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**BULK SHIELDING EXPERIMENTS ON LARGE SS316 ASSEMBLIES
BOMBARDED BY D-T NEUTRONS
VOLUME II : ANALYSIS**

December 1994

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Bulk Shielding Experiments on Large SS316 Assemblies
Bombarded by D-T Neutrons
Volume II: Analysis

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As a part of the Engineering Design Activities (EDA) of International Thermonuclear Experimental Reactor (ITER), the bulk shielding experiments on large SS316 assemblies bombarded by D-T neutrons were carried out at the FNS facility in JAERI. The experimental details are described in a separated issue, Volume I. In this report, Volume II, methods and results of the experimental analyses, and comparisons of the calculated results with the experiments are compiled. Two transport calculation codes, MCNP-4 and DOT-3.5, and cross section libraries based on JENDL-3.1 were used in the analyses. As a result, the following results were found for both neutrons and gamma-rays; (i) Calculated results by MCNP reproduced the experiment within about 30%. (ii) The DOT calculation with consideration of the self-shielding correction factors agreed with the MCNP calculations within about 20%. (iii) Influences of number of energy groups were not so large. (iv) Gamma-ray heating rates in deeper part of the experimental assemblies were 2~3 times underestimated by the DOT calculations without the self-shielding correction comparing with the MCNP calculations.

Keywords: ITER/EDA, FNS, Shielding Experiment, SS316, MCNP, DOT, JENDL-3.1, Self-shielding, Energy Group Number

This report was submitted to the Joint Central Team (JCT) of ITER.

* Sumitomo Atomic Energy Industries, Ltd.

D-T中性子照射された大型SS316体系におけるバルク遮蔽実験
第2部：解析

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(1994年11月15日受理)

国際熱核融合実験炉（ITER）の工学設計活動（EDA）の一環として、D-T中性子照射された大型SS316体系におけるバルク遮蔽実験が原研FNS施設で行われ、実験の詳細が本レポートの別刷である第1部に述べられている。本レポート、第2部は、この実験解析の方法とその結果、および計算結果の実験値との比較をまとめたものである。解析には2つの輸送計算コード、MCNP-4とDOT-3.5、およびJENDL-3.1に基づく断面積ライブラリを用いた。その結果、中性子、 γ 線の双方に対して次のことが分かった。（i）MCNPによる計算は約30%以内で実験値を再現する。（ii）自己遮蔽補正因子を考慮したDOTによる計算値はMCNPの値と約20%以内で一致する。（iii）エネルギー群数による影響はさほど大きくない。（iv）自己遮蔽補正を考慮しないDOT計算ではMCNP計算に比べて実験体系深部での γ 線核発熱率を2～3倍過小評価する。

このレポートはITER/JCTに提出したものである。

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1. Introduction

In the designs of the International Thermonuclear Experimental Reactor, ITER, shielding designs¹⁻⁵⁾ of the inboard blanket/shield are one of the crucial issues for the optimization of the reactor design. In order to experimentally investigate shielding properties of type 316 stainless steel (SS316) shields, which were the primary candidate of the shield for ITER, the bulk shielding experiments on large SS316 assemblies^{6,7)} were carried out at the intense D-T neutron source facility, Fusion Neutronics Source⁸⁾ (FNS), in Japan Atomic Energy Research Institute (JAERI). The experiments were a part of the '94 task of ITER/EDA, Blanket/Shield JA-3, "Preparation of Neutronic Experiments and Measuring Technique." Two massive shields made of SS316 were served for the experimental assemblies. One of the features of the experiments is that measured quantities are obtained in deeper positions up to 914 mm in the experimental assemblies. The depth is thicker than the thickness of the inboard shield of ITER, and the experimental results can be directly reflected to the shielding designs without any extrapolations. The second feature is that various quantities are measured with high accuracy; (i) neutron spectrum in whole energy range from 14 MeV down to eV, (ii) activation reaction rate and fission rate, (iii) gamma-ray spectrum and (iv) gamma-ray heating rate. Since not only the energy-integrated quantities but also neutron and gamma-ray spectra are measured in wide energy ranges, these experimental data supply very useful informations to the shielding designs of ITER.

In order to provide the present status of accuracies of the calculation methods and the related data bases, the bulk shielding experiments were analyzed^{9,10)}. The analyses were a part of the '93 task of ITER/EDA, Shield/Blanket JA-3, "Bulk Shielding Experiments: Phase IA Pre- & Post-Analyses and Preparation of SS316 and SS316/Water Experiments." Two transport calculation codes, the continuous energy Monte Carlo code MCNP-4¹¹⁾ and the two dimensional discrete ordinates code DOT-3.5¹²⁾, and the Japanese Evaluated Nuclear Data Library, JENDL-3.1¹³⁾ were used for the analyses. The MCNP-4 code is regarded to give the most precise results with little discretization and assumption because of the treatment of cross section in continuous energy form and its capability of rigorous modeling. Hence accuracies related to only the cross section data can be extracted through comparisons between the experiments and the analyses. The DOT-3.5 code is widely used^{1,2,14,15)} in the shielding designs of fusion reactors and devices such as ITER. In the shielding designs, more or less rough approximations have been adopted for DOT calculations; number of energy groups, number of angular quadratures, order of Legendre polynomial expansion, spacial mesh intervals and treatment of the self-shielding correction factors in group constants. In the present analyses, two different energy group structures are used to investigate influences of the

structures. In the shielding designs of fusion devices so far, the self-shielding correction to group constants has not been taken in most of cases. This omission of the correction might cause large errors in the shielding calculations. Thus two sets of DOT calculations with and without the self-shielding correction are made to demonstrate the effect of the correction.

Experimental procedures and the measured data are described in the Volume I ⁶⁾ separately. Pre-analyses to determine the experimental configurations are reported in Ref. 16. This report is a compilation of the analyses of the bulk shielding experiments. Detailed informations of the analyses are given in the Chapter 2. The calculated results are presented and compared with the experiment in the Chapter 3. Influences of number of energy groups and the self-shielding correction, and comparisons between the experiments and the analyses are briefly discussed in the Chapter 4.

2. Analysis

2.1 Transport Calculation Code

Two transport codes were used for the experimental analyses. One was the continuous energy neutron and photon transport code MCNP-4¹¹⁾, and the another was the two-dimensional discrete ordinates transport code DOT-3.5¹⁰⁾. In order to calculate the first collision sources for DOT, the modified version of the GRTUNCL code¹⁰⁾ was used. The modification will be mentioned later.

2.2 Calculation Model

Two kinds of experimental assemblies were served to the bulk shielding experiment. One of them had a test region of simple cylindrical shape, 1200 mm in diameter and 1118 mm in thickness, and it was named as "Assembly #1." The source reflector was added to the test region of Assembly #1 to construct "Assembly #2." Figures 2.1 and 2.2 illustrate the calculation models of the two experimental assemblies. The real geometry of them was precisely taken into account in the calculation models. Seven measurement positions were selected in the experiments. They were the front surface of the test region, and 102, 229, 356, 533, 711 and 914 mm from the front surface of the test region.

Both assemblies were made of type 316 stainless steel, and its atomic densities were listed in Table 2.1. The atomic densities of the test region were a little different from those of the source reflector.

2.3 Source Condition

Spectra of the D-T neutrons emitted from the real target have angle-dependent intensity and peak energy ruled by the kinematics of the D-T reaction. They also have low energy neutron component formed by the scattered neutrons with the structural materials of the target. Since the test region and the source reflector surrounded the target completely, source neutron emitted toward whole solid angle should be precisely considered in the analyses. In order to take the source conditions into the analyses, angle-dependent source neutron spectra were used for both MCNP and DOT calculations. The spectra were calculated with the Monte Carlo code MORSE-DD¹⁷⁾ considering the following effects.

1. Slowing down of the deuteron ion in the TiT target layer.

2. Cross section of the D-T reaction at each deuteron energy.
3. Shape of deuteron beam on the target.
4. Kinematics of the D-T reaction.
5. Angular distribution of the emitted neutron (slightly anisotropic in the C. M. system).
6. Precisely simulated target structure shown in Fig. 2.3.

The spectra were calculated at 37 points from 0 to 180 degree with 5 degree interval. Examples of the spectra are shown in Fig. 2.4. It is seen in the spectra that peak energies drift from 14.8 MeV to 13.4 MeV corresponding to emitted angle from the forward to the backward. Validity of the calculated spectra was proved in detail in Ref. 18. Digital data of the spectra at 37 angles are presented in Fig. 2.5. These data were directly used as the source term of both MCNP and DOT calculations.

In the realistic MCNP calculations, the angle-dependent source neutrons were generated in the "source subroutine." The sampling procedures of the source neutron were added to the subroutine. The added part of the subroutine is presented in Fig. 2.6. For the DOT calculations, on the other hand, the FNSUNCL code was used to treat the angle-dependent source neutrons. The FNSUNCL code was a modified version of the GRTUNCL code. It was developed to accurately simulate the angle-dependence of the line neutron source in the Phase-III of JAERI/USDOE Collaborative Program on Fusion Blanket Neutronics¹⁸⁾. The code could be adopted to the present analyses without any changes of its program.

The measured quantities were normalized by the number of source neutrons. In the experiment, the number of source neutrons meant the number of generated neutrons by the D-T reaction. It was not the same as the number of emitted neutrons from the target but the number of D-T reactions occurred at the target. All the calculated values were exactly normalized by the number of D-T reactions as it was done in the experiment.

2.4 MCNP Calculation

For the MCNP analyses, the FSXLIB-J3¹⁹⁾ library based on JENDL-3.1 and FSXDOSJ3²⁰⁾ library based on JENDL Dosimetry File²¹⁾ were used as neutron transport and the dosimetry reaction cross section libraries, respectively. The MCPLIB1¹¹⁾ library was used as a photon transport cross section library. Cross section data used in the analyses are summarized in Table 2.2.

Figures 2.7 and 2.8 are input data used in the calculations for the Assembly #1 and #2, respectively. Geometry and atomic density used have been described in the section 2.2. In order to obtain calculation results with higher statistical accuracy even in the deepest

measurement points at 914 mm from the front surface of the test region, the variance reduction technique with weight window parameters was adopted to the calculations. The parameters were empirically determined as given in the input data.

As mentioned in the previous section, the source subroutine was used to simulate the angle-dependent source neutron spectra. Source neutrons were emitted toward the whole solid angle for the calculation of Assembly #2, while directions of the source neutrons were restricted inside a cone of 63.435 degree for the calculation of Assembly #1. The cone just covered the front surface of the test region. A factor of 0.2764, which corresponded to a proportion of the solid angle suspended by the cone to the whole solid angle, was multiplied to all the tallies.

The surface flux estimators were used for the standard detector. Axial positions of the detector surfaces measuring from the front surface of the test region were 0.0, 102, 229, 356, 533, 711 and 914 mm. At the front surface of the test region, neutron spectra were measured by two counters. Since both counters used in the experiments had diameters of about 20 mm, center of the counters was 10 mm apart from the front surface. Thus a cell flux estimator of 20 mm thickness was placed just in front of the test region. All the estimators were 40 mm in radius. If the radius of the estimator is large, calculated flux becomes smaller than the flux of the "zero-radius" detector because of the gradient of flux along the R-direction. When one observes a neutron flux directly coming from the target at the closest measurement position, that is, at the front surface of the test region, the detector-size effect is the maximum. The detector-size effect was analytically calculated. According to the calculations, it was found that the effects were 0.3, 1.7 and 5.0 % for detectors of 20, 40 and 80 mm in radius, respectively. Thus it was deduced that the detector-size effect could be neglected within an error range of 2 % when detectors of 40 mm in radius were used.

Energy bins for tallies used in the calculations were 125-neutron and 40-gamma-ray energy groups. The energy bins were just the same as those used in the DOT calculations. They will be mentioned in the next section.

An engineering work station, HP9000/730 (Hewlett-Packard Co.), was used for the MCNP calculations. Number of histories and computation time were 1.2 millions and 121 hours for the Assembly #1, and 4.0 millions and 200 hours for the Assembly #2.

Owing to the appropriate variance reduction techniques and the enough computation time, good statistical accuracies were achieved for all the calculated results. Statistical errors in the calculations for the Assemblies #1 and #2 did not differ so much. Statistical errors of a typical high threshold energy reaction, $^{27}\text{Al}(n,\alpha)^{24}\text{Na}$, were less than 1.2 % at all the measurement points. Those of a low energy threshold reaction, $^{115}\text{In}(n,n')^{115\text{m}}\text{In}$, were between 1 to 10 %. As for $^{197}\text{Au}(n,\gamma)^{198}\text{Au}$ reaction which had a large sensitivity at 4.9 eV, since there were few

low energy neutrons around 4.9 eV in the assemblies, very good statistical accuracies were not attained. The errors of the reaction ranged between 4 and 44 %, and between 4 and 25 % for the Assemblies #1 and #2, respectively. Statistical errors of the neutron spectra in most of the energy bins were between 5 and 10 % except for some specific energy regions. As for gamma-ray spectra, the errors in most of the energy bins between 0.1 and 8 MeV were less than 7 %.

2.5 DOT Calculation

Cross section data used in the DOT analyses are also listed in Table 2.2. Two different energy group structures, 125-neutron + 40-gamma-ray groups and 42-neutron + 21-gamma-ray groups, were adopted to the calculations. The energy group structures are summarized in Table 2.3. In order to investigate the effect of self-shielding correction in group constants, two series of DOT calculations were done with and without considering the self-shielding correction. The FUSION-J3²²⁾ (125-n + 40- γ) and FUSION-40²²⁾ (42-n + 21- γ) libraries were used for calculations without the correction while the JSSTD L library^{23, 24)} was used for calculations with the correction. The original JSSTD L library has 295-neutron and 104-gamma-ray groups. The library was condensed into the two group structures. The condensed group constants of each nuclide contained in the SS316 were mixed taking account of the self-shielding correction factors to yield macroscopic cross sections. All the libraries used were based on JENDL-3.1. Photon transport cross sections contained in the FUSION-J3 and FUSION-40 libraries were based on DLC-99²⁵⁾, and those in the JSSTD L library were on the DLC-137²⁶⁾ (PHOTX).

Input data of FNSUNCL and DOT calculations are shown in Figs. 2.9 - 2.24. The P5-S16 approximation was adopted through all the calculations. In the test region and the source reflector, spacial mesh interval of 20 mm was taken as the standard. The mesh intervals used were fixed through the calculations. Mesh intervals in the test region were nearly the same between the Assemblies #1 and #2.

The main frame of the JAERI Computing and Information System Center, FACOM M-780 computer, was used for all the FNSUNCL and DOT calculations. Consumed computation time for calculations with 125-neutron and 40-gamma-ray groups was 13 ~ 25 and 90 ~ 190 minutes for FNSUNCL and DOT, respectively. That for calculations with 42-neutron and 21-gamma-ray groups was 2 ~ 4 and 30 ~ 70 minutes for FNSUNCL and DOT, respectively.

There are four different DOT calculations for each experimental assembly. In order to easily identify the four calculations from each other, they are abbreviated as follows

through this report;

DOT with FUSION-J3 (125-n + 40- γ) without self-shielding correction:	DOT-F-125,
DOT with FUSION-40 (42-n + 21- γ) without self-shielding correction:	DOT-F-42,
DOT with JSSTDL (125-n + 40- γ) with self-shielding correction:	DOT-J-125,
DOT with JSSTDL (42-n + 21- γ) with self-shielding correction:	DOT-J-42.

2.6 Post Processing

In order to extract neutron and gamma-ray spectra, and to calculate reaction rates at the measurement positions with flux files by DOT, the reaction rates and spectra editing code INTERF²⁷⁾ was used. The group-wise dosimetry reaction cross section library in 125 and 42 neutron groups, JDOS125²⁰⁾ and JDOS42²⁰⁾, respectively, was used to calculate the reaction rates for the DOT calculations. The JDOS125 and JDOS42 libraries were also derived from the JENDL Dosimetry File.

The photon interaction cross section library, DLC-99²⁵⁾, was converted to group-wise KERMA factor library²⁸⁾ in 40 and 21 energy groups. The calculated gamma-ray spectra by DOT and MCNP were multiplied by the KERMA factors of SS316, and summed up over all the groups to yield gamma-ray heating rates of SS316.

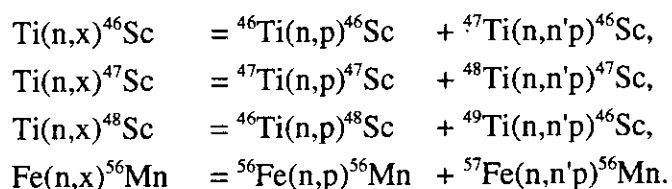
The measured gamma-ray spectra were given with their energy resolution. In order to compare the measured and calculated spectra appropriately, the calculated gamma-ray spectra by both DOT and MCNP were broadened by the energy resolution.

3. Comparison of the Calculation with the Experiment

3.1 Reaction Rate

Fifteen kinds of dosimetry reaction rates are measured in the experiments. Cross sections of the reactions taken from the JENDL Dosimetry File were shown in Figs. 3.1 - 3.5.

Some of the measured reaction rates are sum of two reactions, i.e.,



Cross sections of the three $\text{Ti}(n,x)$ reactions in the JENDL Dosimetry File are assigned as the cross section per titanium atom of natural abundance. Obviously, the calculated reaction rates are given in the same unit; reaction rates per titanium atom of natural abundance. On the other hand, the measured $\text{Ti}(n,x)$ reaction rates are given as those per summed number of two titanium isotopes, that is, ${}^{46}\text{Ti}$ and ${}^{47}\text{Ti}$ for the $\text{Ti}(n,x)^{46}\text{Sc}$ reaction. Thus the measured and calculated $\text{Ti}(n,x)$ reaction rates can not be compared directly. Hence factors of sum of atomic abundance of the two titanium isotopes are multiplied to the experimental reaction rates. The factors are 0.1531, 0.8131 and 0.7945 for the $\text{Ti}(n,x)^{46}\text{Sc}$, $\text{Ti}(n,x)^{47}\text{Sc}$ and $\text{Ti}(n,x)^{48}\text{Sc}$ reactions, respectively.

Since the cross section of the ${}^{57}\text{Fe}(n,n'p)^{56}\text{Mn}$ reaction (7.4 mb) is much smaller than that of the ${}^{56}\text{Fe}(n,p)^{56}\text{Mn}$ reaction (104 mb) at 15 MeV and the abundance of ${}^{57}\text{Fe}$ (2.19 %) is again much smaller than that of ${}^{56}\text{Fe}$ (91.68 %), reaction rate of the ${}^{57}\text{Fe}(n,n'p)^{56}\text{Mn}$ can be neglect to that of the ${}^{56}\text{Fe}(n,p)^{56}\text{Mn}$. Thus the $\text{Fe}(n,x)^{56}\text{Mn}$ reaction is substituted by the ${}^{56}\text{Fe}(n,p)^{56}\text{Mn}$ reaction in all the calculations. The measured $\text{Fe}(n,x)^{56}\text{Mn}$ reaction rates are normalized per summed number of ${}^{56}\text{Fe}$ and ${}^{57}\text{Fe}$ atoms. A factor of 1.0239, which is sum of abundance of ${}^{56}\text{Fe}$ and ${}^{57}\text{Fe}$ divided by abundance of ${}^{56}\text{Fe}$, is multiplied to the measured reaction rate to convert the $\text{Fe}(n,x)^{56}\text{Mn}$ reaction rate into the ${}^{56}\text{Fe}(n,p)^{56}\text{Mn}$ reaction rate.

Calculated to experimental ratios (C/E ratios) of the reaction rates are derived for all the calculations. Numerical values of the measured and calculated reaction rates and their C/E ratios for the Assemblies #1 and #2 are presented in Tables 3.1 and 3.2, respectively. Figures 3.6 - 3.35 show all the C/E ratios. Curves of the experimental errors are indicated in the figures with the C/E values. Statistical errors of the MCNP calculation are attached to each symbol of the C/E ratio.

3.2 Neutron Spectrum

Numerical data of the calculated neutron spectra in the Assemblies #1 and #2 are summarized in Tables 3.3 - 3.7 and 3.8 - 3.12, respectively. The measured and calculated neutron spectra in MeV and keV energy regions in the Assembly #1 are shown in Figs. 3.36 - 3.42 and 3.43 - 3.49, respectively. Those in MeV, keV and eV energy regions in the Assembly #2 are presented in Figs. 3.50 - 3.56, 3.57 - 3.62 and 3.63 - 3.67, respectively.

It should be noticed that assigned errors to the measured neutron spectra in MeV energy region in the tables and figures do not include all the errors. The additional errors are described in detail in Ref. 6. In shallower positions of the assemblies where 14 MeV neutron peak is prominent, measured spectra between 6 and 10 MeV might be assessed smaller as seen in Figs. 3.36 and 3.50. In deeper positions, 711 mm and 914 mm depth, larger spectra are given below 10 MeV as seen in Figs. 3.41, 3.42, 3.55 and 3.56 because of a difficulty in the measurements.

Because the calculated spectra are not broadened with energy resolution of the measured spectra, 14 MeV peaks by calculations are sharper than the measured one. In keV energy region, energy bin widths of the calculated spectra in 125 energy groups seem to nearly correspond to the energy resolution of the measured one. But those in 40 energy groups are much broader than the measured spectra, and fine structures of the spectra are not expressed appropriately.

Both measured and calculated neutron spectra are integrated within eight energy ranges; higher than 10 MeV, 2 - 10 MeV, 0.1 - 1 MeV, 10 - 100 keV, 1 - 10 keV, 0.1 - 1 keV, 10 - 100 eV and 1 - 10 eV. The obtained integral fluxes by experiments and calculations are summarized in Tables 3.13 and 3.14. The C/E ratios of the integral fluxes are presented in the tables and Figs. 3.68 - 3.79. Assigned errors in the tables and figures include all the errors. The mismatches of energy resolution between the experiments and the calculations can be avoided by the integration procedures. Quantitative comparisons between the measured and calculated spectra come to be possible by the integration.

3.3 Gamma-Ray Heating Rate

Numerical values of the measured and calculated gamma-ray heating rates of SS316 and their C/E ratios are summarized in Table 3.15. The C/E ratios for the Assemblies #1 and #2 are also shown in Figs. 3.80 and 3.81, respectively.

3.4 Gamma-Ray Spectrum

Numerical values of the calculated gamma-ray spectra for the Assemblies #1 and #2, which are broadened by the energy resolution of the measured spectra, are tabulated in Tables 3.16 - 3.20 and 3.21 - 3.25, respectively. The measured and calculated spectra in the Assembly #1 and #2 are presented in Figs. 3.82 - 3.85 and 3.86 - 3.89, respectively. It should be remarked that errors of the measured spectra include statistical ones only. There are additional errors of about 10 % in the spectra.

As mentioned in Ref. 6 in detail; contamination gamma-rays, which are not produced by neutron interaction with the SS316 but with the detector itself, are included in the measured spectra in the Assembly #1. In the Figs. 3.86 - 3.89, sharp peaks at 0.5 MeV are made by both annihilation gamma-rays and the contamination gamma-rays. Small bumps at 2.2 MeV seen in Figs. 3.87 - 3.89 might be attributed to the contamination gamma-rays.

4. Discussions

4.1 Influence of Number of Energy Groups

Two different energy group structures were adopted to the DOT calculations; 125-neutron + 40-gamma-ray and 42-neutron + 21-gamma-ray groups. In the MCNP calculations, continuous energy cross section, that was, cross section of infinite energy groups, was used. In order to investigate influences of the number of energy groups, the MCNP, DOT-J-125 and DOT-J-42 calculations are compared in this section. The DOT-F-125 and DOT-F-42 calculations are excluded from the discussions because influences of the omission of the self-shielding correction are significant as described in the next section.

As for reaction ratios of the high threshold reactions which reflect transmission of 14 MeV neutrons, MCNP and DOT-J-125 give nearly the same results as seen in the figures of C/E ratios while DOT-J-42 considerably differs from the others. This fact can be explained by difference of energy bin width around 14 MeV. As seen in Fig. 3.36, for example, energy bin widths of the 42-groups are much coarser than those of the 125-groups. There are only 2 energy bins above 12 MeV in the 42-groups, but more than 10 energy bins are assigned in the 125-groups. Slope of the cross section curve affects to the calculated reaction rates combining with the coarse energy bin widths. When gradients of the cross sections of $Ti(n,x)^{47}Sc$, $^{58}Ni(n,2n)$ and $^{90}Zr(n,2n)$ reactions around 14 MeV are positive, their reaction rates by DOT-J-42 are 10 - 30 % smaller than those by MCNP and DOT-J-125. On the other hand, when gradients of the cross sections of $^{58}Ni(n,p)$ and $^{64}Zn(n,p)$ reactions are negative, their reaction rates by DOT-J-42 are about 10 % larger than those by MCNP and DOT-J-125. Since cross section of $^{93}Nb(n,2n)$ is flat around 14 MeV, its reaction rates by DOT-J-42 are nearly the same as the others.

Influences of number of energy groups are remarkable below the resonance energy region, that is, approximately below 1 MeV. Integral fluxes above 10 MeV and between 2 and 10 MeV by all the calculations are nearly the same as seen in Figs. 3.72 and 3.73. However, it is observed in Figs. 3.74 - 3.79 that there are discrepancies among MCNP, DOT-J-125 and DOT-J-42 in the integral fluxes below 1 MeV. Discrepancies between MCNP and DOT-J-42 are much larger than those between MCNP and DOT-J-125. For integral fluxes in all the six energy bins between 1 eV and 1 MeV, the DOT-J-125 calculations agree with the MCNP ones within 20 %.

Shape of the calculated gamma-ray spectra by DOT-J-125 and DOT-J-42 are very similar above 1 MeV, for example, as seen in Fig. 3.88. However, energy bin widths of the 21-gamma-ray groups structure below 1 MeV are too coarse to express detailed structure of

the spectrum. In the Fig. 3.88, peaks at 0.5 and 0.8 MeV appeared in the spectrum by DOT-J-125 are not represented in that by DOT-J-42. Absolute values of the calculated gamma-ray spectra differ from each other among MCNP, DOT-J-125 and DOT-J-42. These differences are clearly demonstrated in the C/E ratios of gamma-ray heating rate in Figs. 3.80 and 3.81. Agreements of gamma-ray heating rates between DOT-J-125 and MCNP are very good as they are within 11 %. At 914 mm depth in the Assembly #2, however, the gamma-ray heating rate by DOT-J-42 differs by 28 % from that by MCNP. It is summarized that gamma-ray heating rates can be calculated by DOT with self-shielding corrected group constants in both 125 and 42 energy groups with accuracy of about 20 % comparing with MCNP calculations. Results by 125 energy groups are, of course, much closer to the MCNP results than those by 42 energy groups.

4.2 Influence of the Self-Shielding Correction

The self-shielding correction of group constants plays an important role for low energy neutron transport in materials made of medium or heavy nuclei such as SS316. Since the cross sections are treated in continuous energy style, MCNP calculations are free from the self-shielding effect of cross sections. When two DOT calculations with and without the correction are compared, influence of the self-shielding correction can be assessed. Validity of the correction can be tested by comparing MCNP and DOT with JSSTD calculations.

Obviously, the self-shielding correction causes no effect to higher energy neutrons above 1 MeV. Agreements of all the threshold reaction rates by MCNP, DOT-J-125 and DOT-F-125 are very good. If the correction is omitted, however, DOT calculations gives rather distorted fluxes below 1 MeV. At the deepest measurement position of 914 mm in the Assembly #2, for example, the integral fluxes of the each decade of energy by MCNP and DOT-J-125 agree within 22 %, while those DOT-F-125 differ 2 - 3 times from those by MCNP. It is seen in Figs. 3.74 - 3.79 that discrepancies of integral fluxes between two different energy group structures are smaller than those between two calculations with and without the self-shielding correction.

At positions near the front surface of the test region, most of gamma-rays are generated via threshold reactions with high energy neutrons. On the other hand, at deeper positions in the test region, gamma-ray productions are dominated by (n, γ) reactions with lower energy neutrons. Hence the self-shielding correction does not affect so much to the calculated gamma-ray spectra and heating rates at positions near the front surface but deeper positions.

Thus it is summarized that the self-shielding correction is inevitable for shielding calculations of both neutrons and gamma-rays, and calculated fluxes are not reliable if the

correction is omitted.

4.3 Comparison of the Calculation with the Experiment

The calculated results are briefly compared with the experiments in this section. Because comparisons among the calculations have been discussed and differences of them have been clarified in the former sections, discussions in this section are focused on comparisons between the MCNP calculation and the experiment. Validity of the data bases used in the analyses, especially JENDL-3.1, will be assessed through the comparisons.

Transmission of 14 MeV neutrons through the test region is clearly represented in the C/E ratios of $^{93}\text{Nb}(n,2n)^{92\text{m}}\text{Nb}$ reaction rates in Figs. 3.16 and 3.31. It is seen that the reaction rates by MCNP have a trend to become slightly smaller than the experiments in the deeper positions. In the Assembly #1, the C/E ratio of the reaction rate by MCNP is 0.84.

The $^{115}\text{In}(n,n')^{115\text{m}}\text{In}$ reaction cross section, Fig. 3.4, does not have a large sensitivity to 14 MeV neutrons but to neutrons of 1 - 10 MeV energy region. As seen in Figs. 3.17 and 3.32, the similar trend as the $^{93}\text{Nb}(n,2n)^{92\text{m}}\text{Nb}$ reaction rates is observed. The $^{115}\text{In}(n,n')^{115\text{m}}\text{In}$ reaction rates by MCNP are slightly smaller than those by experiment in deeper positions.

As for keV energy region, the calculated spectra by MCNP in both assemblies agree well with the measured ones as a whole. Since the C/E ratios of the integral fluxes energy regions of 10 -100 keV and 100-1000 keV in Figs. 3.70, 3.71, 3.74, and 3.75 range between 0.6 and 1.2, the calculations predict neutron spectra in these energy region with fair accuracy. But a trend is seen that the integral fluxes by MCNP become smaller as the depth increases.

In the energy region of eV, agreements between the calculated spectra by MCNP and the measured ones are fairly good. The C/E ratios of the integral spectra between four energy intervals between 1 eV and 10 keV, Figs. 3.76 - 3.79, range between 0.8 and 1.4.

As for the gamma-ray heating rates, Figs. 3.80 and 3.81, calculations by MCNP are a few tens of percentage larger than those by the experiment up to depth of 400 mm in both assemblies. In shallower positions in the test region, dominant gamma-ray production reactions are not (n,γ) reactions but threshold reactions. Hence the overestimation of the gamma-ray heating rates implies that the gamma-ray production cross section by threshold reactions in JENDL-3.1 is given larger.

Although some problems are pointed out in the calculations with JENDL-3.1 through the comparisons between the MCNP calculations and the experiments, it is concluded that both neutron and gamma-ray can be predicted with accuracies of about 30 % by MCNP calculations based on JENDL-3.1 .

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Table 2.1 Atomic densities adopted to the analyses.

Nuclide	SS316 of the test region	SS316 of the source reflector	Air
N-14	-	-	3.8810×10^{19}
O-16	-	-	1.0400×10^{19}
Si	9.8440×10^{20}	8.1608×10^{20}	-
Cr	1.5476×10^{22}	1.5025×10^{22}	-
Mn-55	9.7963×10^{20}	1.3561×10^{21}	-
Fe	5.7589×10^{22}	5.8331×10^{22}	-
Ni	9.7128×10^{21}	9.1456×10^{21}	-
Mo	1.0503×10^{21}	1.0254×10^{21}	-

unit: [atoms / cm³]

Table 2.2 Cross section libraries used in the analyses. Libraries outside the parentheses are used for the transport calculations, and those inside the parentheses are the original cross section data bases.

	MCNP	DOT without self-shielding correction	DOT with self-shielding correction
Neutron transport	FSXLIB-J3 (JENDL-3.1)	FUSION-J3 FUSION-40 (JENDL-3.1)	JSSTD (JENDL-3.1)
Photon transport	MCPLIB1 (DLC-7E & STORM-ISRAEL)	FUSION-J3 FUSION-40 (DLC-99)	JSSTD (DLC-137, PHOTX)
Dosimetry reaction	FSXDOSJ3 (JENDL Dosimetry File)	JDOS125 (JENDL Dosimetry File)	JDOS42 (JENDL Dosimetry File)
Photon kerma factor	FUSION-J3 (DLC-99)	FUSION-J3 FUSION-40 (DLC-99)	FUSION-J3 FUSION-40 (DLC-99)

Table 2.3 Energy group structures of neutron 125-groups, gamma-ray 40-groups, neutron 42-groups and gamma-ray 21 groups used in the DOT analyses. The unit of energy is eV.

Neutron 125G				Gamma-Ray 40G		Neutron 42G		Gamma-Ray 21G	
Group	Upper-Energy	Group	Upper-Energy	Group	Upper-Energy	Group	Upper-Energy	Group	Upper-Energy
1	1.6487e+07	43	5.3525e+06	85	8.6515e+04	1	1.400e+07	1	1.5000e+07
2	1.6231e+07	44	5.0282e+06	86	7.6349e+04	2	1.200e+07	2	1.3720e+07
3	1.5980e+07	45	4.7236e+06	87	6.7378e+04	3	1.000e+07	3	1.2549e+07
4	1.5732e+07	46	4.4374e+06	88	5.9461e+04	4	9.000e+06	4	1.1478e+07
5	1.5488e+07	47	4.1686e+06	89	5.2474e+04	5	8.000e+06	5	1.0500e+07
6	1.5248e+07	48	3.9160e+06	90	4.6308e+04	6	7.500e+06	6	9.3140e+06
7	1.5012e+07	49	3.6787e+06	91	4.0867e+04	7	7.000e+06	7	8.2610e+06
8	1.4779e+07	50	3.4559e+06	92	3.6065e+04	8	6.500e+06	8	7.3280e+06
9	1.4550e+07	51	3.2465e+06	93	3.1827e+04	9	6.000e+06	9	6.500e+06
10	1.4324e+07	52	3.0498e+06	94	2.8087e+04	10	5.500e+06	10	5.7570e+06
11	1.4102e+07	53	2.8650e+06	95	2.4787e+04	11	5.000e+06	11	5.0990e+06
12	1.3883e+07	54	2.6914e+06	96	2.1874e+04	12	4.500e+06	12	4.5160e+06
13	1.3668e+07	55	2.5284e+06	97	1.9304e+04	13	4.000e+06	13	4.000e+06
14	1.3456e+07	56	2.3752e+06	98	1.5034e+04	14	3.500e+06	14	3.500e+06
15	1.3248e+07	57	2.2313e+06	99	1.1709e+04	15	3.000e+06	15	2.500e+06
16	1.3042e+07	58	2.0961e+06	100	9.1186e+03	16	2.500e+06	16	1.8710e+06
17	1.2840e+07	59	1.9691e+06	101	7.1016e+03	17	2.250e+06	17	1.400e+06
18	1.2641e+07	60	1.8498e+06	102	5.5307e+03	18	2.000e+06	18	1.0580e+06
19	1.2445e+07	61	1.7377e+06	103	4.3073e+03	19	1.750e+06	19	8.000e+05
20	1.2252e+07	62	1.5335e+06	104	3.3546e+03	20	1.500e+06	20	5.6600e+05
21	1.2062e+07	63	1.3533e+06	105	2.6125e+03	21	1.375e+06	21	4.000e+05
22	1.1875e+07	64	1.1943e+06	106	2.0346e+03	22	1.250e+06	22	2.8300e+05
23	1.1691e+07	65	1.0540e+06	107	1.5846e+03	23	1.125e+06	23	2.0000e+05
24	1.1510e+07	66	9.3013e+05	108	1.2341e+03	24	1.000e+06	24	1.4100e+05
25	1.1331e+07	67	8.2084e+05	109	9.6110e+02	25	9.000e+05	25	1.0000e+05
26	1.1156e+07	68	7.2438e+05	110	5.8293e+02	26	8.000e+05	26	4.6500e+04
27	1.0983e+07	69	6.3927e+05	111	3.5357e+02	27	7.000e+05	27	2.1500e+04
28	1.0812e+07	70	5.6415e+05	112	2.1445e+02	28	6.000e+05	28	1.0000e+04
29	1.0645e+07	71	4.9786e+05	113	1.3007e+02	29	5.200e+05	29	4.6500e+03
30	1.0480e+07	72	4.3936e+05	114	7.8891e+01	30	5.000e+05	30	2.1500e+03
31	1.0317e+07	73	3.8774e+05	115	4.7850e+01	31	4.000e+05	31	1.0000e+03
32	1.0157e+07	74	3.4217e+05	116	2.9023e+01	32	3.000e+05	32	4.6500e+02
33	9.9999e+06	75	3.0197e+05	117	1.7603e+01	33	2.000e+05	33	2.1500e+02
34	9.9940e+06	76	2.6649e+05	118	1.0677e+01	34	1.500e+05	34	1.0000e+02
35	8.8249e+06	77	2.3517e+05	119	6.4758e+00	35	1.000e+05	35	4.6500e+01
36	8.2902e+06	78	2.0754e+05	120	3.9278e+00	36	8.000e+04	36	2.1500e+01
37	7.7879e+06	79	1.8315e+05	121	2.3823e+00	37	6.000e+04	37	1.0000e+01
38	7.3161e+06	80	1.6163e+05	122	1.4449e+00	38	4.500e+04	38	4.6500e+00
39	6.8728e+06	81	1.4264e+05	123	8.7640e-01	39	3.000e+04	39	2.1500e+00
40	6.4564e+06	82	1.2588e+05	124	5.3156e-01	40	2.000e+04	40	1.0000e+00
41	6.0652e+06	83	1.1109e+05	125	3.2241e-01	41	1.000e+04	41	4.6500e-01
42	5.6978e+06	84	9.8035e+04	1.0010e-05		42	1.0000e-03	42	2.1500e-01

Table 3.1 Measured and calculated reaction rates and C/E ratios in the Assembly #1.

Reaction	Position [mm]	Expt. Error [%]	Calculated Reaction Rate						Calc. / Expt.					
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42
$^{27}\text{Al}(n,\alpha)^{24}\text{Na}$	-1.0	1.123e-29	3.23	1.079e-29	0.76	1.054e-29	1.111e-29	1.110e-29	0.961	0.73	0.939	0.939	0.989	0.988
	100.6	2.084e-30	3.26	1.914e-30	1.11	1.940e-30	2.028e-30	2.024e-30	0.919	1.02	0.931	0.930	0.973	0.971
	227.1	2.516e-31	3.52	2.173e-31	1.10	2.258e-31	2.323e-31	2.315e-31	0.863	0.95	0.897	0.896	0.923	0.920
	354.6	3.154e-32	3.89	2.613e-32	0.94	2.756e-32	2.792e-32	2.778e-32	0.828	0.78	0.874	0.871	0.885	0.881
	531.4			1.434e-33	0.85	1.491e-33	1.484e-33	1.470e-33						
	710.2			8.108e-35	0.79	8.184e-35	7.973e-35	7.953e-35						
	911.9			3.106e-36	0.79	2.995e-36	2.977e-36	2.894e-36						
	-1.0	2.271e-30	3.80	2.629e-30	0.75	2.573e-30	2.518e-30	2.517e-30	1.158	0.87	1.133	1.133	1.109	1.109
	100.6	4.336e-31	3.92	4.753e-31	1.08	4.826e-31	4.823e-31	4.722e-31	1.096	1.18	1.113	1.112	1.089	1.088
$\text{Ti}(n,x)^{46}\text{Sc}$	227.1	5.672e-32	6.22	5.451e-32	1.06	5.655e-32	5.494e-32	5.480e-32	0.961	1.02	0.999	0.997	0.969	0.966
	354.6	6.499e-33	19.06	6.560e-33	0.91	6.916e-33	6.896e-33	6.640e-33	1.009	0.92	1.064	1.061	1.022	1.018
	531.4			3.585e-34	0.84	3.722e-34	3.705e-34	3.520e-34						
	710.2			2.023e-35	0.77	2.031e-35	2.019e-35	1.897e-35						
	911.9			7.678e-37	0.79	7.380e-37	7.331e-37	6.849e-37						
	-1.0	2.303e-30	3.59	1.982e-30	0.74	1.941e-30	1.941e-30	1.667e-30	0.861	0.64	0.843	0.843	0.724	0.724
	100.6	4.224e-31	3.98	3.662e-31	1.03	3.720e-31	3.717e-31	3.278e-31	0.867	0.89	0.881	0.880	0.777	0.776
	227.1	5.509e-32	4.88	4.360e-32	1.00	4.519e-32	4.506e-32	4.029e-32	0.791	0.79	0.820	0.818	0.734	0.731
	354.6	6.732e-33	14.72	5.430e-33	0.88	5.708e-33	5.672e-33	5.131e-33	0.807	0.71	0.848	0.842	0.769	0.762
531.4			3.156e-34	0.99	3.220e-34	3.174e-34	2.999e-34							
710.2			1.860e-35	1.09	1.848e-35	1.799e-35	1.830e-35							
911.9			8.157e-37	3.79	7.184e-37	6.844e-37	8.440e-37							
$\text{Ti}(n,x)^{48}\text{Sc}$	-1.0	4.511e-30	3.35	4.562e-30	0.75	4.456e-30	4.456e-30	4.461e-30	1.011	0.76	0.988	0.988	0.989	0.989
	100.6	8.326e-31	3.60	7.893e-31	1.11	7.990e-31	7.985e-31	7.948e-31	0.948	1.05	0.960	0.959	0.956	0.955
	227.1	9.701e-32	4.06	8.786e-32	1.12	9.133e-32	9.117e-32	8.943e-32	0.906	1.01	0.941	0.940	0.925	0.922
	354.6	1.123e-32	7.55	1.044e-32	0.96	1.100e-32	1.097e-32	1.065e-32	0.929	0.89	0.979	0.977	0.948	0.945
	531.4	4.651e-34	24.22	5.647e-34	0.86	5.870e-34	5.844e-34	5.574e-34	1.214	1.04	1.262	1.257	1.199	1.194
	710.2			3.152e-35	0.79	3.188e-35	3.171e-35	2.982e-35						
911.9			1.194e-36	0.77	1.155e-36	1.148e-36	1.071e-36							

Table 3.1 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate				Calc. / Expt.								
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42		
$^{56}\text{Fe}(n,p)^{55}\text{Mn}$	-1.0	1.013e-29	3.08	1.013e-29	0.75	9.903e-30	9.902e-30	1.040e-29	1.040e-29	1.000	0.77	0.978	0.977	1.027	1.026
	100.6	1.856e-30	3.06	1.805e-30	1.11	1.828e-30	1.827e-30	1.901e-30	1.898e-30	0.972	1.11	0.985	0.984	1.024	1.023
	227.1	2.367e-31	3.18	2.052e-31	1.09	2.131e-31	2.128e-31	2.178e-31	2.171e-31	0.867	0.97	0.900	0.899	0.920	0.917
	354.6	2.885e-32	3.40	2.468e-32	0.93	2.601e-32	2.593e-32	2.614e-32	2.603e-32	0.855	0.82	0.901	0.899	0.906	0.902
	531.4			1.352e-33	0.84	1.405e-33	1.399e-33	1.381e-33	1.375e-33						
	710.2			7.642e-35	0.78	7.704e-35	7.661e-35	7.438e-35	7.426e-35						
911.9			2.923e-36	0.78	2.815e-36	2.797e-36	2.686e-36	2.698e-36							
$^{59}\text{Co}(n,\alpha)^{55}\text{Mn}$	-1.0	2.983e-30	3.24	3.000e-30	0.75	2.931e-30	2.930e-30	2.986e-30	2.985e-30	1.006	0.75	0.983	0.982	1.001	1.001
	100.6	5.363e-31	3.15	5.226e-31	1.11	5.289e-31	5.286e-31	5.327e-31	5.319e-31	0.975	1.08	0.986	0.986	0.993	0.992
	227.1	6.625e-32	3.50	5.843e-32	1.11	6.069e-32	6.059e-32	6.002e-32	5.984e-32	0.882	0.98	0.915	0.915	0.906	0.903
	354.6	8.038e-33	4.68	6.960e-33	0.95	7.330e-33	7.309e-33	7.128e-33	7.097e-33	0.866	0.82	0.912	0.909	0.887	0.883
	531.4			3.772e-34	0.85	3.918e-34	3.901e-34	3.727e-34	3.710e-34						
	710.2			2.109e-35	0.79	2.130e-35	2.118e-35	1.992e-35	1.990e-35						
911.9			7.994e-37	0.77	7.723e-37	7.675e-37	7.154e-37	7.193e-37							
$^{58}\text{Ni}(n,2n)^{57}\text{Ni}$	-1.0	4.155e-30	3.23	3.833e-30	0.76	3.740e-30	3.740e-30	2.660e-30	2.659e-30	0.923	0.70	0.900	0.900	0.640	0.640
	100.6	6.827e-31	3.51	6.068e-31	1.15	6.139e-31	6.134e-31	4.344e-31	4.340e-31	0.889	1.02	0.899	0.899	0.636	0.636
	227.1	7.855e-32	3.80	6.263e-32	1.21	6.528e-32	6.516e-32	4.573e-32	4.563e-32	0.797	0.96	0.831	0.830	0.582	0.581
	354.6	9.681e-33	5.59	7.040e-33	1.07	7.427e-33	7.406e-33	5.161e-33	5.146e-33	0.727	0.78	0.767	0.765	0.533	0.531
	531.4			3.550e-34	0.95	3.701e-34	3.685e-34	2.550e-34	2.544e-34						
	710.2			1.853e-35	0.89	1.895e-35	1.885e-35	1.305e-35	1.309e-35						
911.9			6.559e-37	0.83	6.474e-37	6.436e-37	4.525e-37	4.578e-37							
$^{58}\text{Ni}(n,p)^{58}\text{Co}$	-1.0	3.296e-29	3.14	3.208e-29	0.80	3.179e-29	3.177e-29	3.684e-29	3.682e-29	0.973	0.78	0.964	0.964	1.118	1.117
	100.6	9.352e-30	3.11	8.416e-30	1.01	8.622e-30	8.614e-30	9.466e-30	9.453e-30	0.900	0.91	0.922	0.921	1.012	1.011
	227.1	1.372e-30	3.11	1.214e-30	1.05	1.248e-30	1.244e-30	1.336e-30	1.331e-30	0.885	0.93	0.910	0.907	0.974	0.970
	354.6	1.862e-31	3.79	1.649e-31	1.04	1.724e-31	1.711e-31	1.826e-31	1.810e-31	0.885	0.92	0.926	0.919	0.980	0.972
	531.4	1.186e-32	4.48	1.026e-32	1.44	1.042e-32	1.025e-32	1.101e-32	1.080e-32	0.865	1.25	0.878	0.864	0.929	0.911
	710.2			6.522e-34	1.46	6.249e-34	6.055e-34	6.754e-34	6.468e-34						
911.9			2.890e-35	2.14	2.548e-35	2.390e-35	3.024e-35	2.690e-35							

Table 3.1 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate						Calc. / Expt.				
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42
$^{64}\text{Zn}(n,p)^{64}\text{Cu}$	-1.0	1.598e-29	3.12	1.709e-29	0.78	1.688e-29	1.687e-29	1.872e-29	1.871e-29	1.056	1.056	1.172	1.171
	100.6	4.063e-30	3.19	4.065e-30	1.02	4.163e-30	4.160e-30	4.483e-30	4.475e-30	1.025	1.024	1.103	1.102
	227.1	5.869e-31	3.60	5.543e-31	1.06	5.711e-31	5.698e-31	6.044e-31	6.022e-31	0.944	0.973	1.030	1.026
	354.6	8.152e-32	4.80	7.254e-32	1.04	7.607e-32	7.571e-32	7.971e-32	7.922e-32	0.890	0.933	0.978	0.972
	531.4			4.301e-33	1.40	4.404e-33	4.366e-33	4.570e-33	4.525e-33				
	710.2			2.627e-34	1.45	2.522e-34	2.489e-34	2.605e-34	2.570e-34				
	911.9			1.041e-35	1.34	9.559e-36	9.377e-36	9.947e-36	9.733e-36				
				7.885e-29	0.75	7.694e-29	7.693e-29	6.341e-29	6.339e-29	0.964	0.940	0.775	0.775
				1.277e-29	1.14	1.291e-29	1.290e-29	1.053e-29	1.052e-29	0.902	0.912	0.743	0.743
$^{90}\text{Zr}(n,2n)^{89}\text{Zr}$	227.1	1.627e-30	3.11	1.344e-30	1.19	1.400e-30	1.397e-30	1.122e-30	1.120e-30	0.826	0.860	0.690	0.688
	354.6	2.023e-31	3.56	1.536e-31	1.04	1.618e-31	1.614e-31	1.279e-31	1.275e-31	0.760	0.800	0.632	0.630
	531.4			7.908e-33	0.92	8.232e-33	8.196e-33	6.394e-33	6.377e-33				
	710.2			4.214e-34	0.85	4.292e-34	4.270e-34	3.303e-34	3.309e-34				
	911.9			1.523e-35	0.80	1.494e-35	1.485e-35	1.153e-35	1.165e-35				
				4.524e-29	0.75	4.418e-29	4.417e-29	4.383e-29	4.381e-29	0.999	0.975	0.967	0.967
				7.729e-30	1.13	7.821e-30	7.815e-30	7.745e-30	7.731e-30	0.953	0.964	0.955	0.953
				8.524e-31	1.13	8.867e-31	8.852e-31	8.678e-31	8.647e-31	0.882	0.917	0.897	0.894
				1.009e-31	0.97	1.063e-31	1.060e-31	1.028e-31	1.023e-31	0.845	0.890	0.860	0.856
$^{93}\text{Nb}(n,2n)^{92m}\text{Nb}$	531.4	6.476e-33	5.37	5.437e-33	0.87	5.651e-33	5.627e-33	5.365e-33	5.340e-33	0.840	0.873	0.828	0.825
	710.2			3.020e-34	0.80	3.062e-34	3.046e-34	2.868e-34	2.864e-34				
	911.9			1.142e-35	0.78	1.108e-35	1.102e-35	1.030e-35	1.036e-35				
				1.560e-29	1.02	1.576e-29	1.571e-29	1.566e-29	1.561e-29	0.882	0.891	0.885	0.882
				9.312e-30	0.96	9.434e-30	9.411e-30	9.223e-30	9.191e-30	0.852	0.863	0.844	0.841
				2.027e-30	1.20	2.062e-30	2.031e-30	2.044e-30	2.008e-30	0.827	0.841	0.834	0.819
				3.728e-31	1.64	3.886e-31	3.733e-31	3.999e-31	3.813e-31	0.798	0.832	0.799	0.856
				3.616e-32	2.78	3.518e-32	3.185e-32	4.012e-32	3.538e-32				
				3.113e-33	4.03	3.187e-33	2.633e-33	4.365e-33	3.371e-33				
$^{115}\text{In}(n,n')^{115m}\text{In}$	710.2			2.808e-34	9.43	2.120e-34	1.516e-34	3.973e-34	2.478e-34				
	911.9												
				1.769e-29	2.94	1.769e-29	1.769e-29	1.769e-29	1.769e-29				
				1.093e-29	2.94	1.093e-29	1.093e-29	1.093e-29	1.093e-29				
				2.452e-30	3.10	2.452e-30	2.452e-30	2.452e-30	2.452e-30				
				4.672e-31	4.12	4.672e-31	4.672e-31	4.672e-31	4.672e-31				

Table 3.1 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate					Calc. / Expt.								
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42		
$^{197}\text{Au}(n, \gamma)^{198}\text{Au}$	-1.0	9.201e-29	5.25	1.268e-28	43.93	8.126e-29	7.304e-29	9.940e-29	9.940e-29	9.698e-29	1.378	60.54	0.883	0.794	1.080	1.054
	100.6	7.324e-28	5.05	5.167e-28	15.82	7.445e-28	6.473e-28	9.266e-28	8.871e-28	0.706	11.16	1.016	0.884	1.265	1.211	
	227.1	1.026e-27	4.94	1.052e-27	8.89	1.073e-27	8.743e-28	1.283e-27	1.117e-27	1.025	9.11	1.046	0.852	1.251	1.088	
	354.6	7.468e-28	4.96	7.372e-28	7.41	9.262e-28	6.869e-28	1.044e-27	7.895e-28	0.987	7.31	1.240	0.920	1.397	1.057	
	531.4	3.964e-28	4.89	4.380e-28	5.77	4.883e-28	3.057e-28	5.026e-28	3.000e-28	1.105	6.37	1.232	0.771	1.268	0.757	
	710.2	1.613e-28	3.12	1.771e-28	5.40	1.872e-28	9.622e-29	1.777e-28	8.191e-29	1.098	5.93	1.160	0.596	1.102	0.508	
	911.9	4.746e-29	3.36	4.535e-29	4.49	4.681e-29	1.899e-29	4.155e-29	1.427e-29	0.956	4.29	0.986	0.400	0.876	0.301	
	$^{235}\text{U}(n, f)$	-4.0	4.107e-28	3.54	3.541e-28	1.24	3.616e-28	3.612e-28	3.580e-28	3.590e-28	0.862	1.07	0.881	0.880	0.872	0.874
		101.6	5.904e-28	3.42	4.744e-28	2.77	5.383e-28	5.545e-28	5.722e-28	6.183e-28	0.803	2.23	0.912	0.939	0.969	1.047
		228.6	5.226e-28	3.40	4.607e-28	4.19	5.033e-28	4.841e-28	5.354e-28	5.316e-28	0.882	3.69	0.963	0.926	1.024	1.017
355.6		3.711e-28	3.40	3.298e-28	3.14	3.616e-28	3.110e-28	3.684e-28	3.146e-28	0.889	2.79	0.975	0.838	0.993	0.848	
533.4		1.708e-28	3.40	1.624e-28	3.21	1.660e-28	1.178e-28	1.566e-28	1.039e-28	0.951	3.05	0.972	0.690	0.917	0.609	
711.2		6.466e-29	3.43	5.667e-29	2.77	5.845e-29	3.348e-29	5.143e-29	2.609e-29	0.877	2.43	0.904	0.518	0.795	0.404	
914.4		1.781e-29	3.45	1.540e-29	2.99	1.371e-29	6.105e-30	1.142e-29	4.280e-30	0.864	2.58	0.770	0.343	0.641	0.240	
$^{238}\text{U}(n, f)$		-4.0	1.364e-28	4.38	1.298e-28	0.73	1.277e-28	1.276e-28	1.224e-28	1.224e-28	0.951	0.69	0.936	0.935	0.898	0.897
		101.6	3.315e-29	3.57	3.166e-29	0.90	3.211e-29	3.207e-29	3.091e-29	3.085e-29	0.955	0.86	0.969	0.967	0.932	0.931
		228.6	5.054e-30	3.80	4.680e-30	0.98	4.802e-30	4.772e-30	4.645e-30	4.613e-30	0.926	0.91	0.950	0.944	0.919	0.913
	355.6	8.000e-31	4.91	6.808e-31	1.05	7.055e-31	6.946e-31	6.912e-31	6.794e-31	0.851	0.89	0.882	0.868	0.864	0.849	
	533.4			4.791e-32	1.67	4.879e-32	4.653e-32	4.897e-32	4.640e-32							
	711.2			3.756e-33	2.72	4.019e-33	3.428e-33	4.042e-33	3.396e-33							
914.4			3.683e-34	11.45	3.708e-34	2.311e-34	3.483e-34	2.098e-34								

Table 3.2 Measured and calculated reaction rates and C/E ratios in the Assembly #2.

