E-05	1.0609E-04
2.69E 01	0.	-1.08E 02	3.5746E 08	1.2246E 09	8.7783E-07	3.0073E-06	1.3706E-06	4.6521E-06
2.69E 01	0.	-5.38E 01	4.0210E 11	7.3420E 11	1.0219E-03	1.8656E-03	1.5382E-03	2.6974E-03
2.69E 01	0.	-1.86E 01	1.8067E 12	3.0762E 12	4.6139E-03	7.8562E-03	6.9090E-03	1.1269E-02
2.69E 01	0.	0.	8.5307E 09	2.6565E 10	2.1348E-05	6.6478E-05	3.2667E-05	9.7288E-05
2.69E 01	0.	1.65E 01	8.2096E 07	3.9214E 08	2.0348E-07	9.7193E-07	3.1458E-07	1.4578E-06
2.69E 01	0.	5.45E 01	1.4099E 05	1.1300E 06	3.4858E-10	2.7939E-09	5.4033E-10	4.2374E-09
2.69E 01	0.	9.25E 01	1.9698E 02	2.3903E 03	4.8281E-13	5.8589E-12	7.5535E-13	9.1403E-12
2.69E 01	0.	1.28E 02	2.4216E-01	4.3783E 00	5.9287E-16	1.0719E-14	9.2869E-16	1.6788E-14
2.95E 01	0.	0.	6.9211E 09	2.1254E 10	1.7225E-05	5.2896E-05	2.6513E-05	7.8491E-05
3.07E 01	0.	-1.08E 02	4.7871E 08	1.5719E 09	1.1762E-06	3.8622E-06	1.8354E-06	5.9643E-06
3.07E 01	0.	-5.38E 01	1.2158E 11	2.5713E 11	3.0540E-04	6.4593E-04	4.6545E-04	9.4724E-04
3.07E 01	0.	-1.86E 01	4.8198E 11	9.5189E 11	1.2158E-03	2.4011E-03	1.8447E-03	3.4910E-03
3.07E 01	0.	0.	5.8816E 09	1.8140E 10	1.4607E-05	4.5050E-05	2.2534E-05	6.7232E-05
3.07E 01	0.	1.65E 01	7.6637E 07	3.5002E 08	1.8886E-07	8.6255E-07	2.9378E-07	1.3173E-06
3.07E 01	0.	5.45E 01	3.1779E 04	2.7971E 05	7.8178E-11	6.8809E-10	1.2183E-10	1.0603E-09
3.07E 01	0.	9.25E 01	7.5774E 01	9.7524E 02	1.8566E-13	2.3895E-12	2.9058E-13	3.7324E-12
3.07E 01	0.	1.28E 02	5.9994E-02	1.1861E 00	1.4687E-16	2.9038E-15	2.3008E-18	4.5483E-15
4.22E 01	0.	-1.08E 02	2.0012E 07	9.1701E 07	4.9047E-08	2.2475E-07	7.6740E-08	3.5030E-07
4.22E 01	0.	-5.38E 01	7.0625E 09	2.0038E 10	1.7463E-05	4.9544E-05	2.7067E-05	7.5022E-05
4.22E 01	0.	0.	1.4001E 09	4.6628E 09	3.4500E-06	1.1490E-05	5.3669E-06	1.7555E-05
4.22E 01	0.	1.65E 01	4.4490E 07	2.0212E 08	1.0921E-07	4.9816E-07	1.7059E 07	7.6842E-07
4.22E 01	0.	5.45E 01	8.7902E 03	7.9860E 04	2.1527E-11	1.9558E-10	3.3710E-11	3.0589E-10

TABLE VIII (Cont.)

MFBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	1.0914E-14	1.6927E-13	1.6795E-14	2.6044E-13	7.2418E-15	1.1235E-13
2.31E 01	0.	1.85E 02	2.2902E-15	3.7753E-14	3.5245E-15	5.8097E-14	1.5195E-15	2.5052E-14
2.43E 01	0.	0.	3.6333E-05	1.1378E-04	5.5025E-05	1.6760E-04	2.4733E-05	8.0781E-05
2.69E 01	0.	-1.08E 02	1.4789E-06	5.0168E-06	2.2728E-06	7.6790E-06	9.8349E-07	3.3580E-06
2.69E 01	0.	-5.38E 01	1.6559E-03	2.8959E-03	2.5038E-03	4.2960E-03	1.1300E-03	2.0345E-03
2.69E 01	0.	-1.86E 01	7.4350E-03	1.2091E-02	1.1215E-02	1.7868E-02	5.0929E-03	8.5432E-03
2.69E 01	0.	0.	3.5204E-05	1.0453E-04	5.3627E-05	1.5599E-04	2.3745E-05	7.2793E-05
2.69E 01	0.	1.65E 01	3.3923E-07	1.5689E-06	5.1910E-07	2.3684E-06	2.2716E-07	1.0734E-06
2.69E 01	0.	5.45E 01	5.8276E-10	4.5638E-09	8.9278E-10	6.9243E-09	3.8952E-10	3.0978E-09
2.69E 01	0.	9.25E 01	8.1516E-13	9.8622E-12	1.2538E-12	1.5151E-11	5.4132E-13	6.5622E-12
2.69E 01	0.	1.28E 02	1.0023E-15	1.8118E-14	1.5425E-15	2.7881E-14	6.6501E-16	1.2023E-14
2.95E 01	0.	0.	2.8583E-05	8.4415E-05	4.3654E-05	1.2680E-04	1.9200E-05	5.8201E-05
3.07E 01	0.	-1.08E 02	1.9804E-06	6.4312E-06	3.0428E-06	9.8363E-06	1.3175E-06	4.3100E-06
3.07E 01	0.	-5.38E 01	5.0146E-04	1.0179E-03	7.6250E-04	1.5205E-03	3.3921E-04	7.0779E-04
3.07E 01	0.	-1.86E 01	1.9869E-03	3.7493E-03	3.0152E-03	5.5774E-03	1.3482E-03	2.6232E-03
3.07E 01	0.	0.	2.4297E-05	7.2333E-05	3.7145E-05	1.0894E-04	1.6295E-05	4.9667E-05
3.07E 01	0.	1.65E 01	3.1692E-07	1.4194E-06	4.8626E-07	2.1602E-06	2.1131E-07	9.5874E-07
3.07E 01	0.	5.45E 01	1.3145E-10	1.1432E-09	2.0184E-10	1.7468E-09	8.7529E-11	7.6728E-10
3.07E 01	0.	9.25E 01	3.1359E-13	4.0276E-12	4.8242E-13	6.1907E-12	2.0819E-13	2.6776E-12
3.07E 01	0.	1.28E 02	2.4831E-16	4.9088E-15	3.8215E-16	7.5543E-15	1.6475E-16	3.2571E-15
4.22E 01	0.	-1.08E 02	8.2816E-08	3.7794E-07	1.2739E-07	5.8039E-07	5.4992E-08	2.5164E-07
4.22E 01	0.	-5.38E 01	2.9193E-05	8.0792E-05	4.4722E-05	1.2249E-04	1.9513E-05	5.4903E-05
4.22E 01	0.	0.	5.7898E-08	1.8917E-05	8.8837E-06	2.8797E-05	3.8802E-06	1.2773E-05
4.22E 01	0.	1.65E 01	1.8408E-07	8.2873E-07	2.8294E-07	1.2691E-06	1.2238E-07	5.5426E-07
4.22E 01	0.	5.45E 01	3.6381E-11	3.3011E-10	5.5981E-11	5.0769E-10	2.4144E-11	2.1925E-10

TABLE VIII (Cont.)

MFBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	2.0620E 06	1.1471E 07	5.0508E-09	2.8098E-08	7.9076E-09	4.3907E-08
5.38E 01	0.	-5.38E 01	4.9626E 08	1.8079E 09	1.2196E-06	4.4430E-06	1.9027E-06	6.8536E-06
5.38E 01	0.	0.	1.6967E 08	6.7732E 08	4.1658E-07	1.6630E-06	6.5056E-07	2.5736E-06
5.38E 01	0.	5.45E 01	5.0343E 03	4.6653E 04	1.2326E-11	1.1422E-10	1.9307E-11	1.7884E-10
5.38E 01	0.	9.25E 01	2.0643E 00	3.3190E 01	5.0537E-15	8.1254E-14	7.9166E-15	1.2727E-13
5.38E 01	0.	1.28E 02	4.6283E-03	1.0436E-01	1.1330E-17	2.5548E-16	1.7749E-17	4.0021E-16
5.57E 01	0.	0.	1.0888E 08	4.5212E 08	2.6720E-07	1.1095E-06	4.1749E-07	1.7203E-06
6.75E 01	0.	0.	1.1712E 07	5.8857E 07	2.8700E-08	1.4422E-07	4.4913E-08	2.2497E-07
7.94E 01	0.	0.	1.1717E 06	7.1379E 06	2.8695E-09	1.7480E-08	4.4935E-09	2.7337E-08
8.97E 01	0.	0.	1.6872E 05	1.2003E 06	4.1309E-10	2.9388E-09	6.4703E-10	4.6003E-09
9.22E 01	0.	-1.68E 02	2.7393E 01	3.2990E 02	6.7058E-14	8.0759E-13	1.0505E-13	1.2651E-12
9.22E 01	0.	-5.38E 01	1.4986E 05	1.0877E 06	3.6692E-10	2.6631E-09	5.7471E-10	4.1692E-09
9.22E 01	0.	0.	9.0687E 04	6.7780E 05	2.2203E-10	1.6595E-09	3.4778E-10	2.5982E-09
9.22E 01	0.	5.45E 01	1.0635E 02	1.2741E 03	2.6036E-13	3.1190E-12	4.0788E-13	4.8860E-12
9.22E 01	0.	1.85E 02	3.2673E-06	1.0513E-04	7.9985E-21	2.5736E-19	1.2530E-20	4.0318E-19
1.29E 02	0.	0.	4.3482E 04	3.2936E 05	1.0646E-10	8.0838E-10	1.6675E-10	1.2626E-09
2.13E 02	0.	0.	2.2545E 03	2.0175E 04	5.5190E-12	4.9388E-11	8.6459E-12	7.7367E-11
1.10E 02	0.	0.	4.8130E 04	3.7036E 05	1.1784E-10	9.0675E-10	1.8458E-10	1.4198E-09
1.10E 02	0.	6.00E 01	1.6933E 02	1.9234E 03	4.1453E-13	4.7086E-12	6.4939E-13	7.3760E-12
1.10E 02	0.	1.20E 02	3.6367E-02	6.9402E-01	8.9025E-17	1.6990E-15	1.3947E-16	2.8816E-15

TABLE VIII (Cont.)

MPBE HEAT- BOTTOM REFL (IN+OUT) SRC * REG 31+33 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	8.5341E-09	4.7380E-08	1.3131E-08	7.2841E-08	5.6644E-09	3.1489E-08
5.38E 01	0.	-5.38E 01	2.0529E-06	7.3896E-06	3.1538E-06	1.1297E-05	1.3660E-06	4.9562E-06
5.38E 01	0.	0.	7.0199E-07	2.7755E-06	1.0789E-06	4.2491E-06	4.6676E-07	1.8572E-06
5.38E 01	0.	5.45E 01	2.0837E-11	1.9300E-10	3.2066E-11	2.9696E-10	1.3826E-11	1.2810E-10
5.38E 01	0.	9.25E 01	8.5441E-15	1.3736E-13	1.3149E-14	2.1138E-13	5.6608E-15	9.1140E-14
5.38E 01	0.	1.28E 02	1.9156E-17	4.3193E-16	2.9482E-17	6.6474E-16	1.2709E-17	2.8657E-16
5.57E 01	0.	0.	4.5051E-07	1.8555E-06	6.9257E-07	2.8429E-06	2.9944E-07	1.2400E-06
6.75E 01	0.	0.	4.8470E-08	2.4273E-07	7.4563E-08	3.7287E-07	3.2181E-08	1.6153E-07
7.94E 01	0.	0.	4.8496E-09	2.9501E-08	7.4623E-09	4.5369E-08	3.2184E-09	1.9596E-08
8.97E 01	0.	0.	6.9631E-10	4.9647E-09	1.0746E-09	7.6383E-09	4.6335E-10	3.2956E-09
9.22E 01	0.	-1.60E 02	1.1338E-13	1.3654E-12	1.7449E-13	2.1014E-12	7.5221E-14	9.0589E-13
9.22E 01	0.	-5.38E 01	6.2027E-10	4.4995E-09	9.5455E-10	6.9227E-09	4.1156E-10	2.9866E-09
9.22E 01	0.	0.	3.7535E-10	2.8040E-09	5.7763E-10	4.3143E-09	2.4905E-10	1.8611E-09
9.22E 01	0.	5.45E 01	4.4019E-13	5.2733E-12	6.7746E-13	8.1155E-12	2.9205E-13	3.4987E-12
9.22E 01	0.	1.85E 02	1.3524E-20	4.3514E-19	2.0813E-20	6.6068E-19	8.9721E-21	2.8869E-19
1.29E 02	0.	0.	1.7997E-10	1.3626E-09	2.7696E-10	2.0966E-09	1.1941E-10	9.0437E-10
2.13E 02	0.	0.	9.3313E-12	8.3499E-11	1.4361E-11	1.2850E-10	6.1908E-12	5.5398E-11
1.10E 02	0.	0.	1.9921E-10	1.5323E-09	3.0657E-10	2.3577E-09	1.3218E-10	1.0169E-09
1.10E 02	0.	6.00E 01	7.0087E-13	7.9606E-12	1.0786E-12	1.2251E-11	4.6499E-13	5.2817E-12
1.10E 02	0.	1.20E 02	1.5032E-16	2.8725E-15	2.3165E-16	4.4209E-15	9.9863E-17	1.9058E-15

TABLE IX

MFBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 • INTENS FCT FROM VOLS 04/15/66 @00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	1.5768E 03	1.4184E 04	3.8603E-12	3.4723E-11	6.0472E-12	5.4387E-11
0.	0.	-1.08E 02	3.8357E 07	1.5290E 08	9.4092E-08	3.7506E-07	1.4708E-07	5.8239E-07
0.	0.	-8.07E 01	2.5066E 09	7.1012E 09	6.1877E-06	1.7530E-05	9.6075E-06	2.6633E-05
0.	0.	-5.38E 01	3.0099E 11	5.9469E 11	7.5978E-04	1.5012E-03	1.1519E-03	2.1746E-03
0.	0.	-3.62E 01	4.7543E 12	7.7786E 12	1.2187E-02	1.9940E-02	1.8176E-02	2.8371E-02
0.	0.	-1.86E 01	3.4409E 12	5.6941E 12	8.8124E-03	1.4583E-02	1.3156E-02	2.0769E-02
0.	0.	1.65E 01	4.1172E 07	2.3042E 08	1.0516E-07	5.8855E-07	1.5745E-07	8.2211E-07
0.	0.	5.45E 01	4.3436E 05	3.1309E 06	1.0940E-09	7.8859E-09	1.6626E-09	1.1374E-08
0.	0.	9.25E 01	4.3118E 02	4.4942E 03	1.0582E-12	1.1029E-11	1.6533E-12	1.7133E-11
0.	0.	1.28E 02	1.6532E 00	2.4263E 01	4.0479E-15	5.9410E-14	6.3399E-15	9.3002E-14
0.	0.	1.85E 02	4.4769E-01	6.8346E 00	1.0960E-15	1.6733E-14	1.7169E-15	2.6205E-14
1.15E 01	0.	-1.08E 02	3.9427E 07	1.5619E 08	9.6746E-08	3.8327E-07	1.5118E-07	5.9442E-07
1.15E 01	0.	-5.38E 01	3.2482E 11	5.9916E 11	8.3358E-04	1.5376E-03	1.2418E-03	2.1849E-03
1.15E 01	0.	-1.86E 01	1.0611E 13	1.3657E 13	2.7879E-02	3.5882E-02	4.0498E-02	5.0673E-02
1.15E 01	0.	1.65E 01	8.8615E 07	4.3743E 08	2.2685E-07	1.1198E-06	3.3882E-07	1.5583E-06
1.15E 01	0.	5.45E 01	3.1498E 05	2.2125E 06	7.9435E-10	5.5796E-09	1.2056E-09	8.0228E-09
1.15E 01	0.	9.25E 01	3.8604E 01	4.3899E 02	9.4809E-14	1.0781E-12	1.4801E-13	1.6711E-12
1.15E 01	0.	1.28E 02	6.1426E-01	9.3329E 00	1.5041E-15	2.2852E-14	2.3556E-15	3.5774E-14
2.31E 01	0.	-1.08E 02	2.3904E 07	9.9178E 07	5.8623E-08	2.4323E-07	9.1659E-08	3.7807E-07
2.31E 01	0.	-5.38E 01	4.8607E 10	1.0863E 11	1.2172E-04	2.7202E-04	1.8613E-04	3.9967E-04
2.31E 01	0.	-1.86E 01	2.9286E 11	5.6648E 11	7.4069E-04	1.4327E-03	1.1207E-03	2.0706E-03
2.31E 01	0.	0.	1.2209E 09	4.8043E 09	3.1325E-06	1.2326E-05	4.6676E-06	1.7123E-05
2.31E 01	0.	1.65E 01	1.2153E 07	7.3001E 07	3.0945E-08	1.8588E-07	4.6486E-08	2.6147E-07
2.31E 01	0.	5.45E 01	3.1410E 05	2.2666E 06	7.9032E-10	5.7031E-09	1.2024E-09	8.2475E-09
2.31E 01	0.	9.25E 01	3.3751E 02	3.5064E 03	8.2817E-13	8.6039E-12	1.2942E-12	1.3372E-11

TABLE IX (Cont.)

MFBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 * INTENS FCT FROM VOLS 04/15/66 @00000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	6.5265E-12	5.8697E-11	1.0044E-11	9.0329E-11	4.3301E-12	3.8947E-11
0.	0.	-1.08E 02	1.5872E-07	6.2820E-07	2.4404E-07	9.6313E-07	1.0546E-07	4.1938E-07
0.	0.	-8.07E 01	1.0363E-05	2.8688E-05	1.5888E-05	4.3561E-05	6.9186E-06	1.9449E-05
0.	0.	-5.38E 01	1.2406E-03	2.3349E-03	1.8821E-03	3.4673E-03	8.4233E-04	1.6380E-03
0.	0.	-3.62E 01	1.9555E-02	3.0425E-02	2.9443E-02	4.4781E-02	1.3433E-02	2.1624E-02
0.	0.	-1.86E 01	1.4155E-02	2.2275E-02	2.1322E-02	3.2802E-02	9.7168E-03	1.5820E-02
0.	0.	1.65E 01	1.6943E-07	8.8048E-07	2.5555E-07	1.2839E-06	1.1607E-07	6.3429E-07
0.	0.	5.45E 01	1.7909E-09	1.2209E-08	2.7197E-09	1.8091E-08	1.2139E-09	8.5917E-09
0.	0.	9.25E 01	1.7841E-12	1.8482E-11	2.7426E-12	2.8340E-11	1.1858E-12	1.2334E-11
0.	0.	1.28E 02	6.8424E-15	1.0037E-13	1.0529E-14	1.5442E-13	4.5403E-15	6.6624E-14
0.	0.	1.85E 02	1.8530E-15	2.8282E-14	2.8516E-15	4.3521E-14	1.2294E-15	1.8768E-14
1.15E 01	0.	-1.08E 02	1.6314E-07	6.4113E-07	2.5080E-07	9.8244E-07	1.0842E-07	4.2837E-07
1.15E 01	0.	-5.38E 01	1.3358E-03	2.3428E-03	2.0102E-03	3.4461E-03	9.1843E-04	1.6667E-03
1.15E 01	0.	-1.86E 01	4.3492E-02	5.4312E-02	6.4671E-02	7.9639E-02	3.0449E-02	3.8814E-02
1.15E 01	0.	1.65E 01	3.6455E-07	1.6685E-06	5.4926E-07	2.4283E-06	2.5017E-07	1.2053E-06
1.15E 01	0.	5.45E 01	1.2985E-09	8.6099E-09	1.9707E-09	1.2739E-08	8.6096E-10	6.0726E-09
1.15E 01	0.	9.25E 01	1.5971E-13	1.8023E-12	2.4544E-13	2.7610E-12	1.0622E-13	1.2047E-12
1.15E 01	0.	1.28E 02	2.5423E-15	3.6608E-14	3.9125E-15	5.9399E-14	1.6870E-15	2.5627E-14
2.31E 01	0.	-1.08E 02	9.8913E-08	4.0784E-07	1.5210E-07	6.2555E-07	6.5713E-08	2.7207E-07
2.31E 01	0.	-5.38E 01	2.0057E-04	4.2955E-04	3.0544E-04	6.4221E-04	1.3535E-04	2.9827E-04
2.31E 01	0.	-1.86E 01	1.2068E-03	2.2229E-03	1.8290E-03	3.2972E-03	8.2056E-04	1.5620E-03
2.31E 01	0.	0.	5.0213E-06	1.8331E-05	7.5569E-06	2.6653E-05	3.4517E-06	1.3259E-05
2.31E 01	0.	1.65E 01	5.0035E-08	2.8017E-07	7.5584E-08	4.1000E-07	3.4196E-08	2.0080E-07
2.31E 01	0.	5.45E 01	1.2952E-09	8.8545E-09	1.9679E-09	1.3138E-08	8.7726E-10	6.2193E-09
2.31E 01	0.	9.25E 01	1.3965E-12	1.4425E-11	2.1470E-12	2.2124E-11	9.2814E-13	9.6236E-12

TABLE IX (Cont.)

MPBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 * INTENS FCT FROM VOLS 04/15/66 Q00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	9.0091E-01	1.3351E 01	2.2059E-15	3.2691E-14	3.4550E-15	5.1176E-14
2.31E 01	0.	1.85E 02	2.1194E-01	3.3022E 00	5.1887E-16	8.0845E-15	8.1278E-16	1.2661E-14
2.43E 01	0.	0.	1.0497E 09	4.0707E 09	2.6716E-06	1.0360E-05	4.0152E-06	1.4613E-05
2.69E 01	0.	-1.08E 02	3.1648E 07	1.2726E 08	7.7627E-08	3.1215E-07	1.2135E-07	4.8487E-07
2.69E 01	0.	-5.38E 01	1.7962E 10	4.4257E 10	4.4701E-05	1.1014E-04	6.8811E-05	1.6388E-04
2.69E 01	0.	-1.86E 01	8.8785E 10	1.9368E 11	2.2247E-04	4.8531E-04	3.3997E-04	7.1162E-04
2.69E 01	0.	0.	7.6324E 08	2.9168E 09	1.9216E-06	7.3435E-06	2.9216E-06	1.0597E-05
2.69E 01	0.	1.65E 01	1.0036E 07	5.5997E 07	2.5074E-08	1.3991E-07	3.8435E-08	2.0559E-07
2.69E 01	0.	5.45E 01	4.6863E 04	3.6891E 05	1.1592E-10	9.1257E-10	1.7960E-10	1.3817E-09
2.69E 01	0.	9.25E 01	9.3215E 01	1.0495E 03	2.2853E-13	2.5730E-12	3.5745E-13	4.0109E-12
2.69E 01	0.	1.28E 02	1.1387E-01	1.9547E 00	2.7877E-16	4.7856E-15	4.3668E-16	7.4950E-15
2.95E 01	0.	0.	5.3169E 08	2.0320E 09	1.3288E-06	5.0782E-06	2.0363E-06	7.4562E-06
3.07E 01	0.	-1.08E 02	3.6923E 07	1.4545E 08	9.0578E-08	3.5682E-07	1.4158E-07	5.5399E-07
3.07E 01	0.	-5.38E 01	6.7515E 09	1.8235E 10	1.6726E-05	4.5174E-05	2.5872E-05	6.7956E-05
3.07E 01	0.	-1.86E 01	2.8528E 10	6.9212E 10	7.1005E-05	1.7227E-04	1.0928E-04	2.5604E-04
3.07E 01	0.	0.	4.3751E 08	1.6783E 09	1.0901E-06	4.1817E-06	1.6759E-06	6.1874E-06
3.07E 01	0.	1.65E 01	7.4541E 06	4.0589E 07	1.8466E-08	1.0055E-07	2.8564E-08	1.5125E-07
3.07E 01	0.	5.45E 01	9.9238E 03	8.6114E 04	2.4422E-11	2.1193E-10	3.8045E-11	3.2611E-10
3.07E 01	0.	9.25E 01	3.0666E 01	3.7485E 02	7.5145E-14	9.1855E-13	1.1760E-13	1.4342E-12
3.07E 01	0.	1.28E 02	3.6152E-02	6.5784E-01	8.8505E-17	1.6105E-15	1.3864E-16	2.5226E-15
4.22E 01	0.	-1.08E 02	2.0939E 06	1.0935E 07	5.1420E-09	2.6789E-08	8.0488E-09	4.1825E-08
4.22E 01	0.	-5.38E 01	5.1984E 08	1.7690E 09	1.2790E-06	4.3525E-06	1.9929E-06	6.6841E-06
4.22E 01	0.	0.	8.9068E 07	3.6588E 08	2.1924E-07	9.0061E-07	3.4145E-07	1.3811E-06
4.22E 01	0.	1.65E 01	3.0681E 06	1.6916E 07	7.5391E-09	4.1567E-08	1.1763E-08	6.4174E-08
4.22E 01	0.	5.45E 01	7.3091E 02	7.6455E 03	1.7911E-12	1.8736E-11	2.8028E-12	2.9243E-11

TABLE IX (Cont.)

MFBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 * INTENS FCT FROM VOLS 04/15/66 @00000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	3.7288E-15	5.5230E-14	5.7381E-15	8.4974E-14	2.4742E-15	3.6661E-14
2.31E 01	0.	1.85E 02	8.7721E-16	1.3665E-14	1.3500E-15	2.1028E-14	5.8202E-16	9.0677E-15
2.43E 01	0.	0.	4.3219E-06	1.5661E-05	6.5302E-06	2.2951E-05	2.9527E-06	1.1202E-05
2.69E 01	0.	-1.08E 02	1.3096E-07	5.2302E-07	2.0136E-07	8.0200E-07	8.7010E-08	3.4907E-07
2.69E 01	0.	-5.38E 01	7.4183E-05	1.7628E-04	1.1330E-04	2.6513E-04	4.9827E-05	1.2130E-04
2.69E 01	0.	-1.86E 01	3.6633E-04	7.6472E-04	5.5770E-04	1.1422E-03	2.4733E-04	5.3177E-04
2.69E 01	0.	0.	3.1471E-06	1.1375E-05	4.7803E-06	1.6859E-05	2.1325E-06	8.0021E-06
2.69E 01	0.	1.65E 01	4.1425E-08	2.2096E-07	6.3150E-08	3.3038E-07	2.7907E-08	1.5342E-07
2.69E 01	0.	5.45E 01	1.9370E-10	1.4880E-09	2.9667E-10	2.2559E-09	1.2952E-10	1.0112E-09
2.69E 01	0.	9.25E 01	3.8574E-13	4.3275E-12	5.9327E-13	6.6459E-12	2.5620E-13	2.8810E-12
2.69E 01	0.	1.28E 02	4.7129E-16	8.0889E-15	7.2529E-16	1.2448E-14	3.1270E-16	5.3676E-15
2.95E 01	0.	0.	2.1946E-06	8.0133E-06	3.3452E-06	1.1977E-05	1.4788E-06	5.5669E-06
3.07E 01	0.	-1.08E 02	1.5278E-07	5.9757E-07	2.3491E-07	9.1611E-07	1.0152E-07	3.9896E-07
3.07E 01	0.	-5.38E 01	2.7900E-05	7.3152E-05	4.2703E-05	1.1058E-04	1.8676E-05	4.9944E-05
3.07E 01	0.	-1.86E 01	1.1781E-04	2.7539E-04	1.7993E-04	4.1397E-04	7.9143E-05	1.8965E-04
3.07E 01	0.	0.	1.8066E-06	6.6531E-06	2.7577E-06	9.9802E-06	1.2145E-06	4.5964E-06
3.07E 01	0.	1.65E 01	3.0804E-08	1.6281E-07	4.7147E-08	2.4611E-07	2.0620E-08	1.1117E-07
3.07E 01	0.	5.45E 01	4.1046E-11	3.5156E-10	6.3017E-11	5.3686E-10	2.7340E-11	2.3620E-10
3.07E 01	0.	9.25E 01	1.2691E-13	1.5476E-12	1.9523E-13	2.3784E-12	8.4260E-14	1.0291E-12
3.07E 01	0.	1.28E 02	1.4963E-16	2.7225E-15	2.3028E-16	4.1897E-15	9.9277E-17	1.8064E-15
4.22E 01	0.	-1.08E 02	8.6864E-09	4.5131E-08	1.3364E-08	6.9356E-08	5.7662E-09	3.0013E-08
4.22E 01	0.	-5.38E 01	2.1502E-06	7.2048E-06	3.3015E-06	1.0993E-05	1.4319E-06	4.8475E-06
4.22E 01	0.	0.	3.6838E-07	1.4885E-06	5.6552E-07	2.2696E-06	2.4541E-07	1.0025E-06
4.22E 01	0.	1.65E 01	1.2693E-08	6.9197E-08	1.9500E-08	1.0582E-07	8.4446E-09	4.6382E-08
4.22E 01	0.	5.45E 01	3.0248E-12	3.1554E-11	4.6530E-12	4.8485E-11	2.0084E-12	2.0988E-11

TABLE IX (Cont.)

MFBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 * INTENS FCT FROM VOLS 04/15/66 Q00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC DIRECT BEAM	ENERGY FLUX MEV PER SQ CM SEC WITH BUILDUP	HEATING RATE IN CARBON WATTS PER GM DIRECT BEAM	HEATING RATE IN CARBON WATTS PER GM WITH BUILDUP	HEATING RATE IN IRON WATTS PER GM DIRECT BEAM	HEATING RATE IN IRON WATTS PER GM WITH BUILDUP
5.38E 01	0.	-1.08E 02	2.1208E 05	1.3517E 06	5.1934E-10	3.3101E-09	8.1330E-10	5.1779E-09
5.38E 01	0.	-5.38E 01	4.0710E 07	1.7367E 08	9.9865E-08	4.2602E-07	1.5610E-07	6.6150E-07
5.38E 01	0.	0.	1.1562E 07	5.5508E 07	2.8362E-08	1.3[illegible]6E-07	4.4336E-08	2.1149E-07
5.38E 01	0.	5.45E 01	3.2843E 02	3.5476E 03	8.0425E-13	8.6872E-12	1.2595E-12	1.3594E-11
5.38E 01	0.	9.25E 01	2.6429E-01	4.4925E 00	6.4704E-16	1.0999E-14	1.0135E-15	1.7225E-14
5.38E 01	0.	1.28E 02	1.1218E-03	2.5334E-02	2.7461E-18	6.2019E-17	4.3019E-18	9.7152E-17
5.57E 01	0.	0.	7.5504E 06	3.7550E 07	1.8514E-08	9.2073E-08	2.8952E-08	1.4323E-07
6.75E 01	0.	0.	9.7666E 05	5.6622E 06	2.3923E-09	1.3869E-08	3.7453E-09	2.1669E-08
7.94E 01	0.	0.	1.0110E 05	7.0335E 05	2.4756E-10	1.7222E-09	3.8772E-10	2.6952E-09
8.97E 01	0.	0.	1.4659E 04	1.1837E 05	3.5890E-11	2.8981E-10	5.6218E-11	4.5381E-10
9.22E 01	0.	-1.68E 02	1.1722E 00	1.7059E 01	2.8695E-15	4.1761E-14	4.4953E-15	6.5421E-14
9.22E 01	0.	-5.38E 01	1.3583E 04	1.1114E 05	3.3254E-11	2.7209E-10	5.2090E-11	4.2609E-10
9.22E 01	0.	0.	7.9035E 03	6.6911E 04	1.9349E-11	1.6381E-10	3.0310E-11	2.5654E-10
9.22E 01	0.	5.45E 01	7.2768E 00	9.9893E 01	1.7814E-14	2.4454E-13	2.7906E-14	3.8307E-13
9.22E 01	0.	1.85E 02	5.2607E-07	1.7247E-05	1.2878E-21	4.2222E-20	2.0175E-21	6.6144E-20
1.29E 02	0.	0.	3.7418E 03	3.2121E 04	9.1607E-12	7.8637E-11	1.4350E-11	1.2315E-10
2.13E 02	0.	0.	2.0885E 02	2.0885E 03	5.1127E-13	5.1126E-12	8.0094E-13	8.0091E-12
1.10E 02	0.	0.	4.1425E 03	3.6100E 04	1.0141E-11	8.8380E-11	1.5886E-11	1.3842E-10
1.10E 02	0.	6.00E 01	1.1310E 01	1.4733E 02	2.7686E-14	3.6068E-13	4.3372E-14	5.6500E-13
1.10E 02	0.	1.20E 02	1.6945E-03	3.7322E-02	4.1481E-18	9.1364E-17	6.4984E-18	1.4313E-16

TABLE IX (Cont.)