Reaction	Position [mm]	Expt. Error [%]	Calculated Reaction Rate						MCNP	Error [%]	Calc. / Expt.				
			DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	DOT- J-125	DOT- F-125			DOT- J-42	DOT- F-42			
$^{27}\text{Al} (n, \alpha) ^{24}\text{Na}$	-1.0	1.072e-29	3.17	1.092e-29	0.81	1.091e-29	1.091e-29	1.153e-29	1.153e-29	1.018	0.82	1.018	1.018	1.076	
	100.6	2.012e-30	3.35	1.898e-30	1.17	1.973e-30	1.972e-30	2.053e-30	2.051e-30	0.943	1.10	0.981	0.980	1.019	
	227.1	2.503e-31	3.56	2.237e-31	1.14	2.291e-31	2.287e-31	2.354e-31	2.349e-31	0.894	1.02	0.915	0.914	0.939	
	354.6	3.091e-32	4.70	2.677e-32	0.98	2.819e-32	2.812e-32	2.853e-32	2.846e-32	0.866	0.85	0.912	0.910	0.923	
	531.4			1.457e-33	0.89	1.547e-33	1.540e-33	1.536e-33	1.533e-33						
	710.2			8.250e-35	0.82	8.616e-35	8.558e-35	8.430e-35	8.445e-35						
	911.9			3.144e-36	0.83	3.199e-36	3.167e-36	3.101e-36	3.135e-36						
	$\text{Ti} (n, x) ^{46}\text{Sc}$	-1.0	2.195e-30	3.73	2.674e-30	0.79	2.671e-30	2.671e-30	2.631e-30	2.630e-30	1.218	0.15	1.217	1.217	1.198
		100.6	4.238e-31	3.88	4.734e-31	1.13	4.918e-31	4.914e-31	4.800e-31	4.795e-31	1.117	0.19	1.160	1.160	1.132
227.1		4.892e-32	6.79	5.614e-32	1.10	5.756e-32	5.746e-32	5.585e-32	5.574e-32	1.148	0.19	1.177	1.175	1.140	
354.6		8.168e-33	18.38	6.721e-33	0.96	7.089e-33	7.070e-33	6.818e-33	6.796e-33	0.823	0.12	0.868	0.866	0.832	
531.4				3.651e-34	0.88	3.872e-34	3.855e-34	3.685e-34	3.668e-34						
710.2				2.058e-35	0.81	2.142e-35	2.128e-35	2.023e-35	2.019e-35						
911.9				7.785e-37	0.83	7.897e-37	7.820e-37	7.436e-37	7.484e-37						
$\text{Ti} (n, x) ^{47}\text{Sc}$		-1.0	2.223e-30	3.64	2.027e-30	0.77	2.022e-30	2.022e-30	1.761e-30	1.761e-30	0.912	0.70	0.910	0.909	0.792
		100.6	4.322e-31	3.85	3.691e-31	1.06	3.814e-31	3.810e-31	3.372e-31	3.367e-31	0.854	0.91	0.882	0.882	0.779
	227.1	5.613e-32	5.62	4.518e-32	1.03	4.632e-32	4.617e-32	4.164e-32	4.150e-32	0.805	0.83	0.825	0.822	0.739	
	354.6	7.370e-33	17.75	5.654e-33	0.94	5.916e-33	5.875e-33	5.396e-33	5.350e-33	0.767	0.72	0.803	0.797	0.726	
	531.4	6.334e-34	20.50	3.240e-34	1.01	3.398e-34	3.345e-34	3.212e-34	3.130e-34	0.511	0.52	0.536	0.528	0.494	
	710.2			1.967e-35	2.10	1.983e-35	1.925e-35	2.024e-35	1.899e-35						
	911.9			7.884e-37	2.73	7.847e-37	7.430e-37	9.762e-37	8.268e-37						
	$\text{Ti} (n, x) ^{48}\text{Sc}$	-1.0	4.294e-30	3.43	4.596e-30	0.80	4.588e-30	4.588e-30	4.622e-30	4.622e-30	1.070	0.68	1.069	1.069	1.076
		100.6	7.831e-31	3.65	7.813e-31	1.17	8.107e-31	8.102e-31	8.049e-31	8.041e-31	0.998	0.93	1.035	1.035	1.027
227.1		9.343e-32	5.49	9.033e-32	1.15	9.244e-32	9.228e-32	9.078e-32	9.061e-32	0.967	0.88	0.989	0.988	0.970	
354.6		1.146e-32	11.00	1.068e-32	1.00	1.123e-32	1.120e-32	1.087e-32	1.085e-32	0.932	0.74	0.980	0.977	0.948	
531.4				5.728e-34	0.90	6.078e-34	6.051e-34	5.778e-34	5.776e-34						
710.2				3.204e-35	0.82	3.347e-35	3.324e-35	3.138e-35	3.155e-35						
911.9				1.206e-36	0.81	1.230e-36	1.218e-36	1.144e-36	1.164e-36						

Table 3.2 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate						Calc. / Expt.				
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42
$^{56}\text{Fe}(n,p)^{55}\text{Mn}$	-1.0	9.636e-30	3.06	1.026e-29	0.80	1.025e-29	1.025e-29	1.081e-29	1.081e-29	1.064	1.064	1.122	1.122
	100.6	1.859e-30	3.08	1.790e-30	1.16	1.860e-30	1.859e-30	1.926e-30	1.924e-30	1.000	1.000	1.036	1.035
	227.1	2.279e-31	3.21	2.111e-31	1.13	2.162e-31	2.159e-31	2.208e-31	2.203e-31	0.949	0.947	0.969	0.967
	354.6	2.931e-32	3.94	2.529e-32	0.98	2.661e-32	2.654e-32	2.674e-32	2.667e-32	0.863	0.863	0.912	0.910
	531.4			1.375e-33	0.88	1.459e-33	1.452e-33	1.437e-33	1.434e-33				
	710.2			7.774e-35	0.81	8.111e-35	8.056e-35	7.874e-35	7.887e-35				
	911.9			2.957e-36	0.82	3.006e-36	2.976e-36	2.891e-36	2.923e-36				
				3.024e-30	0.80	3.021e-30	3.021e-30	3.095e-30	3.094e-30	1.076	1.075	1.101	1.101
$^{59}\text{Co}(n,\alpha)^{55}\text{Mn}$	100.6	5.301e-31	3.19	5.172e-31	1.17	5.368e-31	5.365e-31	5.388e-31	5.382e-31	1.013	1.012	1.016	1.015
	227.1	6.598e-32	3.60	6.004e-32	1.15	6.144e-32	6.134e-32	6.076e-32	6.064e-32	0.931	0.930	0.921	0.919
	354.6	7.459e-33	4.84	7.123e-33	1.00	7.483e-33	7.463e-33	7.276e-33	7.260e-33	0.955	0.955	0.975	0.973
	531.4			3.826e-34	0.89	4.058e-34	4.039e-34	3.865e-34	3.862e-34				
	710.2			2.143e-35	0.82	2.237e-35	2.222e-35	2.098e-35	2.109e-35				
	911.9			8.072e-37	0.80	8.223e-37	8.142e-37	7.642e-37	7.776e-37				
				3.812e-30	0.79	3.789e-30	3.789e-30	2.739e-30	2.738e-30	0.951	0.946	0.683	0.683
				5.965e-31	1.21	6.174e-31	6.169e-31	4.380e-31	4.375e-31	0.884	0.915	0.649	0.649
$^{58}\text{Ni}(n,2n)^{57}\text{Ni}$	100.6	6.747e-31	3.55	6.409e-32	1.27	6.557e-32	6.546e-32	4.611e-32	4.601e-32	0.855	0.853	0.601	0.600
	227.1	7.673e-32	4.04	7.192e-33	1.13	7.525e-33	7.504e-33	5.238e-33	5.228e-33	0.797	0.833	0.580	0.579
	354.6	9.029e-33	5.59	3.584e-34	1.01	3.797e-34	3.780e-34	2.616e-34	2.627e-34	0.585	0.619	0.427	0.429
	531.4	6.130e-34	10.55	1.872e-35	0.93	1.967e-35	1.954e-35	1.347e-35	1.375e-35				
	710.2			6.579e-37	0.87	6.792e-37	6.730e-37	4.664e-37	4.912e-37				
	911.9			3.542e-29	0.86	3.566e-29	3.566e-29	4.086e-29	4.083e-29	1.048	1.056	1.209	1.208
				8.826e-30	1.02	9.097e-30	9.086e-30	9.928e-30	9.909e-30	0.945	0.974	1.063	1.061
				1.271e-30	1.08	1.305e-30	1.300e-30	1.394e-30	1.390e-30	0.939	0.964	1.030	1.026
$^{58}\text{Ni}(n,p)^{58}\text{Co}$	100.6	9.336e-30	3.11	1.726e-31	1.12	1.817e-31	1.803e-31	1.929e-31	1.910e-31	0.907	0.955	1.014	1.004
	227.1	1.354e-30	3.14	1.069e-32	1.52	1.118e-32	1.098e-32	1.198e-32	1.162e-32	0.907	0.948	1.016	1.004
	354.6	1.902e-31	3.67	6.734e-34	1.56	6.824e-34	6.589e-34	7.591e-34	7.097e-34	1.38	0.948	1.016	0.986
	531.4	1.179e-32	4.62	2.882e-35	1.69	2.841e-35	2.643e-35	3.548e-35	3.035e-35				
	710.2												
	911.9												
				3.379e-29	3.07								
				9.336e-30	3.11								

Table 3.2 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate					Calc. / Expt.								
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42			
$^{64}\text{Zn}(n,p)^{64}\text{Cu}$	-1.0	1.617e-29	3.09	1.843e-29	0.83	1.852e-29	1.852e-29	2.045e-29	2.045e-29	2.044e-29	1.140	0.95	1.146	1.145	1.265	1.264
	100.6	4.005e-30	3.25	4.203e-30	1.04	4.351e-30	4.347e-30	4.661e-30	4.654e-30	4.654e-30	1.049	1.09	1.086	1.085	1.164	1.162
	227.1	5.777e-31	3.50	5.770e-31	1.09	5.922e-31	5.907e-31	6.255e-31	6.240e-31	6.240e-31	0.999	1.09	1.025	1.023	1.083	1.080
	354.6	7.901e-32	4.28	7.521e-32	1.11	7.953e-32	7.916e-32	8.344e-32	8.289e-32	8.289e-32	0.952	1.06	1.007	1.002	1.056	1.049
	531.4	6.832e-33	6.05	4.443e-33	1.52	4.679e-33	4.638e-33	4.909e-33	4.821e-33	4.821e-33	0.650	0.99	0.685	0.679	0.719	0.706
	710.2			2.668e-34	1.50	2.719e-34	2.681e-34	2.871e-34	2.784e-34	2.784e-34						
911.9			1.067e-35	1.31	1.047e-35	1.024e-35	1.127e-35	1.075e-35	1.075e-35							
$^{90}\text{Zr}(n,2n)^{89}\text{Zr}$	-1.0	7.922e-29	2.95	7.855e-29	0.79	7.825e-29	7.825e-29	6.531e-29	6.529e-29	6.529e-29	0.992	0.78	0.988	0.988	0.824	0.824
	100.6	1.389e-29	2.98	1.256e-29	1.20	1.301e-29	1.300e-29	1.061e-29	1.060e-29	1.060e-29	0.905	1.09	0.937	0.936	0.764	0.763
	227.1	1.632e-30	3.18	1.376e-30	1.24	1.408e-30	1.405e-30	1.132e-30	1.129e-30	1.129e-30	0.843	1.05	0.863	0.861	0.694	0.692
	354.6	1.974e-31	3.73	1.569e-31	1.09	1.641e-31	1.637e-31	1.299e-31	1.296e-31	1.296e-31	0.795	0.87	0.831	0.829	0.658	0.657
	531.4	9.882e-33	8.53	7.982e-33	0.97	8.459e-33	8.420e-33	6.567e-33	6.589e-33	6.589e-33	0.808	0.78	0.856	0.852	0.664	0.667
	710.2			4.257e-34	0.90	4.466e-34	4.437e-34	3.417e-34	3.478e-34	3.478e-34						
911.9			1.528e-35	0.83	1.573e-35	1.558e-35	1.195e-35	1.250e-35	1.250e-35							
$^{95}\text{Nb}(n,2n)^{94}\text{Nb}$	-1.0	4.402e-29	2.92	4.548e-29	0.80	4.540e-29	4.540e-29	4.532e-29	4.532e-29	4.532e-29	1.033	0.83	1.031	1.031	1.030	1.030
	100.6	7.903e-30	2.99	7.643e-30	1.18	7.928e-30	7.922e-30	7.821e-30	7.814e-30	7.814e-30	0.967	1.14	1.003	1.002	0.990	0.989
	227.1	9.521e-31	3.37	8.767e-31	1.17	8.967e-31	8.952e-31	8.769e-31	8.754e-31	8.754e-31	0.921	1.08	0.942	0.940	0.921	0.919
	354.6	1.255e-31	3.83	1.031e-31	1.02	1.084e-31	1.081e-31	1.047e-31	1.045e-31	1.045e-31	0.822	0.84	0.864	0.862	0.834	0.833
	531.4	6.357e-33	10.42	5.509e-33	0.91	5.845e-33	5.819e-33	5.543e-33	5.549e-33	5.549e-33	0.867	0.79	0.919	0.915	0.872	0.873
	710.2			3.074e-34	0.84	3.211e-34	3.190e-34	3.005e-34	3.028e-34	3.028e-34						
911.9			1.153e-35	0.82	1.178e-35	1.166e-35	1.094e-35	1.117e-35	1.117e-35							
$^{115}\text{In}(n,n')^{115m}\text{In}$	-1.0	2.257e-29	2.91	2.237e-29	1.04	2.274e-29	2.271e-29	2.277e-29	2.269e-29	2.269e-29	0.991	1.03	1.008	1.006	1.009	1.005
	100.6	1.119e-29	3.07	1.092e-29	0.93	1.087e-29	1.081e-29	1.074e-29	1.066e-29	1.066e-29	0.976	0.91	0.971	0.966	0.960	0.952
	227.1	2.375e-30	4.35	2.246e-30	1.15	2.324e-30	2.275e-30	2.335e-30	2.285e-30	2.285e-30	0.946	1.09	0.978	0.958	0.983	0.962
	354.6	4.972e-31	6.81	4.374e-31	1.99	4.414e-31	4.200e-31	4.635e-31	4.385e-31	4.385e-31	0.880	1.75	0.888	0.845	0.932	0.882
	531.4	4.012e-32	12.72	4.016e-32	2.45	4.077e-32	3.636e-32	4.829e-32	4.171e-32	4.171e-32	1.001	2.45	1.016	0.906	1.204	1.040
	710.2			3.658e-33	6.64	3.762e-33	3.045e-33	5.464e-33	4.085e-33	4.085e-33						
911.9			2.354e-34	7.81	2.538e-34	1.771e-34	5.122e-34	3.087e-34	3.087e-34							

Table 3.2 Continued.

Reaction	Position [mm]	Expt. Error [%]	Reaction Rate						Calc. / Expt.						
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42		
$^{197}\text{Au}(n, \gamma)^{198}\text{Au}$	-1.0	1.905e-27	4.98	2.235e-27	25.34	2.089e-27	1.782e-27	2.611e-27	2.445e-27	1.173	29.73	1.097	0.935	1.371	1.284
	100.6	2.831e-27	4.94	2.383e-27	8.24	3.073e-27	2.465e-27	3.680e-27	3.163e-27	0.842	6.94	1.085	0.871	1.300	1.117
	227.1	2.590e-27	4.92	2.802e-27	7.65	2.935e-27	2.177e-27	3.342e-27	2.552e-27	1.082	8.27	1.133	0.841	1.290	0.985
	354.6	1.589e-27	4.96	2.031e-27	5.54	2.077e-27	1.398e-27	2.235e-27	1.477e-27	1.278	7.08	1.307	0.880	1.406	0.929
	531.4	7.520e-28	4.96	8.516e-28	4.09	9.351e-28	5.330e-28	9.287e-28	4.863e-28	1.132	4.63	1.243	0.709	1.235	0.647
	710.2	2.723e-28	3.19	3.301e-28	3.73	3.260e-28	1.535e-28	3.025e-28	1.234e-28	1.212	4.52	1.197	0.564	1.111	0.453
	911.9	7.305e-29	3.45	8.216e-29	3.73	7.615e-29	2.849e-29	6.700e-29	2.058e-29	1.125	4.20	1.042	0.390	0.917	0.282
	-4.0	1.394e-27	3.43	1.272e-27	2.19	1.376e-27	1.378e-27	1.480e-27	1.551e-27	0.912	2.00	0.987	0.989	1.062	1.113
	101.6	1.548e-27	3.41	1.390e-27	2.56	1.489e-27	1.421e-27	1.586e-27	1.570e-27	0.898	2.30	0.962	0.918	1.024	1.014
	228.6	1.163e-27	3.40	1.200e-27	3.99	1.173e-27	1.021e-27	1.210e-27	1.056e-27	1.032	4.12	1.009	0.878	1.040	0.908
355.6	7.394e-28	3.40	7.294e-28	2.74	7.440e-28	5.774e-28	7.317e-28	5.455e-28	0.986	2.70	1.006	0.781	0.990	0.738	
533.4	3.052e-28	3.40	2.938e-28	2.22	3.034e-28	1.954e-28	2.781e-28	1.621e-28	0.962	2.14	0.994	0.640	0.911	0.531	
711.2	1.075e-28	3.41	1.008e-28	2.23	9.883e-29	5.175e-29	8.546e-29	3.845e-29	0.938	2.09	0.919	0.481	0.795	0.358	
914.4	2.736e-29	3.46	2.363e-29	2.44	2.184e-29	8.958e-30	1.811e-29	6.085e-30	0.864	2.11	0.798	0.327	0.662	0.222	
$^{235}\text{U}(n, f)$	-4.0	1.407e-28	3.46	1.401e-28	0.74	1.404e-28	1.404e-28	1.360e-28	1.359e-28	0.996	0.74	0.998	0.998	0.967	0.966
	101.6	3.479e-29	3.60	3.355e-29	0.91	3.408e-29	3.401e-29	3.290e-29	3.280e-29	0.964	0.88	0.979	0.978	0.946	0.943
	228.6	5.390e-30	4.01	4.967e-30	0.99	5.089e-30	5.049e-30	4.945e-30	4.913e-30	0.922	0.91	0.944	0.937	0.918	0.912
	355.6	8.855e-31	6.25	7.283e-31	1.10	7.601e-31	7.452e-31	7.479e-31	7.332e-31	0.822	0.90	0.858	0.841	0.845	0.828
	533.4			5.282e-32	2.47	5.531e-32	5.176e-32	5.567e-32	5.148e-32						
	711.2			5.549e-33	6.53	5.043e-33	4.052e-33	5.023e-33	3.932e-33						
914.4			5.638e-34	15.60	5.231e-34	2.960e-34	4.830e-34	2.589e-34							

Table 3.3 Neutron spectra at the seven positions in the Assembly #1 calculated by MCNP.

Energy [MeV]		Flux / lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.4177e-04	1.0250e-04	8.4095e-06	7.4461e-07	2.8685e-08	1.1160e-09	2.8731e-11
1.5248e+01	1.5012e+01	1.3265e-03	1.7026e-04	1.5940e-05	1.6978e-06	7.7953e-08	3.5004e-09	1.0880e-10
1.5012e+01	1.4779e+01	2.4501e-03	3.3037e-04	3.0966e-05	3.1697e-06	1.4058e-07	6.6525e-09	2.0643e-10
1.4779e+01	1.4550e+01	1.4277e-03	2.3058e-04	2.5914e-05	2.9973e-06	1.5187e-07	8.0269e-09	2.8098e-10
1.4550e+01	1.4324e+01	1.9905e-04	7.8982e-05	1.1360e-05	1.6480e-06	1.0471e-07	6.2057e-09	2.5163e-10
1.4324e+01	1.4102e+01	5.8493e-05	3.5092e-05	5.4445e-06	7.8561e-07	5.4306e-08	3.5125e-09	1.4550e-10
1.4102e+01	1.3883e+01	4.4245e-05	2.3671e-05	3.6731e-06	5.4938e-07	3.6890e-08	2.3186e-09	9.8353e-11
1.3883e+01	1.3668e+01	3.9546e-05	1.7090e-05	2.9341e-06	4.5395e-07	2.7350e-08	1.8875e-09	7.6021e-11
1.3668e+01	1.3456e+01	2.2116e-05	1.0058e-05	2.0982e-06	3.2670e-07	2.1877e-08	1.5406e-09	6.6247e-11
1.3456e+01	1.3248e+01	1.4557e-05	7.1147e-06	1.5813e-06	2.2168e-07	1.6256e-08	1.1211e-09	5.3474e-11
1.3248e+01	1.3042e+01	7.9353e-06	4.7469e-06	1.2612e-06	1.7178e-07	1.2128e-08	8.5454e-10	4.1315e-11
1.3042e+01	1.2840e+01	1.2062e-05	6.0447e-06	8.0467e-07	1.4731e-07	1.0143e-08	6.7613e-10	3.1558e-11
1.2840e+01	1.2641e+01	7.8536e-06	3.8561e-06	6.5227e-07	9.6637e-08	7.6898e-09	5.6457e-10	2.4499e-11
1.2641e+01	1.2445e+01	9.4328e-06	2.6258e-06	4.6154e-07	9.0010e-08	6.8166e-09	4.5192e-10	2.2629e-11
1.2445e+01	1.2252e+01	1.1089e-05	3.4647e-06	4.7087e-07	7.4250e-08	6.3130e-09	4.0570e-10	1.9763e-11
1.2252e+01	1.2062e+01	3.8348e-06	2.9924e-06	5.2570e-07	6.5148e-08	5.4948e-09	3.5687e-10	1.7261e-11
1.2062e+01	1.1875e+01	5.7963e-06	2.4579e-06	5.6565e-07	5.4901e-08	4.9353e-09	2.9107e-10	1.4750e-11
1.1875e+01	1.1691e+01	3.3440e-06	2.3664e-06	5.1356e-07	7.2952e-08	4.4357e-09	2.6034e-10	1.5388e-11
1.1691e+01	1.1510e+01	4.4857e-06	1.5126e-06	3.4736e-07	6.0349e-08	4.2727e-09	2.7757e-10	9.4824e-12
1.1510e+01	1.1331e+01	2.6070e-06	1.5051e-06	3.5205e-07	5.1623e-08	3.2884e-09	2.1851e-10	1.2373e-11
1.1331e+01	1.1156e+01	2.8234e-06	3.9649e-06	6.2660e-08	3.5032e-09	2.4832e-10	2.4832e-10	8.9911e-12
1.1156e+01	1.0983e+01	4.8468e-06	1.7678e-06	2.5484e-07	4.1854e-08	2.3597e-09	2.1149e-10	8.4998e-12
1.0983e+01	1.0812e+01	3.4035e-06	1.7995e-06	3.6282e-07	4.9000e-08	3.0334e-09	1.7988e-10	8.6821e-12
1.0812e+01	1.0645e+01	1.5520e-06	1.1906e-06	4.3347e-07	4.4624e-08	3.6714e-09	2.0932e-10	8.4714e-12
1.0645e+01	1.0480e+01	2.3807e-06	2.6899e-06	4.4229e-07	6.8860e-08	3.6969e-09	2.2965e-10	1.0182e-11
1.0480e+01	1.0317e+01	4.9905e-06	3.3747e-06	4.2907e-07	7.2183e-08	4.1348e-09	2.4736e-10	1.0948e-11
1.0317e+01	1.0157e+01	4.9583e-06	3.5192e-06	5.9008e-07	8.2633e-08	5.3708e-09	2.9392e-10	1.1404e-11
1.0157e+01	9.9999e+00	3.4912e-06	2.4316e-06	6.0712e-07	6.6276e-08	4.3817e-09	2.9601e-10	1.1210e-11
9.9999e+00	9.3940e+00	6.6382e-06	3.0630e-06	5.0555e-07	7.0402e-08	4.4406e-09	2.8923e-10	1.0201e-11
9.3940e+00	8.8249e+00	3.6958e-06	2.6003e-06	4.4430e-07	5.6165e-08	3.8565e-09	2.5287e-10	9.6804e-12
8.8249e+00	8.2902e+00	4.7681e-06	2.9452e-06	4.2400e-07	5.4862e-08	3.4179e-09	2.2699e-10	9.6713e-12
8.2902e+00	7.7879e+00	5.2598e-06	2.3434e-06	4.8374e-07	6.0319e-08	3.2238e-09	2.1735e-10	9.8428e-12
7.7879e+00	7.3161e+00	4.9294e-06	2.8250e-06	4.1767e-07	6.6523e-08	3.7010e-09	2.3097e-10	8.7143e-12
7.3161e+00	6.8728e+00	5.0705e-06	3.4602e-06	5.0394e-07	7.3501e-08	4.5381e-09	2.4048e-10	1.0541e-11
6.8728e+00	6.4564e+00	5.4526e-06	3.4268e-06	5.7494e-07	8.0878e-08	4.4614e-09	2.7936e-10	9.9469e-12
6.4564e+00	6.0652e+00	7.4978e-06	4.1536e-06	6.6871e-07	8.4477e-08	4.9282e-09	2.9846e-10	1.2596e-11
6.0652e+00	5.6978e+00	6.8534e-06	4.6561e-06	6.3236e-07	9.4713e-08	5.4417e-09	3.2802e-10	1.1518e-11
5.6978e+00	5.3525e+00	8.8636e-06	4.7580e-06	7.7716e-07	1.0512e-07	6.1418e-09	3.6941e-10	1.3366e-11
5.3525e+00	5.0282e+00	6.0508e-06	4.0388e-06	7.5810e-07	1.0739e-07	6.6184e-09	4.0255e-10	1.4862e-11
5.0282e+00	4.7236e+00	9.8139e-06	5.5458e-06	8.0137e-07	1.0669e-07	6.5240e-09	3.7571e-10	1.5165e-11
4.7236e+00	4.4374e+00	9.1901e-06	5.8027e-06	1.1190e-06	1.2565e-07	8.6550e-09	4.3899e-10	1.8465e-11
4.4374e+00	4.1686e+00	1.0446e-05	6.1894e-06	1.1662e-06	1.4816e-07	1.0395e-08	5.8946e-10	1.8875e-11
4.1686e+00	3.9160e+00	9.2360e-06	6.3116e-06	1.1980e-06	2.1949e-07	1.1014e-08	6.7867e-10	2.2571e-11
3.9160e+00	3.6787e+00	1.1928e-05	6.8055e-06	1.4949e-06	1.7351e-07	1.0144e-08	9.7824e-10	3.0547e-11
3.6787e+00	3.4559e+00	1.2247e-05	8.9407e-06	1.4844e-06	1.7908e-07	1.2411e-08	7.6340e-10	4.1263e-11
3.4559e+00	3.2465e+00	1.2544e-05	1.0069e-05	1.8701e-06	2.5844e-07	1.4982e-08	1.1612e-09	3.4879e-11
3.2465e+00	3.0498e+00	1.4378e-05	9.7997e-06	1.8230e-06	2.6171e-07	1.6465e-08	1.2015e-09	4.3991e-11
3.0498e+00	2.8650e+00	1.7092e-05	1.1828e-05	2.2087e-06	3.1635e-07	2.0501e-08	1.4421e-09	4.7648e-11
2.8650e+00	2.6914e+00	1.8714e-05	1.3357e-05	2.3504e-06	3.5755e-07	2.5097e-08	1.3140e-09	6.4424e-11
2.6914e+00	2.5284e+00	1.7963e-05	1.4183e-05	2.6949e-06	4.4869e-07	3.0954e-08	1.6114e-09	6.9934e-11
2.5284e+00	2.3752e+00	2.0188e-05	1.7148e-05	3.2471e-06	5.6087e-07	3.4621e-08	2.0633e-09	8.4042e-11
2.3752e+00	2.2313e+00	2.1811e-05	2.0456e-05	3.6927e-06	6.5335e-07	4.1909e-08	2.9543e-09	1.3061e-10
2.2313e+00	2.0961e+00	2.1277e-05	1.9317e-05	4.3620e-06	6.9427e-07	4.5017e-08	3.6104e-09	1.3650e-10
2.0961e+00	1.9691e+00	2.1571e-05	1.9640e-05	4.7717e-06	6.8309e-07	5.1690e-08	3.0652e-09	1.4524e-10
1.9691e+00	1.8498e+00	2.2472e-05	2.1144e-05	5.0951e-06	8.7944e-07	6.0410e-08	4.5949e-09	1.8817e-10
1.8498e+00	1.7377e+00	2.7164e-05	2.3929e-05	5.7227e-06	9.8551e-07	8.6062e-08	4.9525e-09	2.4284e-10
1.7377e+00	1.5335e+00	2.4087e-05	2.6489e-05	5.7396e-06	1.0876e-06	9.2423e-08	6.5276e-09	3.0712e-10
1.5335e+00	1.3533e+00	2.9419e-05	3.0952e-05	7.3725e-06	1.3889e-06	1.1888e-07	8.9718e-09	4.4219e-10
1.3533e+00	1.1943e+00	2.9773e-05	3.3743e-05	8.7740e-06	1.7661e-06	1.4848e-07	1.3543e-08	7.3512e-10
1.1943e+00	1.0540e+00	3.4454e-05	4.2219e-05	1.2466e-05	2.6641e-06	2.8343e-07	2.6296e-08	1.6680e-09
1.0540e+00	9.3013e-01	3.2246e-05	4.6461e-05	1.3284e-05	3.1332e-06	4.2113e-07	4.0880e-08	4.4382e-09
9.3013e-01	8.2084e-01	2.9663e-05	4.1005e-05	1.8187e-05	3.9630e-06	5.9636e-07	3.8496e-08	2.8895e-09
8.2084e-01	7.2438e-01	3.0242e-05	4.4559e-05	1.5414e-05	4.2144e-06	7.2831e-07	3.7266e-08	9.7317e-09

Table 3.3 Continued.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
7.2438e-01	6.3927e-01	4.0641e-05	7.1118e-05	2.7296e-05	8.6686e-06	1.1994e-06	1.6383e-07	2.2689e-08
6.3927e-01	5.6415e-01	3.9891e-05	8.0867e-05	3.6656e-05	1.2860e-05	2.0352e-06	2.8355e-07	3.7468e-08
5.6415e-01	4.9786e-01	3.1442e-05	6.7372e-05	2.9233e-05	1.0303e-05	2.1532e-06	3.8965e-07	4.9670e-08
4.9786e-01	4.3936e-01	2.9307e-05	5.7840e-05	2.7825e-05	9.0923e-06	2.1556e-06	3.9811e-07	5.7588e-08
4.3936e-01	3.8774e-01	2.0869e-05	4.6149e-05	2.4822e-05	7.1125e-06	2.1788e-06	3.1025e-07	2.8528e-08
3.8774e-01	3.4217e-01	3.6001e-05	7.6064e-05	4.0811e-05	1.3750e-05	3.4774e-06	5.7720e-07	1.0112e-07
3.4217e-01	3.0197e-01	2.8139e-05	6.6755e-05	4.2241e-05	1.5288e-05	4.1593e-06	8.1520e-07	1.2189e-07
3.0197e-01	2.6649e-01	2.6031e-05	6.3468e-05	3.9033e-05	1.7359e-05	4.5726e-06	9.7803e-07	1.5496e-07
2.6649e-01	2.3517e-01	1.8750e-05	4.4556e-05	3.1960e-05	1.5748e-05	4.7885e-06	1.0951e-06	1.4017e-07
2.3517e-01	2.0754e-01	1.3976e-05	4.2464e-05	2.6755e-05	1.1168e-05	3.5995e-06	7.6648e-07	1.4349e-07
2.0754e-01	1.8315e-01	1.1269e-05	2.9768e-05	1.8528e-05	1.0555e-05	3.0139e-06	6.6130e-07	1.0849e-07
1.8315e-01	1.6163e-01	1.5264e-05	4.6413e-05	2.8239e-05	1.3567e-05	4.5121e-06	9.4964e-07	1.5313e-07
1.6163e-01	1.4264e-01	8.5875e-06	3.3173e-05	3.3173e-05	9.6502e-06	2.3269e-06	6.9246e-07	1.1163e-07
1.4264e-01	1.2588e-01	1.8768e-05	5.1418e-05	4.1390e-05	1.8964e-05	6.1992e-06	1.7719e-06	3.3087e-07
1.2588e-01	1.1109e-01	1.1921e-05	4.4659e-05	2.6131e-05	1.8741e-05	5.6793e-06	1.6985e-06	3.1009e-07
1.1109e-01	9.8035e-02	7.9217e-06	2.4541e-05	1.7028e-05	9.8778e-06	3.7984e-06	1.0957e-06	1.5044e-07
9.8035e-02	8.6515e-02	4.7824e-06	2.0929e-05	1.6382e-05	8.3446e-06	3.4906e-06	9.3688e-07	1.6306e-07
8.6515e-02	7.6349e-02	9.1538e-06	3.5230e-05	2.6873e-05	1.5231e-05	6.1156e-06	1.8641e-06	3.6603e-07
7.6349e-02	6.7378e-02	5.4868e-06	2.2539e-05	2.1689e-05	1.3859e-05	4.9179e-06	1.4363e-06	2.9470e-07
6.7378e-02	5.9461e-02	4.3339e-06	2.1294e-05	1.6382e-05	1.0319e-05	3.5775e-06	1.2485e-06	2.3552e-07
5.9461e-02	5.2474e-02	3.9173e-06	1.9692e-05	1.9413e-05	1.1529e-05	4.9648e-06	1.3499e-06	2.8171e-07
5.2474e-02	4.6308e-02	2.2746e-06	1.3924e-05	1.2284e-05	8.0828e-06	3.2433e-06	9.5486e-07	2.1027e-07
4.6308e-02	4.0867e-02	2.6237e-06	1.5400e-05	1.7087e-05	1.0485e-05	4.2063e-06	1.4369e-06	2.7534e-07
4.0867e-02	3.6065e-02	2.0191e-06	1.7018e-05	1.1564e-05	8.1851e-06	3.1044e-06	1.0814e-06	2.2078e-07
3.6065e-02	3.1827e-02	1.0682e-06	9.9132e-06	8.9588e-06	5.3367e-06	2.2737e-06	8.1572e-07	1.4977e-07
3.1827e-02	2.8087e-02	4.9828e-07	4.1542e-06	3.5957e-06	3.2318e-06	9.3212e-07	3.9809e-07	7.0010e-08
2.8087e-02	2.4787e-02	2.3040e-06	1.1168e-05	9.7944e-06	8.9845e-06	2.9784e-06	9.9447e-07	2.0713e-07
2.4787e-02	2.1874e-02	3.5727e-06	2.1639e-05	2.2542e-05	1.5918e-05	6.7735e-06	2.5969e-06	4.8396e-07
2.1874e-02	1.9304e-02	2.3802e-06	1.2228e-05	1.2277e-05	8.3883e-06	4.3550e-06	1.2527e-06	3.3506e-07
1.9304e-02	1.5034e-02	1.0741e-06	5.8600e-06	5.7105e-06	5.2459e-06	2.3489e-06	6.4638e-07	1.7196e-07
1.5034e-02	1.1709e-02	6.2811e-07	4.4096e-06	6.0385e-06	3.3999e-06	1.9700e-06	6.2334e-07	1.4345e-07
1.1709e-02	9.1186e-03	3.2684e-07	4.7602e-06	6.3315e-06	4.6916e-06	2.2212e-06	7.8142e-07	1.8771e-07
9.1186e-03	7.1016e-03	1.0712e-07	3.0670e-06	2.6167e-06	2.3854e-06	1.0746e-06	3.3092e-07	8.9801e-08
7.1016e-03	5.5307e-03	2.7343e-07	3.7689e-06	3.4677e-06	2.9662e-06	1.3733e-06	4.3962e-07	1.1193e-07
5.5307e-03	4.3073e-03	3.6410e-07	3.2268e-06	5.2545e-06	3.3667e-06	1.4781e-06	5.3796e-07	1.1604e-07
4.3073e-03	3.3546e-03	2.5177e-07	4.1845e-06	4.4492e-06	3.5089e-06	1.1740e-06	4.7608e-07	1.3919e-07
3.3546e-03	2.6125e-03	3.0851e-07	5.5486e-06	5.5486e-06	3.7186e-06	1.9260e-06	6.7978e-07	1.7617e-07
2.6125e-03	2.0346e-03	1.6695e-07	2.8857e-06	4.0472e-06	2.8615e-06	1.1772e-06	4.9886e-07	1.1631e-07
2.0346e-03	1.5846e-03	4.1287e-07	4.4503e-06	5.1662e-06	4.2634e-06	2.3496e-06	7.5843e-07	1.6492e-07
1.5846e-03	1.2341e-03	3.4156e-07	5.6703e-06	5.0501e-06	4.1849e-06	1.8974e-06	6.9080e-07	1.7878e-07
1.2341e-03	9.6110e-04	4.1187e-07	3.2045e-06	2.8547e-06	2.9895e-06	1.5786e-06	5.9358e-07	1.4035e-07
9.6110e-04	5.8293e-04	2.7064e-07	2.8648e-06	3.7197e-06	3.2800e-06	1.5980e-06	5.5063e-07	1.5294e-07
5.8293e-04	3.5357e-04	1.4079e-07	1.5795e-06	2.9488e-06	2.0728e-06	1.2879e-06	4.0933e-07	1.0396e-07
3.5357e-04	2.1445e-04	9.4334e-08	1.4482e-06	1.9403e-06	2.0207e-06	8.8494e-07	3.7654e-07	9.1817e-08
2.1445e-04	1.3007e-04	7.3824e-08	1.4565e-06	3.0131e-06	2.1313e-06	1.1224e-06	3.6454e-07	1.0242e-07
1.3007e-04	7.8891e-05	7.6207e-08	1.2147e-06	2.2968e-06	1.8312e-06	8.4810e-07	3.6146e-07	9.5543e-08
7.8891e-05	4.7850e-05	1.6122e-07	1.0201e-06	1.9576e-06	1.6598e-06	8.9666e-07	2.6894e-07	8.5211e-08
4.7850e-05	2.9023e-05	8.2676e-08	6.0631e-07	8.2328e-07	1.1622e-06	6.3317e-07	1.9929e-07	5.7877e-08
2.9023e-05	1.7603e-05	5.6020e-09	4.3204e-07	8.6466e-07	7.9734e-07	4.1040e-07	1.7658e-07	5.1016e-08
1.7603e-05	1.0677e-05	5.2042e-08	6.1152e-07	7.0976e-07	7.8103e-07	3.8771e-07	1.6651e-07	4.6064e-08
1.0677e-05	6.4758e-06	1.6086e-08	3.5132e-07	8.880e-07	6.3476e-07	3.4472e-07	1.3331e-07	3.6580e-08
6.4758e-06	3.9278e-06	1.3187e-08	2.8803e-07	5.9372e-07	4.5707e-07	2.5681e-07	1.0369e-07	2.8372e-08
3.9278e-06	2.3823e-06	1.2949e-08	1.8452e-07	3.4177e-07	3.4878e-07	2.0085e-07	7.8837e-08	2.2269e-08
2.3823e-06	1.4449e-06	9.5177e-09	1.3716e-07	2.4421e-07	2.2665e-07	1.2522e-07	5.1444e-08	1.5359e-08
1.4449e-06	8.7640e-07	9.4226e-10	7.1266e-08	1.4759e-07	1.3430e-07	8.3082e-08	3.3044e-08	8.8276e-09
8.7640e-07	5.3156e-07	0.0000e+00	3.5691e-08	7.2385e-08	6.2015e-08	4.2232e-08	1.5614e-08	4.5121e-09
5.3156e-07	3.2241e-07	0.0000e+00	2.0046e-08	3.4470e-08	2.7346e-08	1.7111e-08	6.2251e-09	2.0159e-09
3.2241e-07	1.0010e-11	0.0000e+00	3.1121e-10	9.2491e-10	5.3090e-10	3.6698e-10	1.7128e-10	5.9690e-11

Table 3.4 Neutron spectra at the seven positions in the Assembly #1 calculated by DOT with JSSTD L library of 125 neutron groups.

Energy [MeV]		Flux / lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.5914e-04	1.0497e-04	9.1285e-06	8.6284e-07	3.3803e-08	1.3907e-09	3.8188e-11
1.5248e+01	1.5012e+01	1.3430e-03	1.8024e-04	1.7640e-05	1.8706e-06	8.3994e-08	3.8651e-09	1.1751e-10
1.5012e+01	1.4779e+01	2.4362e-03	3.2936e-04	3.1835e-05	3.3287e-06	1.4955e-07	7.0105e-09	2.1963e-10
1.4779e+01	1.4550e+01	1.4019e-03	2.2903e-04	2.5751e-05	3.0319e-06	1.5418e-07	7.8866e-09	2.6523e-10
1.4550e+01	1.4324e+01	2.0546e-04	7.7637e-05	1.1839e-05	1.6460e-06	9.8712e-08	5.6807e-09	2.1109e-10
1.4324e+01	1.4102e+01	5.7501e-05	3.6009e-05	5.9612e-06	8.9046e-07	5.8194e-08	3.6242e-09	1.4561e-10
1.4102e+01	1.3883e+01	4.0223e-05	2.2810e-05	3.8965e-06	5.8780e-07	3.8694e-08	2.4426e-09	1.0044e-10
1.3883e+01	1.3668e+01	4.2817e-05	1.7072e-05	2.9242e-06	4.4619e-07	2.9761e-08	1.8938e-09	7.8423e-11
1.3668e+01	1.3456e+01	1.9809e-05	1.1340e-05	2.0731e-06	3.2674e-07	2.2407e-08	1.4506e-09	6.0847e-11
1.3456e+01	1.3248e+01	1.2696e-05	8.3627e-06	1.5443e-06	2.4598e-07	1.7112e-08	1.1233e-09	4.7764e-11
1.3248e+01	1.3042e+01	1.2267e-05	6.3893e-06	1.1867e-06	1.9065e-07	1.3386e-08	8.8570e-10	3.7954e-11
1.3042e+01	1.2840e+01	1.0794e-05	4.8273e-06	8.9603e-07	1.4623e-07	1.0510e-08	7.0908e-10	3.1006e-11
1.2840e+01	1.2641e+01	1.0111e-05	4.0694e-06	7.2806e-07	1.1699e-07	8.3289e-09	5.6135e-10	2.4668e-11
1.2641e+01	1.2445e+01	8.7657e-06	3.5252e-06	6.2264e-07	9.8870e-08	6.9455e-09	4.6367e-10	2.0271e-11
1.2445e+01	1.2252e+01	5.9620e-06	2.9801e-06	5.4039e-07	8.5773e-08	5.9840e-09	3.9633e-10	1.7187e-11
1.2252e+01	1.2062e+01	3.7325e-06	2.6277e-06	4.8856e-07	7.7598e-08	5.3723e-09	3.5229e-10	1.5119e-11
1.2062e+01	1.1875e+01	3.4378e-06	2.4863e-06	4.6144e-07	7.2816e-08	4.9876e-09	3.2353e-10	1.3725e-11
1.1875e+01	1.1691e+01	3.5850e-06	2.3280e-06	4.2614e-07	6.7020e-08	4.5761e-09	2.9573e-10	1.2476e-11
1.1691e+01	1.1510e+01	3.5328e-06	2.1709e-06	3.9197e-07	6.1371e-08	4.1823e-09	2.7013e-10	1.1385e-11
1.1510e+01	1.1331e+01	3.5925e-06	1.9598e-06	3.5069e-07	5.4965e-08	3.7558e-09	2.4330e-10	1.0293e-11
1.1331e+01	1.1156e+01	3.6830e-06	1.8448e-06	3.2354e-07	5.0249e-08	3.4139e-09	2.2079e-10	9.3457e-12
1.1156e+01	1.0983e+01	3.6244e-06	1.9154e-06	3.2602e-07	4.9251e-08	3.2545e-09	2.0658e-10	8.6167e-12
1.0983e+01	1.0812e+01	3.3744e-06	2.0892e-06	3.5013e-07	5.1471e-08	3.2852e-09	2.0281e-10	8.2610e-12
1.0812e+01	1.0645e+01	3.3575e-06	2.4704e-06	4.0725e-07	5.8445e-08	3.6050e-09	2.1567e-10	8.5125e-12
1.0645e+01	1.0480e+01	3.4935e-06	2.8811e-06	4.7316e-07	6.6949e-08	4.0314e-09	2.3531e-10	9.0417e-12
1.0480e+01	1.0317e+01	3.6321e-06	3.3100e-06	5.4062e-07	7.5845e-08	4.5030e-09	2.5884e-10	9.7663e-12
1.0317e+01	1.0157e+01	4.2297e-06	3.6036e-06	5.8666e-07	8.2552e-08	4.9095e-09	2.8171e-10	1.0568e-11
1.0157e+01	9.9999e+00	5.6280e-06	3.9384e-06	6.3797e-07	8.9937e-08	5.3669e-09	3.0879e-10	1.1591e-11
9.9999e+00	9.3940e+00	6.1587e-06	3.1277e-06	5.1346e-07	7.3782e-08	4.4869e-09	2.6230e-10	1.0004e-11
9.3940e+00	8.8249e+00	4.4272e-06	2.5185e-06	4.2250e-07	6.1859e-08	3.8461e-09	2.2819e-10	8.8028e-12
8.8249e+00	8.2902e+00	4.6650e-06	2.6716e-06	4.3486e-07	6.1436e-08	3.6655e-09	2.1194e-10	8.0450e-12
8.2902e+00	7.7879e+00	4.9907e-06	2.8804e-06	4.6396e-07	6.5385e-08	3.8790e-09	2.2237e-10	8.3567e-12
7.7879e+00	7.3161e+00	5.4174e-06	3.1503e-06	5.0216e-07	6.9147e-08	3.9988e-09	2.2587e-10	8.4114e-12
7.3161e+00	6.8728e+00	5.9520e-06	3.4279e-06	5.4384e-07	7.4367e-08	4.2636e-09	2.3963e-10	8.8570e-12
6.8728e+00	6.4564e+00	6.4790e-06	3.7677e-06	5.9775e-07	8.1516e-08	4.6588e-09	2.6139e-10	9.6488e-12
6.4564e+00	6.0652e+00	6.8788e-06	4.0748e-06	6.4807e-07	8.8339e-08	5.0421e-09	2.8259e-10	1.0421e-11
6.0652e+00	5.6978e+00	7.3415e-06	4.4173e-06	7.0532e-07	9.6266e-08	5.4997e-09	3.0847e-10	1.1381e-11
5.6978e+00	5.3525e+00	7.7558e-06	4.8051e-06	7.7243e-07	1.0571e-07	6.0500e-09	3.3967e-10	1.2541e-11
5.3525e+00	5.0282e+00	8.3373e-06	5.2207e-06	8.4182e-07	1.1531e-07	6.6056e-09	3.7121e-10	1.3715e-11
5.0282e+00	4.7236e+00	9.0409e-06	5.6833e-06	9.2476e-07	1.2738e-07	7.3282e-09	4.1266e-10	1.5270e-11
4.7236e+00	4.4374e+00	9.7174e-06	6.2056e-06	1.0184e-06	1.4095e-07	8.1392e-09	4.5926e-10	1.7019e-11
4.4374e+00	4.1686e+00	1.0341e-05	6.6925e-06	1.1124e-06	1.5526e-07	9.0226e-09	5.1046e-10	1.8954e-11
4.1686e+00	3.9160e+00	1.0896e-05	7.2690e-06	1.2224e-06	1.7172e-07	1.0033e-08	5.6917e-10	2.1173e-11
3.9160e+00	3.6787e+00	1.1629e-05	7.9709e-06	1.3666e-06	1.9446e-07	1.1475e-08	6.5374e-10	2.4389e-11
3.6787e+00	3.4559e+00	1.2386e-05	8.6525e-06	1.5075e-06	2.1712e-07	1.2947e-08	7.4124e-10	2.7742e-11
3.4559e+00	3.2465e+00	1.3372e-05	9.6284e-06	1.7231e-06	2.5285e-07	1.5316e-08	8.8363e-10	3.3223e-11
3.2465e+00	3.0498e+00	1.4254e-05	1.0700e-05	1.9520e-06	2.8998e-07	1.7758e-08	1.0307e-09	3.8898e-11
3.0498e+00	2.8650e+00	1.5286e-05	1.1980e-05	2.2556e-06	3.4238e-07	2.1368e-08	1.2529e-09	4.7591e-11
2.8650e+00	2.6914e+00	1.6357e-05	1.3274e-05	2.5450e-06	3.9126e-07	2.4725e-08	1.4611e-09	5.5781e-11
2.6914e+00	2.5284e+00	1.7128e-05	1.4398e-05	2.7751e-06	4.2739e-07	2.7068e-08	1.6030e-09	6.1287e-11
2.5284e+00	2.3752e+00	1.8476e-05	1.6433e-05	3.2881e-06	5.1802e-07	3.3432e-08	2.0002e-09	7.6974e-11
2.3752e+00	2.2313e+00	2.1026e-05	1.9515e-05	4.1240e-06	6.8038e-07	4.6009e-08	2.8334e-09	1.1120e-10
2.2313e+00	2.0961e+00	2.0851e-05	1.9754e-05	4.2170e-06	7.0362e-07	4.8312e-08	3.0121e-09	1.1937e-10
2.0961e+00	1.9691e+00	2.1451e-05	2.0535e-05	4.3723e-06	7.2965e-07	5.0284e-08	3.1502e-09	1.2542e-10
1.9691e+00	1.8498e+00	2.2292e-05	2.1811e-05	4.7619e-06	8.0983e-07	5.6928e-08	3.6169e-09	1.4562e-10
1.8498e+00	1.7377e+00	2.4332e-05	2.4745e-05	5.6883e-06	1.0096e-06	7.4422e-08	4.8973e-09	2.0289e-10
1.7377e+00	1.5335e+00	2.3794e-05	2.5193e-05	5.8728e-06	1.0564e-06	7.9395e-08	5.3208e-09	2.2433e-10
1.5335e+00	1.3533e+00	2.6438e-05	3.0222e-05	7.6183e-06	1.4586e-06	1.1774e-07	8.3559e-09	3.7092e-10
1.3533e+00	1.1943e+00	2.8995e-05	3.5873e-05	9.7591e-06	1.9986e-06	1.7556e-07	1.3421e-08	6.4097e-10
1.1943e+00	1.0540e+00	3.0132e-05	3.8737e-05	1.1292e-05	2.4734e-06	2.3794e-07	1.9830e-08	1.0383e-09
1.0540e+00	9.3013e-01	3.2004e-05	4.4388e-05	1.4423e-05	3.5056e-06	3.8840e-07	3.7129e-08	2.2631e-09
9.3013e-01	8.2084e-01	3.0061e-05	4.4057e-05	1.5202e-05	3.9161e-06	4.6958e-07	4.8457e-08	3.2106e-09
8.2084e-01	7.2438e-01	3.0633e-05	5.0496e-05	1.8044e-05	4.7514e-06	5.8663e-07	6.2397e-08	4.2799e-09

Table 3.4 Continued.

Energy [MeV]		Flux / lethargy / Source Neutron							
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm	
7.2438e-01	6.3927e-01	4.1817e-05	7.5093e-05	3.2717e-05	1.0280e-05	1.5886e-06	2.0847e-07	1.8024e-08	
6.3927e-01	5.6415e-01	3.6176e-05	6.8212e-05	3.3088e-05	1.1588e-05	2.0672e-06	3.0970e-07	3.0778e-08	
5.6415e-01	4.9786e-01	2.8732e-05	5.7544e-05	2.8450e-05	1.0258e-05	1.9151e-06	2.9981e-07	3.1154e-08	
4.9786e-01	4.3936e-01	2.5572e-05	5.5172e-05	2.7815e-05	1.0246e-05	1.9774e-06	3.1964e-07	3.4303e-08	
4.3936e-01	3.8774e-01	2.1202e-05	4.9226e-05	2.4700e-05	9.1306e-06	1.7872e-06	2.9384e-07	3.2113e-08	
3.8774e-01	3.4217e-01	3.6185e-05	8.6084e-05	5.0181e-05	2.0655e-05	4.5503e-06	8.2731e-07	1.0010e-07	
3.4217e-01	3.0197e-01	3.3607e-05	8.6772e-05	5.6882e-05	2.5926e-05	6.4452e-06	1.3015e-06	1.7518e-07	
3.0197e-01	2.6649e-01	2.3328e-05	5.8652e-05	3.9483e-05	1.8826e-05	4.9912e-06	1.0687e-06	1.5257e-07	
2.6649e-01	2.3517e-01	1.6341e-05	4.1063e-05	2.6889e-05	1.2882e-05	3.4916e-06	7.6608e-07	1.1216e-07	
2.3517e-01	2.0754e-01	1.5879e-05	4.3488e-05	2.8297e-05	1.3629e-05	3.7648e-06	8.4373e-07	1.2628e-07	
2.0754e-01	1.8315e-01	1.1116e-05	3.3554e-05	2.1591e-05	1.0382e-05	2.8900e-06	6.5453e-07	9.9088e-08	
1.8315e-01	1.6163e-01	1.4948e-05	4.4320e-05	2.9571e-05	1.4439e-05	4.1099e-06	9.5307e-07	1.4791e-07	
1.6163e-01	1.4264e-01	7.0164e-06	2.2496e-05	1.4600e-05	7.0667e-06	2.0091e-06	4.6752e-07	7.2912e-08	
1.4264e-01	1.2588e-01	2.0056e-05	6.7220e-05	4.9166e-05	2.5245e-05	7.5926e-06	1.8543e-06	3.0365e-07	
1.2588e-01	1.1109e-01	1.1877e-05	3.9367e-05	3.0640e-05	1.6361e-05	5.1111e-06	1.2886e-06	2.1787e-07	
1.1109e-01	9.8035e-02	5.6602e-06	2.1254e-05	1.6508e-05	8.8596e-06	2.7895e-06	7.0890e-07	1.2087e-07	
9.8035e-02	8.6515e-02	6.1751e-06	2.5406e-05	2.4089e-05	1.0922e-05	3.4862e-06	8.9633e-07	1.5438e-07	
8.6515e-02	7.6349e-02	1.3250e-05	5.0701e-05	4.4789e-05	2.6168e-05	8.9577e-06	2.4348e-06	4.4388e-07	
7.6349e-02	6.7378e-02	6.9272e-06	2.9744e-05	2.7495e-05	1.6611e-05	5.8784e-06	1.6394e-06	3.0634e-07	
6.7378e-02	5.9461e-02	4.8494e-06	2.3476e-05	2.2312e-05	1.3774e-05	4.9839e-06	1.4139e-06	2.6852e-07	
5.9461e-02	5.2474e-02	3.4400e-06	1.5990e-05	1.5448e-05	9.6864e-06	3.5648e-06	1.0249e-06	1.9711e-07	
5.2474e-02	4.6308e-02	3.6557e-06	1.9656e-05	1.9247e-05	1.2235e-05	4.5757e-06	1.3326e-06	2.5948e-07	
4.6308e-02	4.0867e-02	3.1868e-06	1.6022e-05	1.5916e-05	1.0263e-05	3.9030e-06	1.1522e-06	2.2726e-07	
4.0867e-02	3.6065e-02	2.1059e-06	1.1701e-05	1.1717e-05	7.6187e-06	2.9259e-06	8.7055e-07	1.7297e-07	
3.6065e-02	3.1827e-02	1.2845e-06	8.2904e-06	8.3467e-06	5.4540e-06	2.1058e-06	6.2915e-07	1.2549e-07	
3.1827e-02	2.8087e-02	3.1906e-07	2.4792e-06	2.4870e-06	1.6246e-06	6.2737e-07	1.8749e-07	3.7404e-08	
2.8087e-02	2.4787e-02	4.5926e-06	2.9791e-05	3.1678e-05	2.1396e-05	8.5465e-06	2.6207e-06	5.3521e-07	
2.4787e-02	2.1874e-02	3.8314e-06	1.7474e-05	1.9655e-05	1.3871e-05	5.8102e-06	1.8503e-06	3.9160e-07	
2.1874e-02	1.9304e-02	1.8323e-06	1.0275e-05	1.1807e-05	8.4702e-06	3.6095e-06	1.1648e-06	2.4951e-07	
1.9304e-02	1.5034e-02	4.6124e-07	3.2967e-06	3.8000e-06	2.7388e-06	1.1733e-06	3.8020e-07	8.1756e-08	
1.5034e-02	1.1709e-02	6.1576e-07	5.2916e-06	6.1607e-06	4.4754e-06	1.9337e-06	6.3067e-07	1.3643e-07	
1.1709e-02	9.1186e-03	6.3150e-07	5.1300e-06	6.0572e-06	4.4416e-06	1.9384e-06	6.3707e-07	1.3878e-07	
9.1186e-03	7.1016e-03	2.4875e-07	2.9341e-06	3.4740e-06	2.5529e-06	1.1168e-06	3.6772e-07	8.0245e-08	
7.1016e-03	5.5307e-03	2.7871e-07	3.1417e-06	3.7435e-06	2.7620e-06	1.2134e-06	4.0081e-07	8.7726e-08	
5.5307e-03	4.3073e-03	3.3288e-07	3.6821e-06	4.4304e-06	3.2880e-06	1.4533e-06	4.8231e-07	1.0601e-07	
4.3073e-03	3.3546e-03	3.9726e-07	4.6544e-06	5.6749e-06	4.2442e-06	1.8911e-06	6.3145e-07	1.3956e-07	
3.3546e-03	2.6125e-03	4.3075e-07	4.4176e-06	4.4177e-06	4.1379e-06	1.8634e-06	6.2723e-07	1.3963e-07	
2.6125e-03	2.0346e-03	3.0879e-07	3.8850e-06	4.8702e-06	3.7030e-06	1.6790e-06	5.6810e-07	1.2707e-07	
2.0346e-03	1.5846e-03	4.3834e-07	4.5148e-06	5.7644e-06	4.4338e-06	2.0353e-06	6.9524e-07	1.5682e-07	
1.5846e-03	1.2341e-03	4.2474e-07	4.2650e-06	5.5455e-06	4.3184e-06	2.0087e-06	6.9331e-07	1.5782e-07	
1.2341e-03	9.6110e-04	3.0453e-07	3.3899e-06	4.4627e-06	3.5056e-06	1.6460e-06	5.7226e-07	1.3111e-07	
9.6110e-04	5.8293e-04	2.6302e-07	2.8564e-06	3.8505e-06	3.0806e-06	1.4763e-06	5.2159e-07	1.2120e-07	
5.8293e-04	3.5357e-04	1.2122e-07	1.4871e-06	2.0269e-06	1.6356e-06	7.9117e-07	2.8161e-07	6.5871e-08	
3.5357e-04	2.1445e-04	1.4602e-07	2.0852e-06	2.8818e-06	2.3510e-06	1.1512e-06	4.1373e-07	9.7604e-08	
2.1445e-04	1.3007e-04	1.2050e-07	1.5394e-06	2.1561e-06	1.7787e-06	8.8189e-07	3.2011e-07	7.6191e-08	
1.3007e-04	7.8891e-05	1.2034e-07	1.5617e-06	2.2186e-06	1.8531e-06	9.3197e-07	3.4221e-07	8.2284e-08	
7.8891e-05	4.7850e-05	1.0042e-07	1.3328e-06	1.9172e-06	1.6196e-06	8.2530e-07	3.0631e-07	7.4359e-08	
4.7850e-05	2.9023e-05	6.7805e-08	9.3971e-07	1.3643e-06	1.1624e-06	5.9822e-07	2.2384e-07	5.4737e-08	
2.9023e-05	1.7603e-05	5.8455e-08	7.9708e-07	1.1698e-06	1.0070e-06	5.2470e-07	1.9835e-07	4.8949e-08	
1.7603e-05	1.0677e-05	4.7230e-08	6.5134e-07	9.6514e-07	8.3878e-07	4.4214e-07	1.6877e-07	4.2008e-08	
1.0677e-05	6.4758e-06	3.7190e-08	5.1754e-07	7.7364e-07	6.7840e-07	3.6157e-07	1.3931e-07	3.4961e-08	
6.4758e-06	3.9278e-06	2.7988e-08	3.9316e-07	5.9238e-07	5.2379e-07	2.8206e-07	1.0965e-07	2.7729e-08	
3.9278e-06	2.3823e-06	1.9927e-08	2.8256e-07	4.2875e-07	3.8199e-07	2.0768e-07	8.1409e-08	2.0735e-08	
2.3823e-06	1.4449e-06	1.5321e-08	1.9322e-07	2.8890e-07	2.5849e-07	1.4172e-07	5.5968e-08	1.4349e-08	
1.4449e-06	8.7640e-07	1.4800e-08	1.3089e-07	1.8018e-07	1.6037e-07	8.8444e-08	3.5153e-08	9.0667e-09	
8.7640e-07	5.3156e-07	9.7937e-09	7.9110e-08	1.0229e-07	9.0586e-08	5.0214e-08	2.0072e-08	5.2053e-09	
5.3156e-07	3.2241e-07	5.0436e-09	4.1486e-08	5.1760e-08	4.5710e-08	2.5456e-08	1.0227e-08	2.6649e-09	
3.2241e-07	1.0010e-11	7.3884e-11	6.0545e-10	7.2340e-10	6.3546e-10	3.5443e-10	1.4273e-10	3.7268e-11	

Table 3.5 Neutron spectra at the seven positions in the Assembly #1 calculated by DOT with FUSION-J3 library of 125 neutron groups.

Energy [MeV]		Flux / lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.5914e-04	1.0487e-04	9.1088e-06	8.5994e-07	3.3637e-08	1.3830e-09	3.8020e-11
1.5248e+01	1.5012e+01	1.3430e-03	1.8014e-04	1.7615e-05	1.8662e-06	8.3688e-08	3.8461e-09	1.1677e-10
1.5012e+01	1.4779e+01	2.4361e-03	3.2915e-04	3.1784e-05	3.3203e-06	1.4903e-07	6.9826e-09	2.1846e-10
1.4779e+01	1.4550e+01	1.4016e-03	2.2876e-04	2.5686e-05	3.0200e-06	1.5328e-07	7.8395e-09	2.6434e-10
1.4550e+01	1.4324e+01	2.0542e-04	7.7604e-05	1.1818e-05	1.6408e-06	9.8205e-08	5.6421e-09	2.0903e-10
1.4324e+01	1.4102e+01	5.7446e-05	3.6012e-05	5.9549e-06	8.8829e-07	5.7939e-08	3.6034e-09	1.4463e-10
1.4102e+01	1.3883e+01	4.0105e-05	2.2811e-05	3.8930e-06	5.8660e-07	3.8549e-08	2.4295e-09	9.9759e-11
1.3883e+01	1.3668e+01	4.2662e-05	1.7085e-05	2.9258e-06	4.4605e-07	2.9708e-08	1.8879e-09	7.8096e-11
1.3668e+01	1.3456e+01	1.9600e-05	1.1305e-05	2.0664e-06	3.2551e-07	2.2303e-08	1.4440e-09	6.0644e-11
1.3456e+01	1.3248e+01	1.2588e-05	8.3550e-06	1.5425e-06	2.4556e-07	1.7067e-08	1.1190e-09	4.7592e-11
1.3248e+01	1.3042e+01	1.2224e-05	6.3849e-06	1.1854e-06	1.9032e-07	1.3351e-08	8.8203e-10	3.7817e-11
1.3042e+01	1.2840e+01	1.0785e-05	4.8281e-06	8.9613e-07	1.4558e-07	1.0376e-08	6.9459e-10	3.0143e-11
1.2840e+01	1.2641e+01	1.0127e-05	4.0687e-06	7.2687e-07	1.1696e-07	8.3621e-09	5.6476e-10	2.4820e-11
1.2641e+01	1.2445e+01	8.7906e-06	3.5262e-06	6.2213e-07	9.8708e-08	6.9349e-09	4.6343e-10	2.0276e-11
1.2445e+01	1.2252e+01	5.9930e-06	2.9802e-06	5.3972e-07	8.5663e-08	5.9695e-09	3.9494e-10	1.7125e-11
1.2252e+01	1.2062e+01	3.7594e-06	2.6334e-06	4.8906e-07	7.7589e-08	5.3635e-09	3.5124e-10	1.5099e-11
1.2062e+01	1.1875e+01	3.4607e-06	2.4850e-06	4.6059e-07	7.2607e-08	4.9660e-09	3.2166e-10	1.3622e-11
1.1875e+01	1.1691e+01	3.6116e-06	2.3298e-06	4.2595e-07	6.6931e-08	4.5647e-09	2.9469e-10	1.2420e-11
1.1691e+01	1.1510e+01	3.5566e-06	2.1729e-06	3.9173e-07	6.1276e-08	4.1706e-09	2.6909e-10	1.1333e-11
1.1510e+01	1.1331e+01	3.6107e-06	1.9674e-06	3.5148e-07	5.4958e-08	3.7496e-09	2.4269e-10	1.0252e-11
1.1331e+01	1.1156e+01	3.6814e-06	1.8416e-06	3.2255e-07	4.9972e-08	3.3901e-09	2.1910e-10	9.2602e-12
1.1156e+01	1.0983e+01	3.6446e-06	1.9167e-06	3.2590e-07	4.9184e-08	3.2459e-09	2.0585e-10	8.5793e-12
1.0983e+01	1.0812e+01	3.4209e-06	2.0900e-06	3.4980e-07	5.1374e-08	3.2747e-09	2.0195e-10	8.2165e-12
1.0812e+01	1.0645e+01	3.4015e-06	2.4683e-06	4.0650e-07	5.8274e-08	3.5893e-09	2.1443e-10	8.4605e-12
1.0645e+01	1.0480e+01	3.5209e-06	2.8824e-06	4.7289e-07	6.6842e-08	4.0191e-09	2.3429e-10	8.9962e-12
1.0480e+01	1.0317e+01	3.6517e-06	3.3093e-06	5.3987e-07	7.5658e-08	4.4859e-09	2.5759e-10	9.7091e-12
1.0317e+01	1.0157e+01	4.2491e-06	3.6026e-06	5.8580e-07	8.2337e-08	4.8892e-09	2.8020e-10	1.0503e-11
1.0157e+01	9.9999e+00	5.6517e-06	3.9399e-06	6.3744e-07	8.9760e-08	5.3478e-09	3.0730e-10	1.1528e-11
9.9999e+00	9.3940e+00	6.1851e-06	3.1298e-06	5.1327e-07	7.3681e-08	4.4742e-09	2.6124e-10	9.9566e-12
9.3940e+00	8.8249e+00	4.4540e-06	2.5195e-06	4.2211e-07	6.1727e-08	3.8316e-09	2.2701e-10	8.7484e-12
8.8249e+00	8.2902e+00	4.6734e-06	2.6712e-06	4.3438e-07	6.1297e-08	3.6498e-09	2.1063e-10	7.9708e-12
8.2902e+00	7.7879e+00	4.9721e-06	2.8853e-06	4.6395e-07	6.4476e-08	3.7629e-09	2.1391e-10	7.9930e-12
7.7879e+00	7.3161e+00	5.4085e-06	3.1483e-06	5.0169e-07	6.8929e-08	3.9683e-09	2.2342e-10	8.2743e-12
7.3161e+00	6.8728e+00	5.9469e-06	3.4256e-06	5.4310e-07	7.4166e-08	4.2411e-09	2.3774e-10	8.7698e-12
6.8728e+00	6.4564e+00	6.4805e-06	3.7644e-06	5.9669e-07	8.1267e-08	4.6347e-09	2.5954e-10	9.5674e-12
6.4564e+00	6.0652e+00	6.8766e-06	4.0698e-06	6.4635e-07	8.7993e-08	5.0122e-09	2.8044e-10	1.0330e-11
6.0652e+00	5.6978e+00	7.3377e-06	4.4129e-06	7.0394e-07	9.5962e-08	5.4722e-09	3.0643e-10	1.1294e-11
5.6978e+00	5.3525e+00	7.7504e-06	4.8018e-06	7.7127e-07	1.0543e-07	6.0230e-09	3.3763e-10	1.2452e-11
5.3525e+00	5.0282e+00	8.3142e-06	5.2162e-06	8.4049e-07	1.1500e-07	6.5754e-09	3.6894e-10	1.3616e-11
5.0282e+00	4.7236e+00	9.0068e-06	5.6760e-06	9.2282e-07	1.2698e-07	7.2913e-09	4.0992e-10	1.5152e-11
4.7236e+00	4.4374e+00	9.6731e-06	6.1977e-06	1.0163e-06	1.4048e-07	8.0962e-09	4.5609e-10	1.6881e-11
4.4374e+00	4.1686e+00	1.0291e-05	6.6797e-06	1.1089e-06	1.5451e-07	8.9585e-09	5.0593e-10	1.8762e-11
4.1686e+00	3.9160e+00	1.0862e-05	7.2644e-06	1.2204e-06	1.7119e-07	9.9798e-09	5.6520e-10	2.0997e-11
3.9160e+00	3.6787e+00	1.1591e-05	7.9617e-06	1.3632e-06	1.9365e-07	1.1400e-08	6.4827e-10	2.4148e-11
3.6787e+00	3.4559e+00	1.2338e-05	8.6370e-06	1.5025e-06	2.1598e-07	1.2845e-08	7.3395e-10	2.7425e-11
3.4559e+00	3.2465e+00	1.3326e-05	9.6169e-06	1.7182e-06	2.5160e-07	1.5197e-08	8.7484e-10	3.2835e-11
3.2465e+00	3.0498e+00	1.4199e-05	1.0685e-05	1.9457e-06	2.8839e-07	1.7607e-08	1.0196e-09	3.8405e-11
3.0498e+00	2.8650e+00	1.5223e-05	1.1959e-05	2.2465e-06	3.4005e-07	2.1146e-08	1.2365e-09	4.6857e-11
2.8650e+00	2.6914e+00	1.6300e-05	1.3263e-05	2.5376e-06	3.8908e-07	2.4498e-08	1.4435e-09	5.4970e-11
2.6914e+00	2.5284e+00	1.7027e-05	1.4339e-05	2.7540e-06	4.2257e-07	2.6643e-08	1.5726e-09	5.9952e-11
2.5284e+00	2.3752e+00	1.8385e-05	1.6374e-05	3.2604e-06	5.1107e-07	3.2789e-08	1.9533e-09	7.4904e-11
2.3752e+00	2.2313e+00	2.0931e-05	1.9455e-05	4.0878e-06	6.6989e-07	4.4912e-08	2.7474e-09	1.0723e-10
2.2313e+00	2.0961e+00	2.0834e-05	1.9782e-05	4.2060e-06	6.9794e-07	4.7553e-08	2.9455e-09	1.1606e-10
2.0961e+00	1.9691e+00	2.1371e-05	2.0483e-05	4.3401e-06	7.2002e-07	4.9222e-08	3.0625e-09	1.2119e-10
1.9691e+00	1.8498e+00	2.2024e-05	2.1526e-05	4.6465e-06	7.8103e-07	5.4123e-08	3.4005e-09	1.3562e-10
1.8498e+00	1.7377e+00	2.4293e-05	2.4759e-05	5.6354e-06	9.8826e-07	7.1650e-08	4.6483e-09	1.9010e-10
1.7377e+00	1.5335e+00	2.3649e-05	2.5094e-05	5.7859e-06	1.0270e-06	7.5744e-08	4.9916e-09	2.0714e-10
1.5335e+00	1.3533e+00	2.6239e-05	3.0097e-05	7.4733e-06	1.4044e-06	1.1032e-07	7.6312e-09	3.3012e-10
1.3533e+00	1.1943e+00	2.8644e-05	3.5664e-05	9.5190e-06	1.8971e-06	1.5967e-07	1.1696e-08	5.3367e-10
1.1943e+00	1.0540e+00	2.9887e-05	3.8662e-05	1.1046e-05	2.3514e-06	2.1582e-07	1.7106e-08	8.4535e-10
1.0540e+00	9.3013e-01	3.1649e-05	4.4337e-05	1.4036e-05	3.2875e-06	3.4226e-07	3.0520e-08	1.7091e-09
9.3013e-01	8.2084e-01	2.9886e-05	4.4315e-05	1.4941e-05	3.7152e-06	4.1898e-07	4.0303e-08	2.4475e-09
8.2084e-01	7.2438e-01	2.9923e-05	4.9918e-05	1.7302e-05	4.3787e-06	5.0659e-07	5.0077e-08	3.1365e-09

Table 3.5 Continued.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
7.2438e-01	6.3927e-01	4.0125e-05	7.3500e-05	3.0375e-05	8.8970e-06	1.2265e-06	1.4167e-07	1.0458e-08
6.3927e-01	5.6415e-01	3.5698e-05	6.8463e-05	3.1605e-05	1.0304e-05	1.6297e-06	2.1332e-07	1.7947e-08
5.6415e-01	4.9786e-01	2.8827e-05	5.8910e-05	2.7978e-05	9.4490e-06	1.5718e-06	2.1555e-07	1.9001e-08
4.9786e-01	4.3936e-01	2.5811e-05	5.6822e-05	2.7715e-05	9.6216e-06	1.6638e-06	2.3640e-07	2.1584e-08
4.3936e-01	3.8774e-01	2.1157e-05	5.0175e-05	2.4439e-05	8.5483e-06	1.5046e-06	2.1785e-07	2.0282e-08
3.8774e-01	3.4217e-01	3.3672e-05	8.4296e-05	4.6349e-05	1.7612e-05	3.3966e-06	5.3144e-07	5.3434e-08
3.4217e-01	3.0197e-01	3.2199e-05	8.8351e-05	5.4074e-05	2.2404e-05	4.7737e-06	8.1322e-07	8.9029e-08
3.0197e-01	2.6649e-01	2.2685e-05	6.0456e-05	3.8157e-05	1.6500e-05	3.7226e-06	6.6722e-07	7.6836e-08
2.6649e-01	2.3517e-01	1.7101e-05	4.5157e-05	2.8271e-05	1.2406e-05	2.8792e-06	5.3047e-07	6.2814e-08
2.3517e-01	2.0754e-01	1.5752e-05	4.5651e-05	2.8507e-05	1.2631e-05	2.9930e-06	5.6312e-07	6.8116e-08
2.0754e-01	1.8315e-01	1.0260e-05	3.2935e-05	2.0257e-05	8.9665e-06	2.1393e-06	4.0603e-07	4.9576e-08
1.8315e-01	1.6163e-01	1.4534e-05	4.5707e-05	2.8940e-05	1.3000e-05	3.1707e-06	6.1501e-07	7.6783e-08
1.6163e-01	1.4264e-01	7.2201e-06	2.4334e-05	1.5102e-05	6.7478e-06	1.6478e-06	3.2102e-07	4.0296e-08
1.4264e-01	1.2588e-01	1.4926e-05	5.7052e-05	3.7488e-05	1.7179e-05	4.3124e-06	8.6054e-07	1.1060e-07
1.2588e-01	1.1109e-01	1.3500e-05	4.6449e-05	3.2996e-05	1.5780e-05	4.1322e-06	8.5459e-07	1.1379e-07
1.1109e-01	9.8035e-02	6.3604e-06	2.5178e-05	1.8048e-05	8.6998e-06	2.3005e-06	4.8021e-07	6.4542e-08
9.8035e-02	8.6515e-02	6.8885e-06	3.0165e-05	2.2181e-05	1.0855e-05	2.9149e-06	6.1639e-07	8.3903e-08
8.6515e-02	7.6349e-02	9.3306e-06	4.7297e-05	3.6802e-05	1.8567e-05	5.1290e-06	1.1094e-06	1.5436e-07
7.6349e-02	6.7378e-02	7.2393e-06	3.6138e-05	2.9553e-05	1.5355e-05	4.3596e-06	9.6348e-07	1.3685e-07
6.7378e-02	5.9461e-02	6.0306e-06	3.1508e-05	2.6915e-05	1.4368e-05	4.1830e-06	9.4258e-07	1.3639e-07
5.9461e-02	5.2474e-02	4.2572e-06	2.1011e-05	1.8465e-05	1.0063e-05	2.9877e-06	6.8363e-07	1.0038e-07
5.2474e-02	4.6308e-02	4.1846e-06	2.5051e-05	2.2472e-05	1.2447e-05	3.7564e-06	8.7057e-07	1.2941e-07
4.6308e-02	4.0867e-02	4.0412e-06	2.1239e-05	1.9574e-05	1.1079e-05	3.4167e-06	8.0528e-07	1.2165e-07
4.0867e-02	3.6065e-02	2.6743e-06	1.5504e-05	1.4509e-05	8.3185e-06	2.5984e-06	6.1846e-07	9.4296e-08
3.6065e-02	3.1827e-02	1.5827e-06	1.0760e-05	1.0155e-05	5.8622e-06	1.8433e-06	4.4094e-07	6.7539e-08
3.1827e-02	2.8087e-02	3.0837e-07	2.6204e-06	2.4659e-06	1.4231e-06	4.4750e-07	1.0706e-07	1.6401e-08
2.8087e-02	2.4787e-02	2.2568e-06	2.9763e-05	2.8398e-05	1.6531e-05	5.2433e-06	1.2618e-06	1.9443e-07
2.4787e-02	2.1874e-02	5.1937e-06	2.4217e-05	2.4835e-05	1.5315e-05	5.1626e-06	1.3034e-06	2.1038e-07
2.1874e-02	1.9304e-02	2.4916e-06	1.4295e-05	1.5075e-05	9.4961e-06	3.2708e-06	8.3926e-07	1.3750e-07
1.9304e-02	1.5034e-02	4.9869e-07	3.8457e-06	4.0702e-06	2.5756e-06	8.9135e-07	2.2955e-07	3.7731e-08
1.5034e-02	1.1709e-02	8.0678e-07	7.2072e-06	7.7341e-06	4.9466e-06	1.7308e-06	4.4934e-07	7.4411e-08
1.1709e-02	9.1186e-03	8.3064e-07	6.9532e-06	7.5954e-06	4.9201e-06	1.7444e-06	4.5734e-07	7.6423e-08
9.1186e-03	7.1016e-03	3.1346e-07	3.8833e-06	4.2565e-06	2.7649e-06	9.8312e-07	2.5832e-07	4.3250e-08
7.1016e-03	5.5307e-03	3.5573e-07	4.1771e-06	4.6123e-06	3.0114e-06	1.0763e-06	2.8389e-07	4.7697e-08
5.5307e-03	4.3073e-03	4.4641e-07	5.0238e-06	5.6119e-06	3.6926e-06	1.3302e-06	3.5291e-07	5.9607e-08
4.3073e-03	3.3546e-03	5.3037e-07	6.3008e-06	7.1466e-06	4.7495e-06	1.7286e-06	4.6207e-07	7.8586e-08
3.3546e-03	2.6125e-03	5.7890e-07	5.9594e-06	6.8909e-06	4.6391e-06	1.7115e-06	4.6211e-07	7.9316e-08
2.6125e-03	2.0346e-03	4.0970e-07	5.2126e-06	6.1016e-06	4.1419e-06	1.5413e-06	4.1881e-07	7.2302e-08
2.0346e-03	1.5846e-03	5.8174e-07	5.9993e-06	7.1684e-06	4.9378e-06	1.8664e-06	5.1315e-07	8.9535e-08
1.5846e-03	1.2341e-03	5.7048e-07	5.6813e-06	6.9321e-06	4.8520e-06	1.8661e-06	5.1989e-07	9.1796e-08
1.2341e-03	9.6110e-04	3.1298e-07	3.6365e-06	4.4844e-06	3.1647e-06	1.2279e-06	3.4441e-07	6.1176e-08
9.6110e-04	5.8293e-04	2.8926e-07	3.1053e-06	3.9361e-06	2.8439e-06	1.1333e-06	3.2449e-07	5.8729e-08
5.8293e-04	3.5357e-04	1.1917e-07	1.4643e-06	1.8772e-06	1.3694e-06	5.5156e-07	1.5924e-07	2.9034e-08
3.5357e-04	2.1445e-04	1.2944e-07	2.1328e-06	2.7690e-06	2.0413e-06	8.3191e-07	2.4235e-07	4.4556e-08
2.1445e-04	1.3007e-04	1.1259e-07	1.4438e-06	1.9019e-06	1.4200e-06	5.8724e-07	1.7306e-07	3.2146e-08
1.3007e-04	7.8891e-05	1.2330e-07	1.5795e-06	2.1160e-06	1.6053e-06	6.7637e-07	2.0232e-07	3.8089e-08
7.8891e-05	4.7850e-05	1.0313e-07	1.3464e-06	1.8307e-06	1.4091e-06	6.0403e-07	1.8322e-07	3.4927e-08
4.7850e-05	2.9023e-05	5.6898e-08	7.9536e-07	1.0912e-06	8.4721e-07	3.6697e-07	1.1227e-07	2.1562e-08
2.9023e-05	1.7603e-05	4.9866e-08	6.6853e-07	9.2896e-07	7.3077e-07	3.2166e-07	9.9728e-08	1.9379e-08
1.7603e-05	1.0677e-05	3.9854e-08	5.3955e-07	7.5832e-07	6.0374e-07	2.6976e-07	8.4693e-08	1.6641e-08
1.0677e-05	6.4758e-06	3.0927e-08	4.2246e-07	5.9991e-07	4.8302e-07	2.1891e-07	6.9558e-08	1.3813e-08
6.4758e-06	3.9278e-06	2.2967e-08	3.1670e-07	4.5394e-07	3.6930e-07	1.6963e-07	5.4510e-08	1.0935e-08
3.9278e-06	2.3823e-06	1.6089e-08	2.2397e-07	3.2371e-07	2.6585e-07	1.2364e-07	4.0146e-08	8.1304e-09
2.3823e-06	1.4449e-06	1.2638e-08	1.5224e-07	2.1590e-07	1.7824e-07	8.3791e-08	2.7464e-08	5.6109e-09
1.4449e-06	8.7640e-07	1.3130e-08	1.0528e-07	1.3471e-07	1.1042e-07	5.2283e-08	1.7278e-08	3.5581e-09
8.7640e-07	5.3156e-07	8.8594e-09	6.4526e-08	7.6490e-08	6.2268e-08	2.9671e-08	9.8780e-09	2.0486e-09
5.3156e-07	3.2241e-07	4.5797e-09	3.4081e-08	3.8700e-08	3.1380e-08	1.5040e-08	5.0404e-09	1.0517e-09
3.2241e-07	1.0010e-11	6.8773e-11	4.9463e-10	5.3052e-10	4.2675e-10	2.0483e-10	6.8835e-11	1.4403e-11

Table 3.6 Neutron spectra at the seven positions in the Assembly #1 calculated by DOT with JSSTD library of 42 neutron groups.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5000e+01	1.3720e+01	1.1073e-03	1.6110e-04	1.6701e-05	1.8621e-06	9.0700e-08	4.5898e-09	1.5763e-10
1.3720e+01	1.2549e+01	2.2092e-05	1.7699e-05	2.9659e-06	4.3105e-07	2.6870e-08	1.6029e-09	6.1899e-11
1.2549e+01	1.1478e+01	6.0176e-06	3.7571e-06	7.1735e-07	1.1516e-07	7.9065e-09	5.0508e-10	2.0706e-11
1.1478e+01	1.0500e+01	3.3632e-06	2.2057e-06	4.0301e-07	6.2820e-08	4.1925e-09	2.6344e-10	1.0734e-11
1.0500e+01	9.3140e+00	5.5594e-06	3.7598e-06	6.2059e-07	8.8087e-08	5.2324e-09	2.9902e-10	1.1218e-11
9.3140e+00	8.2610e+00	4.0759e-06	2.0656e-06	3.3315e-07	4.7366e-08	2.8397e-09	1.6342e-10	6.1405e-12
8.2610e+00	7.3280e+00	5.1062e-06	2.9588e-06	4.7544e-07	6.5659e-08	3.7857e-09	2.1275e-10	7.8680e-12
7.3280e+00	6.5000e+00	5.9842e-06	3.4272e-06	5.4170e-07	7.3456e-08	4.1479e-09	2.2988e-10	8.4093e-12
6.5000e+00	5.7570e+00	6.8631e-06	4.0351e-06	6.3939e-07	8.6500e-08	4.8662e-09	2.6894e-10	9.8113e-12
5.7570e+00	5.0990e+00	7.9998e-06	4.9603e-06	7.9519e-07	1.0802e-07	6.0909e-09	3.3695e-10	1.2294e-11
5.0990e+00	4.5160e+00	9.2389e-06	5.8212e-06	9.4590e-07	1.2954e-07	7.3533e-09	4.0824e-10	1.4931e-11
4.5160e+00	4.0000e+01	1.0562e-05	6.8689e-06	1.1369e-06	1.5741e-07	9.0132e-09	5.0236e-10	1.8418e-11
4.0000e+00	3.1620e+00	1.2522e-05	8.8511e-06	1.5625e-06	2.2654e-07	1.3494e-08	7.6688e-10	2.8452e-11
3.1620e+00	2.5000e+00	1.5787e-05	1.2852e-05	2.4902e-06	3.8867e-07	2.4980e-08	1.4881e-09	5.6948e-11
2.5000e+00	1.8710e+00	1.9680e-05	1.8613e-05	4.0197e-06	6.8398e-07	4.8492e-08	3.1108e-09	1.2642e-10
1.8710e+00	1.4000e+00	2.2766e-05	2.4479e-05	5.9213e-06	1.1081e-06	8.8218e-08	6.2489e-09	2.7904e-10
1.4000e+00	1.0580e+00	2.7784e-05	3.4708e-05	9.8800e-06	2.1429e-06	2.0740e-07	1.7696e-08	9.6673e-10
1.0580e+00	8.0000e-01	2.9089e-05	4.1350e-05	1.3900e-05	3.5281e-06	4.2229e-07	4.4408e-08	3.0781e-09
8.0000e-01	5.6600e-01	3.5794e-05	6.5355e-05	3.0543e-05	1.0768e-05	2.0737e-06	3.5994e-07	4.5551e-08
5.6600e-01	4.0000e-01	2.3072e-05	4.6732e-05	2.2264e-05	7.9836e-06	1.5757e-06	2.7968e-07	3.6094e-08
4.0000e-01	2.8300e-01	2.7337e-05	6.3573e-05	3.7010e-05	1.5627e-05	3.7095e-06	7.6178e-07	1.1169e-07
2.8300e-01	2.0000e-01	1.6962e-05	4.3707e-05	2.6484e-05	1.1676e-05	2.9335e-06	6.3186e-07	9.6613e-08
2.0000e-01	1.4100e-01	8.4228e-06	2.3264e-05	1.3597e-05	5.9267e-06	1.4895e-06	3.2269e-07	4.9706e-08
1.4100e-01	1.0000e-01	1.2022e-05	3.7564e-05	2.5356e-05	1.1965e-05	3.2323e-06	7.3710e-07	1.1844e-07
1.0000e-01	4.6500e-02	6.9503e-06	3.0475e-05	2.5745e-05	1.4278e-05	4.5661e-06	1.1864e-06	2.1410e-07
4.6500e-02	2.1500e-02	3.8817e-06	2.2998e-05	2.3569e-05	1.5133e-05	5.6693e-06	1.6671e-06	3.3582e-07
2.1500e-02	1.0000e-02	9.9274e-07	7.7797e-06	8.5636e-06	5.7713e-06	2.2679e-06	6.8999e-07	1.4283e-07
1.0000e-02	4.6500e-03	4.3785e-07	4.9694e-06	5.6556e-06	3.8888e-06	1.5583e-06	4.8059e-07	1.0055e-07
4.6500e-03	2.1500e-03	3.6266e-07	3.9894e-06	4.7150e-06	3.3206e-06	1.3622e-06	4.2704e-07	9.0503e-08
2.1500e-03	1.0000e-03	3.8746e-07	3.9825e-06	4.9175e-06	3.5742e-06	1.5136e-06	4.8547e-07	1.0476e-07
1.0000e-03	4.6500e-04	2.6689e-07	2.8870e-06	3.6923e-06	2.7588e-06	1.2024e-06	3.9373e-07	8.6382e-08
4.6500e-04	2.1500e-04	1.7698e-07	2.4186e-06	3.1712e-06	2.4155e-06	1.0746e-06	3.5704e-07	7.9259e-08
2.1500e-04	1.0000e-04	1.4978e-07	1.8895e-06	2.5393e-06	1.9759e-06	8.9976e-07	3.0408e-07	6.8438e-08
1.0000e-04	4.6500e-05	1.1474e-07	1.4925e-06	2.0487e-06	1.6256e-06	7.5641e-07	2.5977e-07	5.9238e-08
4.6500e-05	2.1500e-05	7.3636e-08	9.9751e-07	1.3910e-06	1.1202e-06	5.3001e-07	1.8431e-07	4.2467e-08
2.1500e-05	1.0000e-05	5.4999e-08	7.4609e-07	1.0575e-06	8.6556e-07	4.1720e-07	1.4717e-07	3.4312e-08
1.0000e-05	4.6500e-06	3.7784e-08	5.2025e-07	7.4782e-07	6.2082e-07	3.0429e-07	1.0876e-07	2.5631e-08
4.6500e-06	2.1500e-06	2.3210e-08	3.2431e-07	4.7163e-07	3.9634e-07	1.9713e-07	7.1286e-08	1.6959e-08
2.1500e-06	1.0000e-06	1.7620e-08	1.8664e-07	2.5834e-07	2.1754e-07	1.0937e-07	3.9931e-08	9.5738e-09
1.0000e-06	4.6500e-07	1.0584e-08	9.2000e-08	1.1863e-07	9.9530e-08	5.0426e-08	1.8548e-08	4.4762e-09
4.6500e-07	2.1500e-07	1.7604e-09	1.4344e-08	1.7890e-08	1.4966e-08	7.5979e-09	2.8014e-09	6.7738e-10
2.1500e-07	1.0000e-09	1.9153e-10	1.8364e-09	2.2658e-09	1.8956e-09	9.6499e-10	3.5672e-10	8.6436e-11

Table 3.7 Neutron spectra at the seven positions in the Assembly #1 calculated by DOT with FUSION-40 library of 42 neutron groups.

Energy [MeV]		Flux / lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5000e+01	1.3720e+01	1.1276e-03	1.6245e-04	1.6832e-05	1.8886e-06	9.2904e-08	4.7202e-09	1.6138e-10
1.3720e+01	1.2549e+01	2.4127e-05	1.7755e-05	3.0190e-06	4.4390e-07	2.8148e-08	1.7187e-09	6.8498e-11
1.2549e+01	1.1478e+01	9.7058e-06	4.2297e-06	7.7273e-07	1.2364e-07	8.6856e-09	5.7644e-10	2.4824e-11
1.1478e+01	1.0500e+01	5.1329e-06	2.4500e-06	4.3302e-07	6.7750e-08	4.6800e-09	3.0815e-10	1.3240e-11
1.0500e+01	9.3140e+00	6.2921e-06	3.2340e-06	5.2661e-07	7.6268e-08	4.7880e-09	2.8992e-10	1.1471e-11
9.3140e+00	8.2610e+00	7.3556e-06	3.0005e-06	4.7245e-07	6.7389e-08	4.1624e-09	2.4848e-10	9.6938e-12
8.2610e+00	7.3280e+00	7.3581e-06	3.1903e-06	5.0064e-07	7.0442e-08	4.2475e-09	2.4767e-10	9.4670e-12
7.3280e+00	6.5000e+00	8.5329e-06	3.6727e-06	5.6768e-07	7.8600e-08	4.6404e-09	2.6600e-10	1.0030e-11
6.5000e+00	5.7570e+00	9.9238e-06	4.3274e-06	6.6968e-07	9.2381e-08	5.4165e-09	3.0872e-10	1.1589e-11
5.7570e+00	5.0990e+00	1.1850e-05	5.3344e-06	8.3363e-07	1.1527e-07	6.7562e-09	3.8472e-10	1.4431e-11
5.0990e+00	4.5160e+00	1.3817e-05	6.2822e-06	9.9330e-07	1.3820e-07	8.1399e-09	4.6495e-10	1.7483e-11
4.5160e+00	4.0000e+00	1.6041e-05	7.4455e-06	1.1967e-06	1.6803e-07	9.9687e-09	5.7180e-10	2.1559e-11
4.0000e+00	3.1620e+00	1.9706e-05	9.7212e-06	1.6551e-06	2.4187e-07	1.4880e-08	8.7155e-10	3.3288e-11
3.1620e+00	2.5000e+00	2.6724e-05	1.4459e-05	2.6837e-06	4.1702e-07	2.7276e-08	1.6643e-09	6.5449e-11
2.5000e+00	1.8710e+00	3.5970e-05	2.1507e-05	4.4215e-06	7.4411e-07	5.3157e-08	3.4719e-09	1.4453e-10
1.8710e+00	1.4000e+00	4.4646e-05	2.9137e-05	6.6743e-06	1.2313e-06	9.8107e-08	7.0221e-09	3.1867e-10
1.4000e+00	1.0580e+00	5.9779e-05	4.3330e-05	1.1584e-05	2.4636e-06	2.3676e-07	2.0292e-08	1.1235e-09
1.0580e+00	8.0000e-01	6.9393e-05	5.4729e-05	1.7128e-05	4.2474e-06	5.0262e-07	5.2810e-08	3.6812e-09
8.0000e-01	5.6600e-01	1.1012e-04	1.0116e-04	4.3261e-05	1.4847e-05	2.8168e-06	4.8480e-07	6.0679e-08
5.6600e-01	4.0000e-01	8.0114e-05	7.3541e-05	3.1901e-05	1.1127e-05	2.1619e-06	3.8043e-07	4.8638e-08
4.0000e-01	2.8300e-01	1.1347e-04	1.1315e-04	5.7813e-05	2.3304e-05	5.3625e-06	1.0823e-06	1.5666e-07
2.8300e-01	2.0000e-01	8.0139e-05	8.0472e-05	4.2530e-05	1.7826e-05	4.3209e-06	9.1142e-07	1.3721e-07
2.0000e-01	1.4100e-01	4.2884e-05	4.2081e-05	2.1741e-05	9.0555e-06	2.2004e-06	4.6703e-07	7.0832e-08
1.4100e-01	1.0000e-01	7.0882e-05	7.4961e-05	4.2575e-05	1.8862e-05	4.8733e-06	1.0829e-06	1.7074e-07
1.0000e-01	4.6500e-02	6.3793e-05	7.3077e-05	4.8218e-05	2.4243e-05	7.2350e-06	1.8077e-06	3.1736e-07
4.6500e-02	2.1500e-02	5.4351e-05	6.6188e-05	4.9488e-05	2.7856e-05	9.4940e-06	2.6464e-06	5.1377e-07
2.1500e-02	1.0000e-02	1.9042e-05	2.4028e-05	1.8733e-05	1.0917e-05	3.8635e-06	1.1086e-06	2.2054e-07
1.0000e-02	4.6500e-03	1.2482e-05	1.5865e-05	1.2585e-05	7.4391e-06	2.6729e-06	7.7602e-07	1.5583e-07
4.6500e-03	2.1500e-03	9.5969e-06	1.3209e-05	1.0715e-05	6.4407e-06	2.3566e-06	6.9381e-07	1.4091e-07
2.1500e-03	1.0000e-03	1.0402e-05	1.3795e-05	1.1497e-05	7.0662e-06	2.6504e-06	7.9541e-07	1.6415e-07
1.0000e-03	4.6500e-04	7.7516e-06	1.0394e-05	8.8546e-06	5.5505e-06	2.1289e-06	6.5016e-07	1.3615e-07
4.6500e-04	2.1500e-04	6.5527e-06	8.9532e-06	7.7429e-06	4.9210e-06	1.9175e-06	5.9295e-07	1.2544e-07
2.1500e-04	1.0000e-04	5.2123e-06	7.1972e-06	6.3275e-06	4.0843e-06	1.6207e-06	5.0835e-07	1.0885e-07
1.0000e-04	4.6500e-05	4.1673e-06	5.8297e-06	5.2017e-06	3.4058e-06	1.3747e-06	4.3701e-07	9.4653e-08
4.6500e-05	2.1500e-05	2.8098e-06	3.9703e-06	3.5828e-06	2.3716e-06	9.7007e-07	3.1160e-07	6.8105e-08
2.1500e-05	1.0000e-05	2.1178e-06	3.0289e-06	2.7672e-06	1.8541e-06	7.6985e-07	2.5022e-07	5.5260e-08
1.0000e-05	4.6500e-06	1.4842e-06	2.1484e-06	1.9846e-06	1.3444e-06	5.6571e-07	1.8587e-07	4.1440e-08
4.6500e-06	2.1500e-06	9.2824e-07	1.3588e-06	1.2673e-06	8.6658e-07	3.6892e-07	1.2237e-07	2.7513e-08
2.1500e-06	1.0000e-06	4.9954e-07	7.3897e-07	6.9467e-07	4.7867e-07	2.0574e-07	6.8804e-08	1.5575e-08
1.0000e-06	4.6500e-07	2.2439e-07	3.3514e-07	3.1708e-07	2.1984e-07	9.5241e-08	3.2060e-08	7.2977e-09
4.6500e-07	2.1500e-07	3.3572e-08	5.0239e-08	4.7627e-08	3.3085e-08	1.4369e-08	4.8467e-09	1.1052e-09
2.1500e-07	1.0000e-09	4.1956e-09	6.3467e-09	6.0296e-09	4.1972e-09	1.8275e-09	6.1779e-10	1.4113e-10