MFBE HEAT- BOTTOM REFL CON CAPT SRC * REG 32 * INTENS FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	8.7775E-10	5.5878E-09	1.3507E-09	8.5943E-09	5.8248E-10	3.7111E-09
5.38E 01	0.	-5.38E 01	1.6845E-07	7.1353E-07	2.5900E-07	1.0939E-06	1.1193E-07	4.7635E-07
5.38E 01	0.	0.	4.7844E-08	2.2813E-07	7.3565E-08	3.4981E-07	3.1790E-08	1.5226E-07
5.38E 01	0.	5.45E 01	1.3593E-12	1.4671E-11	2.0918E-12	2.2568E-11	9.0204E-13	9.7408E-12
5.38E 01	0.	9.25E 01	1.0939E-15	1.8590E-14	1.C934E-15	2.8607E-14	7.2578E-16	1.2336E-14
5.38E 01	0.	1.28E 02	4.6429E-18	1.0485E-16	7.1455E-18	1.6137E-16	3.0804E-18	6.9567E-17
5.57E 01	0.	0.	3.1244E-08	1.5451E-07	4.8049E-08	2.3707E-07	2.0754E-08	1.0302E-07
6.75E 01	0.	0.	4.0421E-09	2.3383E-08	6.2191E-09	3.5946E-08	2.6829E-09	1.5543E-08
7.94E 01	0.	0.	4.1845E-10	2.9087E-09	6.4394E-10	4.4746E-09	2.7767E-10	1.9311E-09
8.97E 01	0.	0.	6.0674E-11	4.8977E-10	9.3375E-11	7.5362E-10	4.0257E-11	3.2503E-10
9.22E 01	0.	-1.68E 02	4.8517E-15	7.0607E-14	7.4668E-15	1.0867E-13	3.2188E-15	4.6844E-14
9.22E 01	0.	-5.38E 01	5.6219E-11	4.5985E-10	8.6518E-11	7.0761E-10	3.7300E-11	3.0517E-10
9.22E 01	0.	0.	3.2712E-11	2.7686E-10	5.0343E-11	4.2604E-10	2.1704E-11	1.8373E-10
9.22E 01	0.	5.45E 01	3.0119E-14	4.1344E-13	4.6353E-14	6.3628E-13	1.9982E-14	2.7430E-13
9.22E 01	0.	1.85E 02	2.1774E-21	7.1387E-20	3.3511E-21	1.0987E-19	1.4446E-21	4.7361E-20
1.29E 02	0.	0.	1.5487E-11	1.3291E-10	2.3835E-11	2.0453E-10	1.0276E-11	8.8200E-11
2.13E 02	0.	0.	8.6443E-13	8.6440E-12	1.3304E-12	1.3303E-11	5.7350E-13	5.7349E-12
1.10E 02	0.	0.	1.7146E-11	1.4938E-10	2.6386E-11	2.2988E-10	1.1376E-11	9.9128E-11
1.10E 02	0.	6.00E 01	4.6810E-14	6.0979E-13	7.2041E-14	9.3846E-13	3.1056E-14	4.0458E-13
1.10E 02	0.	1.20E 02	7.0135E-18	1.5447E-16	1.0794E-17	2.3774E-16	4.6531E-18	1.0249E-16

TABLE X

MPBE HEAT- BOT7 REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	8.1076E 01	1.3817E 03	2.4736E-13	4.2156E-12	2.9066E-13	4.9533E-12
0.	0.	-1.08E 02	5.8606E 06	4.3369E 07	1.7912E-08	1.3255E-07	2.1022E-08	1.5488E-07
0.	0.	-8.07E 01	5.8383E 08	3.1997E 09	1.8084E-06	9.9111E-06	2.1029E-06	1.1235E-05
0.	0.	-5.38E 01	1.2433E 11	5.1954E 11	4.1563E-04	1.7369E-03	4.5887E-04	1.8195E-03
0.	0.	-3.62E 01	2.8421E 12	9.3014E 12	1.0025E-02	3.2810E-02	1.0680E-02	3.3403E-02
0.	0.	-1.86E 01	2.6449E 12	8.6475E 12	9.3320E-03	3.0511E-02	9.9396E-03	3.1057E-02
0.	0.	1.65E 01	4.0392E 07	3.1955E 08	1.2477E-07	9.8705E-07	1.4536E-07	1.1243E-06
C.	0.	5.45E 01	4.5594E 05	4.4929E 06	1.3954E-09	1.3751E-08	1.6361E-09	1.6008E-08
0.	0.	9.25E 01	2.5401E 02	4.1753E 03	7.7503E-13	1.2739E-11	9.1064E-13	1.4966E-11
0.	0.	1.28E 02	4.8898E-01	1.1986E 01	1.4919E-15	3.6568E-14	1.7530E-15	4.2968E-14
0.	0.	1.85E 02	9.0837E-02	2.3770E 00	2.7714E-16	7.2524E-15	3.2565E-16	8.5217E-15
1.15E 01	0.	-1.08E 02	6.3872E 06	4.6749E 07	1.3527E-08	1.4292E-07	2.2913E-08	1.6686E-07
1.15E 01	0.	-5.38E 01	1.8017E 11	6.3959E 11	6.3078E-04	2.2393E-03	6.7530E-04	2.2989E-03
1.15E 01	0.	-1.86E 01	1.3963E 13	2.5385E 13	5.2704E-02	9.5819E-02	5.3719E-02	9.5808E-02
1.15E 01	0.	1.65E 01	8.2219E 07	6.0619E 08	2.5588E-07	1.8866E-06	2.9658E-07	2.1207E-06
1.15E 01	0.	5.45E 01	3.2510E 05	3.1586E 06	9.9576E-10	9.6746E-09	1.1669E-09	1.1245E-08
1.15E 01	0.	9.25E 01	2.7732E 01	5.0064E 02	8.4615E-14	1.5275E-12	9.9421E-14	1.7946E-12
1.15E 01	0.	1.28E 02	1.9086E-01	4.8291E 00	5.8230E-16	1.4734E-14	6.8422E-16	1.7312E-14
2.31E 01	0.	-1.08E 02	3.5624E 06	2.7371E 07	1.0885E-08	8.3630E-08	1.2777E-08	9.7813E-08
2.31E 01	0.	-5.38E 01	1.7305E 10	8.0269E 10	5.6134E-05	2.6037E-04	6.3249E-05	2.7934E-04
2.31E 01	0.	-1.86E 01	1.7122E 11	6.8708E 11	5.7857E-04	2.3217E-03	6.3419E-04	2.4166E-03
2.31E 01	0.	0.	1.0078E 09	6.6076E 09	3.1956E-06	2.0951E-05	3.6568E-06	2.2933E-05
2.31E 01	0.	1.65E 01	1.2105E 07	1.0090E 08	3.7269E-08	3.1066E-07	4.3518E-08	3.5645E-07
2.31E 01	0.	5.45E 01	3.2469E 05	3.2227E 06	9.9369E-10	9.8628E-09	1.1651E-09	1.1485E-08
2.31E 01	0.	9.25E 01	1.9074E 02	3.1418E 03	5.8199E-13	9.5861E-12	6.8382E-13	1.1262E-11

TABLE X (Cont.)

MPBE HEAT- BOTT REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	3.0525E-13	5.2020E-12	4.0603E-13	6.9194E-12	2.5215E-13	4.2971E-12
0.	0.	-1.08E 02	2.2075E-08	1.6258E-07	2.9345E-08	2.1562E-07	1.8252E-08	1.3489E-07
0.	0.	-8.07E 01	2.2067E-06	1.1767E-05	2.9193E-06	1.5354E-05	1.8377E-0C	9.9962E-06
0.	0.	-5.38E 01	4.7963E-04	1.8937E-03	6.1659E-04	2.3583E-03	4.1601E-04	1.7130E-03
0.	0.	-3.62E 01	1.1131E-02	3.4682E-02	1.4008E-02	4.2398E-02	9.9339E-03	3.2109E-02
0.	0.	-1.86E 01	1.0359E-02	3.2246E-02	1.3036E-02	3.9415E-02	9.2464E-03	2.9857E-02
C.	0.	1.65E 01	1.5256E-07	1.1780E-06	2.0203E-07	1.5412E-06	1.2686E-07	9.9693E-07
0.	0.	5.45E 01	1.7180E-09	1.6800E-08	2.2826E-09	2.2239E-08	1.4215E-09	1.3978E-08
0.	0.	9.25E 01	9.5636E-13	1.5718E-11	1.2721E-12	2.0905E-11	7.9001E-13	1.2985E-11
0.	0.	1.28E 02	1.8410E-15	4.5126E-14	2.4488E-15	6.0023E-14	1.5207E-15	3.7275E-14
0.	0.	1.85E 02	3.4200E-16	8.9496E-15	4.5491E-16	1.1904E-14	2.8250E-16	7.3926E-15
1.15E 01	0.	-1.08E 02	2.4061E-08	1.7516E-07	3.1980E-08	2.3221E-07	1.9896E-08	1.4541E-07
1.15E 01	0.	-5.38E 01	7.0411E-04	2.3886E-03	8.8879E-04	2.9362E-03	6.2589E-04	2.1964E-03
1.15E 01	0.	-1.86E 01	5.5781E-02	9.9321E-02	6.8244E-02	1.1994E-01	5.1593E-02	9.3319E-02
1.15E 01	0.	1.65E 01	3.1115E-07	2.2197E-06	4.1091E-07	2.8828E-06	2.5977E-07	1.8982E-06
1.15E 01	0.	5.45E 01	1.2252E-09	1.1800E-08	1.6275E-09	1.5606E-08	1.0142E-09	9.8297E-09
1.15E 01	0.	9.25E 01	1.0441E-13	1.8847E-12	1.3888E-13	2.5067E-12	8.6250E-14	1.5570E-12
1.15E 01	0.	1.28E 02	7.1857E-16	1.8182E-14	9.5580E-16	2.4184E-14	5.9356E-16	1.5019E-14
2.31E 01	0.	-1.08E 02	1.3417E-08	1.0269E-07	1.7838E-08	1.3626E-07	1.1092E-08	8.5130E-08
2.31E 01	0.	-5.38E 01	6.6215E-05	2.9131E-04	8.6111E-05	3.6819E-04	5.6517E-05	2.5850E-04
2.31E 01	0.	-1.86E 01	6.6251E-04	2.5139E-03	8.4814E-04	3.1181E-03	5.7792E-04	2.2858E-03
2.31E 01	0.	0.	3.8328E-06	2.3954E-05	5.0271E-06	3.0641E-05	3.2320E-06	2.0920E-05
2.31E 01	0.	1.65E 01	4.5681E-08	3.7368E-07	6.0564E-08	4.9082E-07	3.7918E-08	3.1444E-07
2.31E 01	0.	5.45E 01	1.2234E-09	1.2054E-08	1.6255E-09	1.5958E-08	1.0123E-09	1.0027E-08
2.31E 01	0.	9.25E 01	7.1816E-13	1.1827E-11	9.5523E-13	1.5730E-11	5.9324E-13	9.7710E-12

TABLE X (Cont.)

MPBE HEAT- BOTT REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILOUP	DIRECT BEAM	WITH BUILOUP	DIRECT BEAM	WITH BUILOUP
2.31E 01	0.	1.28E 02	2.6735E-01	6.6377E 00	8.1568E-16	2.0252E-14	9.5844E-16	2.3796E-14
2.31E 01	0.	1.85E 02	4.3693E-02	1.1682E 00	1.3331E-16	3.5641E-15	1.5664E-16	4.1878E-15
2.43E 01	0.	0.	7.8891E 08	5.1372E 09	2.4864E-06	1.6191E-05	2.8570E-06	1.7858E-05
2.69E 01	0.	-1.08E 02	4.8149E 06	3.5946E 07	1.4715E-08	1.0986E-07	1.7270E-08	1.2839E-07
2.69E 01	0.	-5.38E 01	5.5871E 09	2.7850E 10	1.7718E-05	8.8319E-05	2.0273E-05	9.6856E-05
2.69E 01	0.	-1.86E 01	4.2155E 10	1.9183E 11	1.3738E-04	6.2515E-04	1.5430E-04	6.6656E-04
2.69E 01	0.	0.	4.9143E 08	3.1845E 09	1.5355E-06	9.9499E-06	1.7749E-06	1.1111E-05
2.69E 01	0.	1.65E 01	7.4480E 06	6.2285E 07	2.2843E-08	1.9103E-07	2.6744E-08	2.2115E-07
2.69E 01	0.	5.45E 01	3.6993E 04	4.3357E 05	1.1295E-10	1.3238E-09	1.3265E-10	1.5519E-09
2.69E 01	0.	9.25E 01	4.7343E 01	8.5598E 02	1.4445E-13	2.6117E-12	1.6973E-13	3.0685E-12
2.69E 01	0.	1.28E 02	2.6966E-02	7.8621E-01	8.2274E-17	2.3987E-15	9.6674E-17	2.8186E-15
2.95E 01	0.	0.	2.9829E 08	1.9438E 09	9.2603E-07	6.0344E-06	1.0751E-06	6.8105E-06
3.07E 01	0.	-1.08E 02	5.6923E 06	4.1694E 07	1.7400E-08	1.2745E-07	2.0419E-08	1.4887E-07
3.07E 01	0.	-5.38E 01	1.8835E 09	9.9700E 09	5.8847E-06	3.1150E-05	6.8024E-06	3.4827E-05
3.07E 01	0.	-1.86E 01	1.1522E 10	5.6647E 10	3.6609E-05	1.7999E-04	4.1833E-05	1.9658E-04
3.07E 01	0.	0.	2.2865E 08	1.4996E 09	7.0792E-07	4.6428E-06	8.2345E-07	5.2659E-06
3.07E 01	0.	1.65E 01	4.3660E 06	3.7324E 07	1.3364E-08	1.1424E-07	1.5668E-08	1.3295E-07
3.07E 01	0.	5.45E 01	6.5594E 03	8.7738E 04	2.0018E-11	2.6776E-10	2.3517E-11	3.1436E-10
3.07E 01	0.	9.25E 01	1.4397E 01	2.8408E 02	4.3925E-14	8.6673E-13	5.1613E-14	1.0184E-12
3.07E 01	0.	1.28E 02	7.3076E-03	2.2846E-01	2.2296E-17	6.9703E-16	2.6198E-17	8.1903E-16
4.22E 01	0.	-1.08E 02	2.6063E 05	2.5042E 06	7.9545E-10	7.6430E-09	9.3446E-10	8.9703E-09
4.22E 01	0.	-5.38E 01	1.1594E 08	7.3091E 08	3.5587E-07	2.2434E-06	4.1642E-07	2.5920E-06
4.22E 01	0.	0.	2.8372E 07	2.0483E 08	8.6904E-08	6.2741E-07	1.0184E-07	7.2855E-07
4.22E 01	0.	1.65E 01	1.0860E 06	1.0069E 07	3.3171E-09	3.0753E-08	3.8948E-09	3.6008E-08
4.22E 01	0.	5.45E 01	2.8266E 02	4.8331E 03	8.6241E-13	1.4746E-11	1.0133E-12	1.7326E-11

TABLE X (Cont.)

MPBE HEAT- BOTT REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/68 800000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	1.0066E-15	2.4991E-14	1.3389E-15	3.3241E-14	8.3145E-16	2.0643E-14
2.31E 01	0.	1.85E 02	1.6450E-16	4.3981E-15	2.1881E-16	5.8501E-15	1.3588E-16	3.6330E-15
2.43E 01	0.	0.	2.9955E-06	1.8665E-05	3.9377E-06	2.3981E-05	2.5178E-06	1.6202E-05
2.69E 01	0.	-1.08E 02	1.8138E-08	1.3478E-07	2.4109E-08	1.7878E-07	1.4994E-08	1.1180E-07
2.69E 01	0.	-5.38E 01	2.1249E-05	1.0118E-04	2.7868E-05	1.2957E-04	1.7919E-05	8.8232E-05
2.69E 01	0.	-1.86E 01	1.6150E-04	6.9477E-04	2.0966E-04	8.7483E-04	1.3819E-04	6.1960E-04
2.69E 01	0.	0.	1.8617E-06	1.1624E-05	2.4551E-06	1.5042E-05	1.5576E-06	9.9919E-06
2.69E 01	0.	1.65E 01	2.8080E-08	2.3200E-07	3.7280E-08	3.0619E-07	2.3260E-08	1.9387E-07
2.69E 01	0.	5.45E 01	1.3930E-10	1.6295E-09	1.8525E-10	2.1649E-09	1.1511E-10	1.3485E-09
2.69E 01	0.	9.25E 01	1.7825E-13	3.2226E-12	2.3709E-13	4.2863E-12	1.4724E-13	2.6621E-12
2.69E 01	0.	1.28E 02	1.0153E-16	2.9801E-15	1.3505E-16	3.9373E-15	8.3865E-17	2.4451E-15
2.95E 01	0.	0.	1.1281E-06	7.1308E-06	1.4912E-06	9.2818E-06	9.4058E-07	6.0785E-06
3.07E 01	0.	-1.08E 02	2.1442E-08	1.5627E-07	2.8502E-08	2.0722E-07	1.7730E-08	1.2968E-07
3.07E 01	0.	-5.38E 01	7.1352E-06	3.6438E-05	9.4095E-06	4.7181E-05	5.9694E-06	3.1292E-05
3.07E 01	0.	-1.86E 01	4.3842E-05	2.0529E-04	5.7458E-05	2.6225E-04	3.7010E-05	1.7980E-04
3.07E 01	0.	0.	8.6415E-07	5.5156E-06	1.1434E-06	7.1991E-06	7.1944E-07	4.6835E-08
3.07E 01	0.	1.65E 01	1.6452E-08	1.3952E-07	2.1858E-08	1.8465E-07	1.3613E-08	1.1612E-07
3.07E 01	0.	5.45E 01	2.4698E-11	3.3012E-10	3.2849E-11	4.3893E-10	2.0404E-11	2.7287E-10
3.07E 01	0.	9.25E 01	5.4204E-14	1.0695E-12	7.2099E-14	1.4226E-12	4.4774E-14	8.8348E-13
3.07E 01	0.	1.28E 02	2.7513E-17	8.6015E-16	3.6597E-17	1.1441E-15	2.2727E-17	7.1051E-16
4.22E 01	0.	-1.08E 02	9.8136E-10	9.4199E-09	1.3052E-09	1.2522E-08	8.1078E-10	7.7881E-09
4.22E 01	0.	-5.38E 01	4.3720E-07	2.7188E-06	5.8028E-07	3.5844E-06	3.6230E-07	2.2754E-06
4.22E 01	0.	0.	1.0693E-07	7.6446E-07	1.4203E-07	1.0106E-06	8.8513E-08	6.3730E-07
4.22E 01	0.	1.65E 01	4.0901E-09	3.7806E-08	5.4383E-09	5.0194E-08	3.3805E-09	3.1314E-08
4.22E 01	0.	5.45E 01	1.0642E-12	1.8196E-11	1.4155E-12	2.4202E-11	8.7908E-13	1.5031E-11

TABLE X (Cont.)

MFBE HEAT- BOTT REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/66 Q00000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	2.1932E 04	2.5788E 05	6.6921E-11	7.8685E-10	7.8629E-11	9.2429E-10
5.38E 01	0.	-5.38E 01	7.4035E 06	5.7716E 07	2.2620E-08	1.7634E-07	2.6553E-08	2.0625E-07
5.38E 01	0.	0.	2.6457E 06	2.2643E 07	8.0800E-09	6.9152E-08	9.4877E-09	8.0984E-08
5.38E 01	0.	5.45E 01	7.3497E 01	1.3579E 03	2.2424E-13	4.1430E-12	2.6349E-13	4.8680E-12
5.38E 01	0.	9.25E 01	6.4409E-02	1.8298E 00	1.9651E-16	5.5827E-15	2.3091E-16	6.5598E-15
5.38E 01	0.	1.28E 02	2.0342E-04	7.8908E-03	6.2063E-19	2.4075E-17	7.2926E-19	2.8289E-17
5.57E 01	0.	0.	1.6229E 06	1.4430E 07	4.9553E-09	4.4059E-08	5.8196E-09	5.1638E-08
6.75E 01	0.	0.	1.5245E 05	1.6092E 06	4.6520E-10	4.9106E-09	5.4655E-10	5.7662E-09
7.94E 01	0.	0.	1.1847E 04	1.5151E 05	3.6148E-11	4.6228E-10	4.2473E-11	5.4311E-10
8.97E 01	0.	0.	1.3551E 03	2.0255E 04	4.1346E-12	6.1797E-11	4.8582E-12	7.2610E-11
9.22E 01	0.	-1.68E 02	2.8598E-02	8.0395E-01	8.7253E-17	2.4529E-15	1.0252E-16	2.8822E-15
9.22E 01	0.	-5.38E 01	1.0686E 03	1.6317E 04	3.2602E-12	4.9783E-11	3.8308E-12	5.8494E-11
9.22E 01	0.	0.	6.8080E 02	1.0687E 04	2.0771E-12	3.2607E-11	2.4407E-12	3.8313E-11
9.22E 01	0.	5.45E 01	4.8274E-01	1.2203E 01	1.4728E-15	3.7230E-14	1.7306E-15	4.3746E-14
9.22E 01	0.	1.85E 02	3.1141E-08	1.8729E-06	9.5011E-23	5.7142E-21	1.1164E-22	6.7143E-21
1.29E 02	0.	0.	3.0253E 02	4.8279E 03	9.2304E-13	1.4730E-11	1.0846E-12	1.7308E-11
2.13E 02	0.	0.	6.4309E 00	1.2670E 02	1.9621E-14	3.8656E-13	2.3055E-14	4.5422E-13
1.10E 02	0.	0.	3.3336E 02	5.3996E 03	1.0171E-12	1.6474E-11	1.1951E-12	1.9357E-11
1.10E 02	0.	6.00E 01	6.8266E-01	1.6546E 01	2.0828E-15	5.0483E-14	2.4473E-15	5.9319E-14
1.10E 02	0.	1.20E 02	6.4512E-05	2.6839E-03	1.9683E-19	8.1885E-18	2.3128E-19	9.6216E-18

TABLE X (Cont.)

MPBE HEAT- BOTT REFL CONT FISS SRC * REG 32 * INTENSITY FCT FROM VOLS 04/15/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	8.2577E-11	9.7068E-10	1.0984E-10	1.2910E-09	6.8214E-11	8.0199E-10
5.38E 01	0.	-5.38E 01	2.7884E-08	2.1653E-07	3.7072E-08	2.8733E-07	2.3051E-08	1.7950E-07
5.38E 01	0.	0.	9.9635E-09	8.5029E-08	1.3248E-08	1.1291E-07	8.2346E-09	7.0419E-08
5.38E 01	0.	5.45E 01	2.7672E-13	5.1124E-12	3.6807E-13	6.8001E-12	2.2858E-13	4.2231E-12
5.38E 01	0.	9.25E 01	2.4250E-16	6.8691E-15	3.2256E-16	9.1636E-15	2.0031E-16	5.6906E-15
5.38E 01	0.	1.28E 02	7.6588E-19	2.9709E-17	1.0187E-18	3.9517E-17	6.3264E-19	2.4540E-17
5.57E 01	0.	0.	6.1115E-09	5.4221E-08	8.1271E-09	7.2026E-08	5.0503E-09	4.4876E-08
6.75E 01	0.	0.	5.7399E-10	6.0554E-09	7.6343E-10	8.0517E-09	4.7418E-10	5.0045E-09
7.94E 01	0.	0.	4.4606E-11	5.7037E-10	5.9332E-11	7.5862E-10	3.6847E-11	4.7120E-10
8.97E 01	0.	0.	5.1021E-12	7.6256E-11	6.7865E-12	1.0143E-10	4.2145E-12	6.2992E-11
9.22E 01	0.	-1.68E 02	1.0767E-16	3.0269E-15	1.4322E-16	4.0262E-15	8.8940E-17	2.5003E-15
9.22E 01	0.	-5.38E 01	4.0232E-12	6.1431E-11	5.3514E-12	8.1711E-11	3.3233E-12	5.0745E-11
9.22E 01	0.	0.	2.5632E-12	4.0237E-11	3.4094E-12	5.3520E-11	2.1173E-12	3.3237E-11
9.22E 01	0.	5.45E 01	1.8175E-15	4.5943E-14	2.4176E-15	6.1110E-14	1.5013E-15	3.7950E-14
9.22E 01	0.	1.85E 02	1.1725E-22	7.0514E-21	1.5595E-22	9.3794E-21	9.6848E-23	5.8247E-21
1.29E 02	0.	0.	1.1390E-12	1.8177E-11	1.5151E-12	2.4177E-11	9.4089E-13	1.5015E-11
2.13E 02	0.	0.	2.4212E-14	4.7702E-13	3.2206E-14	6.3451E-13	2.0000E-14	3.9403E-13
1.10E 02	0.	0.	1.2551E-12	2.0329E-11	1.6694E-12	2.7040E-11	1.0367E-12	1.6793E-11
1.10E 02	0.	6.00E 01	2.5702E-15	6.2297E-14	3.4188E-15	8.2865E-14	2.1231E-15	5.1460E-14
1.10E 02	0.	1.20E 02	2.4289E-19	1.0105E-17	3.2308E-19	1.3441E-17	2.0063E-19	8.3468E-18

TABLE XI

MPBE HEAT- UPPER REFL(IN+OUT)   SRC * REG 19+21 * INTENS FCT FROM VOLS   04/16/66   000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	1.0807E-05	2.9342E-04	2.6456E-20	7.1829E-19	4.1446E-20	1.1253E-18
0.	0.	-1.08E 02	1.4047E-01	2.2662E 00	3.4390E-16	5.5483E-15	5.3869E-16	8.6888E-15
0.	0.	-8.07E 01	6.2197E 00	8.0027E 01	1.5234E-14	1.9601E-13	2.3852E-14	3.0653E-13
0.	0.	-5.38E 01	2.1593E 02	2.2286E 03	5.2994E-13	5.4893E-12	8.2797E-13	8.4949E-12
0.	0.	-3.62E 01	3.9352E 03	3.4141E 04	9.7130E-12	8.4270E-11	1.5083E-11	1.2848E-10
0.	0.	-1.86E 01	6.6466E 04	5.1531E 05	1.6702E-10	1.2949E-09	2.5446E-10	1.8792E-09
0.	0.	1.65E 01	3.2035E 09	9.0913E 09	8.1909E-06	2.3245E-05	1.2250E-05	3.2641E-05
0.	0.	5.45E 01	1.2424E 12	1.8303E 12	3.2396E-03	4.7723E-03	4.7444E-03	6.7224E-03
0.	0.	9.25E 01	2.4945E 11	3.6123E 11	6.4756E-04	9.3771E-04	9.5287E-04	1.3354E-03
0.	0.	1.28E 02	1.4106E 08	4.4283E 08	3.4706E-07	1.0895E-06	5.4080E-07	1.6737E-06
0.	0.	1.85E 02	1.4888E 07	5.1400E 07	3.6523E-08	1.2809E-07	5.7089E-08	1.9577E-07
1.15E 01	0.	-1.08E 02	1.3283E-01	2.1542E 00	3.2521E-16	5.2743E-15	5.0939E-16	8.2587E-15
1.15E 01	0.	-5.38E 01	1.8938E 02	1.7948E 03	4.1805E-13	4.4081E-12	8.4942E-13	6.8287E-12
1.15E 01	0.	-1.86E 01	1.5396E 05	1.0921E 06	3.8683E-10	2.7440E-09	5.8943E-10	3.9807E-09
1.15E 01	0.	1.65E 01	2.4909E 09	7.0867E 09	6.3674E-06	1.8064E-05	9.5250E-06	2.5380E-05
1.15E 01	0.	5.45E 01	8.6533E 11	1.3305E 12	2.2535E-03	3.4647E-03	3.3047E-03	4.8732E-03
1.15E 01	0.	9.25E 01	1.7446E 11	2.6302E 11	4.5207E-04	6.8155E-04	6.8650E-04	9.6971E-04
1.15E 01	0.	1.28E 02	1.2772E 08	4.0372E 08	3.1419E-07	9.9313E-07	4.8965E-07	1.5267E-06
2.31E 01	0.	-1.08E 02	9.6923E-02	1.6020E 00	2.3729E-16	3.9221E-15	3.7170E-16	6.1422E-15
2.31E 01	0.	-5.38E 01	1.2449E 02	1.3379E 03	3.0550E-13	3.2831E-12	4.7736E-13	5.1017E-12
2.31E 01	0.	-1.88E 01	5.8028E 04	4.4677E 05	1.4566E-10	1.1215E-09	2.2218E-10	1.6319E-09
2.31E 01	0.	0.	1.5185E 07	7.3271E 07	3.8418E-08	1.8538E-07	5.8109E-08	2.6429E-07
2.31E 01	0.	1.65E 01	2.3581E 09	6.6484E 09	6.0192E-06	1.6970E-05	9.0181E-06	2.3914E-05
2.31E 01	0.	5.45E 01	5.4236E 11	8.1383E 11	1.4112E-03	2.1170E-03	2.0714E-03	2.9878E-03
2.31E 01	0.	9.25E 01	1.1182E 11	1.6719E 11	2.8918E-04	4.3236E-04	4.2725E-04	6.1811E-04

TABLE XI (Cont.)

MPBE HEAT- UPPER REFL (IN+OUT)   SRC * REG 19+21 * INTENS FCT FROM VOLS   04/18/66   000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	4.4731E-20	1.2145E-18	6.8842E-20	1.8691E-18	2.9677E-20	8.0573E-19
0.	0.	-1.08E 02	5.8138E-16	9.3774E-15	8.9471E-16	1.4430E-14	3.8575E-16	6.2229E-15
0.	0.	-8.07E 01	2.5742E-14	3.3079E-13	3.9607E-14	5.0870E-13	1.7085E-14	2.1973E-13
0.	0.	-5.38E 01	8.9345E-13	9.1633E-12	1.3734E-12	1.4050E-11	5.9388E-13	6.1161E-12
0.	0.	-3.62E 01	1.6270E-11	1.3843E-10	2.4945E-11	2.1052E-10	1.0861E-11	9.3612E-11
0.	0.	-1.86E 01	2.7414E-10	2.0180E-09	4.1678E-10	2.9993E-09	1.8549E-10	1.4138E-09
0.	0.	1.65E 01	1.3181E-05	3.4972E-05	1.9871E-05	5.1133E-05	9.0371E-06	2.5096E-05
0.	0.	5.45E 01	5.0980E-03	7.2039E-03	7.6103E-03	1.0550E-02	3.5482E-03	5.1578E-03
0.	0.	9.25E 01	1.0242E-03	1.4322E-03	1.5324E-03	2.1090E-03	7.1042E-04	1.0172E-03
0.	0.	1.28E 02	5.8347E-07	1.8042E-06	8.9590E-07	2.7531E-06	3.8856E-07	1.2136E-06
0.	0.	1.85E 02	6.1805E-08	2.1117E-07	9.4721E-08	3.2374E-07	4.0936E-08	1.4098E-07
1.15E 01	0.	-1.08E 02	5.4976E-16	8.9131E-15	8.4603E-16	1.3715E-14	3.6478E-18	5.9153E-15
1.15E 01	0.	-5.38E 01	7.0074E-13	7.3648E-12	1.0768E-12	1.1280E-11	4.6608E-13	4.9247E-12
1.15E 01	0.	-1.86E 01	6.3502E-10	4.2746E-09	9.6550E-10	6.3521E-09	4.2962E-10	2.9955E-09
1.15E 01	0.	1.85E 01	1.0249E-05	2.7193E-05	1.5453E-05	3.9770E-05	7.0258E-06	1.9506E-05
1.15E 01	0.	5.45E 01	3.5513E-03	5.2218E-03	5.3048E-03	7.6412E-03	2.4693E-03	3.7427E-03
1.15E 01	0.	9.25E 01	7.1849E-04	1.0399E-03	1.0730E-03	1.5306E-03	4.9628E-04	7.3911E-04
1.15E 01	0.	1.28E 02	5.2830E-07	1.6457E-06	8.1124E-07	2.5120E-06	5.5178E-07	1.1065E-06
2.31E 01	0.	-1.08E 02	4.0118E-16	6.6290E-15	8.1736E-16	1.0201E-14	2.6617E-16	4.3990E-15
2.31E 01	0.	-5.38E 01	5.1511E-13	5.5033E-12	7.9189E-13	8.4401E-12	3.4237E-13	3.6720E-12
2.31E 01	0.	-1.88E 01	2.3938E-10	1.7527E-09	3.6409E-10	2.6083E-09	1.6183E-10	1.2258E-09
2.31E 01	0.	0.	6.2574E-08	2.8348E-07	9.4825E-08	4.1766E-07	4.2553E-08	2.0116E-07
2.31E 01	0.	1.65E 01	9.7050E-06	2.5828E-05	1.4843E-05	3.7538E-05	6.6453E-06	1.8344E-05
2.31E 01	0.	5.45E 01	2.2281E-03	3.2023E-03	3.3267E-03	4.6941E-03	1.5468E-03	2.2895E-03
2.31E 01	0.	9.25E 01	4.5936E-04	6.6308E-04	6.8882E-04	9.7829E-04	3.1768E-04	4.8983E-04

TABLE XI (Cont.)