Table 3.8 Neutron spectra at the seven positions in the Assembly #2 calculated by MCNP.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.3407e-04	9.9763e-05	8.5418e-06	7.8074e-07	2.9377e-08	1.2386e-09	3.3127e-11
1.5248e+01	1.5012e+01	1.3384e-03	1.7382e-04	1.7669e-05	1.7988e-06	7.8510e-08	3.4844e-09	1.0493e-10
1.5012e+01	1.4779e+01	2.4187e-03	3.1765e-04	3.0447e-05	3.1231e-06	1.4263e-07	6.7255e-09	2.1318e-10
1.4779e+01	1.4550e+01	1.4340e-03	2.2562e-04	2.5697e-05	3.0586e-06	1.5482e-07	8.1270e-09	2.7572e-10
1.4550e+01	1.4324e+01	1.9482e-04	7.9493e-05	1.2145e-05	1.7218e-06	1.0772e-07	6.2214e-09	2.4645e-10
1.4324e+01	1.4102e+01	5.5919e-05	3.5720e-05	5.7814e-06	8.1764e-07	4.9928e-08	3.4245e-09	1.4662e-10
1.4102e+01	1.3883e+01	4.1305e-05	2.1177e-05	3.8823e-06	5.5245e-07	3.4541e-08	2.3456e-09	1.0118e-10
1.3883e+01	1.3668e+01	4.1522e-05	1.6508e-05	2.8790e-06	4.3468e-07	2.7978e-08	1.8575e-09	7.9357e-11
1.3668e+01	1.3456e+01	3.8185e-05	1.1155e-05	1.9975e-06	3.1041e-07	2.2767e-08	1.5670e-09	6.7862e-11
1.3456e+01	1.3248e+01	2.2495e-05	8.1705e-06	1.4157e-06	2.3328e-07	1.5777e-08	1.1740e-09	5.0087e-11
1.3248e+01	1.3042e+01	2.3744e-05	5.6615e-06	1.2916e-06	1.8253e-07	1.3897e-08	8.8791e-10	4.4679e-11
1.3042e+01	1.2840e+01	2.0344e-05	7.6092e-06	1.1053e-06	1.3572e-07	1.1173e-08	7.6026e-10	2.8537e-11
1.2840e+01	1.2641e+01	1.6754e-05	5.6525e-06	9.3015e-07	1.1893e-07	8.6902e-09	6.2214e-10	2.5892e-11
1.2641e+01	1.2445e+01	1.1474e-05	3.9253e-06	7.4651e-07	1.0962e-07	7.2822e-09	4.7653e-10	2.3144e-11
1.2445e+01	1.2252e+01	1.4496e-05	2.7155e-06	5.8100e-07	8.6805e-08	6.8902e-09	4.8031e-10	2.1900e-11
1.2252e+01	1.2062e+01	8.5247e-06	3.5832e-06	6.4621e-07	8.0306e-08	5.6671e-09	3.7410e-10	1.7966e-11
1.2062e+01	1.1875e+01	3.2990e-06	2.5800e-06	5.3658e-07	7.9415e-08	5.3743e-09	3.4372e-10	1.6286e-11
1.1875e+01	1.1691e+01	5.7035e-06	2.8933e-06	3.9042e-07	7.0676e-08	4.4762e-09	3.2588e-10	1.6703e-11
1.1691e+01	1.1510e+01	2.2249e-06	2.7432e-06	4.4090e-07	5.3067e-08	3.9297e-09	3.0761e-10	1.5057e-11
1.1510e+01	1.1331e+01	4.9735e-06	1.4036e-06	3.0075e-07	5.5076e-08	3.3717e-09	2.8855e-10	1.0373e-11
1.1331e+01	1.1156e+01	5.3931e-06	1.3948e-06	2.6875e-07	4.6598e-08	4.0075e-09	2.4109e-10	1.1071e-11
1.1156e+01	1.0983e+01	1.4741e-06	1.9403e-06	3.9934e-07	3.8630e-08	3.1557e-09	2.5838e-10	1.0177e-11
1.0983e+01	1.0812e+01	8.2157e-06	1.3348e-06	3.2322e-07	3.5890e-08	3.4824e-09	2.1190e-10	9.2929e-12
1.0812e+01	1.0645e+01	3.1669e-06	1.9266e-06	2.8496e-07	4.5323e-08	3.0813e-09	2.1437e-10	1.0858e-11
1.0645e+01	1.0480e+01	3.6880e-06	1.8266e-06	4.2935e-07	5.4248e-08	3.1557e-09	2.6039e-10	1.0519e-11
1.0480e+01	1.0317e+01	7.3381e-06	3.6158e-06	6.4130e-07	7.4915e-08	5.1210e-09	2.2411e-10	1.2099e-11
1.0317e+01	1.0157e+01	6.5022e-06	4.3111e-06	5.6557e-07	7.9873e-08	5.0261e-09	2.8388e-10	9.8340e-12
1.0157e+01	9.9999e+00	8.2905e-06	2.7658e-06	5.7707e-07	7.7297e-08	5.9585e-09	3.1279e-10	1.1861e-11
9.9999e+00	9.3940e+00	6.7289e-06	3.1612e-06	5.5678e-07	7.4838e-08	4.5321e-09	2.6844e-10	1.0030e-11
9.3940e+00	8.8249e+00	7.5981e-06	2.4085e-06	4.4221e-07	6.2485e-08	3.8546e-09	2.3857e-10	9.7258e-12
8.8249e+00	8.2902e+00	5.7118e-06	2.5158e-06	4.6849e-07	6.7190e-08	3.4909e-09	2.2506e-10	1.0705e-11
8.2902e+00	7.7879e+00	6.6959e-06	3.0519e-06	4.1971e-07	6.9925e-08	3.8765e-09	2.1561e-10	9.9683e-12
7.7879e+00	7.3161e+00	7.8455e-06	3.4986e-06	4.5387e-07	7.0063e-08	4.3132e-09	2.3272e-10	1.0630e-11
7.3161e+00	6.8728e+00	1.0457e-05	3.8948e-06	5.7296e-07	7.1483e-08	4.0205e-09	2.6230e-10	9.6235e-12
6.8728e+00	6.4564e+00	1.0642e-05	3.9372e-06	5.4341e-07	8.6078e-08	4.9766e-09	3.1209e-10	1.0857e-11
6.4564e+00	6.0652e+00	9.9119e-06	3.9216e-06	6.4369e-07	8.6548e-08	5.5369e-09	2.9455e-10	1.1121e-11
6.0652e+00	5.6978e+00	1.1717e-05	4.5174e-06	7.9285e-07	9.2175e-08	5.6969e-09	3.6077e-10	1.2740e-11
5.6978e+00	5.3525e+00	1.2225e-05	4.9987e-06	7.6158e-07	1.0614e-07	6.3392e-09	3.7029e-10	1.2890e-11
5.3525e+00	5.0282e+00	1.2258e-05	5.6241e-06	8.5711e-07	1.0969e-07	6.5183e-09	4.1723e-10	1.5296e-11
5.0282e+00	4.7236e+00	1.4051e-05	6.0068e-06	9.9748e-07	9.8193e-07	7.2420e-09	4.0924e-10	1.8791e-11
4.7236e+00	4.4374e+00	1.2991e-05	6.2351e-06	1.0272e-06	1.4729e-07	8.6230e-09	5.1532e-10	1.6829e-11
4.4374e+00	4.1686e+00	1.4257e-05	6.7893e-06	1.0676e-06	1.5902e-07	8.5567e-09	6.0251e-10	2.5078e-11
4.1686e+00	3.9160e+00	1.6122e-05	7.3660e-06	1.3174e-06	1.3452e-07	1.0284e-08	6.4817e-10	2.1485e-11
3.9160e+00	3.6787e+00	1.8994e-05	9.5202e-06	1.5530e-06	2.1309e-07	1.1760e-08	6.9762e-10	2.9396e-11
3.6787e+00	3.4559e+00	2.1664e-05	8.9525e-06	1.5976e-06	2.2056e-07	1.6244e-08	8.1807e-10	3.2871e-11
3.4559e+00	3.2465e+00	1.9133e-05	1.0106e-05	1.5379e-06	2.7877e-07	1.3940e-08	9.6502e-10	3.4469e-11
3.2465e+00	3.0498e+00	2.1436e-05	1.2177e-05	2.2364e-06	2.7657e-07	1.6584e-08	1.1995e-09	4.8802e-11
3.0498e+00	2.8650e+00	2.3566e-05	1.3886e-05	2.3965e-06	3.8221e-07	2.1682e-08	1.2919e-09	6.1380e-11
2.8650e+00	2.6914e+00	2.6620e-05	1.5003e-05	2.6702e-06	4.3491e-07	2.1100e-08	1.5505e-09	6.6546e-11
2.6914e+00	2.5284e+00	3.0397e-05	1.5305e-05	2.8841e-06	4.4764e-07	3.3058e-08	1.7933e-09	8.2614e-11
2.5284e+00	2.3752e+00	3.3212e-05	1.9503e-05	3.0387e-06	6.1892e-07	3.7816e-08	2.2780e-09	8.3637e-11
2.3752e+00	2.2313e+00	3.4941e-05	2.4653e-05	5.0661e-06	7.3642e-07	5.5985e-08	3.3475e-09	1.3635e-10
2.2313e+00	2.0961e+00	3.5936e-05	2.2422e-05	4.3339e-06	6.9558e-07	5.3353e-08	3.1692e-09	1.3554e-10
2.0961e+00	1.9691e+00	3.5454e-05	2.4167e-05	4.5920e-06	7.5050e-07	4.9555e-08	3.1144e-09	1.3980e-10
1.9691e+00	1.8498e+00	3.8880e-05	2.6708e-05	5.4434e-06	8.9242e-07	6.8841e-08	4.9353e-09	1.8653e-10
1.8498e+00	1.7377e+00	4.6508e-05	3.1175e-05	6.3653e-06	1.1053e-06	8.3514e-08	5.9893e-09	2.7978e-10
1.7377e+00	1.5335e+00	4.5809e-05	3.1160e-05	6.6025e-06	1.1705e-06	9.1455e-08	7.0852e-09	3.2947e-10
1.5335e+00	1.3533e+00	5.2147e-05	3.7706e-05	8.0648e-06	1.5357e-06	1.1348e-07	9.5217e-09	4.4238e-10
1.3533e+00	1.1943e+00	5.9503e-05	4.1157e-05	9.7088e-06	1.9589e-06	1.7880e-07	1.4061e-08	7.5168e-10
1.1943e+00	1.0540e+00	6.7004e-05	5.2016e-05	1.4292e-05	3.0620e-06	3.3864e-07	2.8422e-08	1.8143e-09
1.0540e+00	9.3013e-01	6.8855e-05	5.7991e-05	1.6966e-05	4.8720e-06	4.2252e-07	4.7854e-08	2.1554e-09
9.3013e-01	8.2084e-01	6.6809e-05	5.7494e-05	1.7123e-05	5.3771e-06	5.7641e-07	8.3663e-08	5.1069e-09
8.2084e-01	7.2438e-01	7.6942e-05	6.2756e-05	2.1328e-05	5.6886e-06	7.7951e-07	7.9831e-08	2.3261e-09

Table 3.8 Continued.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
7.2438e-01	6.3927e-01	1.1551e-04	1.0174e-04	3.7278e-05	1.1732e-05	1.7844e-06	1.2841e-07	1.8099e-08
6.3927e-01	5.6415e-01	1.1922e-04	1.1026e-04	4.4654e-05	1.6425e-05	2.9958e-06	3.6357e-07	3.1600e-08
5.6415e-01	4.9786e-01	1.0205e-04	9.9182e-05	4.5353e-05	1.5547e-05	2.7401e-06	4.0450e-07	3.4256e-08
4.9786e-01	4.3936e-01	9.0722e-05	8.9658e-05	3.9425e-05	1.4188e-05	2.4752e-06	3.3753e-07	3.1153e-08
4.3936e-01	3.8774e-01	8.0862e-05	7.7243e-05	3.7300e-05	1.3750e-05	2.1512e-06	3.3315e-07	5.8654e-08
3.8774e-01	3.4217e-01	1.2351e-04	1.2252e-04	6.1550e-05	2.2972e-05	5.1546e-06	7.9849e-07	1.1736e-07
3.4217e-01	3.0197e-01	1.1541e-04	1.2011e-04	6.5678e-05	2.5314e-05	5.8322e-06	9.2417e-07	1.1325e-07
3.0197e-01	2.6649e-01	1.0158e-04	1.1978e-04	6.0710e-05	2.9200e-05	6.4118e-06	1.3369e-06	2.0167e-07
2.6649e-01	2.3517e-01	9.1303e-05	9.9690e-05	5.1008e-05	2.6254e-05	6.6543e-06	1.3341e-06	1.6838e-07
2.3517e-01	2.0754e-01	7.5879e-05	8.2121e-05	4.7194e-05	1.7866e-05	5.4380e-06	1.2812e-06	1.8758e-07
2.0754e-01	1.8315e-01	5.8249e-05	7.0246e-05	4.0280e-05	1.4819e-05	4.3070e-06	9.0648e-07	1.4362e-07
1.8315e-01	1.6163e-01	8.3831e-05	8.8633e-05	4.9780e-05	2.2749e-05	7.0571e-06	1.4755e-06	2.2841e-07
1.6163e-01	1.4264e-01	6.0191e-05	6.6677e-05	3.6556e-05	1.7255e-05	4.6874e-06	9.6687e-07	1.9200e-07
1.4264e-01	1.2588e-01	9.6746e-05	1.0847e-04	6.3171e-05	3.2485e-05	1.0256e-05	2.2652e-06	3.9526e-07
1.2588e-01	1.1109e-01	7.7043e-05	9.9740e-05	5.6550e-05	3.0188e-05	9.1766e-06	2.1654e-06	3.7920e-07
1.1109e-01	9.8035e-02	5.0061e-05	5.5318e-05	3.4842e-05	1.7889e-05	6.2601e-06	1.5328e-06	2.3096e-07
9.8035e-02	8.6515e-02	4.2647e-05	4.9876e-05	3.4842e-05	1.6554e-05	5.3706e-06	1.5884e-06	2.7481e-07
8.6515e-02	7.6349e-02	7.1099e-05	9.1104e-05	5.6295e-05	3.1530e-05	1.0027e-05	2.9217e-06	5.0177e-07
7.6349e-02	6.7378e-02	4.9700e-05	6.4223e-05	4.0755e-05	2.4383e-05	8.1097e-06	2.1493e-06	4.1480e-07
6.7378e-02	5.9461e-02	4.0635e-05	5.1321e-05	3.4428e-05	1.7829e-05	6.7837e-06	1.9287e-06	4.0088e-07
5.9461e-02	5.2474e-02	4.1465e-05	4.7914e-05	3.7185e-05	2.2365e-05	7.4947e-06	2.3102e-06	4.5590e-07
5.2474e-02	4.6308e-02	2.9451e-05	3.1846e-05	2.7302e-05	1.5391e-05	5.0771e-06	1.5513e-06	3.7123e-07
4.6308e-02	4.0867e-02	3.7661e-05	4.7453e-05	3.3779e-05	1.9929e-05	7.4726e-06	1.9842e-06	3.6871e-07
4.0867e-02	3.6065e-02	2.9702e-05	3.8098e-05	2.5378e-05	1.5336e-05	5.6022e-06	1.6447e-06	3.0567e-07
3.6065e-02	3.1827e-02	2.0127e-05	2.4714e-05	1.9942e-05	1.2077e-05	4.2994e-06	1.2060e-06	2.2247e-07
3.1827e-02	2.8087e-02	8.9932e-06	8.6549e-06	8.1484e-06	4.5750e-06	2.0926e-06	4.1861e-07	1.0154e-07
2.8087e-02	2.4787e-02	2.4981e-05	3.4447e-05	2.6305e-05	1.4964e-05	6.2341e-06	1.5397e-06	3.3167e-07
2.4787e-02	2.1874e-02	4.8591e-05	5.9641e-05	4.9843e-05	3.1677e-05	1.3087e-05	3.5891e-06	7.8070e-07
2.1874e-02	1.9304e-02	2.8004e-05	3.8580e-05	3.0824e-05	1.8070e-05	7.5565e-06	2.4086e-06	4.5590e-07
1.9304e-02	1.5034e-02	1.3695e-05	1.7048e-05	1.5475e-05	9.1619e-06	4.0511e-06	1.2480e-06	2.7165e-07
1.5034e-02	1.1709e-02	1.1630e-05	1.4965e-05	1.2806e-05	8.6782e-06	2.7080e-06	1.0976e-06	2.1254e-07
1.1709e-02	9.1186e-03	1.4642e-05	1.8689e-05	1.7312e-05	1.0016e-05	4.0368e-06	1.2921e-06	2.7679e-07
9.1186e-03	7.1016e-03	6.7333e-06	7.8486e-06	7.6419e-06	5.5190e-06	2.1105e-06	5.9287e-07	1.2814e-07
7.1016e-03	5.5307e-03	6.9959e-06	1.0639e-05	8.5878e-06	6.0386e-06	2.3414e-06	7.9415e-07	1.8373e-07
5.5307e-03	4.3073e-03	9.1012e-06	1.3683e-05	9.1837e-06	6.0143e-06	2.6222e-06	9.2733e-07	2.0562e-07
4.3073e-03	3.3546e-03	8.8985e-06	1.0535e-05	1.2290e-05	6.1549e-06	2.7980e-06	9.3523e-07	2.1736e-07
3.3546e-03	2.6125e-03	9.7667e-06	1.5705e-05	1.5149e-05	8.0469e-06	3.7190e-06	1.2036e-06	2.6557e-07
2.6125e-03	2.0346e-03	7.2571e-06	1.0170e-05	1.1471e-05	5.6716e-06	2.7681e-06	7.8425e-07	2.1072e-07
2.0346e-03	1.5846e-03	1.0761e-05	1.5409e-05	1.3162e-05	8.2823e-06	3.9578e-06	1.2993e-06	2.5553e-07
1.5846e-03	1.2341e-03	1.0815e-05	1.6237e-05	1.5530e-05	9.3107e-06	3.7205e-06	1.2750e-06	2.8531e-07
1.2341e-03	9.6110e-04	6.7862e-06	1.1887e-05	1.0056e-05	7.5460e-06	3.0228e-06	1.0588e-06	2.3252e-07
9.6110e-04	5.8293e-04	7.9295e-06	1.0050e-05	9.9229e-06	6.7011e-06	2.6674e-06	9.8597e-07	2.1583e-07
5.8293e-04	3.5357e-04	5.7331e-06	7.8664e-06	7.6237e-06	5.0150e-06	2.2471e-06	7.7669e-07	1.7877e-07
3.5357e-04	2.1445e-04	4.0961e-06	5.5480e-06	5.8536e-06	3.9378e-06	1.7700e-06	5.4960e-07	1.3916e-07
2.1445e-04	1.3007e-04	6.4449e-06	6.4615e-06	6.6654e-06	4.3566e-06	2.0235e-06	6.7448e-07	1.6688e-07
1.3007e-04	7.8891e-05	4.1621e-06	5.6947e-06	5.8801e-06	4.3178e-06	1.8349e-06	6.9354e-07	1.5439e-07
7.8891e-05	4.7850e-05	4.2085e-06	4.4778e-06	5.3306e-06	3.4020e-06	1.7697e-06	5.5208e-07	1.2966e-07
4.7850e-05	2.9023e-05	2.4180e-06	3.3304e-06	2.8468e-06	2.2318e-06	1.1262e-06	3.1931e-07	8.7872e-08
2.9023e-05	1.7603e-05	1.8687e-06	3.1032e-06	3.8731e-06	2.1946e-06	7.4914e-07	3.4081e-07	7.8539e-08
1.7603e-05	1.0677e-05	1.4452e-06	2.5761e-06	2.8725e-06	1.7225e-06	6.8668e-07	2.6783e-07	7.6900e-08
1.0677e-05	6.4758e-06	1.1945e-06	2.0816e-06	1.9339e-06	1.6596e-06	6.2156e-07	2.5685e-07	5.9206e-08
6.4758e-06	3.9278e-06	9.5396e-07	1.5507e-06	1.4699e-06	1.1304e-06	5.0036e-07	1.9554e-07	4.8623e-08
3.9278e-06	2.3823e-06	8.1439e-07	1.1059e-06	1.1141e-06	7.6974e-07	3.5674e-07	1.3957e-07	3.5760e-08
2.3823e-06	1.4449e-06	3.6881e-07	7.7637e-07	6.7889e-07	5.2295e-07	2.5908e-07	9.3985e-08	2.4113e-08
1.4449e-06	8.7640e-07	3.6410e-07	3.6564e-07	4.4595e-07	3.0874e-07	1.5258e-07	5.9077e-08	1.4512e-08
8.7640e-07	5.3156e-07	5.3596e-08	2.2340e-07	2.0013e-07	1.4660e-07	7.8252e-08	2.8142e-08	7.5591e-09
5.3156e-07	3.2241e-07	6.0012e-09	7.4322e-08	7.7567e-08	5.3357e-08	3.6582e-08	1.3094e-08	3.1285e-09
3.2241e-07	1.0010e-11	2.0263e-09	2.0692e-09	1.6691e-09	1.1738e-09	7.4126e-10	3.0329e-10	6.6903e-11

Table 3.9 Neutron spectra at the seven positions in the Assembly #2 calculated by DOT with JSSTD L library of 125 neutron groups.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.5645e-04	1.0512e-04	9.1466e-06	8.7429e-07	3.4623e-08	1.4324e-09	3.9729e-11
1.5248e+01	1.5012e+01	1.3339e-03	1.8043e-04	1.7697e-05	1.8945e-06	8.5845e-08	3.9771e-09	1.2174e-10
1.5012e+01	1.4779e+01	2.4228e-03	3.2963e-04	3.1974e-05	3.3766e-06	1.5328e-07	7.2462e-09	2.2786e-10
1.4779e+01	1.4550e+01	1.3996e-03	2.2954e-04	2.5854e-05	3.0694e-06	1.5785e-07	8.1418e-09	2.7445e-10
1.4550e+01	1.4324e+01	2.4860e-04	7.7978e-05	1.1814e-05	1.6596e-06	1.0129e-07	5.9196e-09	2.2258e-10
1.4324e+01	1.4102e+01	1.0545e-04	3.7423e-05	5.8678e-06	8.8315e-07	5.9307e-08	3.7731e-09	1.5452e-10
1.4102e+01	1.3883e+01	7.3550e-05	2.6535e-05	4.0019e-06	5.9162e-07	3.9871e-08	2.6000e-09	1.1086e-10
1.3883e+01	1.3668e+01	5.4980e-05	2.0117e-05	3.2019e-06	4.7346e-07	3.1235e-08	1.9993e-09	8.4087e-11
1.3668e+01	1.3456e+01	1.6651e-05	1.1575e-05	2.2236e-06	3.5272e-07	2.4260e-08	1.5809e-09	6.7043e-11
1.3456e+01	1.3248e+01	9.9588e-06	7.3878e-06	1.5257e-06	2.5518e-07	1.8343e-08	1.2270e-09	5.3083e-11
1.3248e+01	1.3042e+01	1.5918e-05	6.2498e-06	1.1787e-06	1.9483e-07	1.4163e-08	9.6262e-10	4.2364e-11
1.3042e+01	1.2840e+01	1.9518e-05	5.6553e-06	9.6860e-07	1.5542e-07	1.1183e-08	7.6264e-10	3.3909e-11
1.2840e+01	1.2641e+01	1.8143e-05	5.0468e-06	8.3372e-07	1.3007e-07	9.1737e-09	6.2046e-10	2.7527e-11
1.2641e+01	1.2445e+01	1.5540e-05	4.4982e-06	7.3535e-07	1.1315e-07	7.8475e-09	5.2415e-10	2.3058e-11
1.2445e+01	1.2252e+01	1.1021e-05	3.7936e-06	6.3783e-07	9.8243e-08	6.7362e-09	4.4411e-10	1.9305e-11
1.2252e+01	1.2062e+01	7.3556e-06	3.1890e-06	5.5947e-07	8.7247e-08	5.9804e-09	3.9107e-10	1.6807e-11
1.2062e+01	1.1875e+01	6.1823e-06	2.8912e-06	5.1417e-07	8.0312e-08	5.4817e-09	3.5568e-10	1.5113e-11
1.1875e+01	1.1691e+01	5.9355e-06	2.6847e-06	4.7129e-07	7.3367e-08	4.9950e-09	3.2315e-10	1.3668e-11
1.1691e+01	1.1510e+01	5.5920e-06	2.4858e-06	4.3179e-07	6.6966e-08	4.5508e-09	2.9425e-10	1.2438e-11
1.1510e+01	1.1331e+01	5.2666e-06	2.2206e-06	3.8441e-07	5.9715e-08	4.0736e-09	2.6437e-10	1.1214e-11
1.1331e+01	1.1156e+01	5.1312e-06	2.0663e-06	3.5235e-07	5.4345e-08	3.6925e-09	2.3951e-10	1.0174e-11
1.1156e+01	1.0983e+01	5.1008e-06	2.1185e-06	3.5188e-07	5.2971e-08	3.5069e-09	2.2349e-10	9.3734e-12
1.0983e+01	1.0812e+01	4.8549e-06	2.2725e-06	3.7378e-07	5.5150e-08	3.5615e-09	2.2227e-10	9.1450e-12
1.0812e+01	1.0645e+01	4.8570e-06	2.6409e-06	4.2944e-07	6.2067e-08	3.8925e-09	2.3656e-10	9.4801e-12
1.0645e+01	1.0480e+01	5.0258e-06	3.0477e-06	4.9463e-07	7.0601e-08	4.3302e-09	2.5723e-10	1.0057e-11
1.0480e+01	1.0317e+01	5.1397e-06	3.4725e-06	5.6189e-07	7.9601e-08	4.8175e-09	2.8204e-10	1.0838e-11
1.0317e+01	1.0157e+01	5.7101e-06	3.7606e-06	6.0746e-07	8.6371e-08	5.2385e-09	3.0616e-10	1.1697e-11
1.0157e+01	9.9999e+00	7.3086e-06	4.1017e-06	6.5887e-07	9.3885e-08	5.7165e-09	3.3499e-10	1.2806e-11
9.9999e+00	9.3940e+00	8.0057e-06	3.3058e-06	5.3426e-07	7.7712e-08	4.8478e-09	2.8946e-10	1.1268e-11
9.3940e+00	8.8249e+00	6.9392e-06	2.7590e-06	4.4805e-07	6.5281e-08	4.0819e-09	2.4467e-10	9.5858e-12
8.8249e+00	8.2902e+00	6.9813e-06	2.9125e-06	4.6062e-07	6.5452e-08	3.9746e-09	2.3328e-10	8.9914e-12
8.2902e+00	7.7879e+00	7.1623e-06	3.1191e-06	4.9014e-07	6.8799e-08	4.1053e-09	2.3756e-10	9.0472e-12
7.7879e+00	7.3161e+00	7.7064e-06	3.3770e-06	5.2717e-07	7.3285e-08	4.3165e-09	2.4725e-10	9.3328e-12
7.3161e+00	6.8728e+00	8.4611e-06	3.6680e-06	5.6974e-07	7.8723e-08	4.6004e-09	2.6200e-10	9.8457e-12
6.8728e+00	6.4564e+00	9.2972e-06	4.0352e-06	6.2620e-07	8.6266e-08	5.0235e-09	2.8557e-10	1.0722e-11
6.4564e+00	6.0652e+00	9.9826e-06	4.3701e-06	6.7910e-07	9.3447e-08	5.4319e-09	3.0841e-10	1.1570e-11
6.0652e+00	5.6978e+00	1.0758e-05	4.7462e-06	7.3966e-07	1.0184e-07	5.9213e-09	3.3634e-10	1.2624e-11
5.6978e+00	5.3525e+00	1.1530e-05	5.1728e-06	8.1079e-07	1.1186e-07	6.5122e-09	3.7018e-10	1.3903e-11
5.3525e+00	5.0282e+00	1.2496e-05	5.6288e-06	8.8429e-07	1.2204e-07	7.1070e-09	4.0421e-10	1.5192e-11
5.0282e+00	4.7236e+00	1.3580e-05	6.1412e-06	9.7266e-07	1.3491e-07	7.8882e-09	4.4958e-10	1.6919e-11
4.7236e+00	4.4374e+00	1.4746e-05	6.7224e-06	1.0728e-06	1.4934e-07	8.7534e-09	4.9962e-10	1.8824e-11
4.4374e+00	4.1686e+00	1.5808e-05	7.2728e-06	1.1739e-06	1.6464e-07	9.7081e-09	5.5567e-10	2.0971e-11
4.1686e+00	3.9160e+00	1.6911e-05	7.9205e-06	1.2918e-06	1.8226e-07	1.0801e-08	6.1999e-10	2.3441e-11
3.9160e+00	3.6787e+00	1.8226e-05	8.7198e-06	1.4477e-06	2.0673e-07	1.2373e-08	7.1358e-10	2.7049e-11
3.6787e+00	3.4559e+00	1.9564e-05	9.5010e-06	1.6011e-06	2.3118e-07	1.3978e-08	8.1052e-10	3.0818e-11
3.4559e+00	3.2465e+00	2.1276e-05	1.0628e-05	1.8373e-06	2.7007e-07	1.6587e-08	9.6969e-10	3.7040e-11
3.2465e+00	3.0498e+00	2.3101e-05	1.1859e-05	2.0873e-06	3.1052e-07	1.9279e-08	1.1343e-09	4.3499e-11
3.0498e+00	2.8650e+00	2.5224e-05	1.3369e-05	2.4231e-06	3.6791e-07	2.3277e-08	1.3843e-09	5.3443e-11
2.8650e+00	2.6914e+00	2.7427e-05	1.4873e-05	2.7421e-06	4.2144e-07	2.6989e-08	1.6178e-09	6.2798e-11
2.6914e+00	2.5284e+00	2.9257e-05	1.6153e-05	2.9926e-06	4.6076e-07	2.9572e-08	1.7766e-09	6.9098e-11
2.5284e+00	2.3752e+00	3.2307e-05	1.8584e-05	3.5633e-06	5.6048e-07	3.6632e-08	2.2236e-09	8.7050e-11
2.3752e+00	2.2313e+00	3.7024e-05	2.2302e-05	4.5083e-06	7.4128e-07	5.0775e-08	3.1785e-09	1.2709e-10
2.2313e+00	2.0961e+00	3.7121e-05	2.2610e-05	4.6197e-06	7.6802e-07	5.3375e-08	3.3815e-09	1.3654e-10
2.0961e+00	1.9691e+00	3.8417e-05	2.3482e-05	4.7888e-06	7.9611e-07	5.5499e-08	3.5321e-09	1.4329e-10
1.9691e+00	1.8498e+00	4.0173e-05	2.5075e-05	5.2355e-06	8.8599e-07	6.2956e-08	4.0635e-09	1.6676e-10
1.8498e+00	1.7377e+00	4.4289e-05	2.8759e-05	6.3085e-06	1.1124e-06	8.2784e-08	5.5338e-09	2.3381e-10
1.7377e+00	1.5335e+00	4.4607e-05	2.9394e-05	6.5333e-06	1.1637e-06	8.7733e-08	5.9381e-09	2.5413e-10
1.5335e+00	1.3533e+00	5.1797e-05	3.5984e-05	8.6006e-06	1.6248e-06	1.3096e-07	9.3464e-09	4.1938e-10
1.3533e+00	1.1943e+00	5.9958e-05	4.3674e-05	1.1223e-05	2.2591e-06	1.9676e-07	1.5017e-08	7.1912e-10
1.1943e+00	1.0540e+00	6.3715e-05	4.8121e-05	1.3209e-05	2.8422e-06	2.7101e-07	2.2519e-08	1.1788e-09
1.0540e+00	9.3013e-01	7.1453e-05	5.7095e-05	1.7390e-05	4.1422e-06	4.5325e-07	4.3014e-08	2.6057e-09
9.3013e-01	8.2084e-01	7.1127e-05	5.7978e-05	1.8664e-05	4.7038e-06	5.5637e-07	5.6919e-08	3.7424e-09
8.2084e-01	7.2438e-01	8.1123e-05	6.7532e-05	2.2346e-05	5.7530e-06	7.0113e-07	7.4046e-08	5.0507e-09

Table 3.9 Continued.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
7.2438e-01	6.3927e-01	1.1893e-04	1.0933e-04	4.3319e-05	1.3186e-05	1.9938e-06	2.5780e-07	2.1991e-08
6.3927e-01	5.6415e-01	1.1017e-04	1.0498e-04	4.5893e-05	1.5469e-05	2.6822e-06	3.9412e-07	3.8485e-08
5.6415e-01	4.9786e-01	9.4772e-05	8.9826e-05	4.0021e-05	1.3877e-05	2.5153e-06	3.8590e-07	3.9381e-08
4.9786e-01	4.3936e-01	9.1439e-05	8.7364e-05	3.9567e-05	1.4006e-05	2.6215e-06	4.1497e-07	4.3714e-08
4.3936e-01	3.8774e-01	8.2026e-05	7.8072e-05	3.5246e-05	1.2540e-05	2.3819e-06	3.8346e-07	4.1131e-08
3.8774e-01	3.4217e-01	1.4714e-04	1.4935e-04	7.5696e-05	2.9539e-05	6.2519e-06	1.1078e-06	1.3123e-07
3.4217e-01	3.0197e-01	1.5472e-04	1.6348e-04	9.1067e-05	3.8821e-05	9.1706e-06	1.7937e-06	2.3543e-07
3.0197e-01	2.6649e-01	1.0760e-04	1.1353e-04	6.5150e-05	2.8946e-05	7.2517e-06	1.4980e-06	2.0792e-07
2.6649e-01	2.3517e-01	7.6190e-05	7.8616e-05	4.4636e-05	2.0000e-05	5.1202e-06	1.0823e-06	1.5386e-07
2.3517e-01	2.0754e-01	8.0527e-05	8.3374e-05	4.7267e-05	2.1341e-05	5.5648e-06	1.1997e-06	1.7411e-07
2.0754e-01	1.8315e-01	6.1806e-05	6.4000e-05	3.6089e-05	1.6319e-05	4.2922e-06	9.3490e-07	1.3721e-07
1.8315e-01	1.6163e-01	8.2209e-05	8.6796e-05	5.0005e-05	2.2930e-05	6.1608e-06	1.3722e-06	2.0619e-07
1.6163e-01	1.4264e-01	4.1684e-05	4.3336e-05	2.5888e-05	1.1221e-05	3.0171e-06	6.7452e-07	1.0185e-07
1.4264e-01	1.2588e-01	1.2634e-04	1.4083e-04	8.6130e-05	4.1149e-05	1.1626e-05	2.7180e-06	4.2970e-07
1.2588e-01	1.1109e-01	7.6974e-05	8.6618e-05	5.5180e-05	2.7163e-05	7.9289e-06	1.9082e-06	3.1076e-07
1.1109e-01	9.8035e-02	4.2215e-05	4.6794e-05	2.9856e-05	1.4770e-05	4.3438e-06	1.0533e-06	1.7294e-07
9.8035e-02	8.6515e-02	5.0295e-05	5.6812e-05	3.6681e-05	1.8333e-05	5.4570e-06	1.3375e-06	2.2202e-07
8.6515e-02	7.6349e-02	1.0632e-04	1.2463e-04	8.6234e-05	4.5502e-05	1.4368e-05	3.7043e-06	6.4756e-07
7.6349e-02	6.7378e-02	6.4515e-05	7.6282e-05	5.4327e-05	2.9390e-05	9.5404e-06	2.5171e-06	4.5023e-07
6.7378e-02	5.9461e-02	5.1147e-05	6.1845e-05	4.4855e-05	2.4662e-05	8.1539e-06	2.1843e-06	3.9661e-07
5.9461e-02	5.2474e-02	3.5574e-05	4.2861e-05	3.1455e-05	1.7502e-05	5.8690e-06	1.5910e-06	2.9229e-07
5.2474e-02	4.6308e-02	4.3649e-05	5.3468e-05	3.9652e-05	2.2304e-05	7.5808e-06	2.0790e-06	3.8634e-07
4.6308e-02	4.0867e-02	3.5841e-05	4.4265e-05	3.3194e-05	1.8882e-05	6.5088e-06	1.8067e-06	3.3975e-07
4.0867e-02	3.6065e-02	2.6334e-05	3.2615e-05	2.4614e-05	1.4094e-05	4.8985e-06	1.3692e-06	2.5923e-07
3.6065e-02	3.1827e-02	1.8821e-05	2.3239e-05	1.7607e-05	1.0120e-05	3.5329e-06	9.9112e-07	1.8832e-07
3.1827e-02	2.8087e-02	5.6570e-06	6.9317e-06	5.2453e-06	3.0147e-06	1.0526e-06	2.9539e-07	5.6136e-08
2.8087e-02	2.4787e-02	7.0790e-05	8.8053e-05	6.8716e-05	4.0465e-05	1.4521e-05	4.1685e-06	8.0941e-07
2.4787e-02	2.1874e-02	4.3399e-05	5.4922e-05	4.4340e-05	2.6963e-05	1.0057e-05	2.9838e-06	5.9859e-07
2.1874e-02	1.9304e-02	2.5752e-05	3.3052e-05	2.7033e-05	1.6633e-05	6.2904e-06	1.8879e-06	3.8293e-07
1.9304e-02	1.5034e-02	8.3814e-06	1.0652e-05	8.7374e-06	5.3950e-06	2.0493e-06	6.1727e-07	1.2565e-07
1.5034e-02	1.1709e-02	1.3232e-05	1.7286e-05	1.4267e-05	8.8600e-06	3.3891e-06	1.0266e-06	2.1012e-07
1.1709e-02	9.1186e-03	1.2695e-05	1.7001e-05	1.4147e-05	8.8453e-06	3.4111e-06	1.0403e-06	2.1430e-07
9.1186e-03	7.1016e-03	7.1550e-06	9.7517e-06	8.1285e-06	5.0909e-06	1.9673e-06	6.0092e-07	1.2399e-07
7.1016e-03	5.5307e-03	7.8934e-06	1.0508e-05	8.7902e-06	5.5214e-06	2.1411e-06	6.5588e-07	1.3569e-07
5.5307e-03	4.3073e-03	9.3170e-06	1.2434e-05	1.0458e-05	6.5966e-06	2.5710e-06	7.9076e-07	1.6423e-07
4.3073e-03	3.3546e-03	1.1735e-05	1.5924e-05	1.3489e-05	8.5556e-06	3.3565e-06	1.0379e-06	2.1665e-07
3.3546e-03	2.6125e-03	1.0872e-05	1.5364e-05	1.3141e-05	8.3947e-06	3.3216e-06	1.0344e-06	2.1735e-07
2.6125e-03	2.0346e-03	9.3943e-06	1.3658e-05	1.1754e-05	7.5429e-06	3.0013e-06	9.3891e-07	1.9813e-07
2.0346e-03	1.5846e-03	1.1677e-05	1.6161e-05	1.4063e-05	9.1001e-06	3.6569e-06	1.1536e-06	2.4530e-07
1.5846e-03	1.2341e-03	1.1324e-05	1.5556e-05	1.3688e-05	8.9362e-06	3.6294e-06	1.1552e-06	2.4768e-07
1.2341e-03	9.6110e-04	9.0197e-06	1.2528e-05	1.1106e-05	7.2961e-06	2.9858e-06	9.5638e-07	2.0625e-07
9.6110e-04	5.8293e-04	7.7297e-06	1.0840e-05	9.7538e-06	6.4943e-06	2.7009e-06	8.7744e-07	1.9165e-07
5.8293e-04	3.5357e-04	3.8047e-06	5.7094e-06	5.1763e-06	3.4681e-06	1.4534e-06	4.7520e-07	1.0442e-07
3.5357e-04	2.1445e-04	5.6710e-06	8.1306e-06	7.4387e-06	5.0237e-06	2.1260e-06	7.0093e-07	1.5518e-07
2.1445e-04	1.3007e-04	4.2566e-06	6.0935e-06	5.6256e-06	3.8307e-06	1.6376e-06	5.4461e-07	1.2154e-07
1.3007e-04	7.8891e-05	4.3444e-06	6.2850e-06	5.8597e-06	4.0274e-06	1.7417e-06	5.8503e-07	1.3177e-07
7.8891e-05	4.7850e-05	3.7306e-06	5.4436e-06	5.1205e-06	3.5497e-06	1.5517e-06	5.2605e-07	1.1951e-07
4.7850e-05	2.9023e-05	2.6441e-06	3.8806e-06	3.6746e-06	2.5640e-06	1.1300e-06	3.8576e-07	8.8217e-08
2.9023e-05	1.7603e-05	2.2546e-06	3.3349e-06	3.1835e-06	2.2394e-06	9.9689e-07	3.4333e-07	7.9168e-08
1.7603e-05	1.0677e-05	1.8490e-06	2.7577e-06	2.6522e-06	1.8799e-06	8.4469e-07	2.9332e-07	6.8168e-08
1.0677e-05	6.4758e-06	1.4731e-06	2.2154e-06	2.1459e-06	1.5318e-06	6.9445e-07	2.4306e-07	5.6915e-08
6.4758e-06	3.9278e-06	1.1210e-06	1.7001e-06	1.6576e-06	1.1910e-06	5.4449e-07	1.9201e-07	4.5280e-08
3.9278e-06	2.3823e-06	8.0638e-07	1.2329e-06	1.2095e-06	8.7428e-07	4.0281e-07	1.4305e-07	3.3955e-08
2.3823e-06	1.4449e-06	5.4616e-07	8.3484e-07	8.1943e-07	5.9502e-07	2.7603e-07	9.8665e-08	2.3559e-08
1.4449e-06	8.7640e-07	3.5517e-07	5.2865e-07	5.1005e-07	3.7066e-07	1.7290e-07	6.2155e-08	1.4920e-08
8.7640e-07	5.3156e-07	2.0707e-07	3.0370e-07	2.8893e-07	2.1010e-07	9.8494e-08	3.5584e-08	8.5832e-09
5.3156e-07	3.2241e-07	1.0589e-07	1.5479e-07	1.4611e-07	1.0637e-07	5.0084e-08	1.8173e-08	4.4025e-09
3.2241e-07	1.0010e-11	1.5068e-09	2.1813e-09	2.0355e-09	1.4804e-09	6.9822e-10	2.5389e-10	6.1621e-11

Table 3.10 Neutron spectra at the seven positions in the Assembly #2 calculated by DOT with FUSION-J3 library of 125 neutron groups.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5488e+01	1.5248e+01	8.5644e-04	1.0502e-04	9.1268e-06	8.7135e-07	3.4447e-08	1.4227e-09	3.9382e-11
1.5248e+01	1.5012e+01	1.3339e-03	1.8033e-04	1.7673e-05	1.8908e-06	8.5536e-08	3.9574e-09	1.2095e-10
1.5012e+01	1.4779e+01	2.4228e-03	3.2941e-04	3.1923e-05	3.3681e-06	1.5269e-07	7.2082e-09	2.2630e-10
1.4779e+01	1.4550e+01	1.3988e-03	2.2927e-04	2.5788e-05	3.0577e-06	1.5698e-07	8.0821e-09	2.7188e-10
1.4550e+01	1.4324e+01	2.4851e-04	7.7941e-05	1.1793e-05	1.6545e-06	1.0078e-07	5.8789e-09	2.2056e-10
1.4324e+01	1.4102e+01	1.0543e-04	3.7427e-05	5.8617e-06	8.8106e-07	5.9054e-08	3.7500e-09	1.5324e-10
1.4102e+01	1.3883e+01	7.3426e-05	2.6535e-05	3.9992e-06	5.9062e-07	3.9683e-08	2.5732e-09	1.0873e-10
1.3883e+01	1.3668e+01	5.4970e-05	2.0132e-05	3.2037e-06	4.7337e-07	3.1180e-08	1.9906e-09	8.3325e-11
1.3668e+01	1.3456e+01	1.6397e-05	1.1540e-05	2.2165e-06	3.5137e-07	2.4143e-08	1.5711e-09	6.6479e-11
1.3456e+01	1.3248e+01	9.8869e-06	7.3655e-06	1.5234e-06	2.5427e-07	1.8147e-08	1.2039e-09	5.1646e-11
1.3248e+01	1.3042e+01	1.5881e-05	6.2434e-06	1.1775e-06	1.9445e-07	1.4094e-08	9.5334e-10	4.1671e-11
1.3042e+01	1.2840e+01	1.9508e-05	5.6524e-06	9.6789e-07	1.5499e-07	1.1131e-08	7.5714e-10	3.3491e-11
1.2840e+01	1.2641e+01	1.8161e-05	5.0439e-06	8.3272e-07	1.2981e-07	9.1402e-09	6.1682e-10	2.7274e-11
1.2641e+01	1.2445e+01	1.5571e-05	4.4971e-06	7.3451e-07	1.1292e-07	7.8181e-09	5.2098e-10	2.2842e-11
1.2445e+01	1.2252e+01	1.1050e-05	3.7923e-06	6.3682e-07	9.7981e-08	6.7056e-09	4.4099e-10	1.9101e-11
1.2252e+01	1.2062e+01	7.3955e-06	3.1947e-06	5.5977e-07	8.7199e-08	5.9667e-09	3.8931e-10	1.6665e-11
1.2062e+01	1.1875e+01	6.2094e-06	2.8899e-06	5.1321e-07	8.0072e-08	5.4562e-09	3.5331e-10	1.4968e-11
1.1875e+01	1.1691e+01	5.9674e-06	2.6882e-06	4.7125e-07	7.3277e-08	4.9805e-09	3.2157e-10	1.3562e-11
1.1691e+01	1.1510e+01	5.6174e-06	2.4885e-06	4.3170e-07	6.6878e-08	4.5376e-09	2.9284e-10	1.2345e-11
1.1510e+01	1.1331e+01	5.3042e-06	2.2280e-06	3.8520e-07	5.9770e-08	4.0707e-09	2.6368e-10	1.1155e-11
1.1331e+01	1.1156e+01	5.1457e-06	2.0618e-06	3.5114e-07	5.4100e-08	3.6698e-09	2.3759e-10	1.0065e-11
1.1156e+01	1.0983e+01	5.1194e-06	2.1192e-06	3.5172e-07	5.2904e-08	3.4975e-09	2.2250e-10	9.3079e-12
1.0983e+01	1.0812e+01	4.8659e-06	2.2722e-06	3.7339e-07	5.5046e-08	3.5501e-09	2.2119e-10	9.0800e-12
1.0812e+01	1.0645e+01	4.8571e-06	2.6384e-06	4.2858e-07	6.1883e-08	3.8753e-09	2.3512e-10	9.4020e-12
1.0645e+01	1.0480e+01	5.0219e-06	3.0471e-06	4.9419e-07	7.0476e-08	4.3164e-09	2.5598e-10	9.9878e-12
1.0480e+01	1.0317e+01	5.1509e-06	3.4699e-06	5.6093e-07	7.9388e-08	4.7976e-09	2.8041e-10	1.0753e-11
1.0317e+01	1.0157e+01	5.7570e-06	3.7616e-06	6.0666e-07	8.6152e-08	5.2166e-09	3.0435e-10	1.1603e-11
1.0157e+01	9.9999e+00	7.3691e-06	4.1074e-06	6.5868e-07	9.3734e-08	5.6971e-09	3.3324e-10	1.2711e-11
9.9999e+00	9.3940e+00	8.0375e-06	3.3092e-06	5.3424e-07	7.7634e-08	4.8356e-09	2.8823e-10	1.1194e-11
9.3940e+00	8.8249e+00	6.9647e-06	2.7603e-06	4.4769e-07	6.5153e-08	4.0666e-09	2.4325e-10	9.5032e-12
8.8249e+00	8.2902e+00	6.9927e-06	2.9123e-06	4.6017e-07	6.5319e-08	3.9596e-09	2.3191e-10	8.9131e-12
8.2902e+00	7.7879e+00	7.1632e-06	3.1178e-06	4.8956e-07	6.8655e-08	4.0902e-09	2.3623e-10	8.9722e-12
7.7879e+00	7.3161e+00	7.7037e-06	3.3754e-06	5.2663e-07	7.3135e-08	4.2971e-09	2.4542e-10	9.2341e-12
7.3161e+00	6.8728e+00	8.4627e-06	3.6665e-06	5.6902e-07	7.8546e-08	4.5820e-09	2.6039e-10	9.7579e-12
6.8728e+00	6.4564e+00	9.2994e-06	4.0323e-06	6.2513e-07	8.6026e-08	5.0008e-09	2.8370e-10	1.0623e-11
6.4564e+00	6.0652e+00	9.9844e-06	4.3654e-06	6.7746e-07	9.3097e-08	5.4012e-09	3.0602e-10	1.1449e-11
6.0652e+00	5.6978e+00	1.0756e-05	4.7419e-06	7.3827e-07	1.0153e-07	5.8932e-09	3.3406e-10	1.2504e-11
5.6978e+00	5.3525e+00	1.1520e-05	5.1695e-06	8.0960e-07	1.1158e-07	6.4848e-09	3.6788e-10	1.3779e-11
5.3525e+00	5.0282e+00	1.2481e-05	5.6247e-06	8.8292e-07	1.2172e-07	7.0767e-09	4.0168e-10	1.5055e-11
5.0282e+00	4.7236e+00	1.3555e-05	6.1345e-06	9.7077e-07	1.3450e-07	7.8510e-09	4.4656e-10	1.6761e-11
4.7236e+00	4.4374e+00	1.4700e-05	6.7136e-06	1.0705e-06	1.4893e-07	8.7218e-09	4.9705e-10	1.8680e-11
4.4374e+00	4.1686e+00	1.5750e-05	7.2575e-06	1.1700e-06	1.6388e-07	9.6455e-09	5.5102e-10	2.0740e-11
4.1686e+00	3.9160e+00	1.6877e-05	7.9148e-06	1.2896e-06	1.8172e-07	1.0749e-08	6.1573e-10	2.3216e-11
3.9160e+00	3.6787e+00	1.8194e-05	8.7087e-06	1.4440e-06	2.0589e-07	1.2296e-08	7.0763e-10	2.6748e-11
3.6787e+00	3.4559e+00	1.9520e-05	9.4826e-06	1.5955e-06	2.2998e-07	1.3873e-08	8.0257e-10	3.0427e-11
3.4559e+00	3.2465e+00	2.1237e-05	1.0614e-05	1.8317e-06	2.6873e-07	1.6461e-08	9.5996e-10	3.6559e-11
3.2465e+00	3.0498e+00	2.3033e-05	1.1839e-05	2.0801e-06	3.0880e-07	1.9119e-08	1.1219e-09	4.2890e-11
3.0498e+00	2.8650e+00	2.5150e-05	1.3339e-05	2.4124e-06	3.6535e-07	2.3035e-08	1.3657e-09	5.2545e-11
2.8650e+00	2.6914e+00	2.7368e-05	1.4854e-05	2.7331e-06	4.1903e-07	2.6743e-08	1.5980e-09	6.1803e-11
2.6914e+00	2.5284e+00	2.9123e-05	1.6076e-05	2.9683e-06	4.5542e-07	2.9104e-08	1.7422e-09	6.7483e-11
2.5284e+00	2.3752e+00	3.2188e-05	1.8499e-05	3.5306e-06	5.5268e-07	3.5915e-08	2.1701e-09	8.4561e-11
2.3752e+00	2.2313e+00	3.6909e-05	2.2208e-05	4.4637e-06	7.2925e-07	4.9532e-08	3.0790e-09	1.2230e-10
2.2313e+00	2.0961e+00	3.7168e-05	2.2627e-05	4.6036e-06	7.6129e-07	5.2508e-08	3.3041e-09	1.3253e-10
2.0961e+00	1.9691e+00	3.8358e-05	2.3403e-05	4.7492e-06	7.8504e-07	5.4296e-08	3.4311e-09	1.3822e-10
1.9691e+00	1.8498e+00	3.9821e-05	2.4696e-05	5.0981e-06	8.5310e-07	5.9772e-08	3.8137e-09	1.5487e-10
1.8498e+00	1.7377e+00	4.4380e-05	2.8723e-05	6.2364e-06	1.0868e-06	7.9572e-08	5.2424e-09	2.1844e-10
1.7377e+00	1.5335e+00	4.4519e-05	2.9219e-05	6.4208e-06	1.1286e-06	8.3544e-08	5.5619e-09	2.3421e-10
1.5335e+00	1.3533e+00	5.1706e-05	3.5725e-05	8.4064e-06	1.5587e-06	1.2223e-07	8.4978e-09	3.7126e-10
1.3533e+00	1.1943e+00	5.9798e-05	4.3204e-05	1.0863e-05	2.1301e-06	1.7847e-07	1.3112e-08	6.0282e-10
1.1943e+00	1.0540e+00	6.3785e-05	4.7793e-05	1.2827e-05	2.6811e-06	2.4425e-07	1.9347e-08	9.5904e-10
1.0540e+00	9.3013e-01	7.1688e-05	5.6652e-05	1.6758e-05	3.8408e-06	3.9475e-07	3.4980e-08	1.9516e-09
9.3013e-01	8.2084e-01	7.1587e-05	5.7949e-05	1.8166e-05	4.4118e-06	4.9032e-07	4.6779e-08	2.8235e-09
8.2084e-01	7.2438e-01	8.0197e-05	6.6145e-05	2.1213e-05	5.2362e-06	5.9636e-07	5.8448e-08	3.6386e-09

Table 3.10 Continued.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
7.2438e-01	6.3927e-01	1.1610e-04	1.0472e-04	3.9221e-05	1.1100e-05	1.4936e-06	1.6983e-07	1.2365e-08
6.3927e-01	5.6415e-01	1.0987e-04	1.0290e-04	4.2579e-05	1.3330e-05	2.0484e-06	2.6336e-07	2.1840e-08
5.6415e-01	4.9786e-01	9.6273e-05	9.0131e-05	3.8290e-05	1.2395e-05	1.9990e-06	2.6885e-07	2.3332e-08
4.9786e-01	4.3936e-01	9.3678e-05	8.8455e-05	3.8426e-05	1.2765e-05	2.1362e-06	2.9733e-07	2.6705e-08
4.3936e-01	3.8774e-01	8.3212e-05	7.8355e-05	3.4039e-05	1.1403e-05	1.9423e-06	2.7537e-07	2.5210e-08
3.8774e-01	3.4217e-01	1.4227e-04	1.4122e-04	6.7224e-05	2.4186e-05	4.4801e-06	6.8371e-07	6.7434e-08
3.4217e-01	3.0197e-01	1.5400e-04	1.5879e-04	8.2167e-05	3.1848e-05	6.4586e-06	1.0679e-06	1.1429e-07
3.0197e-01	2.6649e-01	1.0825e-04	1.1157e-04	5.9488e-05	2.3955e-05	5.1179e-06	8.8734e-07	9.9661e-08
2.6649e-01	2.3517e-01	8.2212e-05	8.3436e-05	8.2212e-05	8.3436e-05	1.8211e-05	3.9951e-06	8.1983e-08
2.3517e-01	2.0754e-01	8.3081e-05	8.4602e-05	4.5249e-05	1.8697e-05	4.1836e-06	7.5917e-07	8.9356e-08
2.0754e-01	1.8315e-01	5.9671e-05	6.0602e-05	3.2176e-05	1.3314e-05	3.0012e-06	5.4927e-07	6.5244e-08
1.8315e-01	1.6163e-01	8.3245e-05	8.5905e-05	4.6439e-05	1.9479e-05	4.4820e-06	8.3721e-07	1.0158e-07
1.6163e-01	1.4264e-01	4.4376e-05	4.5235e-05	2.4184e-05	1.0119e-05	2.3338e-06	4.7291e-07	5.3413e-08
1.4264e-01	1.2588e-01	1.0333e-04	1.1027e-04	6.1014e-05	2.6057e-05	6.1594e-06	1.1816e-06	1.4735e-07
1.2588e-01	1.1109e-01	8.7300e-05	9.4909e-05	5.5195e-05	2.4368e-05	5.9766e-06	1.1846e-06	1.5268e-07
1.1109e-01	9.8035e-02	4.8140e-05	5.1839e-05	3.0358e-05	1.3495e-05	3.3402e-06	6.6784e-07	8.6855e-08
9.8035e-02	8.6515e-02	5.7587e-05	6.3332e-05	3.7689e-05	1.6954e-05	4.2535e-06	8.6066e-07	1.1328e-07
8.6515e-02	7.6349e-02	9.2087e-05	1.0367e-04	6.3801e-05	2.9368e-05	7.5492e-06	1.5594e-06	2.0946e-07
7.6349e-02	6.7378e-02	7.3003e-05	8.2458e-05	5.2267e-05	2.4593e-05	6.4702e-06	1.3628e-06	1.8661e-07
6.7378e-02	5.9461e-02	6.4683e-05	7.4541e-05	4.8497e-05	2.3282e-05	6.2565e-06	1.3412e-06	1.8687e-07
5.9461e-02	5.2474e-02	4.4298e-05	5.0975e-05	3.3761e-05	1.6457e-05	4.4962e-06	9.7725e-07	1.1328e-07
5.2474e-02	4.6308e-02	5.2875e-05	6.1937e-05	4.1578e-05	2.0518e-05	5.6834e-06	1.2497e-06	1.7855e-07
4.6308e-02	4.0867e-02	4.5497e-05	5.3848e-05	3.6798e-05	1.8454e-05	5.2050e-06	1.1620e-06	1.6853e-07
4.0867e-02	3.6065e-02	3.3592e-05	3.9882e-05	2.7539e-05	1.3943e-05	3.9753e-06	8.9535e-07	1.3099e-07
3.6065e-02	3.1827e-02	2.3610e-05	2.7900e-05	1.9372e-05	9.8584e-06	2.8262e-06	6.3937e-07	9.3942e-08
3.1827e-02	2.8087e-02	5.8521e-06	6.7811e-06	4.7034e-06	2.3932e-06	6.8612e-07	1.5524e-07	2.2812e-08
2.8087e-02	2.4787e-02	6.4499e-05	7.8000e-05	5.4517e-05	2.7917e-05	8.0596e-06	1.8335e-06	2.7088e-07
2.4787e-02	2.1874e-02	5.6668e-05	6.8251e-05	4.9907e-05	2.6674e-05	8.0952e-06	1.9215e-06	2.9626e-07
2.1874e-02	1.9304e-02	3.4099e-05	4.1432e-05	3.0813e-05	1.6726e-05	5.1663e-06	1.2440e-06	1.9449e-07
1.9304e-02	1.5034e-02	9.4721e-06	1.1195e-05	8.3497e-06	4.5478e-06	1.4103e-06	3.4068e-07	5.3426e-08
1.5034e-02	1.1709e-02	1.7305e-05	2.1281e-05	1.6004e-05	8.7846e-06	2.7488e-06	6.6877e-07	1.0561e-07
1.1709e-02	9.1186e-03	1.6533e-05	2.0901e-05	1.5881e-05	8.7985e-06	2.7830e-06	6.8302e-07	1.0877e-07
9.1186e-03	7.1016e-03	9.1414e-06	1.1714e-05	8.9191e-06	4.9517e-06	1.5700e-06	3.8604e-07	6.1590e-08
7.1016e-03	5.5307e-03	1.0117e-05	1.2693e-05	9.7045e-06	5.4077e-06	1.7220e-06	4.2483e-07	6.8001e-08
5.5307e-03	4.3073e-03	1.2261e-05	1.5441e-05	1.1883e-05	6.6584e-06	2.1340e-06	5.2920e-07	8.5126e-08
4.3073e-03	3.3546e-03	1.5341e-05	1.9659e-05	1.5258e-05	8.6110e-06	2.7831e-06	6.9478e-07	1.1248e-07
3.3546e-03	2.6125e-03	1.4146e-05	1.8947e-05	1.4873e-05	8.4729e-06	2.7687e-06	6.9734e-07	1.1385e-07
2.6125e-03	2.0346e-03	1.2181e-05	1.6777e-05	1.3262e-05	7.5997e-06	2.5009e-06	6.3342e-07	1.0397e-07
2.0346e-03	1.5846e-03	1.5062e-05	1.9707e-05	1.5779e-05	9.1384e-06	3.0454e-06	7.7939e-07	1.2919e-07
1.5846e-03	1.2341e-03	1.4713e-05	1.9074e-05	1.5475e-05	9.0669e-06	3.0641e-06	7.9327e-07	1.3293e-07
1.2341e-03	9.6110e-04	9.4111e-06	1.2348e-05	1.0083e-05	5.9428e-06	2.0227e-06	5.2674e-07	8.8752e-08
9.6110e-04	5.8293e-04	8.2511e-06	1.0878e-05	9.0402e-06	5.4216e-06	1.8852e-06	4.9990e-07	8.5682e-08
5.8293e-04	3.5357e-04	3.6068e-06	5.1928e-06	4.3484e-06	2.6264e-06	9.2122e-07	2.4605e-07	4.2460e-08
3.5357e-04	2.1445e-04	5.5779e-06	7.6729e-06	6.4753e-06	3.9410e-06	1.3958e-06	3.7573e-07	6.5335e-08
2.1445e-04	1.3007e-04	3.8822e-06	5.2783e-06	4.4996e-06	2.7647e-06	9.9087e-07	2.6942e-07	4.7292e-08
1.3007e-04	7.8891e-05	4.2791e-06	5.8877e-06	5.0810e-06	3.1596e-06	1.1497e-06	3.1667e-07	5.6270e-08
7.8891e-05	4.7850e-05	3.6863e-06	5.1073e-06	4.4561e-06	2.8017e-06	1.0339e-06	2.8821e-07	5.1799e-08
4.7850e-05	2.9023e-05	2.2034e-06	3.0492e-06	2.6780e-06	1.6952e-06	6.3078e-07	1.7712e-07	3.2053e-08
2.9023e-05	1.7603e-05	1.8666e-06	2.6036e-06	2.3090e-06	1.4766e-06	5.5659e-07	1.5808e-07	2.8916e-08
1.7603e-05	1.0677e-05	1.5161e-06	2.1317e-06	1.9074e-06	1.2312e-06	4.6973e-07	1.3486e-07	2.4917e-08
1.0677e-05	6.4758e-06	1.1932e-06	1.6915e-06	1.5261e-06	9.9372e-07	3.8351e-07	1.1124e-07	2.0753e-08
6.4758e-06	3.9278e-06	8.9834e-07	1.2836e-06	1.1670e-06	7.6613e-07	2.9887e-07	8.7545e-08	1.6481e-08
3.9278e-06	2.3823e-06	6.3746e-07	9.1779e-07	8.4031e-07	5.5581e-07	2.1899e-07	6.4732e-08	1.2290e-08
2.3823e-06	1.4449e-06	4.2923e-07	6.1625e-07	5.6407e-07	3.7515e-07	1.4913e-07	4.4443e-08	8.5043e-09
1.4449e-06	8.7640e-07	2.8269e-07	3.9255e-07	3.5092e-07	2.3347e-07	9.3459e-08	2.8052e-08	5.4063e-09
8.7640e-07	5.3156e-07	1.6628e-07	2.2653e-07	1.9866e-07	1.3221e-07	5.3247e-08	1.6084e-08	3.1198e-09
5.3156e-07	3.2241e-07	8.5438e-08	1.1576e-07	1.0042e-07	6.6887e-08	2.7085e-08	8.2281e-09	1.6048e-09
3.2241e-07	1.0010e-11	1.2137e-09	1.6064e-09	1.3697e-09	9.1053e-10	3.6942e-10	1.1250e-10	2.1998e-11

Table 3.11 Neutron spectra at the seven positions in the Assembly #2 calculated by DOT with JSSTD library of 42 neutron groups.