MPBE HEAT- UPPER REFL(IN+OUT)   SRC * REG 19+21 * INTENS FC7 FROM VOLS   04/16/66   000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	8.1232E 07	2.6351E 08	1.9975E-07	6.4799E-07	3.1143E-07	9.9758E-07
2.31E 01	0.	1.85E 02	1.1830E 07	4.1520E 07	2.9017E-08	1.0184E-07	4.5363E-08	1.5820E-07
2.43E 01	0.	0.	1.7192E 07	7.6382E 07	4.2893E-08	1.9056E-07	6.5851E-08	2.8073E-07
2.69E 01	0.	-1.08E 02	9.0869E-01	1.1979E 01	2.2248E-15	2.9328E-14	3.4848E-15	4.5921E-14
2.69E 01	0.	-5.38E 01	2.8719E 01	3.4181E 02	7.0391E-14	8.3779E-13	1.1013E-13	1.3071E-12
2.69E 01	0.	-1.86E 01	1.2015E 05	7.6625E 05	2.9572E-10	1.8860E-09	4.6060E-10	2.8956E-09
2.69E 01	0.	0.	1.5854E 07	6.7984E 07	3.9269E-08	1.6839E-07	6.0755E-08	2.5315E-07
2.69E 01	0.	1.65E 01	3.8640E 08	1.2789E 09	9.6482E-07	3.1935E-06	1.4799E-06	4.6998E-06
2.89E 01	0.	5.45E 01	1.6610E 11	2.8486E 11	4.2392E-04	7.2701E-04	6.3521E-04	1.0430E-03
2.69E 01	0.	9.25E 01	2.6746E 10	4.9759E 10	6.7879E-05	1.2628E-04	1.0232E-04	1.8285E-04
2.69E 01	0.	1.28E 02	2.1055E 07	7.8305E 07	5.1683E-08	1.9221E-07	8.0733E-08	2.9779E-07
2.95E 01	0.	0.	1.0588E 07	4.6674E 07	2.6140E-08	1.1525E-07	4.0574E-08	1.7495E-07
3.07E 01	0.	-1.08E 02	4.1326E-01	6.1295E 00	1.0119E-15	1.5008E-14	1.5848E-15	2.3498E-14
3.07E 01	0.	-5.38E 01	1.8100E 01	2.1815E 02	4.4332E-14	5.3431E-13	6.9409E-14	8.3546E-13
3.07E 01	0.	-1.86E 01	1.0850E 05	6.7220E 05	2.6145E-10	1.6502E-09	4.0834E-10	2.5566E-09
3.07E 01	0.	0.	8.4467E 06	3.7783E 07	2.0831E-08	9.3180E-08	3.2377E-08	1.4203E-07
3.07E 01	0.	1.65E 01	1.1596E 08	4.2246E 08	2.8727E-07	1.0466E-06	4.4436E-07	1.5731E-06
3.07E 01	0.	5.45E 01	4.5718E 10	9.0511E 10	1.1530E-04	2.2826E-04	1.7498E-04	3.3190E-04
3.07E 01	0.	9.25E 01	8.4786E 09	1.8171E 10	2.1278E-05	4.5812E-05	3.2454E-05	6.6979E-05
3.07E 01	0.	1.28E 02	8.2389E 06	3.3450E 07	2.0203E-08	8.2044E-08	3.1585E-08	1.2749E-07
4.22E 01	0.	-1.08E 02	1.0441E-03	2.2068E-02	2.5580E-18	5.4024E-17	4.0040E-18	8.4625E-17
4.22E 01	0.	-5.38E 01	2.8484E 01	3.0279E 02	6.4794E-14	7.4132E-13	1.0149E-13	1.1607E-12
4.22E 01	0.	0.	1.0102E 06	5.3967E 06	2.4791E-09	1.3244E-08	3.8734E-09	2.0540E-08
4.22E 01	0.	1.65E 01	1.0633E 07	4.7005E 07	2.8138E-08	1.1551E-07	4.0779E-08	1.7821E-07
4.22E 01	0.	5.45E 01	1.9979E 09	5.3082E 09	4.9498E-06	1.3151E-05	7.6558E-06	1.9785E-05

TABLE XI (Cont.)

MPBE HEAT- UPPER REFL(IN+OUT) SRC * REG 19+21 * INTENS FCT FROM VOLS 04/18/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	3.3602E-07	1.0755E-06	5.1607E-07	1.6426E-06	2.2368E-07	7.2232E-07
2.31E 01	0.	1.85E 02	4.8953E-08	1.7065E-07	7.5272E-08	2.6168E-07	3.2525E-08	1.1389E-07
2.43E 01	0.	0.	7.0979E-08	3.0177E-07	1.0828E-07	4.5175E-07	4.7766E-08	2.0914E-07
2.69E 01	0.	-1.08E 02	3.7610E-15	4.9559E-14	5.7878E-15	7.6255E-14	2.4955E-15	3.2892E-14
2.69E 01	0.	-5.38E 01	1.1885E-13	1.4103E-12	1.8280E-13	2.1666E-12	7.8922E-14	9.3837E-13
2.69E 01	0.	-1.86E 01	4.9693E-10	3.1211E-09	7.6288E-10	4.7615E-09	3.3102E-10	2.1003E-09
2.69E 01	0.	0.	6.5519E-08	2.7249E-07	1.0029E-07	4.1179E-07	4.3851E-08	1.8612E-07
2.69E 01	0.	1.65E 01	1.5950E-06	5.0518E-06	2.4323E-06	7.5588E-06	1.0741E-06	3.5037E-06
2.69E 01	0.	5.45E 01	6.8360E-04	1.1191E-03	1.0315E-03	1.6540E-03	4.6803E-04	7.9063E-04
2.69E 01	0.	9.25E 01	1.1016E-04	1.9632E-04	1.6668E-04	2.9146E-04	7.5101E-05	1.3777E-04
2.69E 01	0.	1.28E 02	8.7117E-08	3.2117E-07	1.3391E-07	4.9191E-07	5.7914E-08	2.1475E-07
2.95E 01	0.	0.	4.3765E-08	1.8843E-07	6.7087E-08	2.8801E-07	2.9224E-08	1.2783E-07
3.07E 01	0.	-1.08E 02	1.7104E-15	2.5357E-14	2.8322E-15	3.9014E-14	1.1350E-15	1.8831E-14
3.07E 01	0.	-5.38E 01	7.4908E-14	9.0158E-13	1.1526E-13	1.3864E-12	4.9718E-14	5.9895E-13
3.07E 01	0.	-1.86E 01	4.4063E-10	2.7574E-09	6.7726E-10	4.2233E-09	2.9295E-10	1.8437E-09
3.07E 01	0.	0.	3.4928E-08	1.5302E-07	5.3570E-08	2.3269E-07	2.3300E-08	1.0350E-07
3.07E 01	0.	1.65E 01	4.7920E-07	1.6932E-06	7.3347E-07	2.5586E-06	3.2077E-07	1.1567E-06
3.07E 01	0.	5.45E 01	1.8847E-04	3.5648E-04	2.8603E-04	5.3030E-04	1.2787E-04	2.4939E-04
3.07E 01	0.	9.25E 01	3.4966E-05	7.1984E-05	5.3187E-05	1.0760E-04	2.3640E-05	5.0004E-05
3.07E 01	0.	1.28E 02	3.4084E-08	1.3752E-07	5.2409E-08	2.1091E-07	2.2645E-08	9.1762E-08
4.22E 01	0.	-1.08E 02	4.3213E-18	9.1333E-17	8.6505E-18	1.4058E-16	2.8671E-18	6.0599E-17
4.22E 01	0.	-5.38E 01	1.0955E-13	1.2527E-12	1.6856E-13	1.9275E-12	7.2678E-14	8.3141E-13
4.22E 01	0.	0.	4.1797E-09	2.2154E-08	6.4252E-09	3.3948E-08	2.7782E-09	1.4802E-08
4.22E 01	0.	1.65E 01	4.4003E-08	1.9215E-07	6.7599E-08	2.9378E-07	2.9275E-08	1.2888E-07
4.22E 01	0.	5.45E 01	8.2580E-06	2.1298E-05	1.2636E-05	3.2196E-05	5.5288E-06	1.4540E-05

TABLE XI (Cont.)

MPBE HEAT- UPPER REFL (IN+OUT) SRC * REG 19+21 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC DIRECT BEAM	ENERGY FLUX MEV PER SQ CM SEC WITH BUILDUP	HEATING RATE IN CARBON WATTS PER GM DIRECT BEAM	HEATING RATE IN CARBON WATTS PER GM WITH BUILDUP	HEATING RATE IN IRON WATTS PER GM DIRECT BEAM	HEATING RATE IN IRON WATTS PER GM WITH BUILDUP
5.38E 01	0.	-1.08E 02	1.7545E-04	4.1045E-03	4.2950E-19	1.0048E-17	6.7284E-19	1.5741E-17
5.38E 01	0.	-5.38E 01	1.3231E 01	1.5984E 02	3.2392E-14	3.9132E-13	5.0741E-14	6.1288E-13
5.38E 01	0.	0.	1.2115E 05	7.7210E 05	2.9684E-10	1.8917E-09	4.6460E-10	2.9528E-09
5.38E 01	0.	5.45E 01	1.1488E 08	3.9326E 08	2.8258E-07	9.6731E-07	4.4044E-07	1.4871E-06
5.38E 01	0.	9.25E 01	3.9821E 07	1.4643E 08	9.7853E-08	3.5982E-07	1.5268E-07	5.5527E-07
5.38E 01	0.	1.28E 02	2.7689E 05	1.5096E 06	6.7832E-10	3.6982E-09	1.0618E-09	5.7752E-09
5.57E 01	0.	0.	7.8877E 04	5.2053E 05	1.9323E-10	1.2752E-09	3.0248E-10	1.9918E-09
6.75E 01	0.	0.	1.2422E 04	9.4255E 04	3.0417E-11	2.3079E-10	4.7638E-11	3.6117E-10
7.94E 01	0.	0.	1.9075E 03	1.6543E 04	4.6701E-12	4.0502E-11	7.3153E-12	6.3423E-11
8.97E 01	0.	0.	4.0269E 02	3.8811E 03	9.8584E-13	9.5014E-12	1.5443E-12	1.4882E-11
9.22E 01	0.	-1.68E 02	9.7617E-10	4.1228E-08	2.3897E-24	1.0092E-22	3.7436E-24	1.5811E-22
9.22E 01	0.	-5.38E 01	1.5011E-01	2.4546E 00	3.6746E-16	6.0089E-15	5.7565E-16	9.4134E-15
9.22E 01	0.	0.	2.3014E 02	2.3067E 03	5.6341E-13	5.6469E-12	8.8260E-13	8.8450E-12
9.22E 01	0.	5.45E 01	2.4154E 04	1.6858E 05	5.9140E-11	4.1275E-10	9.2630E-11	6.4608E-10
9.22E 01	0.	1.85E 02	3.2419E 02	2.8848E 03	7.9366E-13	7.0622E-12	1.2433E-12	1.1061E-11
1.29E 02	0.	0.	5.7640E 02	5.0881E 03	1.4111E-12	1.2456E-11	2.2105E-12	1.9509E-11
2.13E 02	0.	0.	9.7485E 01	9.2146E 02	2.3865E-13	2.2557E-12	3.7385E-13	3.5337E-12
1.10E 02	0.	0.	3.0458E 02	2.9010E 03	7.4565E-13	7.1020E-12	1.1681E-12	1.1124E-11
1.10E 02	0.	6.00E 01	1.0639E 04	7.7428E 04	2.6047E-11	1.8957E-10	4.0799E-11	2.9679E-10
1.10E 02	0.	1.20E 02	1.1895E 03	9.9278E 03	2.8631E-12	2.4305E-11	4.4850E-12	3.8064E-11

TABLE XI (Cont.)

MPBE HEAT- UPPER REFL(IN+OUT) SRC * REG 19+21 * INTENS FCT FROM VOLS 04/18/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	7.2618E-19	1.6989E-17	1.1176E-18	2.6146E-17	4.8178E-19	1.1271E-17
5.38E 01	0.	-5.38E 01	5.4763E-14	6.6145E-13	8.4279E-14	1.0179E-12	3.6334E-14	4.3892E-13
5.38E 01	0.	0.	5.0140E-10	3.1862E-09	7.7136E-10	4.8959E-09	3.3287E-10	2.1192E-09
5.38E 01	0.	5.45E 01	4.7520E-07	1.6030E-06	7.2974E-07	2.4469E-06	3.1640E-07	1.0777E-06
5.38E 01	0.	9.25E 01	1.6474E-07	5.9871E-07	2.5309E-07	9.1542E-07	1.0950E-07	4.0144E-07
5.38E 01	0.	1.28E 02	1.1459E-09	6.2317E-09	1.7630E-09	9.5777E-09	7.8068E-10	4.1436E-09
5.57E 01	0.	0.	3.2644E-10	2.1493E-09	5.0224E-10	3.3036E-09	2.1669E-10	1.4289E-09
6.75E 01	0.	0.	5.1413E-11	3.8977E-10	7.9116E-11	5.9958E-10	3.4116E-11	2.5879E-10
7.94E 01	0.	0.	7.8951E-12	6.8449E-11	1.2150E-11	1.0532E-10	5.2384E-12	4.5426E-11
8.97E 01	0.	0.	1.6667E-12	1.6061E-11	2.5651E-12	2.4716E-11	1.1058E-12	1.0657E-11
9.22E 01	0.	-1.68E 02	4.0403E-24	1.7084E-22	6.2182E-24	2.6262E-22	2.6805E-24	1.1321E-22
9.22E 01	0.	-5.38E 01	6.2129E-16	1.0180E-14	9.5617E-16	1.5636E-14	4.1219E-16	6.7404E-15
9.22E 01	0.	0.	9.5256E-13	9.5460E-12	1.4660E-12	1.4691E-11	6.3199E-13	6.3339E-12
9.22E 01	0.	5.45E 01	9.9972E-11	6.9726E-10	1.5385E-10	1.0727E-09	6.6335E-11	4.6286E-10
9.22E 01	0.	1.85E 02	1.3418E-12	1.1938E-11	2.0651E-12	1.8372E-11	8.9026E-13	7.9214E-12
1.29E 02	0.	0.	2.3857E-12	2.1055E-11	3.6715E-12	3.2401E-11	1.5828E-12	1.3971E-11
2.13E 02	0.	0.	4.0349E-13	3.8138E-12	6.2098E-13	5.8694E-12	2.8770E-13	2.5303E-12
1.10E 02	0.	0.	1.2607E-12	1.2008E-11	1.9402E-12	1.8475E-11	8.3641E-13	7.9660E-12
1.10E 02	0.	6.00E 01	4.4033E-11	3.2030E-10	6.7763E-11	4.9281E-10	2.9217E-11	2.1260E-10
1.10E 02	0.	1.20E 02	4.8405E-12	4.1081E-11	7.4494E-12	6.3218E-11	3.2116E-12	2.7261E-11