Energy [MeV]		Flux / lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5000e+01	1.3720e+01	1.1071e-03	1.6095e-04	1.6669e-05	1.8574e-06	9.0569e-08	4.6075e-09	1.5980e-10
1.3720e+01	1.2549e+01	2.1989e-05	1.7608e-05	2.9417e-06	4.2662e-07	2.6541e-08	1.5829e-09	6.1215e-11
1.2549e+01	1.1478e+01	6.2589e-06	3.9428e-06	7.4998e-07	1.2000e-07	8.2108e-09	5.2381e-10	2.1498e-11
1.1478e+01	1.0500e+01	3.3423e-06	2.1556e-06	3.9253e-07	6.1040e-08	4.0633e-09	2.5502e-10	1.0396e-11
1.0500e+01	9.3140e+00	4.4052e-06	3.0029e-06	4.9788e-07	7.0924e-08	4.2349e-09	2.4337e-10	9.1993e-12
9.3140e+00	8.2610e+00	5.2077e-06	2.7824e-06	4.4757e-07	6.2600e-08	3.6687e-09	2.0846e-10	7.7976e-12
8.2610e+00	7.3280e+00	5.0314e-06	2.9057e-06	4.6651e-07	6.4294e-08	3.6927e-09	2.0702e-10	7.6634e-12
7.3280e+00	6.5000e+00	6.0179e-06	3.4548e-06	5.4603e-07	7.3992e-08	4.1740e-09	2.3145e-10	8.4946e-12
6.5000e+00	5.7570e+00	6.9477e-06	4.0946e-06	6.4856e-07	8.7663e-08	4.9270e-09	2.7252e-10	9.9795e-12
5.7570e+00	5.0990e+00	7.8687e-06	4.8642e-06	7.7870e-07	1.0564e-07	5.9488e-09	3.2934e-10	1.2061e-11
5.0990e+00	4.5160e+00	9.1866e-06	5.8001e-06	9.4158e-07	1.2878e-07	7.3003e-09	4.0554e-10	1.4884e-11
4.5160e+00	4.0000e+00	1.0495e-05	6.8447e-06	1.1314e-06	1.5640e-07	8.9404e-09	4.9851e-10	1.8335e-11
4.0000e+00	3.1620e+00	1.2530e-05	8.8871e-06	1.5675e-06	2.2691e-07	1.3494e-08	7.6687e-10	2.8524e-11
3.1620e+00	2.5000e+00	1.5633e-05	1.2743e-05	2.4625e-06	3.8308e-07	2.4519e-08	1.4574e-09	5.5776e-11
2.5000e+00	1.8710e+00	1.9566e-05	1.8537e-05	3.9773e-06	6.7148e-07	4.7084e-08	2.9930e-09	1.2076e-10
1.8710e+00	1.4000e+00	2.2616e-05	2.4378e-05	5.8326e-06	1.0767e-06	8.3958e-08	5.8287e-09	2.5496e-10
1.4000e+00	1.0580e+00	2.7482e-05	3.4510e-05	9.6227e-06	2.0305e-06	1.8790e-07	1.5275e-08	7.8848e-10
1.0580e+00	8.0000e-01	2.8728e-05	4.1177e-05	1.3489e-05	3.3035e-06	3.7230e-07	3.6538e-08	2.3197e-09
8.0000e-01	5.6600e-01	3.4600e-05	6.4701e-05	2.8619e-05	9.3282e-06	1.5703e-06	2.3312e-07	2.4219e-08
5.6600e-01	4.0000e-01	2.3063e-05	4.7682e-05	2.1860e-05	7.3571e-06	1.2905e-06	1.9843e-07	2.1267e-08
4.0000e-01	2.8300e-01	2.6196e-05	6.4107e-05	3.5128e-05	1.3581e-05	2.7780e-06	4.8234e-07	5.7617e-08
2.8300e-01	2.0000e-01	1.6702e-05	4.4970e-05	2.5758e-05	1.0420e-05	2.2572e-06	4.1072e-07	5.1134e-08
2.0000e-01	1.4100e-01	7.7210e-06	2.2360e-05	1.2295e-05	4.9172e-06	1.0641e-06	1.9439e-07	2.4330e-08
1.4100e-01	1.0000e-01	1.1656e-05	3.8329e-05	2.3866e-05	1.0191e-05	2.3440e-06	4.4727e-07	5.8047e-08
1.0000e-01	4.6500e-02	6.6517e-06	3.2178e-05	2.4456e-05	1.1897e-05	3.1142e-06	6.5451e-07	9.2335e-08
4.6500e-02	2.1500e-02	3.3519e-06	2.9854e-05	2.6311e-05	1.3989e-05	3.9749e-06	8.8515e-07	1.3085e-07
2.1500e-02	1.0000e-02	1.2628e-06	1.1161e-05	1.0720e-05	6.0191e-06	1.7978e-06	4.1404e-07	6.2879e-08
1.0000e-02	4.6500e-03	5.7917e-07	7.0816e-06	7.0808e-06	4.0743e-06	1.2443e-06	2.9074e-07	4.4668e-08
4.6500e-03	2.1500e-03	4.6888e-07	5.3917e-06	5.6246e-06	3.3275e-06	1.0426e-06	2.4774e-07	3.8571e-08
2.1500e-03	1.0000e-03	4.6760e-07	4.8918e-06	5.3449e-06	3.2711e-06	1.0586e-06	2.5706e-07	4.0718e-08
1.0000e-03	4.6500e-04	3.3179e-07	3.5261e-06	4.0357e-06	2.5658e-06	8.6256e-07	2.1499e-07	3.4773e-08
4.6500e-04	2.1500e-04	1.8604e-07	2.7955e-06	3.2869e-06	2.1345e-06	7.3319e-07	1.8540e-07	3.0338e-08
2.1500e-04	1.0000e-04	1.7103e-07	2.1321e-06	2.5885e-06	1.7303e-06	6.1265e-07	1.5824e-07	2.6337e-08
1.0000e-04	4.6500e-05	1.3174e-07	1.6718e-06	2.0878e-06	1.4343e-06	5.2303e-07	1.3798e-07	2.3359e-08
4.6500e-05	2.1500e-05	6.9785e-08	9.3736e-07	1.1912e-06	8.3232e-07	3.0918e-07	8.2666e-08	1.4143e-08
2.1500e-05	1.0000e-05	5.2076e-08	6.8804e-07	8.9335e-07	6.3821e-07	2.4312e-07	6.6239e-08	1.1503e-08
1.0000e-05	4.6500e-06	3.5043e-08	4.6970e-07	6.2108e-07	4.5241e-07	1.7630e-07	4.8867e-08	8.6031e-09
4.6500e-06	2.1500e-06	2.1024e-08	2.8606e-07	3.8401e-07	2.8440e-07	1.1305e-07	3.1813e-08	5.6696e-09
2.1500e-06	1.0000e-06	1.6289e-08	1.6397e-07	2.0865e-07	1.5519e-07	6.2610e-08	1.7836e-08	3.2119e-09
1.0000e-06	4.6500e-07	9.8975e-09	8.1361e-08	9.5682e-08	7.0960e-08	2.8927e-08	8.3219e-09	1.5114e-09
4.6500e-07	2.1500e-07	1.6642e-09	1.2705e-08	1.4406e-08	1.0651e-08	4.3545e-09	1.2565e-09	2.2879e-10
2.1500e-07	1.0000e-09	1.7736e-10	1.5936e-09	1.7859e-09	1.3210e-09	5.4209e-10	1.5692e-10	2.8653e-11

Table 3.12 Neutron spectra at the seven positions in the Assembly #2 calculated by DOT
with FUSION-40 library of 42 neutron groups.

Energy [MeV]		Flux / Lethargy / Source Neutron						
Upper	Lower	-10 mm	102 mm	229 mm	356 mm	533 mm	711 mm	914 mm
1.5000e+01	1.3720e+01	1.1274e-03	1.6229e-04	1.6800e-05	1.8857e-06	9.3441e-08	4.8403e-09	1.7156e-10
1.3720e+01	1.2549e+01	2.3958e-05	1.7629e-05	2.9934e-06	4.3972e-07	2.7702e-08	1.6685e-09	6.5223e-11
1.2549e+01	1.1478e+01	1.0116e-05	4.4349e-06	8.0818e-07	1.2879e-07	8.9214e-09	5.7882e-10	2.4200e-11
1.1478e+01	1.0500e+01	5.0701e-06	2.3939e-06	4.2218e-07	6.5774e-08	4.4667e-09	2.8677e-10	1.1968e-11
1.0500e+01	9.3140e+00	6.2361e-06	3.1995e-06	5.2110e-07	7.5112e-08	4.6185e-09	3.7258e-10	1.0561e-11
9.3140e+00	8.2610e+00	7.3727e-06	2.9947e-06	4.7135e-07	6.6684e-08	4.0132e-09	2.3323e-10	8.9261e-12
8.2610e+00	7.3280e+00	7.2481e-06	3.1316e-06	4.9120e-07	6.8475e-08	4.0314e-09	2.3052e-10	8.7224e-12
7.3280e+00	6.5000e+00	8.5961e-06	3.7043e-06	5.7290e-07	7.8598e-08	4.5424e-09	2.5663e-10	9.6316e-12
6.5000e+00	5.7570e+00	1.0065e-05	4.3945e-06	6.8026e-07	9.2992e-08	5.3465e-09	3.0097e-10	1.1267e-11
5.7570e+00	5.0990e+00	1.1651e-05	5.2341e-06	8.1746e-07	1.1199e-07	6.4374e-09	3.6211e-10	1.3548e-11
5.0990e+00	4.5160e+00	1.3758e-05	6.2630e-06	9.9022e-07	1.3660e-07	7.8979e-09	4.4567e-10	1.6705e-11
4.5160e+00	4.0000e+00	1.5958e-05	7.4211e-06	1.1924e-06	1.6605e-07	9.6750e-09	5.4804e-10	2.0582e-11
4.0000e+00	3.1620e+00	1.9752e-05	9.7621e-06	1.6634e-06	2.4179e-07	1.4660e-08	8.4830e-10	3.2208e-11
3.1620e+00	2.5000e+00	2.6437e-05	1.4328e-05	2.6676e-06	4.1200e-07	2.6407e-08	1.5801e-09	6.1274e-11
2.5000e+00	1.8710e+00	3.5757e-05	2.1395e-05	4.3956e-06	7.3226e-07	5.0951e-08	3.2338e-09	1.3105e-10
1.8710e+00	1.4000e+00	4.4468e-05	2.8933e-05	6.5893e-06	1.2015e-06	9.3023e-08	6.4308e-09	2.8096e-10
1.4000e+00	1.0580e+00	5.9507e-05	4.2818e-05	9.5077e-06	1.6344e-06	2.1533e-07	1.7416e-08	8.9568e-10
1.0580e+00	8.0000e-01	6.9031e-05	5.3990e-05	1.6533e-05	3.9792e-06	4.4441e-07	4.3366e-08	2.7409e-09
8.0000e-01	5.6600e-01	1.0827e-04	9.7347e-05	3.9238e-05	1.2464e-05	2.0748e-06	3.0671e-07	3.1718e-08
5.6600e-01	4.0000e-01	8.1180e-05	7.3590e-05	3.0526e-05	9.9636e-06	1.7197e-06	2.6274e-07	2.8042e-08
4.0000e-01	2.8300e-01	1.1258e-04	1.0974e-04	5.2446e-05	1.9337e-05	3.8424e-06	6.5830e-07	7.8057e-08
2.8300e-01	2.0000e-01	8.0997e-05	7.9697e-05	3.9496e-05	1.5155e-05	3.1701e-06	5.6684e-07	6.9845e-08
2.0000e-01	1.4100e-01	4.0600e-05	3.8849e-05	1.8767e-05	7.1508e-06	1.4964e-06	2.6862e-07	3.3270e-08
1.4100e-01	1.0000e-01	7.0428e-05	7.2165e-05	3.7817e-05	1.5175e-05	3.3462e-06	6.2459e-07	7.9974e-08
1.0000e-01	4.6500e-02	6.5090e-05	7.0702e-05	4.1443e-05	1.8295e-05	4.4895e-06	9.1271e-07	1.2615e-07
4.6500e-02	2.1500e-02	6.5450e-05	7.4497e-05	4.7497e-05	2.2342e-05	5.8600e-06	1.2525e-06	1.8060e-07
2.1500e-02	1.0000e-02	2.5808e-05	3.0046e-05	2.0168e-05	9.8599e-06	2.6894e-06	5.9167e-07	8.7393e-08
1.0000e-02	4.6500e-03	1.6961e-05	1.9796e-05	1.3576e-05	6.7505e-06	1.8732e-06	4.1727e-07	6.2269e-08
4.6500e-03	2.1500e-03	1.1967e-05	1.5650e-05	1.1025e-05	5.5886e-06	1.5818e-06	3.5744e-07	5.3976e-08
2.1500e-03	1.0000e-03	1.2114e-05	1.4835e-05	1.0767e-05	5.5897e-06	1.6221e-06	3.7333e-07	5.7240e-08
1.0000e-03	4.6500e-04	9.1493e-06	1.1217e-05	8.3902e-06	4.4760e-06	1.3378e-06	3.1470e-07	4.9148e-08
4.6500e-04	2.1500e-04	7.1980e-06	9.1552e-06	6.9571e-06	3.7681e-06	1.1452e-06	2.7267e-07	4.3026e-08
2.1500e-04	1.0000e-04	5.6723e-06	7.2328e-06	5.6175e-06	3.1066e-06	9.6663e-07	2.3426e-07	3.7520e-08
1.0000e-04	4.6500e-05	4.5389e-06	5.8576e-06	4.6414e-06	2.6182e-06	8.3369e-07	2.0560e-07	3.3424e-08
4.6500e-05	2.1500e-05	2.5869e-06	3.3508e-06	2.6881e-06	1.5355e-06	4.9604e-07	1.2368e-07	2.0295e-08
2.1500e-05	1.0000e-05	1.9256e-06	2.5234e-06	2.0569e-06	1.1948e-06	3.9366e-07	9.9682e-08	1.6572e-08
1.0000e-05	4.6500e-06	1.3288e-06	1.7614e-06	1.4562e-06	8.5847e-07	2.8790e-07	7.3942e-08	1.2440e-08
4.6500e-06	2.1500e-06	8.1601e-07	1.0933e-06	9.1477e-07	5.4612e-07	1.8601e-07	4.8376e-08	8.2243e-09
2.1500e-06	1.0000e-06	4.5529e-07	6.0295e-07	5.0039e-07	3.0069e-07	1.0365e-07	2.7235e-08	4.6719e-09
1.0000e-06	4.6500e-07	2.1645e-07	2.8164e-07	2.2966e-07	1.3836e-07	4.8133e-08	1.2751e-08	2.2034e-09
4.6500e-07	2.1500e-07	3.3334e-08	4.2759e-08	3.4538e-08	2.0807e-08	7.2566e-09	1.9272e-09	3.3379e-10
2.1500e-07	1.0000e-09	4.1085e-09	5.3191e-09	4.2872e-09	2.5865e-09	9.0486e-10	2.4097e-10	4.1833e-11

Table 3.13 Measured and calculated integral neutron fluxes and C/E ratios in the Assembly #1.

Energy Range	Position [mm]	Expt.	Error (+, -) [%]	Calculation						Calc. / Expt.					
				MNFP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MNFP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42		
>10MeV	-10.0	9.625e-05	7.0	1.019e-04	1.018e-04	1.018e-04	1.019e-04	1.018e-04	1.018e-04	1.059	1.058	1.058	1.058	1.058	1.058
	100.6	1.777e-05	7.3	1.653e-05	1.675e-05	1.674e-05	1.667e-05	1.662e-05	1.662e-05	0.930	0.943	0.942	0.938	0.935	0.935
	227.1	2.156e-06	8.3	1.837e-06	1.912e-06	1.908e-06	1.886e-06	1.876e-06	1.876e-06	0.852	0.887	0.885	0.875	0.870	0.870
	354.6	2.667e-07	8.9	2.183e-07	2.302e-07	2.296e-07	2.249e-07	2.235e-07	2.235e-07	0.819	0.863	0.861	0.843	0.838	0.838
	531.4	1.434e-08	11.4	1.182e-08	1.230e-08	1.224e-08	1.183e-08	1.175e-08	1.175e-08	0.824	0.857	0.853	0.825	0.819	0.819
	710.2	8.171e-10	12.1	6.588e-10	6.689e-10	6.654e-10	6.360e-10	6.339e-10	6.339e-10	0.806	0.819	0.814	0.778	0.776	0.776
	911.9	4.115e-11	34.7	2.506e-11	2.429e-11	2.415e-11	2.295e-11	2.302e-11	2.302e-11	0.609	0.590	0.587	0.558	0.559	0.559
	-10.0	1.318e-05	44.8	1.801e-05	1.784e-05	1.778e-05	1.760e-05	1.757e-05	1.757e-05	1.367	1.353	1.349	1.335	1.333	1.333
	100.6	1.213e-05	11.8	1.305e-05	1.336e-05	1.334e-05	1.329e-05	1.328e-05	1.328e-05	1.077	1.102	1.100	1.096	1.095	1.095
	227.1	2.390e-06	8.8	2.457e-06	2.487e-06	2.476e-06	2.510e-06	2.498e-06	2.498e-06	1.028	1.040	1.036	1.050	1.045	1.045
354.6	3.700e-07	7.9	3.672e-07	3.786e-07	3.755e-07	3.890e-07	3.851e-07	3.851e-07	0.992	1.023	1.015	1.052	1.041	1.041	
531.4	2.745e-08	7.3	2.366e-08	2.394e-08	2.361e-08	2.518e-08	2.475e-08	2.475e-08	0.862	0.872	0.860	0.917	0.901	0.901	
710.2	3.211e-09	6.8	1.540e-09	1.423e-09	1.397e-09	1.524e-09	1.489e-09	1.489e-09	0.480	0.443	0.435	0.475	0.464	0.464	
911.9	1.477e-09	4.9	6.186e-11	5.462e-11	5.355e-11	5.939e-11	5.785e-11	5.785e-11	0.042	0.037	0.036	0.040	0.039	0.039	
0.1-1MeV	-10.0	7.228e-05	5.0	5.394e-05	5.291e-05	5.156e-05	4.464e-05	4.335e-05	4.335e-05	0.746	0.732	0.713	0.618	0.600	0.600
	100.6	1.165e-04	5.0	1.186e-04	1.200e-04	1.217e-04	9.964e-05	1.003e-04	1.003e-04	1.018	1.030	1.044	0.855	0.861	0.861
	227.1	6.672e-05	5.0	6.437e-05	6.845e-05	6.574e-05	5.463e-05	5.193e-05	5.193e-05	0.965	1.026	0.985	0.819	0.778	0.778
	354.6	2.963e-05	5.0	2.635e-05	2.933e-05	2.587e-05	2.236e-05	1.953e-05	1.953e-05	0.889	0.990	0.873	0.755	0.659	0.659
	531.4	8.253e-06	5.0	7.098e-06	7.236e-06	5.474e-06	5.224e-06	3.937e-06	3.937e-06	0.860	0.877	0.663	0.633	0.477	0.477
	710.2	2.072e-06	5.0	1.567e-06	1.523e-06	9.624e-07	1.073e-06	6.829e-07	6.829e-07	0.756	0.735	0.464	0.518	0.330	0.330
	911.9	4.127e-07	5.0	2.518e-07	2.207e-07	1.115e-07	1.587e-07	8.204e-08	8.204e-08	0.610	0.535	0.270	0.385	0.199	0.199
	-10.0	8.269e-06	5.0	6.182e-06	7.412e-06	7.644e-06	9.076e-06	8.646e-06	8.646e-06	0.748	0.896	0.924	1.098	1.046	1.046
	100.6	2.958e-05	5.0	3.196e-05	3.602e-05	4.308e-05	4.703e-05	5.621e-05	5.621e-05	1.081	1.218	1.457	1.590	1.900	1.900
	227.1	2.721e-05	5.0	2.916e-05	3.518e-05	3.847e-05	4.445e-05	4.723e-05	4.723e-05	1.072	1.293	1.414	1.634	1.736	1.736
354.6	1.741e-05	5.0	1.911e-05	2.247e-05	2.157e-05	2.702e-05	2.451e-05	2.451e-05	1.098	1.290	1.239	1.552	1.408	1.408	
531.4	7.316e-06	5.0	7.885e-06	8.521e-06	6.651e-06	9.606e-06	6.827e-06	6.827e-06	1.078	1.165	0.909	1.313	0.933	0.933	
710.2	2.509e-06	5.0	2.513e-06	2.523e-06	1.575e-06	2.723e-06	1.501e-06	1.501e-06	1.002	1.006	0.628	1.085	0.598	0.598	
911.9	6.313e-07	5.0	5.243e-07	5.009e-07	2.398e-07	5.323e-07	2.198e-07	2.198e-07	0.831	0.793	0.380	0.843	0.348	0.348	

Table 3.14 Measured and calculated integral neutron fluxes and C/E ratios in the Assembly #2.

Energy Range	Position [mm]	Expt.	Error (+, -) [%]	Calculation						Calc. / Expt.				
				MCNP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	
>10MeV	-10.0	9.027e-05	6.7	6.7	1.027e-04	1.043e-04	1.043e-04	1.044e-04	1.044e-04	1.138	1.156	1.155	1.156	1.156
	100.6	1.726e-05	7.9	7.9	1.636e-05	1.700e-05	1.699e-05	1.683e-05	1.682e-05	0.948	0.985	0.984	0.975	0.975
	227.1	2.091e-06	8.9	8.9	1.889e-06	1.935e-06	1.932e-06	1.905e-06	1.902e-06	0.904	0.926	0.924	0.911	0.909
	354.6	2.483e-07	8.2	8.2	2.228e-07	2.351e-07	2.345e-07	2.290e-07	2.286e-07	0.897	0.947	0.944	0.922	0.920
	531.4	1.388e-08	13.3	13.3	1.200e-08	1.273e-08	1.268e-08	1.223e-08	1.223e-08	0.865	0.918	0.914	0.882	0.882
	710.2	8.118e-10	31.7	31.7	6.723e-10	7.023e-10	6.976e-10	6.679e-10	6.715e-10	0.828	0.865	0.859	0.823	0.827
	911.9	3.408e-11	61.4	61.4	2.534e-11	2.586e-11	2.561e-11	2.448e-11	2.488e-11	0.744	0.759	0.751	0.718	0.730
	-10.0	1.874e-05	30.7	10.5	2.825e-05	2.875e-05	2.870e-05	2.869e-05	2.855e-05	1.507	1.534	1.531	1.531	1.524
	100.6	1.201e-05	11.6	5.6	1.486e-05	1.484e-05	1.482e-05	1.488e-05	1.482e-05	1.237	1.236	1.234	1.239	1.234
2-10MeV	227.1	2.387e-06	8.5	4.9	2.607e-06	2.670e-06	2.657e-06	2.708e-06	2.697e-06	1.092	1.119	1.113	1.135	1.130
	354.6	3.597e-07	7.6	4.8	3.943e-07	4.073e-07	4.039e-07	4.199e-07	4.148e-07	1.096	1.132	1.123	1.167	1.153
	531.4	2.969e-08	7.0	5.0	2.543e-08	2.612e-08	2.577e-08	2.772e-08	2.678e-08	0.856	0.880	0.868	0.934	0.902
	710.2	4.517e-09	6.0	5.2	1.551e-09	1.575e-09	1.547e-09	1.717e-09	1.622e-09	0.343	0.349	0.343	0.380	0.359
	911.9	8.318e-10	5.1	5.0	6.395e-11	6.157e-11	6.018e-11	6.869e-11	6.370e-11	0.077	0.074	0.072	0.083	0.077
	-10.0	2.036e-04	5.0	5.0	2.011e-04	2.090e-04	2.089e-04	1.767e-04	1.754e-04	0.987	1.026	1.026	0.868	0.862
	100.6	1.900e-04	5.0	5.0	2.061e-04	2.087e-04	2.042e-04	1.715e-04	1.666e-04	1.084	1.098	1.075	0.903	0.877
	227.1	9.907e-05	5.0	5.0	1.015e-04	1.067e-04	9.784e-05	8.412e-05	7.662e-05	1.024	1.077	0.988	0.849	0.773
	354.6	4.311e-05	5.0	5.0	4.239e-05	4.391e-05	3.675e-05	3.317e-05	2.769e-05	0.983	1.019	0.853	0.769	0.642
10-100keV	531.4	1.157e-05	5.0	5.0	1.050e-05	1.046e-05	7.488e-06	7.556e-06	5.446e-06	0.907	0.905	0.647	0.653	0.471
	710.2	2.764e-06	5.0	5.0	2.064e-06	2.146e-06	1.283e-06	1.529e-06	9.331e-07	0.747	0.776	0.464	0.553	0.338
	911.9	5.095e-07	5.0	5.0	3.131e-07	3.037e-07	1.454e-07	2.234e-07	1.112e-07	0.615	0.596	0.285	0.438	0.218
	-10.0	6.283e-05	5.0	5.0	6.883e-05	8.056e-05	9.138e-05	1.054e-04	1.201e-04	1.096	1.282	1.454	1.677	1.911
	100.6	7.508e-05	5.0	5.0	8.562e-05	9.805e-05	1.067e-04	1.254e-04	1.346e-04	1.140	1.306	1.421	1.670	1.793
	227.1	5.401e-05	5.0	5.0	6.359e-05	7.290e-05	7.194e-05	8.944e-05	8.381e-05	1.177	1.350	1.332	1.656	1.552
	354.6	3.196e-05	5.0	5.0	3.704e-05	4.129e-05	3.593e-05	4.841e-05	3.879e-05	1.159	1.292	1.124	1.515	1.214
	531.4	1.205e-05	5.0	5.0	1.363e-05	1.423e-05	1.015e-05	1.582e-05	1.002e-05	1.131	1.181	0.843	1.313	0.831
	710.2	3.826e-06	5.0	5.0	3.984e-06	3.967e-06	2.278e-06	4.274e-06	2.118e-06	1.041	1.037	0.595	1.117	0.554
911.9	8.951e-07	5.0	5.0	8.022e-07	7.512e-07	3.332e-07	8.081e-07	3.028e-07	0.896	0.839	0.372	0.903	0.338	

Table 3.14 Continued.

Energy Range	Position [mm]	Expt. Error (+, -) [%]	Calculation						Calc. / Expt.			
			MCNP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42
1-10keV	-10.0		2.028e-05	2.285e-05	2.916e-05	2.492e-05	3.149e-05	1.056	1.123	1.106	1.046	0.895
	100.6		2.919e-05	3.147e-05	3.793e-05	3.290e-05	3.859e-05	1.068	1.044	0.849	0.899	0.595
	227.1		2.688e-05	2.696e-05	2.980e-05	2.670e-05	2.714e-05	1.043	0.973	0.640	0.792	0.401
	354.6	1.537e-05	1.623e-05	1.725e-05	1.700e-05	1.607e-05	1.376e-05	0.978	0.860	0.440	0.676	0.255
	531.4	6.554e-06	7.001e-06	6.841e-06	5.567e-06	5.893e-06	3.896e-06					
	710.2	2.195e-06	2.290e-06	2.135e-06	1.406e-06	1.738e-06	8.810e-07					
	911.9	5.229e-07	5.114e-07	4.497e-07	2.301e-07	3.537e-07	1.331e-07					
	-10.0		1.251e-05	1.216e-05	1.209e-05	1.498e-05	1.690e-05					
	100.6		1.684e-05	1.744e-05	1.646e-05	2.037e-05	2.119e-05					
	227.1		1.690e-05	1.589e-05	1.384e-05	1.760e-05	1.609e-05	1.028	0.966	0.759	1.009	0.787
354.6	1.107e-05	1.138e-05	1.070e-05	8.397e-06	1.117e-05	8.712e-06	1.011	0.925	0.607	0.892	0.543	
531.4	4.877e-06	4.931e-06	4.511e-06	2.963e-06	4.350e-06	2.648e-06	0.966	0.838	0.450	0.760	0.357	
710.2	1.769e-06	1.709e-06	1.483e-06	7.953e-07	1.344e-06	6.306e-07	0.856	0.704	0.297	0.611	0.214	
911.9	4.650e-07	3.981e-07	3.275e-07	1.379e-07	2.843e-07	9.954e-08						
10-100ev	-10.0		5.996e-06	6.311e-06	5.690e-06	6.980e-06	6.945e-06					
	100.6		8.151e-06	9.260e-06	7.897e-06	9.845e-06	9.002e-06					
	227.1		8.912e-06	8.763e-06	6.928e-06	8.865e-06	7.202e-06					
	354.6	4.571e-06	5.843e-06	6.112e-06	4.381e-06	5.857e-06	4.104e-06	1.278	1.337	0.959	1.281	0.898
	531.4	2.117e-06	2.619e-06	2.692e-06	1.629e-06	2.390e-06	1.322e-06	1.237	1.272	0.769	1.129	0.625
	710.2	8.200e-07	9.114e-07	9.190e-07	4.573e-07	7.665e-07	3.291e-07	1.111	1.121	0.558	0.935	0.401
	911.9	2.235e-07	2.246e-07	2.102e-07	8.274e-08	1.673e-07	5.393e-08	1.005	0.940	0.370	0.749	0.241
	-10.0		1.712e-06	1.994e-06	1.594e-06	2.235e-06	1.995e-06					
	100.6		2.733e-06	3.020e-06	2.272e-06	3.259e-06	2.654e-06					
	227.1		2.617e-06	2.943e-06	2.063e-06	3.029e-06	2.204e-06					
354.6	1.468e-06	2.028e-06	2.118e-06	1.357e-06	2.064e-06	1.309e-06	1.382	1.443	0.924	1.406	0.892	
531.4	7.015e-07	8.785e-07	9.706e-07	5.309e-07	8.753e-07	4.433e-07	1.252	1.384	0.757	1.248	0.632	
710.2	2.754e-07	3.454e-07	3.431e-07	1.560e-07	2.894e-07	1.148e-07	1.254	1.246	0.566	1.051	0.417	
911.9	7.744e-08	8.476e-08	8.111e-08	2.946e-08	6.488e-08	1.945e-08	1.094	1.047	0.380	0.838	0.251	

Table 3.15 Measured and calculated gamma-ray heating rates in [Gy/Source Neutron] and C/E ratios in the Assembly #1 and #2.

	Position [mm]	Expt. Error [%]	Calculated Gamma-Ray Heating Rate						Calc. / Expt.						
			MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	MCNP	Error [%]	DOT- J-125	DOT- F-125	DOT- J-42	DOT- F-42	
Assembly #1	-1.0	5.217e-16	22.2	5.830e-16	1.30	6.155e-16	6.196e-16	6.808e-16	6.714e-16	1.117	1.45	1.180	1.188	1.305	1.287
	101.6	3.439e-16	17.3	4.111e-16	0.67	4.208e-16	4.321e-16	4.655e-16	4.632e-16	1.195	0.80	1.223	1.256	1.353	1.347
	228.6	8.327e-17	14.4	9.071e-17	0.84	9.533e-17	1.061e-16	1.044e-16	1.144e-16	1.089	0.91	1.145	1.275	1.254	1.374
	355.6	3.064e-17	17.4	3.444e-17	1.11	3.590e-17	4.036e-17	3.816e-17	4.176e-17	1.124	1.25	1.172	1.324	1.246	1.363
	533.4	1.284e-17	16.9	1.287e-17	1.27	1.350e-17	1.307e-17	1.331e-17	1.180e-17	1.002	1.27	1.051	1.018	1.036	0.919
	711.2	5.125e-18	15.3	4.771e-18	1.17	4.654e-18	3.635e-18	4.276e-18	2.891e-18	0.931	1.09	0.908	0.709	0.834	0.564
	914.4	1.402e-18	14.4	1.181e-18	1.34	1.096e-18	6.623e-19	9.518e-19	4.730e-19	0.842	1.13	0.782	0.472	0.679	0.337
Assembly #2	-1.0	9.476e-16	18.1	1.023e-15	1.23	1.049e-15	1.079e-15	1.134e-15	1.142e-15	1.080	1.33	1.107	1.139	1.197	1.206
	101.6	3.925e-16	13.6	4.987e-16	0.62	5.202e-16	5.489e-16	5.733e-16	5.899e-16	1.271	0.79	1.325	1.398	1.460	1.503
	228.6	1.278e-16	14.5	1.427e-16	0.76	1.504e-16	1.660e-16	1.622e-16	1.741e-16	1.116	0.85	1.177	1.299	1.269	1.362
	355.6	5.847e-17	12.7	6.425e-17	0.99	6.637e-17	6.953e-17	6.838e-17	6.738e-17	1.099	1.08	1.135	1.189	1.169	1.152
	533.4	2.306e-17	13.5	2.462e-17	0.99	2.442e-17	2.147e-17	2.339e-17	1.821e-17	1.068	1.06	1.059	0.931	1.014	0.790
	711.2	8.471e-18	12.9	8.310e-18	0.90	7.881e-18	5.612e-18	7.110e-18	4.252e-18	0.981	0.88	0.930	0.662	0.839	0.502
	914.4	2.267e-18	12.9	1.936e-18	1.10	1.751e-18	9.719e-19	1.513e-18	6.723e-19	0.854	0.94	0.772	0.429	0.667	0.297

Table 3.16 Gamma-ray spectra at the four positions in the Assembly #1
calculated by MCNP.

Energy [MeV]		Flux / Lethargy / Source Neutron			
Upper	Lower	102 mm	356 mm	711 mm	914 mm
1.400e+01	1.200e+01	8.7487e-08	1.9530e-09	9.1315e-11	8.3854e-12
1.200e+01	1.000e+01	4.7496e-07	3.0187e-08	2.1618e-09	5.9069e-10
1.000e+01	9.000e+00	1.4438e-06	2.5140e-07	2.9126e-08	7.4087e-09
9.000e+00	8.000e+00	2.8086e-06	9.5167e-07	1.7072e-07	4.3176e-08
8.000e+00	7.500e+00	3.8985e-06	1.3856e-06	2.6839e-07	6.6640e-08
7.500e+00	7.000e+00	4.4985e-06	1.2018e-06	2.1124e-07	5.2195e-08
7.000e+00	6.500e+00	5.1267e-06	9.1822e-07	1.4235e-07	3.5295e-08
6.500e+00	6.000e+00	5.9489e-06	7.9022e-07	1.2086e-07	3.0066e-08
6.000e+00	5.500e+00	6.9902e-06	7.6517e-07	1.1678e-07	2.8895e-08
5.500e+00	5.000e+00	8.2188e-06	7.6469e-07	1.1130e-07	2.7583e-08
5.000e+00	4.500e+00	9.6116e-06	7.7794e-07	1.0844e-07	2.6716e-08
4.500e+00	4.000e+00	1.0917e-05	7.9166e-07	1.0781e-07	2.6232e-08
4.000e+00	3.500e+00	1.1940e-05	8.2309e-07	1.0566e-07	2.6358e-08
3.500e+00	3.000e+00	1.2714e-05	8.5504e-07	1.0634e-07	2.6715e-08
3.000e+00	2.500e+00	1.2410e-05	7.9815e-07	1.0430e-07	2.5117e-08
2.500e+00	2.250e+00	1.1261e-05	7.6949e-07	1.0146e-07	2.3832e-08
2.250e+00	2.000e+00	1.1176e-05	7.8844e-07	1.0116e-07	2.2976e-08
2.000e+00	1.750e+00	1.3562e-05	8.0525e-07	9.6343e-08	2.2144e-08
1.750e+00	1.500e+00	1.8084e-05	8.6542e-07	9.2122e-08	2.3893e-08
1.500e+00	1.375e+00	2.2244e-05	9.5148e-07	9.2662e-08	2.6159e-08
1.375e+00	1.250e+00	2.4322e-05	9.5300e-07	9.1195e-08	2.5524e-08
1.250e+00	1.125e+00	2.1181e-05	8.6726e-07	8.8198e-08	2.3790e-08
1.125e+00	1.000e+00	1.7359e-05	8.4638e-07	9.2355e-08	2.4780e-08
1.000e+00	9.000e-01	2.0446e-05	1.0803e-06	1.0970e-07	2.8511e-08
9.000e-01	8.000e-01	2.8989e-05	1.4156e-06	1.2782e-07	3.0379e-08
8.000e-01	7.000e-01	3.1491e-05	1.4644e-06	1.2521e-07	2.8276e-08
7.000e-01	6.000e-01	2.7308e-05	1.2808e-06	1.0898e-07	2.5141e-08
6.000e-01	5.200e-01	2.8591e-05	1.8507e-06	2.2088e-07	5.1278e-08
5.200e-01	5.000e-01	3.1093e-05	2.4304e-06	3.2649e-07	7.5435e-08
5.000e-01	4.000e-01	2.8415e-05	1.9320e-06	2.4497e-07	5.7465e-08
4.000e-01	3.000e-01	2.6781e-05	1.4832e-06	1.7741e-07	4.2649e-08
3.000e-01	2.000e-01	2.8457e-05	1.5594e-06	1.8610e-07	4.4402e-08
2.000e-01	1.500e-01	2.4325e-05	1.4086e-06	1.6021e-07	4.2274e-08
1.500e-01	1.000e-01	1.4096e-05	8.6093e-07	9.3997e-08	2.4741e-08
1.000e-01	8.000e-02	4.9881e-06	3.1018e-07	3.3627e-08	8.6360e-09
8.000e-02	6.000e-02	1.1739e-06	6.9487e-08	7.3467e-09	1.8019e-09
6.000e-02	4.500e-02	1.3978e-07	8.4005e-09	8.8954e-10	1.6330e-10
4.500e-02	3.000e-03	8.1521e-09	1.6660e-09	4.3288e-10	6.7411e-13
3.000e-03	2.000e-03	1.8146e-09	1.5770e-11	4.0742e-12	1.5914e-21
2.000e-03	1.000e-03	3.0030e-09	9.2940e-11	2.4010e-11	6.1960e-22

Table 3.17 Gamma-ray spectra at the four positions in the Assembly #1
calculated by DOT with JSSTD library of 125 neutron and
40 gamma-ray groups.

Energy [MeV]		Flux / Lethargy / Source Neutron			
Upper	Lower	102 mm	356 mm	711 mm	914 mm
1.400e+01	1.200e+01	3.3849e-10	9.4664e-11	9.4878e-12	1.8323e-12
1.200e+01	1.000e+01	8.8537e-10	5.1285e-11	5.2840e-12	1.1479e-12
1.000e+01	9.000e+00	8.1931e-09	4.4475e-10	4.5220e-11	1.0295e-11
9.000e+00	8.000e+00	1.2717e-07	7.5176e-09	7.6653e-10	1.7675e-10
8.000e+00	7.500e+00	1.0711e-06	6.3824e-08	6.5629e-09	1.5223e-09
7.500e+00	7.000e+00	4.7349e-06	2.8176e-07	2.9071e-08	6.7583e-09
7.000e+00	6.500e+00	1.3790e-05	8.2171e-07	8.5057e-08	1.9795e-08
6.500e+00	6.000e+00	2.5157e-05	1.5005e-06	1.5576e-07	3.6277e-08
6.000e+00	5.500e+00	3.0430e-05	1.7875e-06	1.8434e-07	4.2946e-08
5.500e+00	5.000e+00	2.7852e-05	1.6439e-06	1.7206e-07	4.0194e-08
5.000e+00	4.500e+00	2.9392e-05	2.0608e-06	2.3522e-07	5.5167e-08
4.500e+00	4.000e+00	3.2514e-05	2.5961e-06	3.1673e-07	7.4415e-08
4.000e+00	3.500e+00	2.9777e-05	1.9631e-06	2.1394e-07	5.0008e-08
3.500e+00	3.000e+00	2.7741e-05	1.3157e-06	1.0013e-07	2.2781e-08
3.000e+00	2.500e+00	3.1790e-05	1.5174e-06	1.1046e-07	2.4985e-08
2.500e+00	2.250e+00	2.9790e-05	1.4708e-06	1.1762e-07	2.6797e-08
2.250e+00	2.000e+00	2.1195e-05	1.1098e-06	1.0623e-07	2.4544e-08
2.000e+00	1.750e+00	1.7861e-05	8.7098e-07	8.9147e-08	2.0805e-08
1.750e+00	1.500e+00	2.1738e-05	8.9390e-07	8.3121e-08	1.9392e-08
1.500e+00	1.375e+00	2.4835e-05	9.7386e-07	8.5936e-08	2.0018e-08
1.375e+00	1.250e+00	2.2554e-05	9.7412e-07	8.8081e-08	2.0535e-08
1.250e+00	1.125e+00	1.8394e-05	8.9175e-07	8.8459e-08	2.0682e-08
1.125e+00	1.000e+00	1.3711e-05	8.0560e-07	9.0194e-08	2.1159e-08
1.000e+00	9.000e-01	1.1279e-05	7.8715e-07	9.3033e-08	2.1865e-08
9.000e-01	8.000e-01	1.1309e-05	7.9385e-07	9.5375e-08	2.2413e-08
8.000e-01	7.000e-01	1.2380e-05	8.0974e-07	9.8750e-08	2.3128e-08
7.000e-01	6.000e-01	1.2603e-05	8.3598e-07	1.0256e-07	2.4024e-08
6.000e-01	5.200e-01	1.1952e-05	8.2873e-07	1.0297e-07	2.4166e-08
5.200e-01	5.000e-01	1.1035e-05	8.1993e-07	1.0472e-07	2.4608e-08
5.000e-01	4.000e-01	9.8665e-06	8.0560e-07	1.0623e-07	2.4979e-08
4.000e-01	3.000e-01	8.5869e-06	8.0258e-07	1.1011e-07	2.5974e-08
3.000e-01	2.000e-01	7.3731e-06	8.1905e-07	1.1662e-07	2.7642e-08
2.000e-01	1.500e-01	6.3008e-06	8.4581e-07	1.2083e-07	2.8694e-08
1.500e-01	1.000e-01	5.4446e-06	9.6624e-07	1.4009e-07	3.3216e-08
1.000e-01	8.000e-02	4.8029e-06	1.2497e-06	2.0637e-07	4.8860e-08
8.000e-02	6.000e-02	4.1905e-06	1.4428e-06	2.6381e-07	6.2635e-08
6.000e-02	4.500e-02	3.0081e-06	1.0083e-06	1.7094e-07	4.1191e-08
4.500e-02	3.000e-02	1.4992e-06	2.8092e-07	3.2006e-08	7.3069e-09
3.000e-02	2.000e-02	4.8091e-07	3.6814e-08	2.9078e-09	6.1122e-10
2.000e-02	1.000e-02	1.0210e-07	2.5142e-09	5.7789e-11	1.0561e-11

Table 3.18 Gamma-ray spectra at the four positions in the Assembly #1
calculated by DOT with FUSION-J3 library of 125 neutron and
40 gamma-ray groups.

Energy [MeV]		Flux / Lethargy / Source Neutron			
Upper	Lower	102 mm	356 mm	711 mm	914 mm
1.400e+01	1.200e+01	9.4366e-08	2.5208e-09	4.9548e-11	7.0358e-12
1.200e+01	1.000e+01	4.9718e-07	4.0639e-08	2.3166e-09	3.7779e-10
1.000e+01	9.000e+00	1.6192e-06	2.9698e-07	2.2445e-08	3.9678e-09
9.000e+00	8.000e+00	3.3944e-06	1.1296e-06	1.2440e-07	2.3036e-08
8.000e+00	7.500e+00	4.7570e-06	1.6820e-06	2.0263e-07	3.6994e-08
7.500e+00	7.000e+00	5.3492e-06	1.4688e-06	1.6065e-07	2.9270e-08
7.000e+00	6.500e+00	5.9106e-06	1.1281e-06	1.0883e-07	1.9886e-08
6.500e+00	6.000e+00	6.7047e-06	9.7943e-07	9.3891e-08	1.7211e-08
6.000e+00	5.500e+00	7.7460e-06	9.4836e-07	9.1641e-08	1.6791e-08
5.500e+00	5.000e+00	8.9491e-06	9.3358e-07	8.8054e-08	1.6084e-08
5.000e+00	4.500e+00	1.0231e-05	9.4012e-07	8.6220e-08	1.5723e-08
4.500e+00	4.000e+00	1.1392e-05	9.5200e-07	8.5356e-08	1.5581e-08
4.000e+00	3.500e+00	1.2299e-05	9.5450e-07	8.3843e-08	1.5308e-08
3.500e+00	3.000e+00	1.2968e-05	9.6292e-07	8.3703e-08	1.5257e-08
3.000e+00	2.500e+00	1.2770e-05	9.3498e-07	8.0759e-08	1.4712e-08
2.500e+00	2.250e+00	1.1684e-05	9.1307e-07	7.7627e-08	1.4190e-08
2.250e+00	2.000e+00	1.1627e-05	8.9948e-07	7.5305e-08	1.3761e-08
2.000e+00	1.750e+00	1.4028e-05	9.0832e-07	7.2715e-08	1.3251e-08
1.750e+00	1.500e+00	1.8688e-05	9.8980e-07	7.1453e-08	1.2978e-08
1.500e+00	1.375e+00	2.2883e-05	1.0750e-06	7.1477e-08	1.2962e-08
1.375e+00	1.250e+00	2.5185e-05	1.0734e-06	6.9812e-08	1.2659e-08
1.250e+00	1.125e+00	2.2048e-05	9.8667e-07	6.7431e-08	1.2251e-08
1.125e+00	1.000e+00	1.8136e-05	9.6676e-07	7.2295e-08	1.3156e-08
1.000e+00	9.000e-01	2.1505e-05	1.2215e-06	8.6258e-08	1.5567e-08
9.000e-01	8.000e-01	3.0106e-05	1.5850e-06	9.5461e-08	1.7007e-08
8.000e-01	7.000e-01	3.1991e-05	1.6102e-06	8.9459e-08	1.5827e-08
7.000e-01	6.000e-01	2.7893e-05	1.3999e-06	8.0721e-08	1.4339e-08
6.000e-01	5.200e-01	3.0064e-05	2.1553e-06	1.6775e-07	3.0402e-08
5.200e-01	5.000e-01	3.2851e-05	2.8740e-06	2.4634e-07	4.4808e-08
5.000e-01	4.000e-01	2.9550e-05	2.2622e-06	1.8313e-07	3.3288e-08
4.000e-01	3.000e-01	2.7634e-05	1.7722e-06	1.3349e-07	2.4209e-08
3.000e-01	2.000e-01	2.9730e-05	1.8982e-06	1.4130e-07	2.5558e-08
2.000e-01	1.500e-01	2.4670e-05	1.6022e-06	1.1974e-07	2.1638e-08
1.500e-01	1.000e-01	1.3603e-05	8.8665e-07	6.5654e-08	1.1839e-08
1.000e-01	8.000e-02	4.7626e-06	3.1070e-07	2.2890e-08	4.1211e-09
8.000e-02	6.000e-02	1.1131e-06	7.2869e-08	5.3527e-09	9.6151e-10
6.000e-02	4.500e-02	1.3709e-07	8.9619e-09	6.5374e-10	1.1673e-10
4.500e-02	3.000e-02	8.7081e-09	5.3275e-10	3.8854e-11	6.8600e-12
3.000e-02	2.000e-02	8.4285e-10	5.0371e-11	3.6816e-12	6.2896e-13
2.000e-02	1.000e-02	2.5686e-10	7.2517e-11	4.8335e-12	7.1898e-13

Table 3.19 Gamma-ray spectra at the four positions in the Assembly #1
calculated by DOT with JSSTD L library of 42 neutron and
21 gamma-ray groups.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.4e+01	1.2e+01	1.1785e-07	2.7378e-09	5.1289e-11	9.0245e-12
1.2e+01	1.0e+01	6.9983e-07	8.3591e-08	7.8852e-09	1.6391e-09
1.0e+01	8.0e+00	2.6182e-06	6.6873e-07	9.0874e-08	2.0574e-08
8.0e+00	7.5e+00	4.6035e-06	1.4113e-06	2.2340e-07	5.0148e-08
7.5e+00	7.0e+00	5.3734e-06	1.2666e-06	1.8156e-07	4.0616e-08
7.0e+00	6.5e+00	6.1416e-06	9.9293e-07	1.2356e-07	2.7654e-08
6.5e+00	6.0e+00	7.1087e-06	8.7099e-07	1.0646e-07	2.3875e-08
6.0e+00	5.5e+00	8.2970e-06	8.4467e-07	1.0293e-07	2.3046e-08
5.5e+00	5.0e+00	9.6305e-06	8.2989e-07	9.7530e-08	2.1740e-08
5.0e+00	4.5e+00	1.1020e-05	8.3446e-07	9.4314e-08	2.0959e-08
4.5e+00	4.0e+00	1.2258e-05	8.4884e-07	9.2954e-08	2.0643e-08
4.0e+00	3.5e+00	1.3245e-05	8.5869e-07	9.1494e-08	2.0299e-08
3.5e+00	3.0e+00	1.4038e-05	8.7037e-07	9.1504e-08	2.0273e-08
3.0e+00	2.5e+00	1.3341e-05	8.4811e-07	8.8523e-08	1.9597e-08
2.5e+00	2.0e+00	1.3119e-05	8.1972e-07	8.3142e-08	1.8431e-08
2.0e+00	1.5e+00	1.7734e-05	8.9689e-07	8.0325e-08	1.7765e-08
1.5e+00	1.0e+00	2.3452e-05	1.0894e-06	9.1135e-08	2.0065e-08
1.0e+00	4.0e-01	3.3708e-05	1.9826e-06	1.7907e-07	3.9455e-08
4.0e-01	2.0e-01	3.3739e-05	1.9555e-06	1.7758e-07	3.9118e-08
2.0e-01	1.0e-01	1.7022e-05	9.9266e-07	8.9917e-08	1.9795e-08
1.0e-01	1.0e-02	1.7506e-07	1.3170e-08	1.1929e-09	2.6166e-10

Table 3.20 Gamma-ray spectra at the four positions in the Assembly #1
calculated by DOT with FUSION-40 library of 42 neutron and
21 gamma-ray groups.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.4e+01	1.2e+01	1.1127e-07	2.6868e-09	4.0094e-11	5.2703e-12
1.2e+01	1.0e+01	7.3323e-07	8.2717e-08	4.6189e-09	7.0514e-10
1.0e+01	8.0e+00	2.9885e-06	7.3776e-07	5.8191e-08	9.6428e-09
8.0e+00	7.5e+00	5.3989e-06	1.6586e-06	1.5295e-07	2.5095e-08
7.5e+00	7.0e+00	6.1397e-06	1.4891e-06	1.2500e-07	2.0459e-08
7.0e+00	6.5e+00	6.7927e-06	1.1537e-06	8.4725e-08	1.3898e-08
6.5e+00	6.0e+00	7.6722e-06	1.0030e-06	7.3047e-08	1.2023e-08
6.0e+00	5.5e+00	8.8168e-06	9.7452e-07	7.1628e-08	1.1784e-08
5.5e+00	5.0e+00	1.0133e-05	9.6430e-07	6.9339e-08	1.1374e-08
5.0e+00	4.5e+00	1.1524e-05	9.7508e-07	6.8295e-08	1.1184e-08
4.5e+00	4.0e+00	1.2750e-05	9.8799e-07	6.7706e-08	1.1094e-08
4.0e+00	3.5e+00	1.3722e-05	9.9123e-07	6.6586e-08	1.0914e-08
3.5e+00	3.0e+00	1.4543e-05	1.0050e-06	6.6791e-08	1.0935e-08
3.0e+00	2.5e+00	1.3843e-05	9.7988e-07	6.4664e-08	1.0577e-08
2.5e+00	2.0e+00	1.3545e-05	9.3363e-07	6.0024e-08	9.8249e-09
2.0e+00	1.5e+00	1.8007e-05	9.9523e-07	5.7431e-08	9.3620e-09
1.5e+00	1.0e+00	2.3168e-05	1.1593e-06	6.3234e-08	1.0271e-08
1.0e+00	4.0e-01	3.0881e-05	1.9543e-06	1.1380e-07	1.8458e-08
4.0e-01	2.0e-01	3.0199e-05	1.8936e-06	1.1098e-07	1.8013e-08
2.0e-01	1.0e-01	1.5336e-05	9.7118e-07	5.6448e-08	9.1367e-09
1.0e-01	1.0e-02	1.4144e-07	1.1777e-08	6.8380e-10	1.1057e-10

Table 3.21 Gamma-ray spectra at the four positions in the Assembly #2
calculated by MCNP.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.400e+01	1.200e+01	7.5578e-08	3.1763e-09	3.3169e-10	1.3885e-11
1.200e+01	1.000e+01	5.4305e-07	6.3577e-08	1.0217e-08	1.1940e-09
1.000e+01	9.000e+00	2.2316e-06	4.7069e-07	6.8261e-08	1.3506e-08
9.000e+00	8.000e+00	4.9377e-06	1.8143e-06	2.5512e-07	6.8265e-08
8.000e+00	7.500e+00	6.8370e-06	2.8932e-06	4.2693e-07	1.1405e-07
7.500e+00	7.000e+00	7.5028e-06	2.5092e-06	3.8436e-07	8.8396e-08
7.000e+00	6.500e+00	7.9549e-06	1.8591e-06	2.8843e-07	5.7446e-08
6.500e+00	6.000e+00	8.5011e-06	1.5870e-06	2.3783e-07	4.8884e-08
6.000e+00	5.500e+00	9.2069e-06	1.5262e-06	2.1324e-07	4.7369e-08
5.500e+00	5.000e+00	1.0163e-05	1.5072e-06	1.9517e-07	4.4807e-08
5.000e+00	4.500e+00	1.1374e-05	1.5488e-06	1.8960e-07	4.3091e-08
4.500e+00	4.000e+00	1.2668e-05	1.5856e-06	1.8973e-07	4.3016e-08
4.000e+00	3.500e+00	1.3877e-05	1.5640e-06	1.9157e-07	4.3788e-08
3.500e+00	3.000e+00	1.4515e-05	1.5519e-06	1.9406e-07	4.3825e-08
3.000e+00	2.500e+00	1.4607e-05	1.5269e-06	1.8089e-07	4.1568e-08
2.500e+00	2.250e+00	1.3603e-05	1.4136e-06	1.6346e-07	3.9657e-08
2.250e+00	2.000e+00	1.3081e-05	1.3521e-06	1.5727e-07	3.8158e-08
2.000e+00	1.750e+00	1.5148e-05	1.3862e-06	1.6115e-07	3.7375e-08
1.750e+00	1.500e+00	2.0529e-05	1.4678e-06	1.6540e-07	3.6728e-08
1.500e+00	1.375e+00	2.4719e-05	1.5323e-06	1.6308e-07	3.6225e-08
1.375e+00	1.250e+00	2.6546e-05	1.5018e-06	1.5611e-07	3.5248e-08
1.250e+00	1.125e+00	2.3340e-05	1.3785e-06	1.4829e-07	3.4764e-08
1.125e+00	1.000e+00	1.9427e-05	1.4009e-06	1.5925e-07	3.9135e-08
1.000e+00	9.000e-01	2.3468e-05	1.8096e-06	1.9748e-07	4.7700e-08
9.000e-01	8.000e-01	3.3294e-05	2.2686e-06	2.2583e-07	5.1610e-08
8.000e-01	7.000e-01	3.5452e-05	2.2085e-06	2.0925e-07	4.6641e-08
7.000e-01	6.000e-01	3.0894e-05	1.9493e-06	1.8642e-07	4.2237e-08
6.000e-01	5.200e-01	3.3368e-05	3.1862e-06	3.6844e-07	8.8525e-08
5.200e-01	5.000e-01	3.6625e-05	4.1362e-06	5.0870e-07	1.2398e-07
5.000e-01	4.000e-01	3.3211e-05	3.3038e-06	3.9627e-07	9.5122e-08
4.000e-01	3.000e-01	3.0688e-05	2.6135e-06	2.9342e-07	6.8774e-08
3.000e-01	2.000e-01	3.2903e-05	2.7149e-06	3.1005e-07	6.9096e-08
2.000e-01	1.500e-01	2.7743e-05	2.4094e-06	2.7708e-07	6.1838e-08
1.500e-01	1.000e-01	1.6634e-05	1.4433e-06	1.5631e-07	3.8339e-08
1.000e-01	8.000e-02	5.9638e-06	5.0413e-07	5.9711e-08	1.5151e-08
8.000e-02	6.000e-02	1.3560e-06	1.1036e-07	1.4277e-08	3.9819e-09
6.000e-02	4.500e-02	1.7041e-07	1.1743e-08	1.4392e-09	5.6900e-10
4.500e-02	3.000e-02	1.3168e-09	1.6025e-10	5.0675e-12	5.2362e-11
3.000e-02	2.000e-02	2.2841e-10	1.0200e-10	6.8569e-12	3.4562e-12
2.000e-02	1.000e-02	1.3572e-09	6.0478e-10	4.0581e-11	5.9595e-12

Table 3.22 Gamma-ray spectra at the four positions in the Assembly #2
calculated by DOT with JSSTD library of 125 neutron and
40 gamma-ray groups.

Energy [MeV]		Flux / Lethargy / Source Neutron			
Upper	Lower	102 mm	356 mm	711 mm	914 mm
1.400e+01	1.200e+01	1.1378e-07	3.2988e-09	1.6428e-10	4.0522e-11
1.200e+01	1.000e+01	6.8631e-07	6.4226e-08	6.2141e-09	1.4872e-09
1.000e+01	9.000e+00	2.5285e-06	5.2024e-07	5.4634e-08	1.3301e-08
9.000e+00	8.000e+00	5.3305e-06	2.0504e-06	2.6233e-07	6.0266e-08
8.000e+00	7.500e+00	7.2091e-06	3.0990e-06	4.9014e-07	1.0134e-07
7.500e+00	7.000e+00	7.8121e-06	2.6170e-06	3.7390e-07	8.1650e-08
7.000e+00	6.500e+00	8.2341e-06	1.9178e-06	2.3530e-07	5.4829e-08
6.500e+00	6.000e+00	8.8559e-06	1.6390e-06	2.0170e-07	4.6025e-08
6.000e+00	5.500e+00	9.7287e-06	1.5732e-06	1.9430e-07	4.3897e-08
5.500e+00	5.000e+00	1.0814e-05	1.5176e-06	1.8373e-07	4.1276e-08
5.000e+00	4.500e+00	1.2106e-05	1.4989e-06	1.7853e-07	3.9786e-08
4.500e+00	4.000e+00	1.3385e-05	1.5045e-06	1.7683e-07	3.9247e-08
4.000e+00	3.500e+00	1.4277e-05	1.5031e-06	1.7405e-07	3.8579e-08
3.500e+00	3.000e+00	1.4619e-05	1.5086e-06	1.7323e-07	3.8409e-08
3.000e+00	2.500e+00	1.4604e-05	1.4539e-06	1.6572e-07	3.6877e-08
2.500e+00	2.250e+00	1.3932e-05	1.4200e-06	1.6062e-07	3.5255e-08
2.250e+00	2.000e+00	1.3673e-05	1.4108e-06	1.5942e-07	3.4639e-08
2.000e+00	1.750e+00	1.5850e-05	1.4100e-06	1.5428e-07	3.4074e-08
1.750e+00	1.500e+00	2.0870e-05	1.4756e-06	1.4854e-07	3.3175e-08
1.500e+00	1.375e+00	2.5464e-05	1.5410e-06	1.4758e-07	3.2747e-08
1.375e+00	1.250e+00	2.7516e-05	1.5252e-06	1.4448e-07	3.1895e-08
1.250e+00	1.125e+00	2.4234e-05	1.4442e-06	1.4057e-07	3.0929e-08
1.125e+00	1.000e+00	2.0732e-05	1.4747e-06	1.5106e-07	3.3202e-08
1.000e+00	9.000e-01	2.5026e-05	1.8278e-06	1.7732e-07	3.9054e-08
9.000e-01	8.000e-01	3.3590e-05	2.2678e-06	1.9399e-07	4.2506e-08
8.000e-01	7.000e-01	3.5571e-05	2.2932e-06	1.8490e-07	3.9674e-08
7.000e-01	6.000e-01	3.1761e-05	2.0203e-06	1.7186e-07	3.6339e-08
6.000e-01	5.200e-01	3.5757e-05	3.3772e-06	3.5602e-07	7.9669e-08
5.200e-01	5.000e-01	4.0613e-05	4.6603e-06	5.1557e-07	1.1830e-07
5.000e-01	4.000e-01	3.5828e-05	3.6256e-06	4.0158e-07	8.8272e-08
4.000e-01	3.000e-01	3.2515e-05	2.7867e-06	2.9058e-07	6.4161e-08
3.000e-01	2.000e-01	3.5624e-05	3.0170e-06	3.1052e-07	6.8535e-08
2.000e-01	1.500e-01	2.9541e-05	2.5396e-06	2.6249e-07	5.7886e-08
1.500e-01	1.000e-01	1.6196e-05	1.3897e-06	1.4327e-07	3.1570e-08
1.000e-01	8.000e-02	5.5651e-06	4.7604e-07	4.8940e-08	1.0774e-08
8.000e-02	6.000e-02	1.2621e-06	1.0774e-07	1.1037e-08	2.4258e-09
6.000e-02	4.500e-02	1.4978e-07	1.2660e-08	1.2854e-09	2.8124e-10
4.500e-02	3.000e-02	9.4650e-09	7.4892e-10	7.5391e-11	1.6295e-11
3.000e-02	2.000e-02	1.0112e-09	8.8089e-11	8.6369e-12	1.7864e-12
2.000e-02	1.000e-02	5.9974e-10	1.6718e-10	1.4762e-11	2.7316e-12

Table 3.23 Gamma-ray spectra at the four positions in the Assembly #2
calculated by DOT with FUSION-J3 library of 125 neutron and
40 gamma-ray groups.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.400e+01	1.200e+01	1.0681e-07	3.3055e-09	1.2554e-10	2.3796e-11
1.200e+01	1.000e+01	7.2656e-07	6.6133e-08	4.4138e-09	8.0804e-10
1.000e+01	9.000e+00	2.8038e-06	4.9559e-07	3.4064e-08	6.4762e-09
9.000e+00	8.000e+00	6.1921e-06	2.0663e-06	1.7410e-07	3.1222e-08
8.000e+00	7.500e+00	8.4640e-06	3.2536e-06	3.4225e-07	5.4739e-08
7.500e+00	7.000e+00	9.0544e-06	2.7751e-06	2.6403e-07	4.4626e-08
7.000e+00	6.500e+00	9.3299e-06	2.0283e-06	1.6602e-07	3.0055e-08
6.500e+00	6.000e+00	9.8163e-06	1.7287e-06	1.4252e-07	2.5328e-08
6.000e+00	5.500e+00	1.0604e-05	1.6696e-06	1.3917e-07	2.4494e-08
5.500e+00	5.000e+00	1.1652e-05	1.6293e-06	1.3413e-07	2.3498e-08
5.000e+00	4.500e+00	1.2947e-05	1.6240e-06	1.3234e-07	2.3033e-08
4.500e+00	4.000e+00	1.4210e-05	1.6292e-06	1.3168e-07	2.2864e-08
4.000e+00	3.500e+00	1.5069e-05	1.6199e-06	1.2955e-07	2.2496e-08
3.500e+00	3.000e+00	1.5424e-05	1.6281e-06	1.2926e-07	2.2457e-08
3.000e+00	2.500e+00	1.5448e-05	1.5731e-06	1.2390e-07	2.1594e-08
2.500e+00	2.250e+00	1.4748e-05	1.5300e-06	1.1950e-07	2.0545e-08
2.250e+00	2.000e+00	1.4420e-05	1.5117e-06	1.1792e-07	2.0062e-08
2.000e+00	1.750e+00	1.6527e-05	1.5001e-06	1.1361e-07	1.9631e-08
1.750e+00	1.500e+00	2.1520e-05	1.5606e-06	1.0962e-07	1.9151e-08
1.500e+00	1.375e+00	2.6172e-05	1.6282e-06	1.0950e-07	1.9027e-08
1.375e+00	1.250e+00	2.8238e-05	1.6115e-06	1.0735e-07	1.8569e-08
1.250e+00	1.125e+00	2.4878e-05	1.5259e-06	1.0431e-07	1.7991e-08
1.125e+00	1.000e+00	2.1356e-05	1.5596e-06	1.1212e-07	1.9339e-08
1.000e+00	9.000e-01	2.5758e-05	1.9225e-06	1.3190e-07	2.2829e-08
9.000e-01	8.000e-01	3.4331e-05	2.3571e-06	1.4440e-07	2.4872e-08
8.000e-01	7.000e-01	3.6130e-05	2.3606e-06	1.3742e-07	2.3169e-08
7.000e-01	6.000e-01	3.2261e-05	2.0801e-06	1.2692e-07	2.1071e-08
6.000e-01	5.200e-01	3.6773e-05	3.4984e-06	2.5483e-07	4.4528e-08
5.200e-01	5.000e-01	4.1948e-05	4.8270e-06	3.6592e-07	6.5460e-08
5.000e-01	4.000e-01	3.6741e-05	3.7416e-06	2.8540e-07	4.8961e-08
4.000e-01	3.000e-01	3.2802e-05	2.8447e-06	2.0595e-07	3.5542e-08
3.000e-01	2.000e-01	3.5384e-05	3.0383e-06	2.1749e-07	3.7521e-08
2.000e-01	1.500e-01	2.9466e-05	2.5692e-06	1.8434e-07	3.1760e-08
1.500e-01	1.000e-01	1.6268e-05	1.4183e-06	1.0098e-07	1.7362e-08
1.000e-01	8.000e-02	5.7014e-06	4.9633e-07	3.5179e-08	6.0399e-09
8.000e-02	6.000e-02	1.3362e-06	1.1632e-07	8.2183e-09	1.4083e-09
6.000e-02	4.500e-02	1.6470e-07	1.4280e-08	1.0012e-09	1.7070e-10
4.500e-02	3.000e-02	1.0293e-08	8.4891e-10	5.9219e-11	9.9909e-12
3.000e-02	2.000e-02	9.7256e-10	8.1040e-11	5.5469e-12	9.0687e-13
2.000e-02	1.000e-02	4.7057e-10	1.1752e-10	6.9393e-12	9.9453e-13

Table 3.24 Gamma-ray spectra at the four positions in the Assembly #2 calculated by DOT with JSSTD library of 42 neutron and 21 gamma-ray groups.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.4e+01	1.2e+01	1.3878e-07	4.4636e-09	4.5648e-10	2.4125e-11
1.2e+01	1.0e+01	1.0268e-06	1.6658e-07	1.9515e-08	3.3295e-09
1.0e+01	8.0e+00	4.4240e-06	1.2477e-06	1.3906e-07	3.0998e-08
8.0e+00	7.5e+00	7.6821e-06	2.9502e-06	3.4905e-07	8.1737e-08
7.5e+00	7.0e+00	8.4611e-06	2.6087e-06	3.1793e-07	6.6767e-08
7.0e+00	6.5e+00	9.0360e-06	1.9316e-06	2.3531e-07	4.4715e-08
6.5e+00	6.0e+00	9.7831e-06	1.6311e-06	1.9086e-07	3.7940e-08
6.0e+00	5.5e+00	1.0769e-05	1.5527e-06	1.7087e-07	3.6353e-08
5.5e+00	5.0e+00	1.1966e-05	1.5022e-06	1.5676e-07	3.4299e-08
5.0e+00	4.5e+00	1.3375e-05	1.4931e-06	1.5315e-07	3.3177e-08
4.5e+00	4.0e+00	1.4695e-05	1.4972e-06	1.5304e-07	3.2717e-08
4.0e+00	3.5e+00	1.5663e-05	1.4968e-06	1.5131e-07	3.2170e-08
3.5e+00	3.0e+00	1.6308e-05	1.5287e-06	1.5231e-07	3.2231e-08
3.0e+00	2.5e+00	1.5677e-05	1.4819e-06	1.4711e-07	3.1127e-08
2.5e+00	2.0e+00	1.5559e-05	1.4079e-06	1.3795e-07	2.9257e-08
2.0e+00	1.5e+00	2.0345e-05	1.4700e-06	1.3317e-07	2.8213e-08
1.5e+00	1.0e+00	2.6710e-05	1.7329e-06	1.5032e-07	3.1789e-08
1.0e+00	4.0e-01	3.9330e-05	3.2874e-06	2.9719e-07	6.2743e-08
4.0e-01	2.0e-01	3.9454e-05	3.2399e-06	2.9439e-07	6.2177e-08
2.0e-01	1.0e-01	1.9955e-05	1.6416e-06	1.4891e-07	3.1439e-08
1.0e-01	1.0e-02	2.3650e-07	2.0536e-08	1.9147e-09	4.0821e-10

Table 3.25 Gamma-ray spectra at the four positions in the Assembly #2 calculated by DOT with FUSION-40 library of 42 neutron and 21 gamma-ray groups.

Energy [MeV]		102 mm	Flux / Lethargy / Source Neutron		
Upper	Lower		356 mm	711 mm	914 mm
1.4e+01	1.2e+01	1.3340e-07	4.1591e-09	2.5064e-10	1.1273e-11
1.2e+01	1.0e+01	1.0907e-06	1.4511e-07	1.0099e-08	1.2799e-09
1.0e+01	8.0e+00	5.2203e-06	1.1991e-06	7.9160e-08	1.3005e-08
8.0e+00	7.5e+00	9.3678e-06	3.0118e-06	2.1026e-07	3.6453e-08
7.5e+00	7.0e+00	1.0120e-05	2.6690e-06	1.9246e-07	2.9961e-08
7.0e+00	6.5e+00	1.0491e-05	1.9622e-06	1.4183e-07	2.0042e-08
6.5e+00	6.0e+00	1.1056e-05	1.6531e-06	1.1530e-07	1.7057e-08
6.0e+00	5.5e+00	1.1931e-05	1.5894e-06	1.0512e-07	1.6615e-08
5.5e+00	5.0e+00	1.3080e-05	1.5616e-06	9.8833e-08	1.6058e-08
5.0e+00	4.5e+00	1.4492e-05	1.5712e-06	9.8348e-08	1.5846e-08
4.5e+00	4.0e+00	1.5788e-05	1.5773e-06	9.8794e-08	1.5740e-08
4.0e+00	3.5e+00	1.6713e-05	1.5697e-06	9.7613e-08	1.5489e-08
3.5e+00	3.0e+00	1.7396e-05	1.6059e-06	9.8568e-08	1.5571e-08
3.0e+00	2.5e+00	1.6752e-05	1.5586e-06	9.5280e-08	1.5047e-08
2.5e+00	2.0e+00	1.6488e-05	1.4634e-06	8.8253e-08	1.3963e-08
2.0e+00	1.5e+00	2.1064e-05	1.5067e-06	8.4329e-08	1.3303e-08
1.5e+00	1.0e+00	2.6771e-05	1.7156e-06	9.2493e-08	1.4569e-08
1.0e+00	4.0e-01	3.6722e-05	2.9922e-06	1.6730e-07	2.6259e-08
4.0e-01	2.0e-01	3.6022e-05	2.8964e-06	1.6305e-07	2.5626e-08
2.0e-01	1.0e-01	1.8347e-05	1.4814e-06	8.2798e-08	1.2984e-08
1.0e-01	1.0e-02	1.9873e-07	1.6774e-08	9.6996e-10	1.5420e-10

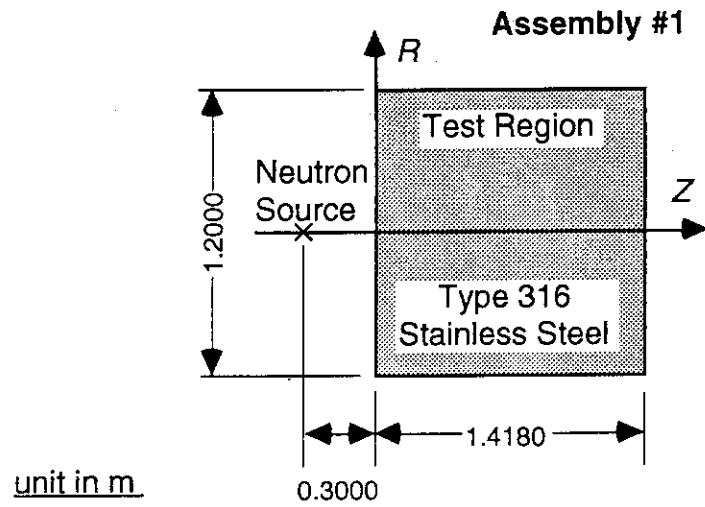


Fig. 2.1 Calculation model for the Assembly #1.

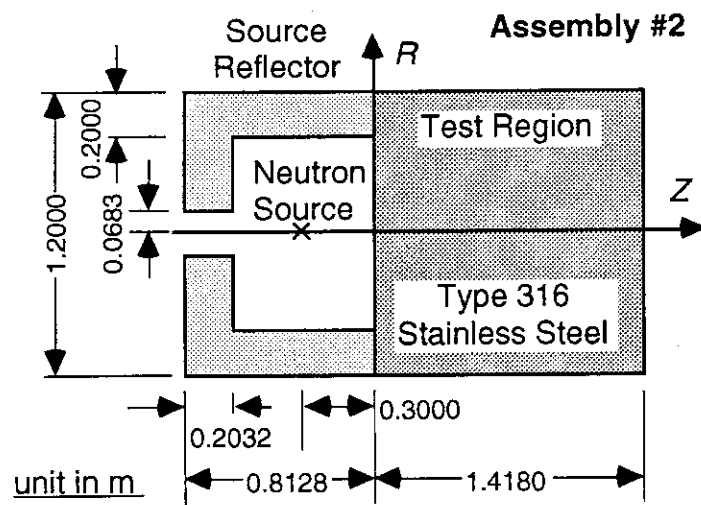


Fig. 2.2 Calculation model for the Assembly #2.

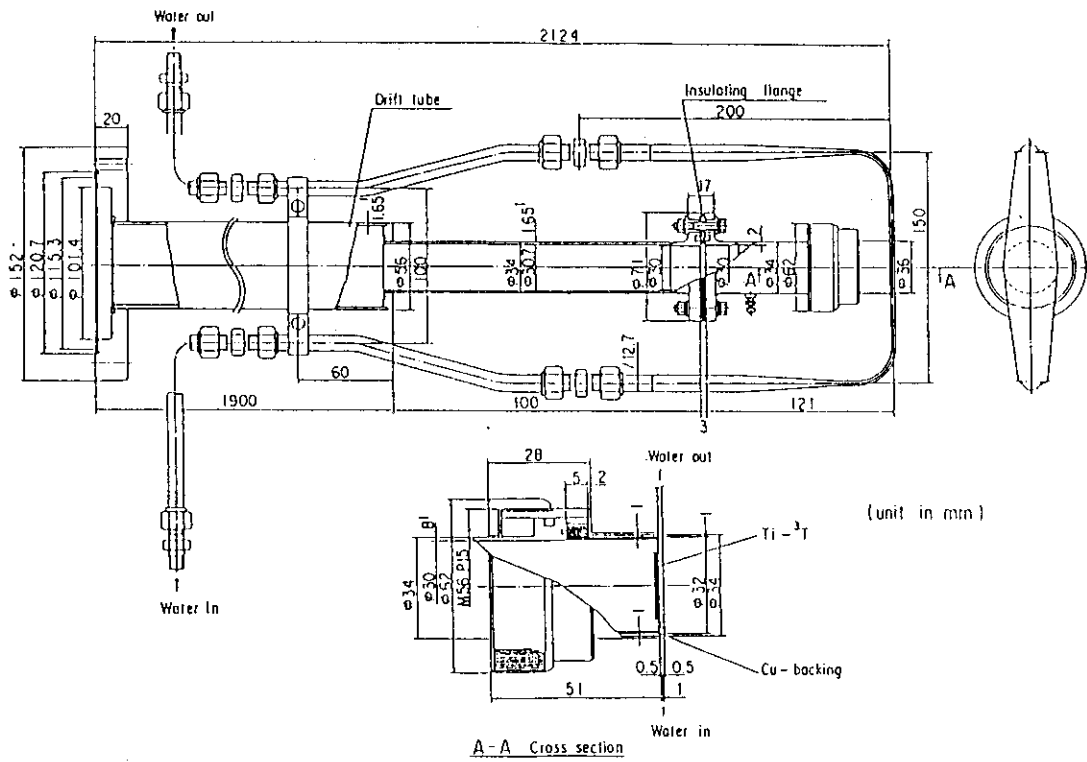


Fig. 2.3 Structure of the FNS water cooled tritium target for the 80° beam line.

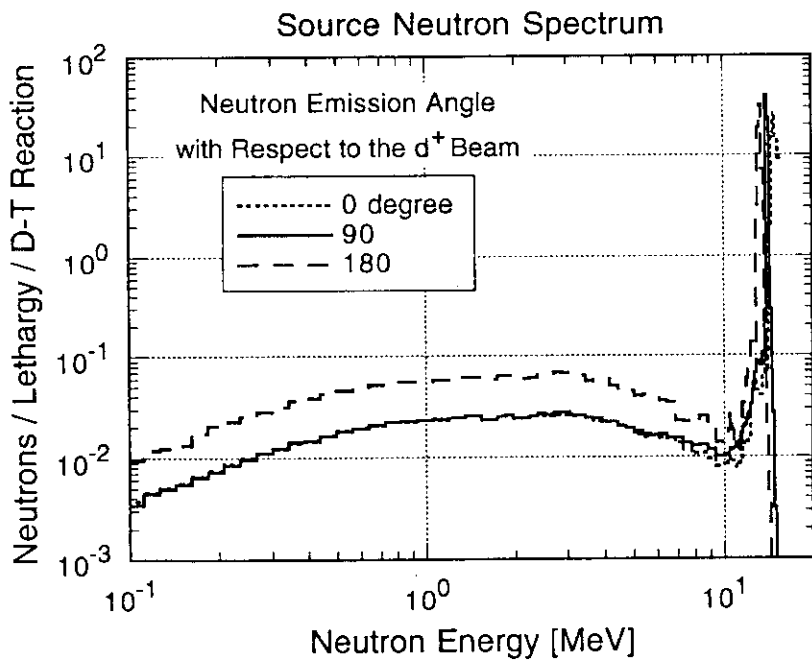


Fig. 2.4 Angle-dependent source neutron spectra used in the analyses.

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FNS 80-DEG. NEW WATER COOLED TARGET : N 125-G / ANGLE 37 : MORSE-DD
MCNP : ENERGY-ANGLE SOURCE SPECTRA FOR USER SUPPLY SOURCE ROUTINE
# NEUTRON 125-GROUP ENERGY BOUNDARIES
1.64870E+07 1.62310E+07 1.59800E+07 1.57320E+07 1.54880E+07 1.52480E+07
1.50120E+07 1.47790E+07 1.45500E+07 1.43240E+07 1.41020E+07 1.38830E+07
1.36680E+07 1.34560E+07 1.32480E+07 1.30420E+07 1.28400E+07 1.26410E+07
1.24450E+07 1.22520E+07 1.20620E+07 1.18750E+07 1.16910E+07 1.15100E+07
1.13310E+07 1.11560E+07 1.09830E+07 1.08120E+07 1.06450E+07 1.04800E+07
1.03170E+07 1.01570E+07 9.99990E+06 9.39400E+06 8.82490E+06 8.29020E+06
7.78790E+06 7.31610E+06 6.87280E+06 6.45640E+06 6.06520E+06 5.69780E+06
5.35250E+06 5.02820E+06 4.72360E+06 4.43740E+06 4.16850E+06 3.91600E+06
3.67870E+06 3.45590E+06 3.24650E+06 3.04980E+06 2.86500E+06 2.69140E+06
2.52840E+06 2.37520E+06 2.23130E+06 2.09610E+06 1.96910E+06 1.84980E+06
1.73770E+06 1.53350E+06 1.35330E+06 1.19430E+06 1.05400E+06 9.30130E+05
8.20840E+05 7.24380E+05 6.39270E+05 5.64150E+05 4.97860E+05 4.39360E+05
3.87740E+05 3.42170E+05 3.01970E+05 2.66490E+05 2.35170E+05 2.07540E+05
1.83150E+05 1.61630E+05 1.42640E+05 1.25880E+05 1.11090E+05 9.80350E+04
8.65150E+04 7.63490E+04 6.73780E+04 5.94610E+04 5.24740E+04 4.63080E+04
4.08670E+04 3.60650E+04 3.18270E+04 2.80870E+04 2.47870E+04 2.18740E+04
1.93040E+04 1.50340E+04 1.17090E+04 9.11860E+03 7.10160E+03 5.53070E+03
4.30730E+03 3.35460E+03 2.61250E+03 2.03460E+03 1.58460E+03 1.23410E+03
4.30730E+03 3.35460E+03 2.61250E+03 2.03460E+03 1.58460E+03 1.23410E+03
9.61100E+02 5.82930E+02 3.53570E+02 2.14450E+02 1.30070E+02 7.88910E+01
4.78500E+01 2.90230E+01 1.76030E+01 1.06770E+01 6.47580E+00 3.92780E+00
2.38230E+00 1.44490E+00 8.76400E-01 5.31560E-01 3.22410E-01 1.00100E-05
# ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
# ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
# ANGULAR SOURCE SPECTRA TABLE
# DETECTOR NO. 37 ANGLE = 180.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 2.8133E-07 1.1132E-05 7.0699E-05 2.9725E-04 5.8035E-03
1.1174E-01 5.0083E-01 2.9325E-01 3.5848E-02 1.9167E-03 2.2345E-03
2.1223E-03 1.5259E-03 9.3736E-04 7.3617E-04 5.2773E-04 2.7017E-04
1.7811E-04 1.8328E-04 2.3002E-04 2.9362E-04 4.2296E-04 2.8769E-04
2.2497E-04 2.1734E-04 8.6941E-04 1.1876E-03 1.5784E-03 1.3262E-03
1.4116E-03 1.4346E-03 2.1877E-03 2.2324E-03 2.4385E-03 2.5503E-03
2.5201E-03 2.8233E-03 2.9695E-03 3.1546E-03 3.6912E-03 3.6241E-03
3.5154E-03 4.0251E-03 4.0676E-03 4.2225E-03 4.3285E-03 4.1782E-03
4.0598E-03 3.8551E-03 3.7352E-03 3.8356E-03 4.0109E-03 4.0103E-03
7.3721E-03 7.7382E-03 7.6206E-03 7.2109E-03 6.8743E-03 6.8912E-03
6.9001E-03 6.5590E-03 5.9411E-03 5.7141E-03 5.3731E-03 4.8503E-03
4.5656E-03 3.9063E-03 3.5676E-03 3.1742E-03 2.8645E-03 2.5666E-03
2.1491E-03 1.6690E-03 1.5367E-03 1.4715E-03 1.1850E-03 7.2317E-04
6.0690E-04 4.8332E-04 4.6588E-04 4.9846E-04 3.4556E-04 2.2581E-04
1.7049E-04 1.9573E-04 1.3066E-04 1.1007E-04 1.4885E-04 9.4420E-05
1.7731E-04 9.3409E-05 7.5281E-05 4.8565E-05 1.4022E-04 5.9894E-05
3.6855E-05 4.8798E-05 1.7405E-05 2.5103E-05 2.5085E-05 2.4342E-05
3.7830E-05 1.1205E-05 4.9533E-06 2.2206E-05 5.0575E-06 1.4315E-06
4.4221E-07 2.1665E-07 1.2984E-07 1.1197E-07 1.2533E-07 7.9222E-08
4.8207E-08 2.9786E-08 1.7825E-08 1.0563E-08 1.7191E-08
# DETECTOR NO. 36 ANGLE = 175.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 3.7835E-07 1.1441E-05 7.1589E-05 3.2069E-04 5.9072E-03
1.1362E-01 5.0424E-01 2.9650E-01 3.6687E-02 2.1034E-03 2.3824E-03
2.3643E-03 1.5373E-03 1.0950E-03 9.0216E-04 5.8232E-04 3.0937E-04
1.9418E-04 2.2513E-04 2.5174E-04 3.7938E-04 3.7668E-04 3.6816E-04
2.6841E-04 2.4088E-04 9.4038E-04 1.2670E-03 2.5181E-03 1.6416E-03
1.5187E-03 1.5842E-03 2.2275E-03 2.2738E-03 2.5485E-03 2.6521E-03
2.7587E-03 2.9765E-03 3.1518E-03 3.3321E-03 3.8155E-03 3.8634E-03
3.8329E-03 4.2131E-03 4.2484E-03 4.3953E-03 4.5454E-03 4.4384E-03
4.3055E-03 4.0501E-03 3.9252E-03 3.9979E-03 4.2933E-03 4.2104E-03
7.8070E-03 8.1364E-03 8.0414E-03 7.6252E-03 7.1929E-03 7.2062E-03
7.1945E-03 6.8679E-03 6.1286E-03 5.7872E-03 5.8984E-03 5.1840E-03
4.6260E-03 4.0971E-03 3.6996E-03 3.2870E-03 3.2319E-03 2.6774E-03
2.2376E-03 1.7009E-03 1.5526E-03 1.6186E-03 1.2897E-03 7.4667E-04
5.9701E-04 4.7018E-04 4.7219E-04 4.6062E-04 3.4094E-04 2.4816E-04
1.6731E-04 1.9320E-04 1.3040E-04 1.0584E-04 1.4500E-04 9.1075E-05
1.5279E-04 9.8490E-05 7.8313E-05 5.6966E-05 1.2022E-04 5.5179E-05
3.4974E-05 4.1840E-05 1.7134E-05 2.4323E-05 2.4930E-05 1.8584E-05
4.2462E-05 1.3667E-05 4.8839E-06 1.7358E-05 4.4998E-06 5.5091E-07
3.9295E-07 2.9448E-07 2.7254E-07 2.3974E-07 2.0566E-07 1.2782E-07
7.7551E-08 4.7355E-08 2.8479E-08 1.6972E-08 2.6943E-08
# DETECTOR NO. 35 ANGLE = 170.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 3.6185E-07 9.5040E-06 5.8872E-05 2.8999E-04 4.7439E-03
1.5019E-01 3.5413E-01 2.5513E-01 2.4816E-02 1.7208E-03 1.9255E-03

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Fig. 2.5 Calculated source neutron spectra at 37 angles used in the analyses.

1.9925E-03	1.2381E-03	1.2442E-03	8.6672E-04	5.0687E-04	2.7164E-04
2.0134E-04	1.9040E-04	1.9574E-04	2.9987E-04	2.9225E-04	3.6524E-04
2.8297E-04	2.3123E-04	7.8890E-04	1.0449E-03	1.3277E-03	1.1490E-03
1.1557E-03	1.2977E-03	1.6929E-03	1.7493E-03	2.0090E-03	2.0004E-03
2.1562E-03	2.3733E-03	2.7334E-03	2.7047E-03	2.9446E-03	3.2352E-03
4.5391E-03	3.3228E-03	3.3184E-03	3.7626E-03	3.6943E-03	3.5435E-03
4.8576E-03	3.3648E-03	3.3153E-03	3.2196E-03	3.5733E-03	3.3254E-03
6.7419E-03	6.7177E-03	7.3722E-03	6.3825E-03	6.0115E-03	5.9379E-03
5.6789E-03	5.7026E-03	5.1413E-03	4.6794E-03	5.7318E-03	3.8717E-03
3.7424E-03	3.3807E-03	3.0274E-03	2.6121E-03	2.6261E-03	1.8869E-03
1.7138E-03	1.1776E-03	1.1197E-03	1.7472E-03	1.2439E-03	5.9356E-04
4.4854E-04	3.3661E-04	3.3863E-04	3.3456E-04	2.4365E-04	1.8998E-04
1.1907E-04	1.1157E-04	4.0102E-05	3.6947E-05	1.1068E-04	6.7082E-05
8.6911E-05	4.8253E-05	4.7431E-05	6.2276E-05	7.4372E-05	3.5246E-05
1.7196E-05	2.2051E-05	9.4176E-06	1.8920E-05	1.7962E-05	9.0355E-06
3.3089E-05	8.9171E-06	1.6759E-06	7.9120E-06	1.8300E-06	6.4386E-07
2.3745E-07	1.2144E-07	1.1283E-07	7.6016E-08	4.5987E-08	2.7550E-08
1.6531E-08	9.9574E-09	5.8651E-09	3.3952E-09	4.5389E-09	
# DETECTOR NO. 34	ANGLE = 165.0				
0.0	0.0	0.0	0.0	0.0	0.0
0.0	5.1082E-07	1.1670E-05	7.0606E-05	4.2223E-04	6.0348E-03
2.1281E-01	3.4467E-01	2.7046E-01	1.5885E-02	1.7828E-03	1.8549E-03
1.7356E-03	1.1338E-03	7.8382E-04	6.0876E-04	4.0911E-04	2.3795E-04
1.9771E-04	1.5310E-04	1.7963E-04	2.1663E-04	2.7483E-04	3.0444E-04
2.4874E-04	2.1519E-04	7.7115E-04	1.0766E-03	1.3226E-03	1.0973E-03
1.0457E-03	1.2748E-03	1.7166E-03	1.7760E-03	1.8308E-03	1.9160E-03
2.1251E-03	2.2543E-03	2.5858E-03	2.5611E-03	2.8428E-03	2.9902E-03
2.9110E-03	3.1924E-03	3.2355E-03	3.7441E-03	3.6503E-03	3.3356E-03
3.3900E-03	3.1860E-03	3.0971E-03	3.1019E-03	3.3434E-03	3.1527E-03
6.2305E-03	6.4802E-03	6.4301E-03	6.0320E-03	5.7398E-03	5.7555E-03
5.6117E-03	5.5303E-03	4.9000E-03	4.6177E-03	4.9295E-03	4.0625E-03
3.6606E-03	3.2393E-03	2.9173E-03	2.5212E-03	2.3047E-03	1.9101E-03
1.6915E-03	1.2459E-03	1.1716E-03	1.3675E-03	9.7259E-04	5.6789E-04
4.6392E-04	3.5134E-04	3.2277E-04	2.9870E-04	2.1404E-04	1.7976E-04
1.1890E-04	1.1646E-04	5.0052E-05	5.5373E-05	1.1692E-04	6.9411E-05
1.0414E-04	6.2000E-05	5.1281E-05	8.9099E-05	9.3171E-05	4.3286E-05
2.3677E-05	3.2742E-05	1.0195E-05	2.2316E-05	2.0126E-05	1.3144E-05
3.2913E-05	9.9547E-06	2.7943E-06	7.1506E-06	1.9256E-06	7.2235E-07
6.9051E-07	4.3253E-07	1.8998E-07	5.8739E-08	3.5327E-08	2.1339E-08
1.2501E-08	7.0390E-09	4.0867E-09	2.3189E-09	3.6063E-09	
# DETECTOR NO. 33	ANGLE = 160.0				
0.0	0.0	0.0	0.0	0.0	0.0
0.0	6.7487E-07	1.3181E-05	8.1451E-05	5.1859E-04	9.0841E-03
2.1863E-01	3.9434E-01	2.1507E-01	4.7857E-03	1.3917E-03	1.5682E-03
1.4746E-03	9.7756E-04	7.3315E-04	5.3407E-04	3.6160E-04	1.9848E-04
1.8629E-04	1.4586E-04	1.6584E-04	2.0129E-04	2.0772E-04	2.3660E-04
1.8806E-04	1.9433E-04	6.8231E-04	1.0178E-03	1.2018E-03	9.7392E-04
9.2581E-04	1.1802E-03	1.5383E-03	1.6285E-03	1.5696E-03	1.7448E-03
1.7410E-03	2.0592E-03	2.1806E-03	2.2943E-03	2.4707E-03	2.6902E-03
2.5402E-03	2.8614E-03	2.9290E-03	3.4241E-03	3.2323E-03	2.8926E-03
2.9612E-03	2.8695E-03	2.7537E-03	2.7800E-03	2.9559E-03	2.8356E-03
5.4665E-03	5.8099E-03	5.7228E-03	5.4298E-03	5.2356E-03	5.1995E-03
5.1038E-03	4.9578E-03	4.4405E-03	4.2069E-03	3.8507E-03	3.5177E-03
3.3137E-03	2.8949E-03	2.6330E-03	2.2811E-03	2.0353E-03	1.7130E-03
1.5128E-03	1.1546E-03	1.0909E-03	1.1571E-03	8.3544E-04	5.1003E-04
4.1292E-04	3.1477E-04	2.7525E-04	2.5511E-04	1.8714E-04	1.6139E-04
1.1163E-04	1.1493E-04	4.8959E-05	5.5486E-05	1.1391E-04	6.5659E-05
1.0277E-04	6.4725E-05	5.0868E-05	7.0970E-05	8.3075E-05	4.1826E-05
2.1846E-05	2.7435E-05	8.8435E-06	2.4692E-05	1.9525E-05	1.3839E-05
2.6915E-05	1.1308E-05	3.5200E-06	6.7376E-06	2.1735E-06	3.9223E-07
2.3959E-07	1.4161E-07	7.7039E-08	7.7988E-08	5.0946E-08	3.0675E-08
1.8100E-08	1.0424E-08	6.0555E-09	3.4685E-09	5.3803E-09	
# DETECTOR NO. 32	ANGLE = 155.0				
0.0	0.0	0.0	0.0	0.0	0.0
0.0	8.9791E-07	1.4586E-05	9.5698E-05	5.6608E-04	2.6967E-02
1.9132E-01	3.9240E-01	1.6671E-01	3.8048E-03	1.3617E-03	1.3263E-03
1.2102E-03	8.8958E-04	7.5102E-04	4.8041E-04	3.2739E-04	1.8630E-04
1.9849E-04	1.3412E-04	1.5276E-04	1.7149E-04	1.6488E-04	1.8827E-04
1.4737E-04	1.4125E-04	5.8666E-04	9.2285E-04	1.1113E-03	8.3773E-04
8.4104E-04	1.0331E-03	1.3060E-03	1.4303E-03	1.3361E-03	1.5202E-03
1.5421E-03	1.8882E-03	1.9012E-03	2.0756E-03	2.1427E-03	2.3393E-03
2.3223E-03	2.5239E-03	2.6140E-03	2.9561E-03	2.8357E-03	2.5353E-03
2.6349E-03	2.5420E-03	2.4548E-03	2.4387E-03	2.6031E-03	2.5276E-03
4.8102E-03	5.1441E-03	5.0666E-03	4.8717E-03	4.7288E-03	4.6509E-03
4.5458E-03	4.4021E-03	3.9861E-03	3.7728E-03	3.3999E-03	3.0991E-03
2.9660E-03	2.5794E-03	2.3559E-03	2.0478E-03	1.7990E-03	1.5004E-03
1.3428E-03	1.0309E-03	9.7457E-04	1.0035E-03	7.1358E-04	4.4090E-04
3.6019E-04	2.8148E-04	2.3747E-04	2.1923E-04	1.6562E-04	1.3953E-04
9.6636E-05	1.0480E-04	4.7050E-05	4.9619E-05	1.0190E-04	6.0504E-05
9.2283E-05	5.7845E-05	4.5599E-05	4.8541E-05	6.9290E-05	3.9698E-05
2.0074E-05	2.2337E-05	7.0312E-06	2.2823E-05	1.6930E-05	1.4584E-05
2.2601E-05	8.4404E-06	3.3708E-06	5.5248E-06	1.9803E-06	3.1467E-07
1.1544E-07	1.1136E-07	6.8319E-08	4.0515E-08	3.0920E-08	2.0354E-08
1.3326E-08	6.5807E-09	3.7466E-09	2.0959E-09	2.9469E-09	
# DETECTOR NO. 31	ANGLE = 150.0				
0.0	0.0	0.0	0.0	0.0	0.0
0.0	1.1210E-06	1.5006E-05	1.0060E-04	5.2316E-04	2.2578E-02
2.2494E-01	2.7657E-01	9.8913E-02	3.5616E-03	1.3244E-03	1.1043E-03
9.6955E-04	7.9390E-04	6.9932E-04	4.4349E-04	3.4276E-04	1.8292E-04
2.4814E-04	1.3386E-04	1.4963E-04	1.8128E-04	1.3764E-04	1.6132E-04