TABLE XII

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	7.4975E-08	3.6449E-06	2.2184E-22	1.0785E-20	2.7090E-22	1.3025E-20
0.	0.	-1.08E 02	4.9359E-03	1.4281E-01	1.4928E-17	4.3191E-16	1.7776E-17	5.1063E-16
0.	0.	-8.07E 01	3.7603E-01	8.7390E 00	1.1481E-15	2.6883E-14	1.3530E-15	3.1212E-14
0.	0.	-5.38E 01	3.2060E 01	5.9151E 02	9.9001E-14	1.8286E-12	1.1529E-13	2.1079E-12
0.	0.	-3.62E 01	1.2394E 03	1.8725E 04	3.8688E-12	5.8447E-11	4.4572E-12	6.6555E-11
0.	0.	-1.86E 01	5.2356E 04	6.3963E 05	1.6583E-10	2.0259E-09	1.8839E-10	2.2673E-09
0.	0.	1.65E 01	2.1289E 09	9.7552E 09	6.9135E-06	3.1679E-05	7.6931E-06	3.4483E-05
0.	0.	5.45E 01	4.9368E 11	1.4169E 12	1.6275E-03	4.8710E-03	1.7935E-03	5.0183E-03
0.	0.	9.25E 01	1.1777E 11	3.3731E 11	3.8688E-04	1.1081E-03	4.2770E-04	1.1949E-03
0.	0.	1.28E 02	3.1849E 07	1.9660E 08	9.9497E-08	6.1417E-07	1.1472E-07	6.9496E-07
0.	0.	1.85E 02	1.2943E 06	9.0538E 06	4.0037E-09	2.8006E-08	4.6614E-09	3.2045E-08
1.15E 01	0.	-1.08E 02	4.7006E-03	1.3677E-01	1.4233E-17	4.1414E-16	1.6926E-17	4.8905E-16
1.15E 01	0.	-5.38E 01	2.9703E 01	5.4815E 02	9.1985E-14	1.6975E-12	1.0680E-13	1.9530E-12
1.15E 01	0.	-1.86E 01	5.8410E 04	8.9042E 05	1.8501E-10	2.1869E-09	2.1019E-10	2.4469E-09
1.15E 01	0.	1.65E 01	6.3555E 08	3.3196E 09	2.0584E-08	1.0741E-05	2.2946E-06	1.1734E-05
1.15E 01	0.	5.45E 01	1.0407E 12	2.2518E 12	3.5201E-03	7.6166E-03	3.8099E-03	8.0775E-03
1.15E 01	0.	9.25E 01	2.5038E 11	4.6835E 11	8.5272E-04	1.5952E-03	9.1946E-04	1.6925E-03
1.15E 01	0.	1.28E 02	2.1725E 07	1.3599E 08	6.7850E-08	4.2473E-07	7.8252E-08	4.8078E-07
2.31E 01	0.	-1.08E 02	4.8142E-03	1.3876E-01	1.4559E-17	4.1962E-16	1.7338E-17	4.9614E-16
2.31E 01	0.	-5.38E 01	2.7939E 01	5.1394E 02	8.6182E-14	1.5853E-12	1.0048E-13	1.8316E-12
2.31E 01	0.	-1.88E 01	2.7760E 04	3.4861E 05	8.7813E-11	1.1027E-09	9.9880E-11	1.2361E-09
2.31E 01	0.	0.	5.8161E 06	4.8144E 07	1.8572E-08	1.5373E-07	2.0951E-08	1.7032E-07
2.31E 01	0.	1.65E 01	8.4794E 08	4.2048E 09	2.7450E-06	1.3812E-05	3.0622E-06	1.4865E-05
2.31E 01	0.	5.45E 01	3.1235E 10	1.1088E 11	1.0157E-04	3.6048E-04	1.1308E-04	3.9167E-04
2.31E 01	0.	9.25E 01	9.6997E 09	3.4671E 10	3.1394E-05	1.1222E-04	3.5099E-05	1.2253E-04

TABLE XII (Cont.)

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	2.8566E-22	1.3719E-20	3.9022E-22	1.8601E-20	2.2874E-22	1.1083E-20
0.	0.	-1.08E 02	1.8696E-17	5.3664E-16	2.5094E-17	7.166[illegible]E-16	1.5276E-17	4.4104E-16
0.	0.	-8.07E 01	1.4215E-15	3.2767E-14	1.8936E-15	4.3410E-14	1.1713E-15	2.7161E-14
0.	0.	-5.38E 01	1.2098E-13	2.2101E-12	1.5974E-13	2.8977E-12	1.0064E-13	1.8520E-12
0.	0.	-3.62E 01	4.6725E-12	6.9698E-11	6.1180E-12	9.0426E-11	3.9207E-12	5.9031E-11
0.	0.	-1.86E 01	1.9726E-10	2.3712E-09	2.5545E-10	3.0334E-09	1.6737E-10	2.0360E-09
0.	0.	1.65E 01	8.0446E-06	3.5997E-05	1.0259E-05	4.5249E-05	6.9365E-06	3.1586E-05
0.	0.	5.45E 01	1.8741E-03	5.2325E-03	2.3821E-03	6.5770E-03	1.6283E-03	4.6396E-03
0.	0.	9.25E 01	4.4702E-04	1.2463E-03	5.6967E-04	1.5702E-03	3.8743E-04	1.1018E-03
0.	0.	1.28E 02	1.2030E-07	7.2764E-07	1.5763E-07	9.3994E-07	1.0085E-07	6.1917E-07
0.	0.	1.85E 02	4.8925E-09	3.3582E-08	8.4578E-09	4.3745E-08	4.0699E-09	2.8325E-08
1.15E 01	0.	-1.08E 02	1.7799E-17	5.1390E-16	2.3869E-17	6.8567E-16	1.4559E-17	4.2275E-16
1.15E 01	0.	-5.38E 01	1.1204E-13	2.0470E-12	1.4760E-13	2.6775E-12	9.3431E-14	1.7196E-12
1.15E 01	0.	-1.86E 01	2.2009E-10	2.5590E-09	2.8500E-10	3.2730E-09	1.8674E-10	2.1976E-09
1.15E 01	0.	1.65E 01	2.3998E-06	1.2253E-05	3.0653E-06	1.5418E-05	2.0649E-06	1.0721E-05
1.15E 01	0.	5.45E 01	3.9751E-03	8.4124E-03	5.0107E-03	1.0537E-02	3.5038E-03	7.5375E-03
1.15E 01	0.	9.25E 01	9.5899E-04	1.7628E-03	1.2090E-03	2.2107E-03	8.4785E-04	1.5788E-03
1.15E 01	0.	1.28E 02	8.2083E-08	5.0340E-07	1.0754E-07	6.5044E-07	6.8781E-08	4.2823E-07
2.31E 01	0.	-1.08E 02	1.8235E-17	5.2142E-16	2.4478E-17	6.9633E-16	1.4899E-17	4.2850E-16
2.31E 01	0.	-5.38E 01	1.0545E-13	1.9206E-12	1.3935E-13	2.5204E-12	8.7642E-14	1.6079E-12
2.31E 01	0.	-1.86E 01	1.0459E-10	1.2928E-09	1.3557E-10	1.6561E-09	8.8661E-11	1.1087E-09
2.31E 01	0.	0.	2.1928E-08	1.7801E-07	2.8238E-08	2.2590E-07	1.8707E-08	1.5405E-07
2.31E 01	0.	1.65E 01	3.2027E-06	1.5521E-05	4.0909E-06	1.9537E-05	2.7581E-06	1.3585E-05
2.31E 01	0.	5.45E 01	1.1823E-04	4.0878E-04	1.5113E-04	5.1549E-04	1.0192E-04	3.5921E-04
2.31E 01	0.	9.25E 01	3.6718E-05	1.2793E-04	4.7085E-05	1.6187E-04	3.1540E-05	1.1198E-04

TABLE XII (Cont.)

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	1.1849E 07	7.8377E 07	3.6872E-08	2.4391E-07	4.2673E-08	2.7727E-07
2.31E 01	0.	1.85E 02	1.0823E 06	7.7367E 06	3.3414E-09	2.3886E-08	3.8978E-09	2.7394E-08
2.43E 01	0.	0.	5.3124E 06	4.3758E 07	1.6878E-08	1.3902E-07	1.9132E-08	1.5478E-07
2.69E 01	0.	-1.08E 02	1.6540E-02	4.4443E-01	5.0116E-17	1.3466E-15	5.9559E-17	1.5887E-15
2.69E 01	0.	-5.38E 01	7.7480E 00	1.5334E 02	2.3818E-14	4.7137E-13	2.7868E-14	5.4690E-13
2.69E 01	0.	-1.86E 01	2.5582E 04	3.1091E 05	7.9921E-11	9.7133E-10	9.2028E-11	1.1031E-09
2.69E 01	0.	0.	5.0473E 06	4.0779E 07	1.5918E-08	1.2860E-07	1.8173E-08	1.4424E-07
2.69E 01	0.	1.65E 01	1.6631E 08	9.9114E 08	5.2992E-07	3.1581E-06	5.9947E-07	3.5010E-06
2.69E 01	0.	5.45E 01	1.1675E 10	4.5582E 10	3.7501E-05	1.4841E-04	4.2182E-05	1.6078E-04
2.69E 01	0.	9.25E 01	2.8389E 09	1.1932E 10	9.0817E-06	3.8170E-05	1.0251E-05	4.2120E-05
2.69E 01	0.	1.28E 02	3.8419E 06	2.8114E 07	1.1891E-08	8.7014E-08	1.3835E-08	9.9549E-08
2.95E 01	0.	0.	3.7463E 06	3.0672E 07	1.1753E-08	9.6227E-08	1.3486E-08	1.0852E-07
3.07E 01	0.	-1.08E 02	4.8684E-02	1.2198E 00	1.4780E-16	3.7032E-15	1.7527E-16	4.3590E-15
3.07E 01	0.	-5.38E 01	2.8301E 00	5.9448E 01	8.6711E-15	1.8214E-13	1.0181E-14	2.1216E-13
3.07E 01	0.	-1.86E 01	2.2252E 04	2.6579E 05	6.8936E-11	8.2342E-10	8.0060E-11	9.4358E-10
3.07E 01	0.	0.	2.6606E 06	2.2616E 07	8.3887E-09	7.0783E-08	9.6491E-09	8.0051E-08
3.07E 01	0.	1.65E 01	4.4676E 07	3.0107E 08	1.4100E-07	9.5017E-07	1.6092E-07	1.0640E-06
3.07E 01	0.	5.45E 01	3.3231E 09	1.4938E 10	1.0573E-05	4.7529E-05	1.1988E-05	5.2689E-05
3.07E 01	0.	9.25E 01	8.7959E 08	4.2358E 09	2.7887E-06	1.3429E-05	3.1720E-06	1.4952E-05
3.07E 01	0.	1.28E 02	1.4266E 06	1.1313E 07	4.3976E-09	3.4871E-08	5.1373E-09	4.0090E-08
4.22E 01	0.	-1.08E 02	1.0978E-04	3.7257E-03	3.2982E-19	1.1194E-17	3.9567E-19	1.3327E-17
4.22E 01	0.	-5.38E 01	3.2301E 00	6.4565E 01	9.7885E-15	1.9526E-13	1.1636E-14	2.3045E-13
4.22E 01	0.	0.	2.4405E 05	2.4369E 06	7.5391E-10	7.5281E-09	8.7838E-10	8.6450E-09
4.22E 01	0.	1.65E 01	2.7585E 06	2.3150E 07	8.5722E-09	7.1937E-08	9.9301E-09	8.1983E-08
4.22E 01	0.	5.45E 01	1.3142E 08	8.0259E 08	4.1075E-07	2.5085E-06	4.7333E-07	2.8359E-06

TABLE XII (Cont.)

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	4.4764E-08	2.9042E-07	5.8819E-08	3.7644E-07	3.7416E-08	2.4622E-07
2.31E 01	0.	1.85E 02	4.0917E-09	2.8713E-08	5.4087E-09	3.7467E-08	3.3985E-09	2.4174E-08
2.43E 01	0.	0.	2.0032E-08	1.6183E-07	2.5896E-08	2.0620E-07	1.7024E-08	1.3951E-07
2.69E 01	0.	-1.08E 02	6.2627E-17	1.6693E-15	8.3940E-17	2.2257E-15	5.1255E-17	1.3742E-15
2.69E 01	0.	-5.38E 01	2.9257E-14	5.7369E-13	3.8765E-14	7.5532E-13	2.4247E-14	4.7867E-13
2.69E 01	0.	-1.86E 01	9.6476E-11	1.1550E-09	1.2627E-10	1.4952E-09	8.0980E-11	9.8026E-10
2.69E 01	0.	0.	1.9039E-08	1.5090E-07	2.4752E-08	1.9343E-07	1.6089E-08	1.2932E-07
2.69E 01	0.	1.65E 01	6.2763E-07	3.6597E-06	8.1024E-07	4.6527E-06	5.3420E-07	3.1653E-06
2.69E 01	0.	5.45E 01	4.4148E-05	1.6795E-04	5.6824E-05	2.1299E-04	3.7742E-05	1.4634E-04
2.69E 01	0.	9.25E 01	1.0731E-05	4.4015E-05	1.3845E-05	5.5963E-05	9.1490E-06	3.8204E-05
2.69E 01	0.	1.28E 02	1.4520E-08	1.0432E-07	1.9156E-08	1.3587E-07	1.2085E-08	8.8002E-08
2.95E 01	0.	0.	1.4135E-08	1.1358E-07	1.8450E-08	1.4624E-07	1.1897E-08	9.6918E-08
3.07E 01	0.	-1.08E 02	1.8426E-16	4.5790E-15	2.4657E-16	8.0947E-15	1.5106E-16	3.7766E-15
3.07E 01	0.	-5.38E 01	1.0692E-14	2.2264E-13	1.4205E-14	2.9401E-13	8.8364E-15	1.8518E-13
3.07E 01	0.	-1.86E 01	8.3997E-11	9.8879E-10	1.1066E-10	1.2893E-09	7.0024E-11	8.3316E-10
3.07E 01	0.	0.	1.0116E-08	8.3802E-08	1.3228E-08	1.0814E-07	8.4973E-09	7.1349E-08
3.07E 01	0.	1.85E 01	1.6859E-07	1.1130E-06	2.1914E-07	1.4256E-06	1.4250E-07	9.5505E-07
3.07E 01	0.	5.45E 01	1.2555E-05	5.5078E-05	1.6248E-05	7.0190E-05	1.0665E-05	4.7635E-05
3.07E 01	0.	9.25E 01	3.3227E-06	1.5636E-05	4.3099E-06	1.9980E-05	2.8156E-06	1.3476E-05
3.07E 01	0.	1.28E 02	5.3935E-09	4.2029E-08	7.1373E-09	5.4944E-08	4.4747E-09	3.5317E-08
4.22E 01	0.	-1.08E 02	4.1646E-19	1.4016E-17	5.6195E-19	1.8811E-17	3.3827E-19	1.1455E-17
4.22E 01	0.	-5.38E 01	1.2239E-14	2.4216E-13	1.6431E-14	3.2294E-13	9.9975E-15	1.9929E-13
4.22E 01	0.	0.	9.2190E-10	9.0613E-09	1.2175E-09	1.1835E-08	7.6853E-10	7.6219E-09
4.22E 01	0.	1.85E 01	1.0417E-08	8.5880E-08	1.3697E-08	1.1150E-07	8.7010E-09	7.2673E-08
4.22E 01	0.	5.45E 01	4.9834E-07	2.9890E-06	6.5006E-07	3.8324E-06	4.1629E-07	2.5283E-06

TABLE XII (Cont.)

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	7.9526E-06	3.1263E-04	2.3532E-20	9.2506E-19	2.8737E-20	1.1174E-18
5.38E 01	0.	-5.38E 01	1.3410E 00	2.8189E 01	4.0336E-15	8.4789E-14	4.8341E-15	1.0067E-13
5.38E 01	0.	0.	2.1290E 04	2.5003E 05	6.5161E-11	7.6526E-10	7.6647E-11	8.8884E-10
5.38E 01	0.	5.45E 01	6.2826E 06	4.9117E 07	1.9398E-08	1.5166E-07	2.2621E-08	1.7397E-07
5.38E 01	0.	9.25E 01	2.5662E 06	2.1084E 07	7.9073E-09	8.4966E-08	9.2399E-09	7.4729E-08
5.38E 01	0.	1.28E 02	2.4023E 04	2.5941E 05	7.3137E-11	7.8975E-10	8.6537E-11	9.2239E-10
5.57E 01	0.	0.	1.2869E 04	1.5615E 05	3.9321E-11	4.7709E-10	4.6337E-11	5.5532E-10
6.75E 01	0.	0.	1.3049E 03	1.8213E 04	3.9571E-12	5.5229E-11	4.7011E-12	6.4875E-11
7.94E 01	0.	0.	1.2675E 02	2.0307E 03	3.8185E-13	6.1178E-12	4.5693E-13	7.2430E-12
8.97E 01	0.	0.	1.7918E 01	3.2104E 02	5.3703E-14	9.6222E-13	6.4634E-14	1.1460E-12
9.22E 01	0.	-1.68E 02	1.6188E-11	1.0328E-09	4.6360E-26	2.9577E-24	5.8876E-26	3.6901E-24
9.22E 01	0.	-5.38E 01	6.6653E-03	1.8392E-01	1.9710E-17	5.4389E-16	2.4091E-17	6.5756E-16
9.22E 01	0.	0.	9.2882E 00	1.7291E 02	2.7794E-14	5.1741E-13	3.3512E-14	6.1737E-13
9.22E 01	0.	5.45E 01	5.9118E 02	8.5825E 03	1.7765E-12	2.5791E-11	2.1321E-12	3.0599E-11
9.22E 01	0.	1.85E 02	9.4226E 00	1.6143E 02	2.8098E-14	4.8137E-13	3.4018E-14	5.7634E-13
1.29E 02	0.	0.	1.4401E 01	2.5337E 02	4.3094E-14	7.5822E-13	5.1960E-14	9.0442E-13
2.13E 02	0.	0.	7.8287E-01	1.5163E 01	2.3046E-15	4.4837E-14	2.8325E-15	5.4189E-14
1.10E 02	0.	0.	9.1669E 00	1.8833E 02	2.7411E-14	5.0335E-13	3.3079E-14	6.0102E-13
1.10E 02	0.	6.00E 01	2.4973E 02	3.7587E 03	7.4938E-13	1.1279E-11	9.0079E-13	1.3405E-11
1.10E 02	0.	1.20E 02	2.8375E 01	4.7878E 02	8.4798E-14	1.4308E-12	1.0241E-13	1.7089E-12

TABLE XII (Cont.)

MPBE HEAT- UPPER REFL CONTROL SRC * REG 20 * INTENS FCT FROM VOLS 04/16/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	3.0302E-20	1.1770E-18	4.1395E-20	1.5960E-18	2.4264E-20	9.5071E-19
5.38E 01	0.	-5.38E 01	5.0876E-15	1.0584E-13	6.8601E-15	1.4176E-13	4.1356E-15	8.6690E-14
5.38E 01	0.	0.	8.0517E-11	9.3258E-10	1.0710E-10	1.2288E-09	6.6439E-11	7.7736E-10
5.38E 01	0.	5.45E 01	2.3745E-08	1.8235E-07	3.1380E-08	2.3798E-07	1.9728E-08	1.5350E-07
5.38E 01	0.	9.25E 01	9.7008E-09	7.8345E-08	1.2840E-08	1.0246E-07	8.0466E-09	6.5807E-08
5.38E 01	0.	1.28E 02	9.0960E-11	9.6831E-10	1.2152E-10	1.2812E-09	7.4701E-11	8.0355E-10
5.57E 01	0.	0.	4.8684E-11	5.8276E-10	6.4846E-11	7.6909E-10	4.0113E-11	4.8494E-10
6.75E 01	0.	0.	4.9433E-12	6.8140E-11	6.6234E-12	9.0547E-11	4.0466E-12	5.6289E-11
7.94E 01	0.	0.	4.8082E-13	7.6134E-12	6.4760E-13	1.0176E-11	3.9132E-13	6.2497E-12
8.97E 01	0.	0.	6.8053E-14	1.2053E-12	9.2032E-14	1.6180E-12	5.5131E-14	9.8472E-13
9.22E 01	0.	-1.68E 02	6.2327E-26	3.8995E-24	8.7334E-26	5.4030E-24	4.8380E-26	3.0697E-24
9.22E 01	0.	-5.38E 01	2.5406E-17	6.9266E-16	3.4726E-17	9.3975E-16	2.0329E-17	5.5911E-16
9.22E 01	0.	0.	3.5292E-14	6.4946E-13	4.7787E-14	8.7296E-13	2.8549E-14	5.2980E-13
9.22E 01	0.	5.45E 01	2.2442E-12	3.2171E-11	3.0289E-12	4.3064E-11	1.8222E-12	2.6364E-11
9.22E 01	0.	1.85E 02	3.5840E-14	6.0650E-13	4.8867E-14	8.1720E-13	2.8897E-14	4.9340E-13
1.29E 02	0.	0.	5.4719E-14	9.5139E-13	7.4093E-14	1.2785E-12	4.4264E-14	7.7630E-13
2.13E 02	0.	0.	2.9887E-15	5.7106E-14	4.1001E-15	7.7692E-14	2.3809E-15	4.5943E-14
1.10E 02	0.	0.	3.4838E-14	6.3230E-13	4.7202E-14	8.5032E-13	2.8163E-14	5.1551E-13
1.10E 02	0.	6.00E 01	9.4833E-13	1.4096E-11	1.2813E-12	1.8892E-11	7.6902E-13	1.1535E-11
1.10E 02	0.	1.20E 02	1.0788E-13	1.7980E-12	1.4622E-13	2.4184E-12	8.7141E-14	1.4655E-12

TABLE XIII

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	2.8589E 02	4.1578E 03	8.6500E-13	1.2580E-11	1.0278E-12	1.4869E-11
0.	0.	-1.08E 02	3.0652E 07	1.8980E 08	9.4461E-08	5.8492E-07	1.1021E-07	6.7219E-07
0.	0.	-8.07E 01	4.3020E 09	1.9034E 10	1.3718E-05	6.0695E-05	1.5591E-05	6.6364E-05
0.	0.	-5.38E 01	7.7609E 11	2.2268E 12	2.6860E-03	7.7069E-03	2.8858E-03	7.9549E-03
0.	0.	-3.62E 01	1.6436E 11	5.6124E 11	5.5355E-04	1.8902E-03	6.0564E-04	1.9783E-03
0.	0.	-1.86E 01	2.0982E 09	1.0142E 10	6.6303E-06	3.2050E-05	7.5845E-06	3.5434E-05
0.	0.	1.65E 01	6.3442E 04	7.0057E 05	1.9569E-10	2.1610E-09	2.2783E-10	2.4947E-09
0.	0.	5.45E 01	7.9416E 02	1.1461E 04	2.4427E-12	3.5253E-11	2.8510E-12	4.0913E-11
0.	0.	9.25E 01	3.9830E-01	9.1875E 00	1.2151E-15	2.8028E-14	1.4301E-15	3.2887E-14
0.	0.	1.28E 02	6.3428E-04	2.1039E-02	1.9241E-18	6.3821E-17	2.2788E-18	7.5337E-17
0.	0.	1.85E 02	8.6822E-05	3.1189E-03	2.6281E-19	9.4408E-18	3.1203E-19	1.1166E-17
1.15E 01	0.	-1.08E 02	2.5982E 07	1.6252E 08	8.0039E-08	5.0064E-07	9.3413E-08	5.7576E-07
1.15E 01	0.	-5.38E 01	3.9673E 12	6.6606E 12	1.4541E-02	2.4413E-02	1.5054E-02	2.4785E-02
1.15E 01	0.	-1.86E 01	1.2371E 09	6.3216E 09	3.9137E-06	2.0000E-05	4.4717E-06	2.2101E-05
1.15E 01	0.	1.65E 01	9.6335E 04	1.0186E 06	2.9756E-10	3.1463E-09	3.4600E-10	3.6245E-09
1.15E 01	0.	5.45E 01	5.3288E 02	7.6478E 03	1.6414E-12	2.3557E-11	1.9130E-12	2.7292E-11
1.15E 01	0.	9.25E 01	9.5754E-02	2.1773E 00	2.9247E-16	6.6505E-15	3.4376E-16	7.7930E-15
1.15E 01	0.	1.28E 02	3.2268E-04	1.0752E-02	9.7880E-19	3.2613E-17	1.1593E-18	3.8500E-17
2.31E 01	0.	-1.08E 02	1.5480E 07	1.0013E 08	4.7622E-08	3.0803E-07	5.5644E-08	3.5512E-07
2.31E 01	0.	-5.38E 01	5.2471E 10	1.8640E 11	1.7554E-04	8.2360E-04	1.9293E-04	6.5603E-04
2.31E 01	0.	-1.86E 01	5.4982E 08	2.8380E 09	1.7251E-06	8.9047E-06	1.9839E-06	9.9482E-06
2.31E 01	0.	0.	2.4422E 06	2.0052E 07	7.5592E-09	6.2066E-08	8.7771E-09	7.1117E-08
2.31E 01	0.	1.65E 01	2.7650E 04	3.2041E 05	8.5234E-11	9.8770E-10	9.9288E-11	1.1416E-09
2.31E 01	0.	5.45E 01	6.1147E 02	8.9438E 03	1.8804E-12	2.7503E-11	2.1952E-12	3.1930E-11
2.31E 01	0.	9.25E 01	3.4749E-01	7.8998E 00	1.0601E-15	2.4099E-14	1.2477E-15	2.8277E-14

TABLE XIII (Cont.)

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
0.	0.	-1.68E 02	1.0807E-12	1.5626E-11	1.4489E-12	2.0869E-11	8.8463E-13	1.2845E-11
0.	0.	-1.08E 02	1.1568E-07	7.0472E-07	1.5307E-07	9.2331E-07	9.6083E-08	5.9233E-07
0.	0.	-8.07E 01	1.6333E-05	6.9307E-05	2.1266E-05	8.8210E-05	1.3847E-05	6.0586E-05
0.	0.	-5.38E 01	3.0096E-03	8.2683E-03	3.7943E-03	1.0188E-02	2.6679E-03	7.5704E-03
0.	0.	-3.62E 01	6.3254E-04	2.0586E-03	8.0573E-04	2.5562E-03	5.5265E-04	1.8638E-03
0.	0.	-1.86E 01	7.9489E-06	3.7037E-05	1.0388E-05	4.7430E-05	6.7052E-06	3.2094E-05
0.	0.	1.65E 01	2.3908E-10	2.6161E-09	3.1572E-10	3.4336E-09	1.9893E-10	2.1913E-09
0.	0.	5.45E 01	2.9923E-12	4.2919E-11	3.9590E-12	5.6542E-11	2.4850E-12	3.5803E-11
0.	0.	9.25E 01	1.5022E-15	3.4534E-14	2.0000E-15	4.5875E-14	1.2392E-15	2.8557E-14
0.	0.	1.28E 02	2.3952E-18	7.9159E-17	3.2036E-18	1.0563E-16	1.9658E-18	6.5143E-17
0.	0.	1.85E 02	3.2806E-19	1.1735E-17	4.3957E-19	1.5682E-17	2.6871E-19	9.6420E-18
1.15E 01	0.	-1.08E 02	9.8056E-08	6.0365E-07	1.2978E-07	7.9126E-07	8.1422E-08	5.0709E-07
1.15E 01	0.	-5.38E 01	1.5651E-02	2.5724E-02	1.9319E-02	3.1407E-02	1.4295E-02	2.3873E-02
1.15E 01	0.	-1.86E 01	4.6861E-06	2.3101E-05	6.1182E-06	2.9564E-05	3.9566E-06	2.0025E-05
1.15E 01	0.	1.65E 01	3.6304E-10	3.8002E-09	4.7900E-10	4.9803E-09	3.0237E-10	3.1885E-09
1.15E 01	0.	5.45E 01	2.0076E-12	2.8626E-11	2.6534E-12	3.7665E-11	1.6691E-12	2.3912E-11
1.15E 01	0.	9.25E 01	3.6105E-16	8.1822E-15	4.8022E-16	1.0858E-14	2.9815E-16	6.7735E-15
1.15E 01	0.	1.28E 02	1.2185E-18	4.0453E-17	1.6299E-18	5.3980E-17	1.0001E-18	3.3289E-17
2.31E 01	0.	-1.08E 02	5.8418E-08	3.7240E-07	7.7377E-08	4.8889E-07	4.8462E-08	3.1223E-07
2.31E 01	0.	-5.38E 01	2.0158E-04	6.8297E-04	2.5744E-04	8.5051E-04	1.7548E-04	6.1577E-04
2.31E 01	0.	-1.86E 01	2.0800E-06	1.0407E-05	2.7270E-06	1.3407E-05	1.7473E-06	8.9438E-06
2.31E 01	0.	0.	9.2088E-09	7.4538E-08	1.2140E-08	9.7371E-08	7.6782E-09	6.2799E-08
2.31E 01	0.	1.65E 01	1.0419E-10	1.1973E-09	1.3766E-10	1.5727E-09	8.6659E-11	1.0019E-09
2.31E 01	0.	5.45E 01	2.3040E-12	3.3497E-11	3.0489E-12	4.4141E-11	1.9130E-12	2.7935E-11
2.31E 01	0.	9.25E 01	1.3106E-15	2.9693E-14	1.7449E-15	3.9443E-14	1.0811E-15	2.4555E-14

TABLE XIII (Cont.)

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	6.3247E-04	2.0468E-02	1.9188E-18	6.2097E-17	2.2723E-18	7.3294E-17
2.31E 01	0.	1.85E 02	4.9901E-05	1.8040E-03	1.5110E-19	5.4624E-18	1.7933E-19	6.4589E-18
2.43E 01	0.	0.	2.1271E 06	1.7472E 07	6.5692E-09	5.3960E-08	7.6435E-09	6.2027E-08
2.69E 01	0.	-1.08E 02	1.9535E 07	1.2260E 08	6.0164E-08	3.7758E-07	7.0233E-08	4.3445E-07
2.69E 01	0.	-5.38E 01	1.2745E 10	5.2464E 10	4.1459E-05	1.7066E-04	4.6454E-05	1.8319E-04
2.69E 01	0.	-1.86E 01	2.1044E 08	1.1691E 09	6.5537E-07	3.6408E-06	7.5799E-07	4.1135E-06
2.69E 01	0.	0.	1.7576E 06	1.4413E 07	5.4111E-09	4.4373E-08	6.3145E-09	5.1231E-08
2.69E 01	0.	1.65E 01	2.0918E 04	2.4222E 05	6.4192E-11	7.4329E-10	7.5114E-11	8.6407E-10
2.69E 01	0.	5.45E 01	4.5463E 01	7.8415E 02	1.3915E-13	2.4000E-12	1.6322E-13	2.8037E-12
2.69E 01	0.	9.25E 01	5.9428E-02	1.5328E 00	1.8103E-16	4.6692E-15	2.1340E-16	5.4882E-15
2.69E 01	0.	1.28E 02	3.9115E-05	1.4920E-03	1.1844E-19	4.5178E-18	1.4057E-19	5.3423E-18
2.95E 01	0.	0.	1.4081E 06	1.1600E 07	4.3248E-09	3.5627E-08	5.0585E-09	4.1273E-08
3.07E 01	0.	-1.08E 02	2.1301E 07	1.3156E 08	6.5638E-08	4.0539E-07	7.6588E-08	4.6596E-07
3.07E 01	0.	-5.38E 01	3.3847E 09	1.5482E 10	1.0794E-05	4.9373E-05	1.2266E-05	5.4025E-05
3.07E 01	0.	-1.86E 01	8.3730E 07	4.9857E 08	2.5943E-07	1.5448E-06	3.0127E-07	1.7602E-06
3.07E 01	0.	0.	1.2188E 06	1.0104E 07	3.7392E-09	3.0999E-08	4.3784E-09	3.5969E-08
3.07E 01	0.	1.65E 01	1.5407E 04	1.7979E 05	4.7138E-11	5.5005E-10	5.5331E-11	6.4184E-10
3.07E 01	0.	5.45E 01	6.2217E 00	1.2134E 02	1.8992E-14	3.7041E-13	2.2340E-14	4.3415E-13
3.07E 01	0.	9.25E 01	1.6642E-02	4.5901E-01	5.0632E-17	1.3965E-15	5.9767E-17	1.6436E-15
3.07E 01	0.	1.28E 02	6.2102E-06	2.6505E-04	1.8774E-20	8.0128E-19	2.2323E-20	9.4882E-19
4.22E 01	0.	-1.08E 02	1.1824E 06	9.4281E 06	3.6182E-09	2.8850E-08	4.2480E-09	3.3582E-08
4.22E 01	0.	-5.38E 01	1.1884E 08	6.8587E 08	3.6879E-07	2.1285E-06	4.2773E-07	2.4184E-06
4.22E 01	0.	0.	2.9929E 05	2.7377E 06	9.1455E-10	8.3657E-09	1.0751E-09	9.7646E-09
4.22E 01	0.	1.65E 01	9.3376E 03	1.0942E 05	2.8436E-11	3.3323E-10	3.3544E-11	3.9095E-10
4.22E 01	0.	5.45E 01	9.1930E-01	2.0103E 01	2.7880E-15	6.0968E-14	3.3034E-15	7.1947E-14

TABLE XIII (Cont.)