Fig. 2.5 Continued

1.2904E-04	1.1531E-04	4.8660E-04	8.5456E-04	1.0188E-03	6.9732E-04
7.4484E-04	9.3855E-04	1.1452E-03	1.2785E-03	1.1886E-03	1.3201E-03
1.3301E-03	1.6687E-03	1.6385E-03	1.8017E-03	1.8697E-03	2.0389E-03
2.0579E-03	2.2140E-03	2.3498E-03	2.6237E-03	2.4751E-03	2.2369E-03
2.3388E-03	2.2566E-03	2.1950E-03	2.1379E-03	2.2828E-03	2.2342E-03
4.2100E-03	4.5225E-03	4.4508E-03	4.3349E-03	4.2050E-03	4.1278E-03
3.9950E-03	3.8727E-03	3.5175E-03	3.3076E-03	2.9602E-03	2.6811E-03
2.6115E-03	2.2597E-03	2.0636E-03	1.8064E-03	1.5735E-03	1.2990E-03
1.1844E-03	9.0201E-04	8.5816E-04	8.6443E-04	6.0849E-04	3.8430E-04
3.1181E-04	2.4748E-04	2.0782E-04	1.8709E-04	1.5327E-04	1.2630E-04
8.5958E-05	9.1331E-05	4.4863E-05	4.5554E-05	8.6432E-05	5.3778E-05
7.8548E-05	4.9696E-05	3.7560E-05	3.3195E-05	5.9252E-05	3.5652E-05
1.7451E-05	2.0285E-05	4.7895E-06	1.8249E-05	1.5183E-05	1.4572E-05
1.9134E-05	7.6785E-06	2.8089E-06	3.6283E-06	1.4016E-06	2.6963E-07
1.1540E-07	4.7313E-08	3.6275E-08	3.7447E-08	3.0101E-08	1.6947E-08
6.5259E-09	2.4384E-09	1.3198E-09	6.9724E-10	1.0038E-09	
# DETECTOR NO. 30	ANGLE = 145.0				
0.0	0.0	0.0	0.0	0.0	0.0
0.0	1.6949E-06	2.1978E-05	1.3643E-04	6.0091E-04	2.3480E-02
2.6318E-01	2.7600E-01	5.4050E-02	3.2500E-03	1.2919E-03	1.0160E-03
8.5611E-04	7.1990E-04	6.3299E-04	4.2210E-04	3.4271E-04	1.9814E-04
2.3532E-04	1.4259E-04	1.4960E-04	1.7688E-04	1.2743E-04	1.2620E-04
1.2203E-04	1.0976E-04	4.6639E-04	8.1490E-04	9.8662E-04	6.6162E-04
7.6308E-04	9.2414E-04	1.1079E-03	1.2367E-03	1.1609E-03	1.2308E-03
1.2418E-03	1.5900E-03	1.5373E-03	1.7221E-03	1.7437E-03	1.8929E-03
1.9941E-03	2.1000E-03	2.2515E-03	2.5008E-03	2.3070E-03	2.1394E-03
2.2162E-03	2.1584E-03	2.1062E-03	2.0473E-03	2.1780E-03	2.1356E-03
4.0013E-03	4.3099E-03	4.2048E-03	4.1103E-03	3.9833E-03	3.9063E-03
3.7788E-03	3.6355E-03	3.3137E-03	3.1030E-03	2.7784E-03	2.5073E-03
2.4569E-03	2.1258E-03	1.9309E-03	1.6933E-03	1.4796E-03	1.2275E-03
1.1158E-03	8.5627E-04	8.1476E-04	8.0224E-04	5.6604E-04	3.5453E-04
2.8569E-04	2.3434E-04	1.9996E-04	1.7166E-04	1.5059E-04	1.1994E-04
8.3085E-05	8.4877E-05	4.9478E-05	4.6774E-05	8.0741E-05	5.2202E-05
7.5314E-05	4.2304E-05	3.3567E-05	2.8351E-05	5.3527E-05	3.0993E-05
1.6388E-05	1.8109E-05	6.9901E-06	1.7221E-05	1.4210E-05	1.3371E-05
1.7076E-05	4.4784E-06	1.5095E-06	4.4346E-06	1.6978E-06	2.6603E-07
8.8200E-08	1.0072E-07	1.4891E-07	1.3208E-07	8.9108E-08	4.9790E-08
2.1794E-08	1.1539E-08	6.7703E-09	3.9349E-09	6.0322E-09	
# DETECTOR NO. 29	ANGLE = 140.0				
0.0	0.0	0.0	0.0	0.0	0.0
8.3758E-09	3.2259E-06	3.6848E-05	1.9696E-04	7.5786E-04	2.8071E-02
3.6635E-01	2.6706E-01	1.7009E-02	2.9138E-03	1.3014E-03	9.8912E-04
7.9827E-04	6.6673E-04	6.0671E-04	4.1567E-04	3.3070E-04	2.1432E-04
2.4904E-04	1.5170E-04	1.5436E-04	1.4332E-04	1.2830E-04	1.1970E-04
1.1459E-04	1.1102E-04	4.7404E-04	8.0617E-04	9.7136E-04	6.5863E-04
8.2244E-04	9.7565E-04	1.0950E-03	1.2550E-03	1.1613E-03	1.2151E-03
1.2302E-03	1.5517E-03	1.5489E-03	1.7214E-03	1.7282E-03	1.8651E-03
2.0120E-03	2.1197E-03	2.2769E-03	2.4929E-03	2.2883E-03	2.1430E-03
2.2366E-03	2.1648E-03	2.0825E-03	2.0127E-03	2.1776E-03	2.1173E-03
3.9451E-03	4.2898E-03	4.1755E-03	4.0607E-03	3.9507E-03	3.8711E-03
3.7580E-03	3.5891E-03	3.2842E-03	3.0715E-03	2.7721E-03	2.4871E-03
2.4433E-03	2.1114E-03	1.9100E-03	1.6739E-03	1.4647E-03	1.2191E-03
1.1111E-03	8.6411E-04	8.1556E-04	7.8804E-04	5.6044E-04	3.4677E-04
2.7549E-04	2.3238E-04	2.0242E-04	1.6774E-04	1.4996E-04	1.1996E-04
8.8578E-05	8.9432E-05	6.1748E-05	5.2939E-05	7.9992E-05	5.4394E-05
7.6257E-05	4.5755E-05	3.6237E-05	3.1611E-05	5.1836E-05	2.7927E-05
1.9274E-05	1.6869E-05	7.9097E-06	1.8214E-05	1.4095E-05	1.1872E-05
1.8913E-05	4.2903E-06	1.3943E-06	6.0019E-06	1.6842E-06	3.9013E-07
2.0573E-07	3.0670E-07	2.9182E-07	1.2486E-07	7.4879E-08	4.5499E-08
2.6566E-08	1.4635E-08	8.5884E-09	4.9522E-09	7.6450E-09	
# DETECTOR NO. 28	ANGLE = 135.0				
0.0	0.0	0.0	0.0	0.0	0.0
6.6301E-08	7.0022E-06	6.0610E-05	3.0120E-04	1.1054E-03	8.7910E-02
4.5054E-01	2.2314E-01	8.7039E-03	2.5413E-03	1.3146E-03	1.0274E-03
7.7033E-04	6.4257E-04	5.1682E-04	3.9690E-04	3.3611E-04	2.2998E-04
2.7166E-04	1.6956E-04	1.6884E-04	1.4875E-04	1.4038E-04	1.3160E-04
1.2650E-04	1.2339E-04	5.1868E-04	8.3099E-04	9.5169E-04	6.6309E-04
8.2152E-04	9.6828E-04	1.1113E-03	1.2520E-03	1.1899E-03	1.2335E-03
1.2741E-03	1.5875E-03	1.6245E-03	1.8029E-03	1.7928E-03	1.9302E-03
2.0497E-03	2.1811E-03	2.3036E-03	2.5041E-03	2.3271E-03	2.1892E-03
2.2790E-03	2.1897E-03	2.0963E-03	2.0463E-03	2.2020E-03	2.1441E-03
3.9834E-03	4.3372E-03	4.2133E-03	4.0817E-03	3.9724E-03	3.9057E-03
3.8220E-03	3.6130E-03	3.3144E-03	3.1137E-03	2.8229E-03	2.5167E-03
2.4615E-03	2.1303E-03	1.9255E-03	1.6999E-03	1.4891E-03	1.2549E-03
1.1354E-03	8.9488E-04	8.3718E-04	7.9595E-04	5.7350E-04	3.4863E-04
2.6964E-04	2.2675E-04	2.0970E-04	1.7849E-04	1.6461E-04	1.2741E-04
9.9796E-05	9.6615E-05	7.5223E-05	5.9055E-05	7.8031E-05	5.5161E-05
7.8496E-05	5.2523E-05	4.4599E-05	3.7881E-05	5.6352E-05	2.7468E-05
1.9952E-05	1.7650E-05	1.0450E-05	1.7764E-05	1.3308E-05	1.2003E-05
1.9138E-05	4.9426E-06	1.1253E-06	6.6121E-06	2.0351E-06	7.2957E-07
1.2222E-06	6.9884E-07	2.5650E-07	1.2777E-07	8.1596E-08	4.9696E-08
2.9194E-08	1.6330E-08	9.6405E-09	5.6648E-09	8.9422E-09	
# DETECTOR NO. 27	ANGLE = 130.0				
0.0	0.0	0.0	0.0	0.0	0.0
2.2355E-07	1.3946E-05	9.7231E-05	4.9304E-04	4.3809E-03	1.5888E-01
5.9957E-01	1.2934E-01	5.9629E-03	2.2007E-03	1.3389E-03	1.0226E-03
7.5445E-04	5.9669E-04	5.2290E-04	3.8106E-04	3.1829E-04	2.3544E-04
2.5732E-04	1.7797E-04	1.7706E-04	1.5935E-04	1.5720E-04	1.4166E-04
1.3660E-04	1.3429E-04	5.6647E-04	8.3879E-04	9.1136E-04	6.5701E-04

Fig. 2.5 Continued

8.6825E-04	9.8927E-04	1.1826E-03	1.3017E-03	1.2510E-03	1.2741E-03
1.3552E-03	1.6826E-03	1.7276E-03	1.9284E-03	1.8946E-03	2.0313E-03
2.1083E-03	2.2246E-03	2.3216E-03	2.5221E-03	2.3616E-03	2.2390E-03
2.3086E-03	2.2094E-03	2.1091E-03	2.0756E-03	2.2469E-03	2.1756E-03
4.0428E-03	4.4142E-03	4.2691E-03	4.1176E-03	4.0365E-03	3.9712E-03
3.9220E-03	3.6633E-03	3.3799E-03	3.1996E-03	2.9137E-03	2.5972E-03
2.5078E-03	2.1761E-03	1.9691E-03	1.7425E-03	1.5346E-03	1.2927E-03
1.1557E-03	9.3503E-04	8.6925E-04	8.1876E-04	6.0651E-04	3.6738E-04
2.8595E-04	2.3679E-04	2.0954E-04	1.7714E-04	1.7163E-04	1.3969E-04
1.1067E-04	1.0034E-04	8.4935E-05	6.6903E-05	7.9046E-05	5.6364E-05
8.5317E-05	5.9717E-05	5.2391E-05	4.5358E-05	5.7759E-05	3.0117E-05
2.6913E-05	2.0625E-05	1.2185E-05	1.8492E-05	1.4476E-05	9.8925E-06
1.8589E-05	5.0499E-06	2.0118E-06	8.0632E-06	3.2367E-06	3.1658E-06
1.1346E-06	3.5995E-07	1.2803E-07	7.6927E-08	5.1571E-08	3.1477E-08
1.8237E-08	9.7204E-09	5.6876E-09	3.2586E-09	5.5706E-09	
# DETECTOR NO. 26	ANGLE = 125.0				
0.0	0.0	0.0	0.0	0.0	0.0
8.5582E-07	2.2739E-05	1.3161E-04	7.7918E-04	6.1183E-03	3.1671E-01
5.9319E-01	1.9254E-02	4.2549E-03	1.8912E-03	1.2685E-03	9.9572E-04
7.1559E-04	5.6036E-04	5.0357E-04	3.6113E-04	2.8606E-04	2.4805E-04
2.5531E-04	1.8159E-04	1.6519E-04	1.5199E-04	1.6071E-04	1.4352E-04
1.3665E-04	1.4310E-04	5.7015E-04	8.1935E-04	9.1369E-04	6.8028E-04
8.9815E-04	1.0154E-03	1.2839E-03	1.3774E-03	1.3314E-03	1.3337E-03
1.4193E-03	1.6866E-03	1.7090E-03	1.9331E-03	1.8861E-03	2.0201E-03
2.0664E-03	2.2012E-03	2.2858E-03	2.4728E-03	2.3247E-03	2.2206E-03
2.2796E-03	2.1704E-03	2.0723E-03	2.0613E-03	2.2326E-03	2.1488E-03
3.9762E-03	4.3459E-03	4.2034E-03	4.0661E-03	3.9872E-03	3.9286E-03
3.8897E-03	3.6131E-03	3.3366E-03	3.1493E-03	2.8801E-03	2.5846E-03
2.4904E-03	2.1592E-03	1.9439E-03	1.7274E-03	1.5326E-03	1.3002E-03
1.1447E-03	9.3905E-04	8.6726E-04	8.1126E-04	6.1134E-04	3.6682E-04
2.8080E-04	2.3767E-04	2.1721E-04	1.8225E-04	1.7178E-04	1.3597E-04
1.0931E-04	1.0084E-04	9.0884E-05	7.4498E-05	6.6072E-05	5.9279E-05
8.6327E-05	5.7765E-05	5.9750E-05	4.8184E-05	5.8773E-05	3.7165E-05
3.1479E-05	1.8343E-05	1.0464E-05	1.7527E-05	1.5228E-05	1.1005E-05
1.9083E-05	5.1425E-06	2.2032E-06	1.0534E-05	6.3183E-06	2.2495E-06
6.1526E-07	1.8923E-07	4.3189E-08	2.6625E-08	2.0829E-08	1.2829E-08
6.9631E-09	2.9984E-09	1.6296E-09	8.2994E-10	1.6024E-09	
# DETECTOR NO. 25	ANGLE = 120.0				
0.0	0.0	0.0	0.0	0.0	0.0
2.2944E-06	3.3811E-05	2.0585E-04	1.5900E-03	7.8871E-03	5.6856E-01
3.4946E-01	7.6500E-03	3.1351E-03	1.6418E-03	1.2196E-03	9.4631E-04
6.8750E-04	5.2345E-04	4.6385E-04	3.3053E-04	2.6771E-04	2.3717E-04
2.3658E-04	1.8547E-04	1.5747E-04	1.4898E-04	1.5736E-04	1.4089E-04
1.3291E-04	1.4087E-04	5.5408E-04	8.4586E-04	9.6960E-04	7.7944E-04
9.8683E-04	1.0752E-03	1.2825E-03	1.3533E-03	1.3243E-03	1.3264E-03
1.4078E-03	1.6601E-03	1.6755E-03	1.8912E-03	1.8535E-03	1.9788E-03
1.9998E-03	2.1421E-03	2.1830E-03	2.3896E-03	2.2551E-03	2.1527E-03
2.2215E-03	2.1034E-03	2.0160E-03	2.0111E-03	2.1694E-03	2.0831E-03
3.8573E-03	4.2221E-03	4.0743E-03	3.9483E-03	3.8728E-03	3.8028E-03
3.7698E-03	3.4982E-03	3.2364E-03	3.0578E-03	2.7958E-03	2.5238E-03
2.4336E-03	2.1076E-03	1.8878E-03	1.6749E-03	1.4965E-03	1.2732E-03
1.1155E-03	9.3412E-04	8.5527E-04	7.7762E-04	5.8585E-04	3.4910E-04
2.7138E-04	2.4068E-04	2.1652E-04	1.7720E-04	1.6964E-04	1.3553E-04
1.0859E-04	1.0309E-04	8.9797E-05	7.1544E-05	8.7058E-05	6.2362E-05
8.9898E-05	6.3702E-05	5.9993E-05	4.5523E-05	5.5730E-05	3.6701E-05
2.9748E-05	1.5837E-05	1.1124E-05	2.2795E-05	1.4229E-05	8.8521E-06
1.9648E-05	5.1785E-06	5.5667E-06	7.2296E-06	6.5238E-06	2.9807E-06
5.7698E-07	1.8522E-07	7.1894E-08	4.5585E-08	3.1981E-08	1.9536E-08
1.0981E-08	5.5515E-09	3.1608E-09	1.7897E-09	2.8533E-09	
# DETECTOR NO. 24	ANGLE = 115.0				
0.0	0.0	0.0	0.0	0.0	1.4415E-08
4.4834E-06	4.7137E-05	3.0702E-04	2.8316E-03	1.8619E-02	8.4279E-01
8.1891E-02	4.7301E-03	2.4430E-03	1.5379E-03	1.1489E-03	8.7505E-04
6.4023E-04	4.8227E-04	4.3108E-04	3.0496E-04	2.5063E-04	2.3437E-04
2.3187E-04	2.0034E-04	1.5201E-04	1.5186E-04	1.6844E-04	1.4502E-04
1.3759E-04	1.4760E-04	5.7055E-04	8.7709E-04	1.0182E-03	8.6560E-04
1.0445E-03	1.1305E-03	1.2765E-03	1.3224E-03	1.3054E-03	1.3152E-03
1.3994E-03	1.6094E-03	1.6300E-03	1.8327E-03	1.8031E-03	1.9288E-03
1.9485E-03	2.0799E-03	2.1175E-03	2.3097E-03	2.2058E-03	2.1046E-03
2.1662E-03	2.0429E-03	1.9604E-03	1.9571E-03	2.0955E-03	2.0126E-03
3.7415E-03	4.1118E-03	3.9645E-03	3.8493E-03	3.7739E-03	3.7071E-03
3.6781E-03	3.4034E-03	3.1671E-03	3.0000E-03	2.7342E-03	2.4611E-03
2.3599E-03	2.0534E-03	1.8559E-03	1.6405E-03	1.4539E-03	1.2337E-03
1.0920E-03	9.2547E-04	8.4566E-04	7.5657E-04	5.7723E-04	3.5307E-04
2.7371E-04	2.2411E-04	1.9684E-04	1.7383E-04	1.7130E-04	1.3713E-04
1.0535E-04	1.0217E-04	9.1919E-05	7.0141E-05	8.3613E-05	6.3252E-05
9.2454E-05	6.7626E-05	5.7599E-05	4.4719E-05	5.5483E-05	3.7441E-05
2.8970E-05	1.6255E-05	1.2075E-05	2.3158E-05	1.5932E-05	9.1442E-06
2.0923E-05	7.3523E-06	7.5554E-06	7.5417E-06	6.3468E-06	1.4703E-06
4.2676E-07	2.5603E-07	1.2244E-07	7.5931E-08	4.9930E-08	3.0287E-08
1.7540E-08	9.4677E-09	5.5093E-09	3.1850E-09	5.2187E-09	
# DETECTOR NO. 23	ANGLE = 110.0				
0.0	0.0	0.0	0.0	0.0	2.8857E-08
8.4050E-06	6.7246E-05	4.9937E-04	6.4064E-03	6.9774E-02	8.8061E-01
6.3306E-03	3.1939E-03	1.9961E-03	1.4631E-03	1.1140E-03	8.1587E-04
5.9222E-04	4.5432E-04	4.0108E-04	2.8284E-04	2.3983E-04	2.5734E-04
2.4407E-04	2.2296E-04	1.8480E-04	1.7862E-04	1.9698E-04	1.7189E-04
1.6452E-04	1.7347E-04	6.6770E-04	9.1612E-04	9.8309E-04	8.9031E-04
1.0275E-03	1.1093E-03	1.2229E-03	1.2982E-03	1.2804E-03	1.2930E-03
1.3701E-03	1.5650E-03	1.6012E-03	1.7724E-03	1.7565E-03	1.8926E-03

Fig. 2.5 Continued

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1.9026E-03 2.0189E-03 2.0568E-03 2.2317E-03 2.1508E-03 2.0385E-03
2.1040E-03 1.9729E-03 1.9102E-03 1.9021E-03 2.0363E-03 1.9592E-03
3.6355E-03 4.0035E-03 3.8620E-03 3.7363E-03 3.6580E-03 3.5985E-03
3.5666E-03 3.2867E-03 3.0703E-03 2.9282E-03 2.6590E-03 2.3968E-03
2.3009E-03 2.0002E-03 1.7962E-03 1.5949E-03 1.4262E-03 1.2106E-03
1.0581E-03 8.9560E-04 8.0717E-04 7.3452E-04 5.5559E-04 3.4747E-04
2.7755E-04 2.2014E-04 1.9227E-04 1.7518E-04 1.6971E-04 1.3485E-04
1.0288E-04 9.6823E-05 8.8290E-05 6.5954E-05 8.0897E-05 6.1697E-05
9.1331E-05 7.1904E-05 5.6933E-05 4.5038E-05 5.0421E-05 3.4796E-05
3.6050E-05 1.9702E-05 1.4569E-05 2.2191E-05 1.3973E-05 8.5006E-06
2.0144E-05 8.7232E-06 6.8648E-06 6.3568E-06 3.9782E-06 2.5051E-06
1.0405E-06 2.5855E-07 1.0838E-07 6.6257E-08 4.3805E-08 2.6631E-08
1.5380E-08 8.2296E-09 4.7720E-09 2.7969E-09 4.7150E-09
# DETECTOR NO. 22 ANGLE = 105.0
0.0 0.0 0.0 0.0 0.0 2.4873E-07
1.3231E-05 9.2865E-05 8.7947E-04 1.3776E-02 5.4827E-01 4.0248E-01
4.2705E-03 2.3002E-03 1.7099E-03 1.4454E-03 1.0989E-03 7.5577E-04
5.4657E-04 4.3171E-04 3.7012E-04 2.7472E-04 2.4669E-04 2.6774E-04
2.4633E-04 2.3636E-04 2.0276E-04 1.9019E-04 2.0703E-04 1.8552E-04
1.7636E-04 1.9123E-04 7.1085E-04 8.9644E-04 9.4240E-04 8.7186E-04
9.8223E-04 1.0780E-03 1.1703E-03 1.2653E-03 1.2398E-03 1.2590E-03
1.3328E-03 1.5008E-03 1.5371E-03 1.7079E-03 1.6953E-03 1.8319E-03
1.8430E-03 1.9497E-03 1.9829E-03 2.1372E-03 2.0793E-03 1.9679E-03
2.0431E-03 1.9088E-03 1.8442E-03 1.8315E-03 1.9621E-03 1.8867E-03
3.5061E-03 3.8795E-03 3.7337E-03 3.6138E-03 3.5382E-03 3.4833E-03
3.4601E-03 3.1937E-03 2.9823E-03 2.8333E-03 2.5601E-03 2.3144E-03
2.2220E-03 1.9272E-03 1.7283E-03 1.5299E-03 1.3665E-03 1.1669E-03
1.0239E-03 8.7194E-04 7.8028E-04 7.0345E-04 5.4430E-04 3.3167E-04
2.6637E-04 2.1845E-04 1.8906E-04 1.6148E-04 1.5728E-04 1.3204E-04
9.6734E-05 8.4057E-05 8.5157E-05 6.6669E-05 7.7763E-05 5.9391E-05
9.3587E-05 6.9867E-05 5.6188E-05 4.3179E-05 4.9298E-05 3.1133E-05
2.9982E-05 2.0273E-05 1.5702E-05 2.0473E-05 1.5198E-05 9.2796E-06
1.8551E-05 1.0498E-05 4.8483E-06 8.7398E-06 2.1959E-06 2.5108E-06
1.0289E-06 1.7426E-07 5.2550E-08 3.2498E-08 2.3054E-08 1.4153E-08
7.8995E-09 3.8570E-09 2.1661E-09 1.1424E-09 2.1773E-09
# DETECTOR NO. 21 ANGLE = 100.0
0.0 0.0 0.0 0.0 0.0 6.7023E-07
2.9288E-05 1.7547E-04 1.8057E-03 2.0560E-02 9.4450E-01 8.1780E-03
2.9787E-03 1.8119E-03 1.5798E-03 1.4520E-03 1.1037E-03 7.3572E-04
5.3950E-04 4.3129E-04 3.7038E-04 2.9151E-04 2.7802E-04 2.6086E-04
2.4018E-04 2.2862E-04 2.0259E-04 1.8758E-04 2.0163E-04 1.8093E-04
1.7206E-04 1.8755E-04 6.9083E-04 8.4623E-04 9.0626E-04 8.6180E-04
9.5096E-04 1.0568E-03 1.1042E-03 1.1929E-03 1.1642E-03 1.2073E-03
1.2854E-03 1.4376E-03 1.5100E-03 1.6570E-03 1.6449E-03 1.7720E-03
1.7847E-03 1.8966E-03 1.9153E-03 2.0644E-03 2.0157E-03 1.9035E-03
1.9710E-03 1.8495E-03 1.7900E-03 1.7761E-03 1.8985E-03 1.8279E-03
3.3926E-03 3.7559E-03 3.6132E-03 3.4788E-03 3.4071E-03 3.3684E-03
3.3436E-03 3.0840E-03 2.8801E-03 2.7284E-03 2.4570E-03 2.2382E-03
2.1482E-03 1.8546E-03 1.6710E-03 1.4796E-03 1.3114E-03 1.1202E-03
9.7835E-04 8.3622E-04 7.5337E-04 6.7702E-04 5.2798E-04 3.1833E-04
2.4811E-04 2.0853E-04 1.8748E-04 1.5595E-04 1.4416E-04 1.2448E-04
9.1237E-05 7.7455E-05 8.2274E-05 6.6356E-05 7.3316E-05 5.3120E-05
8.4060E-05 7.3440E-05 6.0267E-05 4.3339E-05 4.4719E-05 2.7196E-05
2.7864E-05 1.8710E-05 1.5473E-05 1.9280E-05 1.4095E-05 8.9170E-06
1.7487E-05 1.0095E-05 4.8414E-06 8.2697E-06 2.2037E-06 2.5050E-06
1.0648E-06 2.2204E-07 8.2837E-08 5.0716E-08 3.3780E-08 2.0615E-08
1.1878E-08 6.3301E-09 3.6336E-09 2.0456E-09 3.5337E-09
# DETECTOR NO. 20 ANGLE = 95.0
0.0 0.0 0.0 0.0 0.0 1.4046E-06
3.9778E-05 2.5477E-04 3.3630E-03 2.5387E-02 9.5634E-01 6.4895E-03
2.1419E-03 1.4871E-03 1.4673E-03 1.4270E-03 1.0912E-03 7.1690E-04
5.2895E-04 4.2708E-04 3.6821E-04 3.0136E-04 2.8958E-04 2.4770E-04
2.2306E-04 2.2121E-04 1.9980E-04 1.8731E-04 1.9661E-04 1.7747E-04
1.6918E-04 1.8426E-04 6.7558E-04 8.0302E-04 8.5648E-04 8.1939E-04
8.9015E-04 9.9780E-04 1.0439E-03 1.1423E-03 1.1137E-03 1.1570E-03
1.2344E-03 1.3704E-03 1.4148E-03 1.5532E-03 1.5615E-03 1.6768E-03
1.7000E-03 1.8129E-03 1.8290E-03 1.9551E-03 1.9263E-03 1.8264E-03
1.8945E-03 1.7729E-03 1.7197E-03 1.6925E-03 1.8124E-03 1.7424E-03
3.2420E-03 3.5927E-03 3.4370E-03 3.3142E-03 3.2422E-03 3.2039E-03
3.1738E-03 2.9484E-03 2.7409E-03 2.5879E-03 2.3215E-03 2.1129E-03
2.0258E-03 1.7507E-03 1.5692E-03 1.3886E-03 1.2308E-03 1.0486E-03
9.1460E-04 7.8486E-04 7.0981E-04 6.4303E-04 5.0014E-04 2.8954E-04
2.2995E-04 1.9871E-04 1.8200E-04 1.4800E-04 1.2882E-04 1.0521E-04
8.2438E-05 7.8330E-05 7.9630E-05 6.2280E-05 7.0263E-05 5.1060E-05
7.5034E-05 6.2809E-05 5.5296E-05 4.0284E-05 4.1991E-05 2.6341E-05
2.6509E-05 1.4645E-05 1.2265E-05 2.0126E-05 1.3817E-05 7.4286E-06
1.8492E-05 6.2082E-06 5.5262E-06 7.6592E-06 1.6990E-06 9.9804E-07
1.3780E-06 1.0828E-06 2.0834E-07 8.5500E-08 5.1594E-08 3.1123E-08
1.9026E-08 1.2006E-08 7.0108E-09 4.1456E-09 6.9302E-09
# DETECTOR NO. 19 ANGLE = 90.0
0.0 0.0 0.0 0.0 0.0 2.6828E-06
4.9304E-05 4.3044E-04 4.5219E-03 3.6843E-01 6.2044E-01 4.4165E-03
1.6714E-03 1.2353E-03 1.3836E-03 1.3818E-03 1.0702E-03 7.2665E-04
5.2066E-04 4.2389E-04 3.6410E-04 3.2302E-04 3.0313E-04 2.3882E-04
2.1967E-04 2.1217E-04 1.8963E-04 1.8142E-04 1.8838E-04 1.6722E-04
1.5826E-04 1.6668E-04 6.3204E-04 7.3883E-04 8.1574E-04 8.0422E-04
8.5016E-04 9.6558E-04 9.6664E-04 1.0409E-03 1.0134E-03 1.0532E-03
1.1208E-03 1.2207E-03 1.2703E-03 1.3965E-03 1.4004E-03 1.5054E-03
1.5289E-03 1.6224E-03 1.6339E-03 1.7429E-03 1.7278E-03 1.6368E-03

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Fig. 2.5 Continued

1.6871E-03	1.5817E-03	1.5405E-03	1.5197E-03	1.6182E-03	1.5665E-03
2.9085E-03	3.1983E-03	3.0694E-03	2.9755E-03	2.8787E-03	2.8382E-03
2.7967E-03	2.6078E-03	2.4184E-03	2.2669E-03	2.0277E-03	1.8401E-03
1.7767E-03	1.5362E-03	1.3773E-03	1.2101E-03	1.0562E-03	8.9893E-04
8.0050E-04	6.8155E-04	6.1733E-04	5.5606E-04	4.2983E-04	2.5980E-04
2.0319E-04	1.7180E-04	1.5901E-04	1.3691E-04	1.2339E-04	9.7985E-05
7.1828E-05	6.9509E-05	6.9588E-05	5.2570E-05	6.2568E-05	4.8259E-05
6.8236E-05	5.5222E-05	4.2500E-05	3.1273E-05	3.7422E-05	2.3115E-05
2.2281E-05	1.5281E-05	1.0289E-05	1.5313E-05	1.2484E-05	9.1578E-06
1.6309E-05	6.0638E-06	4.8678E-06	6.7599E-06	1.4570E-06	9.0732E-07
1.3230E-06	1.0470E-06	1.9881E-07	8.0852E-08	4.8765E-08	2.9420E-08
1.7933E-08	1.1210E-08	6.6058E-09	3.9022E-09	6.5140E-09	
# DETECTOR NO. 18	ANGLE = 85.0				
0.0	0.0	0.0	0.0	1.0166E-08	5.5161E-06
8.9111E-05	9.0599E-04	6.8726E-03	6.4966E-01	7.3033E-02	3.1960E-03
1.4338E-03	1.1701E-03	1.3489E-03	1.3599E-03	1.0767E-03	7.2983E-04
5.3264E-04	4.1977E-04	3.6503E-04	3.2931E-04	3.0611E-04	2.3516E-04
2.1871E-04	2.1070E-04	1.8664E-04	1.8397E-04	1.9202E-04	1.6646E-04
1.5757E-04	1.6826E-04	6.3366E-04	7.3237E-04	8.3473E-04	8.2533E-04
8.5153E-04	9.8543E-04	9.8212E-04	1.0595E-03	1.0410E-03	1.0816E-03
1.1654E-03	1.2663E-03	1.3201E-03	1.4170E-03	1.4354E-03	1.5281E-03
1.5546E-03	1.6281E-03	1.6405E-03	1.7547E-03	1.7367E-03	1.6520E-03
1.6955E-03	1.6004E-03	1.5535E-03	1.5316E-03	1.6141E-03	1.5723E-03
2.9170E-03	3.1741E-03	3.0198E-03	2.9366E-03	2.7976E-03	2.8100E-03
2.7606E-03	2.5510E-03	2.3652E-03	2.2246E-03	1.9448E-03	1.7463E-03
1.7303E-03	1.5038E-03	1.3386E-03	1.1876E-03	1.0354E-03	8.7665E-04
7.7155E-04	6.5809E-04	6.0815E-04	5.4971E-04	4.2063E-04	2.6302E-04
2.0267E-04	1.7238E-04	1.6174E-04	1.4221E-04	1.2788E-04	1.0105E-04
7.0055E-05	6.7549E-05	7.2033E-05	5.6457E-05	6.5195E-05	4.7695E-05
7.9798E-05	6.1868E-05	4.2659E-05	3.0063E-05	3.6289E-05	2.6279E-05
2.0017E-05	1.5513E-05	1.2495E-05	1.6743E-05	1.0830E-05	7.9878E-06
2.1308E-05	5.9946E-06	5.1503E-06	8.1263E-06	1.2702E-06	7.2907E-07
4.4338E-07	3.6439E-07	5.5582E-07	3.7402E-07	1.8067E-07	2.8611E-08
1.5286E-08	9.5458E-09	5.6370E-09	3.3185E-09	5.5899E-09	
# DETECTOR NO. 17	ANGLE = 80.0				
0.0	0.0	0.0	0.0	2.3878E-08	1.0544E-05
1.8159E-04	1.6538E-03	1.0816E-01	7.1456E-01	1.5762E-02	2.6287E-03
1.3261E-03	1.1602E-03	1.3148E-03	1.3167E-03	1.0841E-03	7.5529E-04
5.5354E-04	4.3299E-04	3.7586E-04	3.4959E-04	3.1741E-04	2.4063E-04
2.3158E-04	2.1510E-04	1.9088E-04	1.9297E-04	1.9441E-04	1.7414E-04
1.6386E-04	1.7360E-04	6.6292E-04	7.4120E-04	8.4013E-04	8.5734E-04
8.7795E-04	1.0191E-03	1.0347E-03	1.1174E-03	1.1055E-03	1.1517E-03
1.2447E-03	1.3279E-03	1.3772E-03	1.4707E-03	1.4973E-03	1.5992E-03
1.6204E-03	1.7024E-03	1.7138E-03	1.8177E-03	1.8126E-03	1.7223E-03
1.7587E-03	1.6764E-03	1.6192E-03	1.5907E-03	1.6772E-03	1.6316E-03
3.0416E-03	3.3236E-03	3.1819E-03	3.0740E-03	2.9742E-03	2.9831E-03
2.9305E-03	2.7131E-03	2.5184E-03	2.3636E-03	2.0752E-03	1.8659E-03
1.8309E-03	1.5909E-03	1.4219E-03	1.2679E-03	1.1063E-03	9.3905E-04
8.2479E-04	7.0931E-04	6.4839E-04	5.8755E-04	4.5714E-04	2.8884E-04
2.2711E-04	1.8667E-04	1.5855E-04	1.3488E-04	1.2288E-04	1.0976E-04
8.7947E-05	8.0806E-05	7.6735E-05	6.2897E-05	7.1697E-05	5.2502E-05
8.7301E-05	6.5613E-05	5.3394E-05	3.8823E-05	3.9314E-05	2.8753E-05
2.3133E-05	1.8132E-05	1.4915E-05	1.9154E-05	1.1728E-05	7.5911E-06
2.0805E-05	9.6445E-06	5.7105E-06	8.5326E-06	1.6539E-06	9.4138E-07
5.5908E-07	2.8838E-07	4.9062E-07	3.3325E-07	1.5755E-07	1.7383E-08
8.5610E-09	5.3897E-09	3.0829E-09	1.7877E-09	3.4571E-09	
# DETECTOR NO. 16	ANGLE = 75.0				
0.0	0.0	0.0	0.0	2.2318E-07	2.2255E-05
3.9825E-04	2.5265E-03	3.5056E-01	5.5144E-01	1.3327E-02	2.3236E-03
1.2385E-03	1.1170E-03	1.2420E-03	1.2400E-03	1.0749E-03	7.8256E-04
5.6608E-04	4.3968E-04	3.7872E-04	3.5368E-04	3.1739E-04	2.4216E-04
2.4465E-04	2.1454E-04	1.9569E-04	2.0039E-04	2.0182E-04	1.7927E-04
1.6839E-04	1.7827E-04	6.7726E-04	7.3764E-04	8.2728E-04	8.5409E-04
8.6874E-04	1.0237E-03	1.0587E-03	1.1269E-03	1.1190E-03	1.1638E-03
1.2530E-03	1.3543E-03	1.3971E-03	1.5003E-03	1.5241E-03	1.6261E-03
1.6411E-03	1.7332E-03	1.7295E-03	1.8282E-03	1.8336E-03	1.7555E-03
1.7895E-03	1.7023E-03	1.6464E-03	1.6209E-03	1.7131E-03	1.6620E-03
3.1089E-03	3.4109E-03	3.2748E-03	3.1455E-03	3.0663E-03	3.0608E-03
3.0054E-03	2.7878E-03	2.5995E-03	2.4583E-03	2.1692E-03	1.9486E-03
1.8820E-03	1.6456E-03	1.4709E-03	1.3131E-03	1.1472E-03	9.8646E-04
8.6628E-04	7.4817E-04	6.8025E-04	6.1160E-04	4.8038E-04	2.9675E-04
2.3276E-04	1.9360E-04	1.6598E-04	1.4068E-04	1.2654E-04	1.1221E-04
9.0381E-05	8.2116E-05	8.0541E-05	6.9845E-05	8.0983E-05	6.1836E-05
9.3860E-05	6.5677E-05	5.6538E-05	4.1692E-05	4.3132E-05	3.1265E-05
2.5027E-05	1.8536E-05	1.9040E-05	1.9259E-05	1.0511E-05	7.5556E-06
2.1955E-05	9.3876E-06	6.5787E-06	9.0364E-06	2.0560E-06	1.1151E-06
6.5154E-07	2.5708E-07	1.0707E-07	6.4376E-08	8.1014E-08	1.2122E-07
7.7811E-08	4.7237E-08	2.8465E-08	1.7090E-08	2.6844E-08	
# DETECTOR NO. 15	ANGLE = 70.0				
0.0	0.0	0.0	0.0	7.7782E-07	5.2595E-05
7.5123E-04	4.7888E-02	5.7281E-01	3.3010E-01	8.9590E-03	2.0751E-03
1.1994E-03	1.0713E-03	1.1364E-03	1.1560E-03	1.0542E-03	7.9346E-04
5.4692E-04	4.3020E-04	3.7762E-04	3.5515E-04	3.0422E-04	2.3629E-04
2.3976E-04	1.9646E-04	1.9345E-04	2.0040E-04	1.9935E-04	1.8046E-04
1.6845E-04	1.7878E-04	6.7576E-04	7.5044E-04	8.4707E-04	8.6777E-04
8.9037E-04	1.0131E-03	1.0346E-03	1.1089E-03	1.1141E-03	1.1598E-03
1.2446E-03	1.3627E-03	1.4025E-03	1.5033E-03	1.5299E-03	1.6211E-03
1.6494E-03	1.7320E-03	1.7293E-03	1.8182E-03	1.8307E-03	1.7591E-03
1.7849E-03	1.7087E-03	1.6499E-03	1.6295E-03	1.7217E-03	1.6746E-03

Fig. 2.5 Continued

3.1275E-03	3.4198E-03	3.2991E-03	3.1711E-03	3.1125E-03	3.0912E-03
3.0324E-03	2.8076E-03	2.6166E-03	2.4834E-03	2.2050E-03	1.9859E-03
1.8982E-03	1.6671E-03	1.4915E-03	1.3296E-03	1.1674E-03	1.0062E-03
8.8371E-04	7.6388E-04	6.8899E-04	6.1848E-04	4.9084E-04	2.9260E-04
2.3361E-04	2.0547E-04	1.7987E-04	1.4753E-04	1.2821E-04	1.1149E-04
9.1668E-05	8.1336E-05	7.8904E-05	7.1644E-05	8.0441E-05	6.0722E-05
9.3289E-05	6.9941E-05	6.5292E-05	4.6837E-05	4.3983E-05	3.1640E-05
2.0825E-05	1.8432E-05	1.9671E-05	2.3562E-05	1.2986E-05	9.0666E-06
2.3192E-05	7.9816E-06	6.9761E-06	9.6681E-06	2.0929E-06	1.1084E-06
5.9873E-07	2.9006E-07	1.3132E-07	7.9156E-08	8.8177E-08	1.2256E-07
7.8423E-08	4.7559E-08	2.8614E-08	1.7126E-08	2.6742E-08	
# DETECTOR NO. 14 ANGLE = 65.0					
0.0	0.0	0.0	0.0	1.9562E-06	1.2755E-04
1.2063E-03	1.9135E-01	6.1978E-01	1.6045E-01	6.3671E-03	1.8480E-03
1.1307E-03	1.0451E-03	1.0358E-03	1.0666E-03	1.0362E-03	8.0016E-04
5.3339E-04	4.1712E-04	3.6654E-04	3.4455E-04	2.8471E-04	2.3380E-04
2.3689E-04	1.9314E-04	1.9577E-04	2.0532E-04	2.0731E-04	1.9018E-04
1.7325E-04	1.8417E-04	6.9621E-04	7.4204E-04	8.3368E-04	8.5276E-04
8.7532E-04	1.0034E-03	1.0412E-03	1.1091E-03	1.1107E-03	1.1556E-03
1.2319E-03	1.3513E-03	1.3846E-03	1.4856E-03	1.5137E-03	1.6017E-03
1.6308E-03	1.7277E-03	1.7248E-03	1.8110E-03	1.8121E-03	1.7514E-03
1.7725E-03	1.7052E-03	1.6309E-03	1.6149E-03	1.7132E-03	1.6658E-03
3.1046E-03	3.4110E-03	3.2979E-03	3.1550E-03	3.1200E-03	3.0953E-03
3.0338E-03	2.8073E-03	2.6136E-03	2.4853E-03	2.2143E-03	1.9892E-03
1.8933E-03	1.6677E-03	1.5037E-03	1.3422E-03	1.1744E-03	1.0117E-03
8.8660E-04	7.7632E-04	7.0185E-04	6.1751E-04	4.8891E-04	2.8975E-04
2.3363E-04	2.1094E-04	1.8258E-04	1.5218E-04	1.2861E-04	1.0813E-04
9.7056E-05	8.6960E-05	8.0155E-05	7.1826E-05	7.8111E-05	6.1098E-05
9.2801E-05	7.0573E-05	6.4900E-05	4.7292E-05	4.2566E-05	3.2921E-05
2.4179E-05	1.9804E-05	1.9515E-05	2.3860E-05	1.4156E-05	1.0367E-05
2.0492E-05	1.0410E-05	7.4388E-06	8.5969E-06	1.5732E-06	8.5457E-07
5.1938E-07	2.4669E-07	1.0740E-07	6.4748E-08	3.9023E-08	2.3383E-08
1.4071E-08	8.5408E-09	4.9476E-09	2.7333E-09	4.7424E-09	
# DETECTOR NO. 13 ANGLE = 60.0					
0.0	0.0	0.0	0.0	5.9532E-06	2.6198E-04
1.4414E-02	3.3191E-01	5.5806E-01	7.9752E-02	4.7307E-03	1.6740E-03
1.0805E-03	1.0206E-03	9.3813E-04	9.9104E-04	1.0087E-03	7.8931E-04
5.1065E-04	3.8443E-04	3.4150E-04	3.2008E-04	2.6003E-04	2.4655E-04
2.4155E-04	2.0105E-04	1.9932E-04	2.1921E-04	2.2135E-04	2.0344E-04
1.8524E-04	1.9041E-04	7.4509E-04	7.5728E-04	8.3953E-04	8.5940E-04
8.8859E-04	9.9778E-04	1.0280E-03	1.0903E-03	1.1018E-03	1.1433E-03
1.2263E-03	1.3371E-03	1.3819E-03	1.4658E-03	1.5080E-03	1.5765E-03
1.6227E-03	1.7199E-03	1.7083E-03	1.7803E-03	1.7907E-03	1.7470E-03
1.7588E-03	1.6962E-03	1.6207E-03	1.6113E-03	1.7090E-03	1.6555E-03
3.0851E-03	3.4021E-03	3.2957E-03	3.1183E-03	3.0875E-03	3.0743E-03
3.0192E-03	2.7912E-03	2.5943E-03	2.4662E-03	2.2127E-03	1.9926E-03
1.8760E-03	1.6447E-03	1.4916E-03	1.3451E-03	1.1843E-03	1.0199E-03
8.8048E-04	7.5858E-04	6.9201E-04	6.2460E-04	4.9639E-04	2.9693E-04
2.4041E-04	2.0869E-04	1.8176E-04	1.6059E-04	1.3826E-04	1.1435E-04
1.0208E-04	9.0115E-05	8.1079E-05	7.6198E-05	7.9405E-05	5.6080E-05
8.3967E-05	6.5998E-05	6.5094E-05	4.6335E-05	4.5554E-05	2.9622E-05
2.1753E-05	1.8346E-05	2.1639E-05	2.5875E-05	1.9038E-05	1.1490E-05
2.0781E-05	1.1063E-05	4.9804E-06	9.3706E-06	1.3486E-06	7.0381E-07
4.2008E-07	2.0875E-07	8.7309E-08	5.2502E-08	3.1486E-08	1.8896E-08
1.1396E-08	6.9027E-09	3.8807E-09	2.1421E-09	3.8837E-09	
# DETECTOR NO. 12 ANGLE = 55.0					
0.0	0.0	0.0	0.0	1.0534E-05	4.4914E-04
1.0360E-01	3.9431E-01	4.5995E-01	4.1881E-02	3.7296E-03	1.5312E-03
1.0673E-03	9.6853E-04	8.6461E-04	9.1042E-04	9.7229E-04	7.8333E-04
4.9395E-04	3.5350E-04	3.1187E-04	2.9130E-04	2.3041E-04	2.4749E-04
2.3849E-04	2.0849E-04	2.0425E-04	2.2271E-04	2.3291E-04	2.1382E-04
1.9354E-04	1.9858E-04	7.6865E-04	7.7927E-04	8.7092E-04	8.8183E-04
9.2347E-04	1.0026E-03	1.0176E-03	1.0749E-03	1.0825E-03	1.1210E-03
1.1982E-03	1.3280E-03	1.3668E-03	1.4442E-03	1.4927E-03	1.5537E-03
1.6002E-03	1.7090E-03	1.6875E-03	1.7623E-03	1.7645E-03	1.7236E-03
1.7336E-03	1.6827E-03	1.6075E-03	1.6019E-03	1.6981E-03	1.6504E-03
3.0738E-03	3.3814E-03	3.2615E-03	3.0775E-03	3.0590E-03	3.0505E-03
3.0073E-03	2.7769E-03	2.5694E-03	2.4419E-03	2.1988E-03	1.9854E-03
1.8687E-03	1.6393E-03	1.4838E-03	1.3380E-03	1.1798E-03	1.0063E-03
8.6956E-04	7.5608E-04	6.9336E-04	6.3247E-04	5.0724E-04	2.9806E-04
2.3863E-04	2.0210E-04	1.7402E-04	1.5606E-04	1.3090E-04	1.1074E-04
9.9812E-05	8.8783E-05	8.6213E-05	8.1647E-05	7.6750E-05	5.2700E-05
8.1286E-05	6.8496E-05	7.2987E-05	4.9490E-05	4.5489E-05	2.9095E-05
2.3067E-05	1.9540E-05	2.0037E-05	2.3146E-05	1.7797E-05	1.3401E-05
2.2731E-05	9.6903E-06	6.8688E-06	8.7348E-06	1.2134E-06	3.5725E-07
2.4049E-07	2.1997E-07	1.6912E-07	1.0378E-07	6.2541E-08	3.7647E-08
2.2737E-08	1.3700E-08	7.9958E-09	4.6399E-09	7.7541E-09	
# DETECTOR NO. 11 ANGLE = 50.0					
0.0	0.0	0.0	0.0	2.9960E-05	1.0799E-03
2.0287E-01	4.2829E-01	3.4188E-01	3.1311E-02	2.8746E-03	1.4187E-03
1.0827E-03	9.3500E-04	8.0656E-04	8.5483E-04	9.4226E-04	7.7785E-04
4.7988E-04	3.3737E-04	2.8232E-04	2.6826E-04	2.2865E-04	2.3055E-04
2.2224E-04	1.9600E-04	1.8977E-04	2.0760E-04	2.2084E-04	2.0433E-04
1.8394E-04	1.9514E-04	7.3193E-04	7.6984E-04	9.0637E-04	9.0276E-04
9.5760E-04	1.0159E-03	1.0244E-03	1.0765E-03	1.0786E-03	1.1123E-03
1.1828E-03	1.3297E-03	1.3569E-03	1.4346E-03	1.4856E-03	1.5516E-03
1.5901E-03	1.6960E-03	1.6715E-03	1.7349E-03	1.7403E-03	1.7009E-03
1.7139E-03	1.6615E-03	1.5935E-03	1.5962E-03	1.6924E-03	1.6419E-03
3.0607E-03	3.3648E-03	3.2370E-03	3.0458E-03	3.0329E-03	3.0235E-03

Fig. 2.5 Continued

2.9858E-03	2.7584E-03	2.5523E-03	2.4249E-03	2.1785E-03	1.9525E-03
1.8354E-03	1.6336E-03	1.4832E-03	1.3306E-03	1.1709E-03	1.0042E-03
8.7870E-04	7.5714E-04	6.8492E-04	6.2603E-04	5.1249E-04	2.9945E-04
2.2841E-04	1.9410E-04	1.7445E-04	1.5113E-04	1.2869E-04	1.1623E-04
1.0409E-04	9.4238E-05	8.6824E-05	7.7165E-05	7.4482E-05	5.7007E-05
9.1044E-05	7.2310E-05	6.3841E-05	4.5727E-05	4.5969E-05	3.2256E-05
2.3603E-05	1.7262E-05	2.1740E-05	2.3276E-05	1.5754E-05	1.6049E-05
2.4448E-05	8.9675E-06	6.5154E-06	8.4586E-06	1.3307E-06	4.0630E-07
2.6942E-07	2.3497E-07	1.7611E-07	1.0784E-07	6.5000E-08	3.9156E-08
2.3556E-08	1.4243E-08	8.3154E-09	4.8047E-09	8.0264E-09	
* DETECTOR NO. 10 ANGLE = 45.0					
0.0	0.0	0.0	0.0	5.9828E-05	3.1221E-02
2.6880E-01	4.4411E-01	2.6127E-01	8.6141E-03	2.3038E-03	1.3610E-03
1.1030E-03	8.9468E-04	7.4529E-04	8.1224E-04	9.1756E-04	7.7524E-04
4.7823E-04	3.0710E-04	2.6233E-04	2.4956E-04	2.2194E-04	2.0771E-04
2.0422E-04	1.7785E-04	1.7364E-04	1.9002E-04	2.0733E-04	1.8931E-04
1.7044E-04	1.7926E-04	6.8096E-04	7.4221E-04	9.0116E-04	8.9378E-04
9.5723E-04	1.0062E-03	1.0498E-03	1.0997E-03	1.0933E-03	1.1347E-03
1.1933E-03	1.3269E-03	1.3579E-03	1.4277E-03	1.4841E-03	1.5452E-03
1.5858E-03	1.6852E-03	1.6446E-03	1.7124E-03	1.7103E-03	1.6780E-03
1.6951E-03	1.6444E-03	1.5752E-03	1.5845E-03	1.6794E-03	1.6312E-03
3.0316E-03	3.3351E-03	3.2137E-03	3.0248E-03	3.0167E-03	2.9925E-03
2.9527E-03	2.7297E-03	2.5412E-03	2.4071E-03	2.1436E-03	1.9214E-03
1.8109E-03	1.6221E-03	1.4795E-03	1.3335E-03	1.1622E-03	9.9937E-04
8.7974E-04	7.6241E-04	6.9005E-04	6.1246E-04	4.9454E-04	2.9491E-04
2.3394E-04	1.9833E-04	1.7511E-04	1.4793E-04	1.2522E-04	1.1638E-04
1.0237E-04	9.5500E-05	8.6911E-05	8.0443E-05	7.8750E-05	5.7068E-05
8.3543E-05	7.4430E-05	6.7446E-05	5.1181E-05	4.6957E-05	3.1365E-05
2.3033E-05	1.6642E-05	2.0401E-05	2.0789E-05	1.5248E-05	1.2511E-05
2.5409E-05	9.0416E-06	6.0714E-06	9.0294E-06	2.6953E-06	9.3249E-07
2.5819E-07	1.7280E-07	1.3520E-07	8.3016E-08	5.0045E-08	3.0050E-08
1.8023E-08	1.0855E-08	6.3268E-09	3.6719E-09	6.0908E-09	
* DETECTOR NO. 9 ANGLE = 40.0					
0.0	0.0	0.0	0.0	1.3996E-04	1.0331E-01
2.8163E-01	4.6378E-01	1.6850E-01	7.1715E-03	1.9089E-03	1.3190E-03
1.1338E-03	8.5898E-04	6.9993E-04	7.8126E-04	8.9814E-04	7.6692E-04
4.7796E-04	2.9565E-04	2.5043E-04	2.4040E-04	2.1936E-04	1.9152E-04
1.9310E-04	1.6345E-04	1.6161E-04	1.7706E-04	1.9853E-04	1.7757E-04
1.5871E-04	1.7462E-04	6.4380E-04	7.1504E-04	8.6012E-04	8.5586E-04
9.2161E-04	9.7908E-04	1.0783E-03	1.1219E-03	1.1054E-03	1.1444E-03
1.1942E-03	1.3285E-03	1.3615E-03	1.4330E-03	1.4852E-03	1.5481E-03
1.5741E-03	1.6717E-03	1.6370E-03	1.6978E-03	1.6889E-03	1.6592E-03
1.6804E-03	1.6353E-03	1.5566E-03	1.5768E-03	1.6708E-03	1.6243E-03
3.0117E-03	3.3042E-03	3.1761E-03	2.9987E-03	2.9907E-03	2.9598E-03
2.9280E-03	2.7098E-03	2.5171E-03	2.3856E-03	2.1321E-03	1.9087E-03
1.8036E-03	1.6182E-03	1.4688E-03	1.3150E-03	1.1414E-03	9.7603E-04
8.6670E-04	7.7426E-04	6.9665E-04	6.0340E-04	4.8056E-04	2.8773E-04
2.3921E-04	2.0155E-04	1.7450E-04	1.5123E-04	1.2805E-04	1.1154E-04
9.3509E-05	8.7624E-05	8.4361E-05	8.2482E-05	8.0636E-05	5.8733E-05
9.2101E-05	7.4686E-05	6.7448E-05	4.8317E-05	4.7162E-05	3.4191E-05
2.3325E-05	1.7143E-05	2.0718E-05	2.1674E-05	1.3023E-05	1.2117E-05
2.4798E-05	1.3958E-05	6.1917E-06	8.2243E-06	2.4272E-06	8.3598E-07
2.0562E-07	2.0224E-07	1.5484E-07	9.4669E-08	5.7097E-08	3.4255E-08
2.0626E-08	1.2315E-08	7.1074E-09	4.0827E-09	6.8717E-09	
* DETECTOR NO. 8 ANGLE = 35.0					
0.0	0.0	0.0	0.0	4.1913E-04	1.5996E-01
3.0105E-01	4.3809E-01	1.1940E-01	6.4152E-03	1.6222E-03	1.3283E-03
1.1491E-03	8.1603E-04	6.8095E-04	7.4528E-04	8.9898E-04	7.6990E-04
4.7809E-04	2.9282E-04	2.4285E-04	2.3599E-04	2.0814E-04	1.7588E-04
1.7058E-04	1.5014E-04	1.4986E-04	1.6306E-04	1.8668E-04	1.6549E-04
1.4603E-04	1.6300E-04	5.9247E-04	6.9080E-04	8.1929E-04	8.1899E-04
8.9359E-04	9.4978E-04	1.0647E-03	1.0973E-03	1.0853E-03	1.1233E-03
1.1846E-03	1.3391E-03	1.3924E-03	1.4501E-03	1.5003E-03	1.5621E-03
1.5794E-03	1.6683E-03	1.6326E-03	1.6905E-03	1.6764E-03	1.6491E-03
1.6659E-03	1.6197E-03	1.5347E-03	1.5594E-03	1.6564E-03	1.6091E-03
2.9835E-03	3.2754E-03	3.1564E-03	2.9920E-03	2.9681E-03	2.9339E-03
2.9043E-03	2.6837E-03	2.4896E-03	2.3512E-03	2.1032E-03	1.8944E-03
1.7980E-03	1.6152E-03	1.4551E-03	1.2959E-03	1.1272E-03	9.6810E-04
8.5145E-04	7.4843E-04	6.8634E-04	6.0530E-04	4.8117E-04	2.8667E-04
2.3559E-04	2.0274E-04	1.7747E-04	1.5195E-04	1.2465E-04	1.0979E-04
9.5892E-05	8.3639E-05	7.6711E-05	7.8702E-05	8.0279E-05	6.3120E-05
1.0108E-04	7.9701E-05	6.9887E-05	4.6751E-05	3.9903E-05	3.0345E-05
2.4885E-05	2.1616E-05	2.0341E-05	2.4461E-05	1.3215E-05	8.7597E-06
2.2180E-05	9.7950E-06	7.7113E-06	8.9265E-06	3.5902E-06	1.1282E-06
3.5944E-07	1.5413E-07	1.1587E-07	7.1016E-08	4.2723E-08	2.5589E-08
1.5301E-08	8.8523E-09	5.1182E-09	2.8637E-09	4.8088E-09	
* DETECTOR NO. 7 ANGLE = 30.0					
0.0	0.0	0.0	0.0	5.7086E-03	2.0313E-01
3.4256E-01	3.5342E-01	1.1747E-01	6.0931E-03	1.4287E-03	1.4204E-03
1.1384E-03	7.7202E-04	6.7450E-04	7.2070E-04	8.9082E-04	7.7423E-04
4.7798E-04	2.8679E-04	2.3616E-04	2.3275E-04	2.0146E-04	1.6525E-04
1.6174E-04	1.4281E-04	1.4237E-04	1.5778E-04	1.7932E-04	1.5983E-04
1.3940E-04	1.5677E-04	5.6929E-04	6.6617E-04	7.8352E-04	7.8659E-04
8.5941E-04	9.2590E-04	1.0342E-03	1.0732E-03	1.0652E-03	1.0973E-03
1.1479E-03	1.3096E-03	1.3893E-03	1.4300E-03	1.4801E-03	1.5339E-03
1.5829E-03	1.6731E-03	1.6451E-03	1.7007E-03	1.6850E-03	1.6530E-03
1.6677E-03	1.6241E-03	1.5243E-03	1.5507E-03	1.6476E-03	1.5910E-03
2.9444E-03	3.2511E-03	3.1372E-03	2.9650E-03	2.9302E-03	2.8942E-03
2.8695E-03	2.6609E-03	2.4700E-03	2.3426E-03	2.1016E-03	1.8753E-03