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
2.31E 01	0.	1.28E 02	2.3883E-18	7.7012E-17	3.1941E-18	1.0275E-16	1.9604E-18	6.3381E-17
2.31E 01	0.	1.85E 02	1.8854E-19	6.7878E-18	2.5256E-19	9.0685E-18	1.5447E-19	5.5783E-18
2.43E 01	0.	0.	8.0208E-09	6.5025E-08	1.0590E-08	8.5135E-08	6.6767E-09	5.4648E-08
2.69E 01	0.	-1.08E 02	7.3725E-08	4.5552E-07	9.7595E-08	5.9729E-07	6.1207E-08	3.8250E-07
2.69E 01	0.	-5.38E 01	4.8609E-05	1.9103E-04	6.2767E-05	2.4059E-04	4.1676E-05	1.6947E-04
2.69E 01	0.	-1.86E 01	7.9508E-07	4.3069E-06	1.0461E-06	5.5850E-06	6.6492E-07	3.6687E-06
2.69E 01	0.	0.	6.6279E-09	5.3726E-08	8.7694E-09	7.0559E-08	5.5044E-09	4.4996E-08
2.69E 01	0.	1.65E 01	7.8859E-11	9.0662E-10	1.0454E-10	1.1960E-09	6.5352E-11	7.5526E-10
2.69E 01	0.	5.45E 01	1.7139E-13	2.9429E-12	2.2761E-13	3.8964E-12	1.4176E-13	2.4422E-12
2.69E 01	0.	9.25E 01	2.2420E-16	5.7641E-15	2.9885E-16	7.6671E-15	1.8470E-16	4.7599E-15
2.69E 01	0.	1.28E 02	1.4778E-19	5.6144E-18	1.9796E-19	7.5011E-18	1.2108E-19	4.6137E-18
2.95E 01	0.	0.	5.3106E-09	4.3295E-08	7.0383E-09	5.6994E-08	4.4024E-09	3.6164E-08
3.07E 01	0.	-1.08E 02	8.0393E-08	4.8852E-07	1.0639E-07	6.4016E-07	6.6767E-08	4.1054E-07
3.07E 01	0.	-5.38E 01	1.2849E-05	5.6424E-05	1.6727E-05	7.1840E-05	1.0895E-05	4.9295E-05
3.07E 01	0.	-1.86E 01	3.1611E-07	1.8441E-06	4.1698E-07	2.4034E-06	2.6352E-07	1.5604E-06
3.07E 01	0.	0.	4.5972E-09	3.7737E-08	6.0977E-09	4.9733E-08	3.8075E-09	3.1481E-08
3.07E 01	0.	1.65E 01	5.8107E-11	6.7367E-10	7.7207E-11	8.9120E-10	4.8034E-11	5.5953E-10
3.07E 01	0.	5.45E 01	2.3485E-14	4.5585E-13	3.1227E-14	6.0505E-13	1.9365E-14	3.7729E-13
3.07E 01	0.	9.25E 01	6.2800E-17	1.7265E-15	8.3793E-17	2.2987E-15	5.1680E-17	1.4242E-15
3.07E 01	0.	1.28E 02	2.3473E-20	9.9728E-19	3.1485E-20	1.3338E-18	1.9204E-20	8.1863E-19
4.22E 01	0.	-1.08E 02	4.4614E-09	3.5242E-08	5.9292E-09	4.6553E-08	3.6872E-09	2.9326E-08
4.22E 01	0.	-5.38E 01	4.4878E-07	2.5332E-06	5.9148E-07	3.2961E-06	3.7447E-07	2.1483E-06
4.22E 01	0.	0.	1.1292E-09	1.0250E-08	1.5021E-09	1.3564E-08	9.3234E-10	8.5105E-09
4.22E 01	0.	1.65E 01	3.5245E-11	4.1055E-10	4.7001E-11	5.4532E-10	2.9019E-11	3.3951E-10
4.22E 01	0.	5.45E 01	3.4723E-15	7.5595E-14	4.6455E-15	1.0084E-13	2.8489E-15	6.2225E-14

TABLE XIII (Cont.)

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			ENERGY FLUX MEV PER SQ CM SEC		HEATING RATE IN CARBON WATTS PER GM		HEATING RATE IN IRON WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	1.0284E 05	9.9667E 05	3.1361E-10	3.0394E-09	3.6946E-10	3.5575E-09
5.38E 01	0.	-5.38E 01	5.3567E 06	3.8964E 07	1.6452E-08	1.1967E-07	1.9248E-08	1.3848E-07
5.38E 01	0.	0.	3.9434E 04	4.1779E 05	1.2019E-10	1.2734E-09	1.4166E-10	1.4920E-09
5.38E 01	0.	5.45E 01	5.8177E-01	1.2863E 01	1.7583E-15	3.8877E-14	2.0917E-15	4.6032E-14
5.38E 01	0.	9.25E 01	9.7137E-05	3.5762E-03	2.9257E-19	1.0771E-17	3.4943E-19	1.2796E-17
5.38E 01	0.	1.28E 02	1.7898E-07	8.8860E-06	5.3878E-22	2.6749E-20	6.4389E-22	3.1788E-20
5.57E 01	0.	0.	2.5060E 04	2.7444E 05	7.6337E-11	8.3598E-10	9.0029E-11	9.8032E-10
6.75E 01	0.	0.	2.9660E 03	3.7585E 04	9.0119E-12	1.1420E-10	1.0657E-11	1.3435E-10
7.94E 01	0.	0.	3.1108E 02	4.5816E 03	9.4290E-13	1.3887E-11	1.1181E-12	1.6386E-11
8.97E 01	0.	0.	4.5332E 01	7.5539E 02	1.3712E-13	2.2850E-12	1.6298E-13	2.7024E-12
9.22E 01	0.	-1.68E 02	4.2677E-01	9.1622E 00	1.2831E-15	2.7547E-14	1.5359E-15	3.2778E-14
9.22E 01	0.	-5.38E 01	4.4485E 02	6.3687E 03	1.3485E-12	1.9307E-11	1.5968E-12	2.2776E-11
9.22E 01	0.	0.	2.3705E 01	4.1192E 02	7.1659E-14	1.2452E-12	8.5233E-14	1.4737E-12
9.22E 01	0.	5.45E 01	7.8368E-03	2.2033E-01	2.3504E-17	6.6081E-16	2.8217E-17	7.8812E-16
9.22E 01	0.	1.85E 02	1.8126E-11	1.3208E-09	5.3537E-26	3.9010E-24	6.5474E-26	4.7070E-24
1.29E 02	0.	0.	2.4986E 01	4.1463E 02	7.5578E-14	1.2542E-12	8.9829E-14	1.4833E-12
2.13E 02	0.	0.	8.9982E-01	1.7360E 01	2.7012E-15	5.2115E-14	3.2395E-15	6.2096E-14
1.10E 02	0.	0.	1.9146E 01	3.3039E 02	5.7881E-14	9.9880E-13	6.8840E-14	1.1820E-12
1.10E 02	0.	6.00E 01	1.8532E-02	4.8677E-01	5.5641E-17	1.4615E-15	6.6711E-17	1.7413E-15
1.10E 02	0.	1.20E 02	1.8080E-06	7.6336E-05	5.3738E-21	2.2689E-19	6.5218E-21	2.7267E-19

TABLE XIII (Cont.)

MPBE HEAT- FUEL FOLL ENDS CAPT+FISS SRC * REG 35* UNIFORM SOURCE DISTR. 04/19/66 000000

COORDINATES			HEATING RATE IN NICKEL WATTS PER GM		HEATING RATE IN TANTALUM WATTS PER GM		HEATING RATE IN SODIUM WATTS PER GM	
			DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP	DIRECT BEAM	WITH BUILDUP
5.38E 01	0.	-1.08E 02	3.8814E-10	3.7351E-09	5.1710E-10	4.9528E-09	3.1992E-10	3.0945E-09
5.38E 01	0.	-5.38E 01	2.0209E-08	1.4526E-07	2.6790E-08	1.9113E-07	1.6748E-08	1.2143E-07
5.38E 01	0.	0.	1.4883E-10	1.5667E-09	1.9835E-10	2.0790E-09	1.2262E-10	1.2969E-09
5.38E 01	0.	5.45E 01	2.1996E-15	4.8383E-14	2.9514E-15	6.4701E-14	1.7988E-15	3.9718E-14
5.38E 01	0.	9.25E 01	3.6761E-19	1.3454E-17	4.9464E-19	1.8034E-17	2.9967E-19	1.1015E-17
5.38E 01	0.	1.28E 02	6.7743E-22	3.3424E-20	9.1192E-22	4.4817E-20	5.5195E-22	2.7357E-20
5.57E 01	0.	0.	9.4590E-11	1.0294E-09	1.2612E-10	1.3669E-09	7.7896E-11	8.5162E-10
6.75E 01	0.	0.	1.1200E-11	1.4113E-10	1.4964E-11	1.8784E-10	9.2034E-12	1.1645E-10
7.94E 01	0.	0.	1.1754E-12	1.7217E-11	1.5734E-12	2.2965E-11	9.6371E-13	1.4173E-11
8.97E 01	0.	0.	1.7137E-13	2.8401E-12	2.2978E-13	3.7945E-12	1.4025E-13	2.3336E-12
9.22E 01	0.	-1.68E 02	1.6162E-15	3.4470E-14	2.1781E-15	4.6258E-14	1.3151E-15	2.8184E-14
9.22E 01	0.	-5.38E 01	1.6807E-12	2.3931E-11	2.2496E-12	3.1914E-11	1.3782E-12	1.9703E-11
9.22E 01	0.	0.	8.9630E-14	1.5489E-12	1.2025E-13	2.0705E-12	7.3307E-14	1.2719E-12
9.22E 01	0.	5.45E 01	2.9701E-17	8.2901E-16	4.0108E-17	1.1144E-15	2.4111E-17	6.7656E-16
9.22E 01	0.	1.85E 02	6.9050E-26	4.9572E-24	9.4429E-26	6.7179E-24	5.5227E-26	4.0079E-24
1.29E 02	0.	0.	9.4455E-14	1.5589E-12	1.2665E-13	2.0828E-12	7.7300E-14	1.2809E-12
2.13E 02	0.	0.	3.4095E-15	6.5311E-14	4.6008E-15	8.7728E-14	2.7702E-15	5.3342E-14
1.10E 02	0.	0.	7.2391E-14	1.2423E-12	9.7112E-14	1.6606E-12	5.9211E-14	1.0202E-12
1.10E 02	0.	6.00E 01	7.0211E-17	1.8315E-15	9.4725E-17	2.4602E-15	5.7057E-17	1.4959E-15
1.10E 02	0.	1.20E 02	6.8726E-21	2.8704E-19	9.3502E-21	3.8790E-19	5.5306E-21	2.3283E-19

APPENDIX B

ABSORBED DOSE RATES IN IRON AT DETECTOR POINTS NOT INCLUDED IN AXIAL PLOTS

Table XIV presents in summary form all the individual contributions to the absorbed dose rate in iron, at the detector points not included in the axial plots, H(Z).

TABLE XIV

ABSORBED DOSE RATES IN IRON AT DETECTOR POINTS

NOT INCLUDED IN AXIAL PLOTS

[in (W/g) at (R,Z)]

Source	(24.3,0)	(29.5,0)	(55.7,0)	(67.55,0)	(79.4,0)	(89.7,0)	(129.5,0)	(213.4,0)
PF+EFP	0.77214	0.1067	7.196 - 5	4.760 - 6	3.412 - 7	3.887 - 8	5.53 - 9	9.74 -11
Core Capture	0.07395	0.01223	1.354 - 5	9.594 - 7	7.418 - 8	9.160 - 9	1.374 - 9	3.769 -11
Margin	0.06354	0.01075	1.981 - 5	1.816 - 6	1.768 - 7	2.603 - 8	4.872 - 9	2.437 -10
Hexagonal Sleeve	0.04708	0.00724	1.072 - 5	9.601 - 7	9.253 - 8	1.358 - 8	2.532 - 9	1.265 -10
Margin Control (top)	0.27446	0.24793	1.578 - 4	1.051 - 5	7.755 - 7	9.31 - 8	1.52 - 8	4.57 -10
Margin Control (bottom)	0.00015	0.00014	5.36 - 6	7.04 - 7	8.44 - 8	1.408 - 8	3.767 - 9	2.21 -10
Core Sleeve	0.00341	0.01864	2.142 - 5	1.825 - 6	1.720 - 7	2.504 - 8	4.673 - 9	2.326 -10
Side Reflector	0.01043	0.04563	1.648 - 2	9.343 - 4	7,648 - 5	1.051 - 5	1.879 - 6	9.044 - 8
Thermal Shield + Reflector Sleeve	0.000014	0.0000433	1.950 - 2	1.472 - 2	2.957 - 3	2.364 - 4	3.421 - 5	1,366 - 6
Gas Space	0.000336	0.000170	1.430 - 6	1.324 - 7	1.166 - 8	1.523 - 9	3.712 -10	9.735 -12
End Caps (top)	0.0	0.0	2.778 - 9	3.691 -10	4.581 -11	7.873 -12	5.938 -12	2.713 -13
End Caps (bottom)	0.000295	0.000137	6.840 - 7	5.196 - 8	3.926 - 9	4.614 -10	7.593 -11	1.428 -12
Upper Reflector	0.0	0.0	1.99 - 9	3.612 -10	6.342 -11	1.488 -11	1.951 -11	3.534 -12
Upper Reflector Control	0.0	0.0	5.55 -10	6.49 -11	7.24 -12	1.15 -12	9.04 -13	5.42 -14
Bottom Reflector	0.00011	0.00008	1.72 - 6	2.25 - 7	2.73 - 8	4.60 - 9	1.26 - 9	7.74 -11
Bottom Reflector Control Capture	0.00001	0.000007	1.43 - 7	2.17 - 8	2.70 - 9	4.54 -10	1.23 -10	8.01 -12
Bottom Reflector Control Fission	0.00002	0.000007	5.16 - 8	5.77 - 9	5.43 -10	7.26 -11	1.73 -11	4.54 -13
Fuel Follow Ends	0.0	0.0	9.80 -10	1.34 -10	1.64 -11	2.70 -12	1.48 -12	6.21 -14
Total	1.2452	4.497 - 1	3.628 - 2	1.568 - 2	3.035 - 3	2.471 - 4	3.613 - 5	1.458 - 6