Fig. 2.5 Continued

1.7698E-03	1.5920E-03	1.4435E-03	1.2843E-03	1.1163E-03	9.5419E-04
8.3201E-04	7.2743E-04	6.7339E-04	5.9617E-04	4.7903E-04	2.8857E-04
2.3697E-04	2.0056E-04	1.7503E-04	1.5399E-04	1.2891E-04	1.1010E-04
9.7865E-05	8.9814E-05	8.0720E-05	7.8833E-05	7.6789E-05	5.9752E-05
8.7582E-05	7.5921E-05	7.3410E-05	4.8773E-05	4.0289E-05	3.0871E-05
2.7906E-05	2.9608E-05	2.0883E-05	1.9881E-05	1.0227E-05	6.9839E-06
2.1185E-05	9.5356E-06	4.9158E-06	8.7448E-06	4.6806E-06	1.2961E-06
8.3175E-07	3.8999E-07	1.7327E-07	6.5953E-08	3.9684E-08	2.3774E-08
1.4209E-08	8.1587E-09	4.7467E-09	2.6400E-09	4.5597E-09	
# DETECTOR NO.	6	ANGLE = 25.0			
0.0	0.0	0.0	0.0	3.8666E-02	2.2939E-01
3.3095E-01	3.3021E-01	9.3995E-02	5.7748E-03	1.3284E-03	1.5651E-03
1.1285E-03	7.3454E-04	6.8679E-04	7.1726E-04	8.8338E-04	7.8329E-04
4.9505E-04	2.8394E-04	2.3034E-04	2.1753E-04	1.9359E-04	1.5405E-04
1.4901E-04	1.3575E-04	1.3328E-04	1.4897E-04	1.6912E-04	1.5314E-04
1.3019E-04	1.5184E-04	5.4781E-04	6.4799E-04	7.5490E-04	7.5899E-04
8.3096E-04	9.1007E-04	1.0036E-03	1.0466E-03	1.0406E-03	1.0637E-03
1.1182E-03	1.2864E-03	1.3749E-03	1.4145E-03	1.4632E-03	1.5146E-03
1.5819E-03	1.6683E-03	1.6411E-03	1.6883E-03	1.6725E-03	1.6440E-03
1.6606E-03	1.6219E-03	1.5220E-03	1.5454E-03	1.6419E-03	1.5849E-03
2.9275E-03	3.2433E-03	3.1182E-03	2.9351E-03	2.9160E-03	2.8715E-03
2.8305E-03	2.6224E-03	2.4450E-03	2.3252E-03	2.0954E-03	1.8628E-03
1.7558E-03	1.5741E-03	1.4265E-03	1.2648E-03	1.1047E-03	9.5547E-04
8.3558E-04	7.2603E-04	6.5534E-04	5.7904E-04	4.7082E-04	2.7838E-04
2.2548E-04	1.9047E-04	1.7006E-04	1.5598E-04	1.3475E-04	1.1748E-04
1.0489E-04	9.0442E-05	8.1647E-05	7.7728E-05	7.5620E-05	5.6844E-05
8.9702E-05	8.0144E-05	6.8059E-05	4.5187E-05	4.1228E-05	3.0566E-05
2.3431E-05	2.2742E-05	2.1660E-05	2.0622E-05	1.1209E-05	8.4085E-06
1.7808E-05	1.0298E-05	5.2494E-06	8.2153E-06	3.5754E-06	1.5450E-06
8.7961E-07	4.7170E-07	2.2520E-07	9.7260E-08	5.8581E-08	3.5205E-08
2.1067E-08	1.2426E-08	7.2480E-09	4.1349E-09	7.0998E-09	
# DETECTOR NO.	5	ANGLE = 20.0			
0.0	0.0	0.0	0.0	7.6544E-02	2.2132E-01
3.1814E-01	3.8291E-01	3.4905E-02	5.8395E-03	1.2750E-03	1.7827E-03
1.1025E-03	6.8570E-04	6.8120E-04	7.3260E-04	8.7682E-04	7.9218E-04
5.0512E-04	2.8311E-04	2.1602E-04	2.2385E-04	1.9659E-04	1.5251E-04
1.4793E-04	1.3661E-04	1.3285E-04	1.5120E-04	1.7352E-04	1.5529E-04
1.3504E-04	1.5183E-04	5.4516E-04	6.1833E-04	7.1022E-04	7.2093E-04
7.9448E-04	8.9578E-04	9.8190E-04	1.0184E-03	1.0287E-03	1.0290E-03
1.0924E-03	1.2622E-03	1.3534E-03	1.3981E-03	1.4492E-03	1.4955E-03
1.5684E-03	1.6488E-03	1.6149E-03	1.6691E-03	1.6561E-03	1.6225E-03
1.6345E-03	1.6064E-03	1.5180E-03	1.5344E-03	1.6301E-03	1.5749E-03
2.9180E-03	3.2297E-03	3.0938E-03	2.9176E-03	2.9116E-03	2.8641E-03
2.8057E-03	2.6012E-03	2.4296E-03	2.3015E-03	2.0661E-03	1.8448E-03
1.7446E-03	1.5571E-03	1.4156E-03	1.2644E-03	1.1025E-03	9.3544E-04
8.1769E-04	7.1642E-04	6.4228E-04	5.6621E-04	4.5696E-04	2.7154E-04
2.3180E-04	1.9441E-04	1.7134E-04	1.5510E-04	1.3729E-04	1.2175E-04
1.0496E-04	8.5439E-05	7.7958E-05	7.7721E-05	7.3330E-05	5.3915E-05
9.8865E-05	7.0046E-05	6.6897E-05	4.5110E-05	4.3305E-05	3.3620E-05
2.5810E-05	1.9527E-05	1.8963E-05	1.9758E-05	1.2475E-05	9.2707E-06
1.8139E-05	1.1218E-05	5.3872E-06	6.1711E-06	2.0929E-06	1.4805E-06
1.1278E-06	6.5364E-07	3.3031E-07	1.5163E-07	9.0138E-08	5.4359E-08
3.2685E-08	1.9477E-08	1.1495E-08	6.7662E-09	1.1124E-08	
# DETECTOR NO.	4	ANGLE = 15.0			
0.0	0.0	0.0	0.0	9.1941E-02	2.6806E-01
3.5410E-01	2.8455E-01	3.2023E-02	4.8461E-03	1.2358E-03	2.0603E-03
1.0759E-03	6.7031E-04	6.6643E-04	7.3884E-04	8.9195E-04	7.9234E-04
5.2071E-04	2.8768E-04	2.0132E-04	2.2158E-04	1.9788E-04	1.4742E-04
1.4473E-04	1.3321E-04	1.2870E-04	1.5005E-04	1.7026E-04	1.5342E-04
1.3192E-04	1.4871E-04	5.3126E-04	6.0732E-04	6.9376E-04	7.0117E-04
7.7627E-04	8.9176E-04	9.6989E-04	9.9074E-04	1.0226E-03	1.0021E-03
1.0707E-03	1.2298E-03	1.3213E-03	1.3779E-03	1.4275E-03	1.4615E-03
1.5526E-03	1.6304E-03	1.5927E-03	1.6467E-03	1.6342E-03	1.5957E-03
1.6134E-03	1.5853E-03	1.5077E-03	1.5228E-03	1.6144E-03	1.5653E-03
2.9025E-03	3.2096E-03	3.0809E-03	2.9141E-03	2.8996E-03	2.8396E-03
2.7857E-03	2.5861E-03	2.4237E-03	2.2855E-03	2.0432E-03	1.8232E-03
1.7259E-03	1.5415E-03	1.4042E-03	1.2598E-03	1.0975E-03	9.2556E-04
8.0663E-04	7.0323E-04	6.2446E-04	5.6185E-04	4.5837E-04	2.6533E-04
2.2894E-04	1.9414E-04	1.7044E-04	1.5106E-04	1.3568E-04	1.2392E-04
1.0823E-04	8.4122E-05	7.4565E-05	7.3861E-05	7.2207E-05	5.2297E-05
9.5607E-05	6.7757E-05	6.2308E-05	4.4581E-05	4.7764E-05	3.4515E-05
2.5261E-05	1.7102E-05	1.5735E-05	1.8448E-05	1.2361E-05	1.0694E-05
1.9815E-05	1.1722E-05	7.1133E-06	6.4887E-06	1.8255E-06	1.0600E-06
9.2490E-07	6.6269E-07	4.1861E-07	2.0459E-07	1.2210E-07	7.3560E-08
4.4279E-08	2.6361E-08	1.5602E-08	9.1799E-09	1.5191E-08	
# DETECTOR NO.	3	ANGLE = 10.0			
0.0	0.0	0.0	0.0	1.1642E-01	2.4857E-01
3.7951E-01	2.5645E-01	3.1773E-02	5.0555E-03	1.1759E-03	2.3546E-03
1.0686E-03	6.6974E-04	6.5115E-04	7.2396E-04	9.2523E-04	8.2654E-04
5.2118E-04	2.7361E-04	2.0154E-04	2.2045E-04	1.9246E-04	1.4187E-04
1.3708E-04	1.2634E-04	1.2305E-04	1.4648E-04	1.6297E-04	1.4879E-04
1.2701E-04	1.4336E-04	5.1024E-04	5.9242E-04	6.7615E-04	6.8078E-04
7.5623E-04	8.8024E-04	9.5945E-04	9.7981E-04	1.0240E-03	9.9095E-04
1.0535E-03	1.2090E-03	1.2945E-03	1.3748E-03	1.4029E-03	1.4366E-03
1.5434E-03	1.6300E-03	1.5819E-03	1.6339E-03	1.6272E-03	1.5797E-03
1.6010E-03	1.5715E-03	1.5045E-03	1.5171E-03	1.6040E-03	1.5597E-03
2.8824E-03	3.1881E-03	3.0645E-03	2.9009E-03	2.8743E-03	2.8130E-03
2.7800E-03	2.5844E-03	2.4068E-03	2.2711E-03	2.0330E-03	1.8064E-03
1.7137E-03	1.5327E-03	1.3928E-03	1.2488E-03	1.0872E-03	9.1786E-04

Fig. 2.5 Continued

8.0149E-04	7.0332E-04	6.3267E-04	5.7016E-04	4.5988E-04	2.5871E-04
2.2756E-04	1.9569E-04	1.6185E-04	1.4402E-04	1.3226E-04	1.2078E-04
1.0637E-04	8.5644E-05	7.3601E-05	7.2192E-05	7.0134E-05	5.1037E-05
8.9122E-05	6.9435E-05	6.3116E-05	4.7055E-05	4.7573E-05	3.1909E-05
2.5920E-05	1.8250E-05	1.6779E-05	1.7771E-05	9.5596E-06	8.6683E-06
2.3414E-05	1.2816E-05	7.3184E-06	7.6131E-06	1.4451E-06	7.4222E-07
3.5597E-07	1.8033E-07	1.8698E-07	2.3515E-07	2.0601E-07	1.2793E-07
7.7138E-08	4.6172E-08	2.7579E-08	1.6328E-08	2.6362E-08	
# DETECTOR NO. 2	ANGLE = 5.0				
0.0	0.0	0.0	0.0	1.4266E-01	2.2369E-01
4.0507E-01	2.3227E-01	3.1489E-02	5.3793E-03	1.1292E-03	2.5848E-03
1.0645E-03	6.4579E-04	6.5864E-04	7.1080E-04	9.4891E-04	8.6205E-04
5.2667E-04	2.5473E-04	2.0836E-04	2.1582E-04	1.8610E-04	1.3986E-04
1.3221E-04	1.2093E-04	1.2374E-04	1.4268E-04	1.5861E-04	1.4520E-04
1.2411E-04	1.3578E-04	4.9796E-04	6.0630E-04	6.8574E-04	6.8783E-04
7.5621E-04	8.7105E-04	9.4153E-04	9.6907E-04	1.0076E-03	9.8066E-04
1.0426E-03	1.2051E-03	1.2847E-03	1.3882E-03	1.3985E-03	1.4358E-03
1.5403E-03	1.6277E-03	1.5742E-03	1.6337E-03	1.6307E-03	1.5723E-03
1.5991E-03	1.5654E-03	1.5048E-03	1.5144E-03	1.5942E-03	1.5624E-03
2.8944E-03	3.2043E-03	3.0698E-03	2.8950E-03	2.8734E-03	2.8135E-03
2.7915E-03	2.5905E-03	2.4036E-03	2.2680E-03	2.0441E-03	1.8205E-03
1.7223E-03	1.5388E-03	1.3907E-03	1.2428E-03	1.0760E-03	9.2398E-04
8.1254E-04	7.1105E-04	6.4340E-04	5.7403E-04	4.5807E-04	2.5445E-04
2.2634E-04	2.0022E-04	1.6712E-04	1.4737E-04	1.3227E-04	1.1642E-04
9.7519E-05	8.0751E-05	7.2335E-05	7.2465E-05	7.1767E-05	5.1826E-05
9.0182E-05	7.0994E-05	6.2513E-05	4.8815E-05	4.4413E-05	3.0197E-05
2.8196E-05	1.9477E-05	1.7146E-05	1.7372E-05	9.2661E-06	8.5143E-06
2.2875E-05	1.2712E-05	6.8685E-06	7.6081E-06	2.3506E-06	7.9421E-07
7.6540E-07	6.7491E-07	3.9386E-07	2.0421E-07	6.3820E-08	3.6800E-08
2.1770E-08	1.2588E-08	7.1652E-09	3.9247E-09	6.9538E-09	
# DETECTOR NO. 1	ANGLE = 0.0				
0.0	0.0	0.0	0.0	1.4276E-01	2.2368E-01
4.0519E-01	2.3206E-01	3.1364E-02	5.3721E-03	1.1067E-03	2.6708E-03
1.0556E-03	6.4016E-04	6.5564E-04	7.0786E-04	9.5418E-04	8.7356E-04
5.2460E-04	2.4759E-04	2.0933E-04	2.1838E-04	1.8675E-04	1.4421E-04
1.3431E-04	1.2190E-04	1.2642E-04	1.4100E-04	1.5964E-04	1.4779E-04
1.2673E-04	1.3230E-04	4.9914E-04	5.9420E-04	6.7795E-04	6.8043E-04
7.4273E-04	8.5947E-04	9.3079E-04	9.6374E-04	1.0082E-03	9.7555E-04
1.0459E-03	1.2120E-03	1.2893E-03	1.3989E-03	1.3949E-03	1.4353E-03
1.5248E-03	1.6310E-03	1.5700E-03	1.6284E-03	1.6304E-03	1.5676E-03
1.5963E-03	1.5660E-03	1.5070E-03	1.5116E-03	1.5890E-03	1.5658E-03
2.8900E-03	3.1949E-03	3.0651E-03	2.9025E-03	2.8823E-03	2.8147E-03
2.7917E-03	2.5861E-03	2.4082E-03	2.2762E-03	2.0587E-03	1.8216E-03
1.7222E-03	1.5293E-03	1.3852E-03	1.2447E-03	1.0821E-03	9.4058E-04
8.2187E-04	7.0538E-04	6.3363E-04	5.7113E-04	4.6877E-04	2.6606E-04
2.2815E-04	1.9156E-04	1.6297E-04	1.4476E-04	1.2221E-04	1.0639E-04
9.7926E-05	8.0374E-05	6.9982E-05	6.6729E-05	6.6152E-05	5.3031E-05
1.0042E-04	7.6437E-05	7.0560E-05	4.7636E-05	3.9790E-05	2.7772E-05
2.6856E-05	1.9386E-05	1.8523E-05	1.9948E-05	1.1482E-05	9.8805E-06
1.9937E-05	1.0053E-05	6.7864E-06	6.9047E-06	2.0054E-06	1.3301E-06
1.1166E-06	8.5386E-07	4.0943E-07	2.1118E-07	6.9261E-08	3.9982E-08
2.3521E-08	1.3766E-08	7.9062E-09	4.4338E-09	7.5075E-09	

Fig. 2.5 Continued


```

subroutine source
-----
c - This source routine is supplied by k.kosako on 1991/10/8. -
c - The purpose is to generate source neutrons from previously -
c - calculated angle-energy-correlated spectra for the FNS-80 new -
c - water cooled D-T target. -
c - The angle-energy-correlated spectra are calculated by the -
c - MORSE-DD code in 125 neutron energy bins and 37 angle points -
c - of 5 degree intervals. -
-----
c dummy subroutine. aborts job if source subroutine is missing.
c if nsr=0, subroutine source must be furnished by the user.
c at entrance, a random set of uuu,vvv,www has been defined. the
c following variables must be defined within the subroutine:
c xxx,yyy,zzz,icl,jsu,erg,wgt,tme and possibly ipt,uuu,vvv,www.
c subroutine srcdx may also be needed.
c
(many parameter, common and dimension statements, etc. in this space)

c -----
c -----
c -----< "ihistq" = 0, first call of this subroutine >-
c -----< "ihistq" = 1, already called once >-
c -----
c -----< additional dimensions >-
character aetitl(2)*72,qdummy*72
c
common /maekawa/ ihistq,eng125(126),angits(37),aespec(125,37),
& caespc(0:125,37),angbin(37),angdeg(38),iangbn,ienerg,idcell,
& idemis,idangc,xpoint,ypoint,zpoint,rda,rdbr,rdthet,dltpai,
& ctheta,rfcc,rfac,rfea,rfec,rfeac,rfwcl,rfwc2,rfic,rfcl,rf2c,
& wcintg,wn10,rfb1,wnorm1,wnorm2,rbcone
data ihistq /0/
c -----
c -----< 'eng125' : energy boundary of neutron 125-groups >-
c -----< (ev) >-
c -----< 'angits' : neutron angular intensity distribution >-
c -----< for angle bins (relative) >-
c -----< 'aespec' : angle-energy spectra for angle bins >-
c -----< (neutron energy 125-groups and angle >-
c -----< bins 37 from calculated result) >-
c -----< 'caespc' : cumulated angle-energy spectra for >-
c -----< angle bins >-
c -----< 'angbin' : directional cosine of angle bins >-
c -----< 'angdeg' : angle (degrees) of angle bins boundary >-
c -----
c
if(ihistq.eq.1) go to 90
c =====< setup for initial data >=
ihistq = 1
iangbn = 37
ienerg = 125
pai = 3.14159265
c < unit number to read source spectra >
iuunit = 57
open (iuunit,file='source.data')
c -----< read the angle-energy spectra >-
c -----< title >
read(iuunit,80) aetitl(1)
read(iuunit,80) aetitl(2)
80 format(a72)
c < energy boundary >
read(iuunit,80) qdummy
read(iuunit,10) (eng125(iqa),iqa=1,ienerg+1)
10 format(6e12.4)
c < angle bins >
read(iuunit,80) qdummy
read(iuunit,10) (angbin(iqa),iqa=1,iangbn)
c < intensity of angle bins >
read(iuunit,80) qdummy
read(iuunit,10) (angits(iqa),iqa=1,iangbn)
c < angle-energy spectra >
read(iuunit,80) qdummy
do 20 iqa=1,iangbn
read(iuunit,80) qdummy
read(iuunit,10) (aespec(iqb,iqa),iqb=1,ienerg)
20 continue
close (iuunit)
c

```

Fig. 2.6 The source subroutine to generate angle-dependent source neutrons used in the MCNP analyses.

```

c -----< setup from input data on idum card >-
c      1. idcell : cell number included point source
c      idcell = idum(1)
c
c      if(idcell.le.0) idcell = 1
c -----< setup from input data on rdum card >-
c      1. xpoint : x position of point source
c      2. ypoint : y position of point source
c      3. zpoint : z position of point source
c      xpoint = rdum(1)
c      ypoint = rdum(2)
c      zpoint = rdum(3)
c
c      dltpai = pai / 180.0
c
c -----< convert to cumulated spectra >-
c      do 30 iqa=1,iangbn
c        totrf = 0.0
c        caespc(0,iqa) = 0.0
c        do 40 iqb=1,ienerg
c          totrf = totrf + aespec(iqb,iqa)
c          caespc(iqb,iqa) = totrf
c        40 continue
c        do 50 iqb=1,ienerg
c          caespc(iqb,iqa) = caespc(iqb,iqa) / totrf
c        50 continue
c      30 continue
c
c -----< convert angle bin for sampling >-
c      angl = acos( angbin(1) ) / dltpai
c      angdeg(1) = angl
c      do 130 iqa=2,iangbn
c        ang2 = acos( angbin(iqa) ) / dltpai
c        angdeg(iqa) = (ang1 + ang2) / 2.0
c      130 continue
c      angl = ang2
c      angdeg(iangbn+1) = angl
c
c -----< convert energy unit >-
c      do 190 iqa1=1,ienerg+1
c        eng125(iqa1) = eng125(iqa1) * 1.0d-6
c      190 continue
c
c -----< check cell number >-
c      icl = namchg(1,idcell)
c      call chkcel(icl,2,j)
c      if(j.ne.0) call expire(1,'source',
c        & 'souce is not in any cells on the idum card.')
c
c      70 format(
c        & /1h0,'title of angle-energy spectra source for mcnp'
c        & /1h , '-----'
c        & /1h ,a72 /1h ,a72
c        & /1h0,'idum(1) =',i9, ' : cell number of point source'
c        & /1h0,'rdum(1) =',f9.3, ' : x position of source'
c        & /1h , 'rdum(2) =',f9.3, ' : y position of source'
c        & /1h , 'rdum(3) =',f9.3, ' : z position of source')
c =====< terminate to set initial data >=
c
c =====< sampling of emitted neutron >=
c      90 continue
c =====
c =====< calculate source parameters with particle >=
c -----< erg : particle energy (mev) >-
c -----< xxx,yyy,zzz : emission position of particle >-
c -----< uuu,vvv,www : emission angle of particle >-
c -----< tme : starting time of particle >-
c -----< (shakes) >-
c -----< ipt : particle type >-
c -----< wgt : statistical weight of particle>-
c -----< icl : starting cell of particle >-
c -----< jsu : starting surface of particle >-
c =====
c
c -----< energy sampling from spectra >-
c -----< emission angle >-
c === the following statements are necessary only for the assembly #1 ===
c      www=0.552786404*rang()
c      www=1.0-www
c      uuu=(rang()*2.0)-1
c      vvv=(rang()*2.0)-1
c      uvw=sqrt((1-www*www)/(uuu*uuu+vvv*vvv))
c      uuu=uuu*uvw
c      vvv=vvv*uvw
c =====
c      dtheta = acos( www ) / dltpai
c      do 140 iqa=iangbn,1,-1
c        if(angdeg(iqa).ge.dtheta) go to 150

```

Fig. 2.6 Continued.

```

140 continue
150 continue
c                                     < energy group >
  write(iuo,70) aetitl(1),aetitl(2),idcell,xxx,yyy,zzz
  r = rang()
  do 160 iqal=1,ienerg
  if(r.le.caespc(iqal,iqa)) go to 170
160 continue
  iqal = ienerg
170 continue
c                                     < determine the emission energy >
  rat = (r - caespc(iqal-1,iqa))
  & / (caespc(iqal,iqa) - caespc(iqal-1,iqa))
  rat = - rat * (engl25(iqal) - engl25(iqal+1)) + engl25(iqal)
  erg = rat
c
  wgt = angits(iqa)
c
c -----< starting position of source particle >-----
  xxx = xpoint
  yyy = ypoint
  zzz = zpoint
  tme = 0.0
  jsu = 0
  icl = namchg(1,idcell)
c
  return
  end

```

Fig. 2.6 Continued.

```

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c *****
c * cell card *
c *****
1 4 4.9210-5 (1 -2 -30) : (2 -3 -34) #34 $ source region
34 4 4.9215-5 19 -3 -31 $ cell for track length
2 1 8.5792-2 3 -4 -33 $ SS316
3 1 8.5792-2 4 -5 -33 $ SS316
4 1 8.5792-2 5 -6 -33 $ SS316
5 1 8.5792-2 6 -7 -33 $ SS316
6 1 8.5792-2 7 -8 -33 $ SS316
7 1 8.5792-2 8 -9 -33 $ SS316
8 1 8.5792-2 9 -10 -33 $ SS316
9 1 8.5792-2 10 -11 -33 $ SS316
10 1 8.5792-2 11 -12 -33 $ SS316
11 1 8.5792-2 12 -13 -33 $ SS316
12 1 8.5792-2 13 -14 -33 $ SS316
13 1 8.5792-2 14 -15 -33 $ SS316
14 1 8.5792-2 15 -16 -33 $ SS316
15 1 8.5792-2 16 -17 -33 $ SS316
16 1 8.5792-2 17 -18 -33 $ SS316
17 1 8.5792-2 3 -4 33 -35 $ SS316
18 1 8.5792-2 4 -5 33 -35 $ SS316
19 1 8.5792-2 5 -6 33 -35 $ SS316
20 1 8.5792-2 6 -7 33 -35 $ SS316
21 1 8.5792-2 7 -8 33 -35 $ SS316
22 1 8.5792-2 8 -9 33 -35 $ SS316
23 1 8.5792-2 9 -10 33 -35 $ SS316
24 1 8.5792-2 10 -11 33 -35 $ SS316
25 1 8.5792-2 11 -12 33 -35 $ SS316
26 1 8.5792-2 12 -13 33 -35 $ SS316
27 1 8.5792-2 13 -14 33 -35 $ SS316
28 1 8.5792-2 14 -15 33 -35 $ SS316
29 1 8.5792-2 15 -16 33 -35 $ SS316
30 1 8.5792-2 16 -17 33 -35 $ SS316
31 1 8.5792-2 17 -18 33 -35 $ SS316
32 0 (1 -2 30 -35) : (2 -3 34 -35) $ source reflector
33 0 -1 : 18 : 35 $ void
c *****
c * surface card *
c *****
1 pz -51.28
2 pz -30.96
3 pz 30.00
4 pz 38.00
5 pz 40.16

```

Fig. 2.7 Input data of MCNP for the analysis of the Assembly #1.

```

6 pz 50.00
7 pz 52.86
8 pz 62.00
9 pz 65.56
10 pz 74.00
11 pz 83.34
12 pz 86.00
13 pz 96.00
14 pz 101.12
15 pz 106.00
16 pz 116.00
17 pz 121.44
18 pz 141.80
19 pz 28.00
30 cz 6.83
31 cz 4.00
32 cz 8.00
33 cz 20.00
34 cz 40.00
35 cz 60.00
c *****
c * mode card - neutron & photon *
c *****
mode n p
c *****
c * weight window card *
c *****
ext:n 0 0 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z
0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z
0.1z 0.1z 0 0
wwe:n 1.0e-5 1.0 5.0 13.0 100.0
wvp:n 5 3 5 0 0
wn1:n $ for thermal neutrons
0.4 0.4 $ source void
0.1 0.03 0.02 0.015 0.01
0.006 0.004 0.0025 0.0015 0.001
6.0e-4 4.0e-4 2.5e-4 1.5e-4 1.0e-4
0.4 0.12 0.08 0.06 0.04
0.024 0.016 0.01 0.006 0.004
0.0024 0.0016 0.001 6.0e-4 4.0e-4
0.4 -1 $ source reflector, external void
wn2:n $ for eV, keV neutrons
0.4 0.4 $ source void
0.4 0.4 0.4 0.4 0.25
0.15 0.1 0.06 0.04 0.025
0.015 0.01 0.006 0.004 0.0025
0.8 0.8 0.8 0.8 0.8
0.6 0.4 0.24 0.16 0.1
0.06 0.04 0.024 0.016 0.01
0.4 -1 $ source reflector, external void
wn3:n $ for 1-5MeV neutrons
0.4 0.4 $ source void
0.1 0.06 0.04 0.02 0.01
0.004 0.002 0.001 3.0e-4 1.0e-4
3.0e-5 1.0e-5 3.0e-6 1.0e-6 3.0e-7
0.4 0.24 0.16 0.08 0.04
0.016 0.008 0.004 0.0012 4.0e-4
1.2e-4 4.0e-5 1.2e-5 4.0e-6 1.2e-6
0.4 -1 $ source reflector, external void
wn4:n $ for 5-13MeV neutrons
0.4 0.4 $ source void
0.1 0.025 0.0064 0.0016 8.0e-4
2.0e-4 1.0e-4 2.5e-5 1.2e-5 3.2e-6
8.0e-7 4.0e-7 2.0e-7 1.0e-7 5.0e-8
0.4 0.1 0.025 0.0064 0.0032
8.0e-4 4.0e-4 1.0e-4 4.8e-5 1.2e-5
3.2e-6 1.6e-6 8.0e-7 4.0e-7 2.0e-7
0.4 -1 $ source reflector, external void
wn5:n $ for 14MeV neutrons
0.4 0.4 $ source void
0.1 0.025 0.0064 0.0016 4.0e-4
1.0e-4 4.8e-5 1.2e-5 6.0e-6 1.5e-6
4.0e-7 1.9e-7 4.8e-8 1.2e-8 6.4e-9
0.4 0.1 0.025 0.0064 0.0016
4.0e-4 1.9e-4 4.8e-5 2.4e-5 6.0e-6
1.6e-6 7.6e-7 1.9e-7 4.8e-8 2.5e-8
0.4 -1 $ source reflector, external void
wwe:p 100.0
wvp:p 5 3 5 0 0
wn1:p $ for gamma-rays
0.4 0.4 $ source void
0.1 0.03 0.015 0.01 0.007
0.005 0.0035 0.0025 0.0018 0.0013
9.0e-4 6.3e-4 4.5e-4 3.2e-4 2.2e-4
0.4 0.12 0.06 0.04 0.028
0.02 0.014 0.01 0.0072 0.0052
0.0036 0.00252 0.0018 0.00128 8.8e-4
0.4 -1 $ source reflector, external void

```

Fig. 2.7 Continued.

```

c *****
c * source specificatio cards *
c *****
c an user supplied source subroutine is used.
c *****
c * material specification cards *
c *****
c ----- materials for the assembly -----
m1 14000.34c 9.8440-4 24000.34c 1.5476-2 $ SS316 in test region
    25055.34c 9.7963-4 26000.34c 5.7589-2
    28000.34c 9.7128-3 42000.34c 1.0503-3
m3 14000.34c 8.1608-4 24000.34c 1.5025-2 $ SS316 in source reflector
    25055.34c 1.3561-3 26000.34c 5.8331-2
    28000.34c 9.1456-3 42000.34c 1.0254-3
m4 7014.34c 3.8810-5 8016.34c 1.0400-5 $ air
c ----- materials for dosimetry reactions -----
m5 2003.34c 1.0 $ He-3 (n,p)
m6 5010.03y 1.0 $ B-10 (n,a) a-prod.
m7 7014.34c 1.0 $ N-14 (n,p)
m8 13027.03y 1.0 $ Al-27(n,a)
m9 22000.03y 1.0 $ Ti-0 (n,x)Sc-46, Sc-47, Sc-48
m10 25055.03y 1.0 $ Mn-55(n,g)
m11 26054.03y 1.0 $ Fe-54(n,p)
m12 26056.03y 1.0 $ Fe-56(n,p)
m13 27059.34c 1.0 $ Co-59(n,2n), (n,g), (n,a), (n,p)
m14 28058.03y 1.0 $ Ni-58(n,2n), (n,p)
m15 29063.03y 1.0 $ Cu-63(n,2n), (n,g), (n,a)
m16 29065.34c 1.0 $ Cu-65(n,2n), (n,g)
m17 30064.03y 1.0 $ Zn-64(n,p)
m18 40090.03y 1.0 $ Zr-90(n,2n)
m19 41093.03y 1.0 $ Nb-93(n,2n)Nb-92m
m20 49115.03y 1.0 $ In-115(n,n')In-115m
m21 74186.03y 1.0 $ W-186(n,g)
m22 79197.03y 1.0 $ Au-197(n,g)
m23 92235.03y 1.0 $ U-235(n,f)
m24 92238.03y 1.0 $ U-238(n,f)
c ----- materials for (n,g) reactions of the assembly itself -----
m31 1001.34c 1.0 $ Hydrogen
m32 8016.34c 1.0 $ Oxygen
m33 14000.34c 1.0 $ Silicon
m34 24000.34c 1.0 $ Chromium
c 25055.03y please refer m10
m35 26000.34c 1.0 $ Iron
m36 28000.34c 1.0 $ Nickel
m37 42000.34c 1.0 $ Molybdenum
c *****
c * tally specification cards *
c *****
fc12 >>>>>>> neutron reaction rate surface (r=8cm) <<<<<<<<<
f12:n 3 4 5 6 7 8 9 10 11 12
    13 14 15 16 17 18 19
fm12 (.2764) (.2764 1 1) (.2764 1 2) (.2764 1 102)
    (.2764 5 103) (.2764 6 107) (.2764 6 207) (.2764 7 103)
    (.2764 8 107) (.2764 9 210) (.2764 9 211) (.2764 9 212)
    (.2764 10 102) (.2764 11 103) (.2764 12 103) (.2764 13 16)
    (.2764 13 102) (.2764 13 103) (.2764 13 107) (.2764 14 16)
    (.2764 14 103) (.2764 15 16) (.2764 15 102) (.2764 15 107)
    (.2764 16 16) (.2764 16 102) (.2764 17 103) (.2764 18 16)
    (.2764 19 16) (.2764 20 51) (.2764 21 102) (.2764 22 102)
    (.2764 23 18) (.2764 24 18) (.2764 33 102) (.2764 34 102)
    (.2764 35 102) (.2764 36 102) (.2764 37 102)
fs12 -32
sd12 201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
fq12 s e f m
e12 15.488
fc22 >>>>>>> neutron reaction rate surface (r=4cm) <<<<<<<<<
f22:n 3 4 5 6 7 8 9 10 11 12
    13 14 15 16 17 18 19
fm22 (.2764) (.2764 1 1) (.2764 1 2) (.2764 1 102)
    (.2764 5 103) (.2764 6 107) (.2764 6 207) (.2764 7 103)
    (.2764 8 107) (.2764 9 210) (.2764 9 211) (.2764 9 212)
    (.2764 13 102) (.2764 13 103) (.2764 13 107) (.2764 14 16)
    (.2764 14 103) (.2764 15 16) (.2764 15 102) (.2764 15 107)
    (.2764 16 16) (.2764 16 102) (.2764 17 103) (.2764 18 16)
    (.2764 19 16) (.2764 20 51) (.2764 21 102) (.2764 22 102)
    (.2764 23 18) (.2764 24 18) (.2764 33 102) (.2764 34 102)
    (.2764 35 102) (.2764 36 102) (.2764 37 102)
fs22 -31
sd22 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
    50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
    50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
    50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
    50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
    50.26548 11259.47 50.26548 11259.47 50.26548 11259.47

```

Fig. 2.7 Continued.

```

fq22 s e f m
e22 15.488
(.2764 10 102) (.2764 11 103) (.2764 12 103) (.2764 13 16)
fc34 >>>>>>>> neutron reaction rate cell (r=4cm) <<<<<<<<<<
f34:n 34
fm34 (.2764) (.2764 1 1) (.2764 1 2) (.2764 1 102)
(.2764 5 103) (.2764 6 107) (.2764 6 207) (.2764 7 103)
(.2764 8 107) (.2764 9 210) (.2764 9 211) (.2764 9 212)
(.2764 10 102) (.2764 11 103) (.2764 12 103) (.2764 13 16)
(.2764 13 102) (.2764 13 103) (.2764 13 107) (.2764 14 16)
(.2764 14 103) (.2764 15 16) (.2764 15 102) (.2764 15 107)
(.2764 16 16) (.2764 16 102) (.2764 17 103) (.2764 18 16)
(.2764 19 16) (.2764 20 51) (.2764 21 102) (.2764 22 102)
(.2764 23 18) (.2764 24 18) (.2764 33 102) (.2764 34 102)
(.2764 35 102) (.2764 36 102) (.2764 37 102)

e34 15.488
fq34 s e f m
fc42 >>>>>>>> neutron spectrum surface (r=4cm) <<<<<<<<<<
f42:n 3 5 7 9 11 14 17 19
fm42 (.2764)
fs42 -31
sd42 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47

fc52 >>>>>>>> neutron spectrum-decade surface (r=4cm) <<<<<<<<<<
f52:n 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19
fm52 (.2764)
fs52 -31
sd52 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47

e52 1e-7 1e-6 1e-5 1e-4 1e-3 1e-2 1e-1 1e+0 1e+1 15.488
fc64 >>>>>>>> neutron spectrum cell (r=4cm) <<<<<<<<<<
f64:n 34
fm64 (.2764)
fc72 >>>>>>>> neutron energy-reaction rate surface (r=8cm) <<<<<<<<<<
f72:n 3 5 7 9 11 14 17 19
fm72 (.2764) (.2764 1 1) (.2764 1 2) (.2764 1 102)
fs72 -32
sd72 201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
201.0619 11108.67 201.0619 11108.67

fc82 >>>>>>>> neutron energy-reaction rate surface (r=4cm) <<<<<<<<<<
f82:n 3 5 7 9 11 14 17 19
fm82 (.2764) (.2764 1 1) (.2764 1 2) (.2764 1 102)
(.2764 5 103) (.2764 6 107) (.2764 6 207) (.2764 7 103)
(.2764 10 102) (.2764 13 102) (.2764 15 102) (.2764 16 102)
(.2764 20 51) (.2764 21 102) (.2764 22 102) (.2764 23 18)
(.2764 24 18) (.2764 33 102) (.2764 34 102) (.2764 35 102)
(.2764 36 102) (.2764 37 102)

e82 1e-7 1e-6 1e-5 1e-4 1e-3 1e-2 1e-1 1e+0 1e+1 15.488
fs82 -31
sd82 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47

fc102 >>>>>>>> photon spectrum surface (r=4cm) <<<<<<<<<<
f102:p 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19
fm102 (.2764)
e102 1.0000-02 2.0000-02 3.0000-02 4.5000-02 6.0000-02
8.0000-02 1.0000-01 1.5000-01 2.0000-01 3.0000-01
4.0000-01 5.0000-01 5.2000-01 6.0000-01 7.0000-01
8.0000-01 9.0000-01 1.0000+00 1.1300+00 1.2500+00
1.3800+00 1.5000+00 1.7500+00 2.0000+00 2.2500+00
2.5000+00 3.0000+00 3.5000+00 4.0000+00 4.5000+00
5.0000+00 5.5000+00 6.0000+00 6.5000+00 7.0000+00
7.5000+00 8.0000+00 9.0000+00 1.0000+01 1.2000+01
1.4000+01

fs102 -31
sdi102 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47

c
-----
fq0 s m e f
e0 1.0010-11 3.2241-07
5.3156-07 8.7640-07 1.4449-06 2.3823-06 3.9278-06
6.4758-06 1.0677-05 1.7603-05 2.9023-05 4.7850-05
7.8891-05 1.3007-04 2.1445-04 3.5357-04 5.8293-04
9.6110-04 1.2341-03 1.5846-03 2.0346-03 2.6125-03
3.3546-03 4.3073-03 5.5307-03 7.1016-03 9.1186-03
1.1709-02 1.5034-02 1.9304-02 2.1874-02 2.4787-02
2.8087-02 3.1827-02 3.6065-02 4.0867-02 4.6308-02
5.2474-02 5.9461-02 6.7378-02 7.6349-02 8.6515-02

```

Fig. 2.7 Continued.

```

9.8035-02 1.1109-01 1.2588-01 1.4264-01 1.6163-01
1.8315-01 2.0754-01 2.3517-01 2.6649-01 3.0197-01
3.4217-01 3.8774-01 4.3936-01 4.9786-01 5.6415-01
50.26548 11259.47 50.26548 11259.47
6.3927-01 7.2438-01 8.2084-01 9.3013-01 1.0540+00
1.1943+00 1.3533+00 1.5335+00 1.7377+00 1.8498+00
1.9691+00 2.0961+00 2.2313+00 2.3752+00 2.5284+00
2.6914+00 2.8650+00 3.0498+00 3.2465+00 3.4559+00
3.6787+00 3.9160+00 4.1686+00 4.4374+00 4.7236+00
5.0282+00 5.3525+00 5.6978+00 6.0652+00 6.4564+00
6.8728+00 7.3161+00 7.7879+00 8.2902+00 8.8249+00
9.3940+00 9.9999+00 1.0157+01 1.0317+01 1.0480+01
1.0645+01 1.0812+01 1.0983+01 1.1156+01 1.1331+01
1.1510+01 1.1691+01 1.1875+01 1.2062+01 1.2252+01
1.2445+01 1.2641+01 1.2840+01 1.3042+01 1.3248+01
1.3456+01 1.3668+01 1.3883+01 1.4102+01 1.4324+01
1.4550+01 1.4779+01 1.5012+01 1.5248+01 1.5488+01
*****
c * problem cutoff cards *
c *****
phys:n 16.0 0.0
phys:p 30.0 0 0
phys:e 30.0 1 1 1 1 1 1 1
cut:n 0 0.0 -0.5 -0.25 0
cut:p 0 0.0099 -0.5 -0.25 0
nps 2000000
ctme 2000000
*****
c * user data arrays *
c *****
idum 1
rdum 0.0 0.0 0.0
*****
c * peripheral cards *
c *****
prdmp 200000 200000 1 1
lost 10 10
print

```

Fig. 2.7 Continued.

```

analysis of the bulk shielding experiment for SS316 #2 assembly Jul. 1993
c *****
c * cell card *
c *****
1 4 4.9210-5 (1 -2 -30) : (2 -3 -34) #34 $ source region
34 4 4.9215-5 19 -3 -31 $ cell for track length
2 1 8.5792-2 3 -4 -33 $ SS316
3 1 8.5792-2 4 -5 -33 $ SS316
4 1 8.5792-2 5 -6 -33 $ SS316
5 1 8.5792-2 6 -7 -33 $ SS316
6 1 8.5792-2 7 -8 -33 $ SS316
7 1 8.5792-2 8 -9 -33 $ SS316
8 1 8.5792-2 9 -10 -33 $ SS316
9 1 8.5792-2 10 -11 -33 $ SS316
10 1 8.5792-2 11 -12 -33 $ SS316
11 1 8.5792-2 12 -13 -33 $ SS316
12 1 8.5792-2 13 -14 -33 $ SS316
13 1 8.5792-2 14 -15 -33 $ SS316
14 1 8.5792-2 15 -16 -33 $ SS316
15 1 8.5792-2 16 -17 -33 $ SS316
16 1 8.5792-2 17 -18 -33 $ SS316
17 1 8.5792-2 3 -4 33 -35 $ SS316
18 1 8.5792-2 4 -5 33 -35 $ SS316
19 1 8.5792-2 5 -6 33 -35 $ SS316
20 1 8.5792-2 6 -7 33 -35 $ SS316
21 1 8.5792-2 7 -8 33 -35 $ SS316
22 1 8.5792-2 8 -9 33 -35 $ SS316
23 1 8.5792-2 9 -10 33 -35 $ SS316
24 1 8.5792-2 10 -11 33 -35 $ SS316
25 1 8.5792-2 11 -12 33 -35 $ SS316
26 1 8.5792-2 12 -13 33 -35 $ SS316
27 1 8.5792-2 13 -14 33 -35 $ SS316
28 1 8.5792-2 14 -15 33 -35 $ SS316
29 1 8.5792-2 15 -16 33 -35 $ SS316
30 1 8.5792-2 16 -17 33 -35 $ SS316

```

Fig. 2.8 Input data of MCNP for the analysis of the Assembly #2.

```

31 1 8.5792-2 17 -18 33 -35 $ SS316
32 3 8.5699-2 (1 -2 30 -35) : (2 -3 34 -35) $ source reflector
33 0 -1 : 18 : 35 $ void
c *****
c * surface card *
c *****
1 pz -51.28
2 pz -30.96
3 pz 30.00
4 pz 38.00
5 pz 40.16
6 pz 50.00
7 pz 52.86
8 pz 62.00
9 pz 65.56
10 pz 74.00
11 pz 83.34
12 pz 86.00
13 pz 96.00
14 pz 101.12
15 pz 106.00
16 pz 116.00
17 pz 121.44
18 pz 141.80
19 pz 28.00
30 cz 6.83
31 cz 4.00
32 cz 8.00
33 cz 20.00
34 cz 40.00
35 cz 60.00

c *****
c * mode card - neutron & photon *
c *****
mode n p
c *****
c * weight window card *
c *****
ext:n 0 0 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z
0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z
0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z 0.1z
wwe:n 1.0e-5 1.0 5.0 13.0 100.0
wvp:n 5 3 5 0 0
wnw1:n $ for thermal neutrons
0.4 0.4 $ source void
0.1 0.03 0.02 0.015 0.01
0.006 0.004 0.0025 0.0015 0.001
6.0e-4 4.0e-4 2.5e-4 1.5e-4 1.0e-4
0.4 0.12 0.08 0.06 0.04
0.024 0.016 0.01 0.006 0.004
0.0024 0.0016 0.001 6.0e-4 4.0e-4
0.4 -1 $ source reflector, external void
wnw2:n $ for eV, keV neutrons
0.4 0.4 $ source void
0.4 0.4 0.4 0.4 0.25
0.15 0.1 0.06 0.04 0.025
0.015 0.01 0.006 0.004 0.0025
0.8 0.8 0.8 0.8 0.8
0.6 0.4 0.24 0.16 0.1
0.06 0.04 0.024 0.016 0.01
0.4 -1 $ source reflector, external void
wnw3:n $ for 1-5MeV neutrons
0.4 0.4 $ source void
0.1 0.06 0.04 0.02 0.01
0.004 0.002 0.001 3.0e-4 1.0e-4
3.0e-5 1.0e-5 3.0e-6 1.0e-6 3.0e-7
0.4 0.24 0.16 0.08 0.04
0.016 0.008 0.004 0.0012 4.0e-4
1.2e-4 4.0e-5 1.2e-5 4.0e-6 1.2e-6
0.4 -1 $ source reflector, external void
wnw4:n $ for 5-13MeV neutrons
0.4 0.4 $ source void
0.1 0.025 0.0064 0.0016 8.0e-4
2.0e-4 1.0e-4 2.5e-5 1.2e-5 3.2e-6
8.0e-7 4.0e-7 2.0e-7 1.0e-7 5.0e-8
0.4 0.1 0.025 0.0064 0.0032
8.0e-4 4.0e-4 1.0e-4 4.8e-5 1.2e-5
3.2e-6 1.6e-6 8.0e-7 4.0e-7 2.0e-7
0.4 -1 $ source reflector, external void
wnw5:n $ for 14MeV neutrons
0.4 0.4 $ source void
0.1 0.025 0.0064 0.0016 4.0e-4
1.0e-4 4.8e-5 1.2e-5 6.0e-6 1.5e-6
4.0e-7 1.9e-7 4.8e-8 1.2e-8 6.4e-9
0.4 0.1 0.025 0.0064 0.0016
4.0e-4 1.9e-4 4.8e-5 2.4e-5 6.0e-6
1.6e-6 7.6e-7 1.9e-7 4.8e-8 2.5e-8

```

Fig. 2.8 Continued.


```

0.4      -1 $ source reflector, external void
wwe:p    100.0
wwp:p    5 3 5 0 0
wwnl:p   $ for gamma-rays
0.4      0.4      $ source void
0.1      0.03     0.015  0.01  0.007
0.005    0.0035  0.0025  0.0018 0.0013
9.0e-4   6.3e-4  4.5e-4  3.2e-4 2.2e-4
0.4      0.12    0.06   0.04  0.028
0.02     0.014   0.01   0.0072 0.0052
0.0036   0.00252 0.0018 0.00128 8.8e-4
0.4      -1 $ source reflector, external void
c
c *****
c * source specificatio cards *
c *****
c an user supplied source subroutine is used.
c *****
c * material specification cards *
c *****
c ----- materials for the assembly -----
m1 14000.34c 9.8440-4 24000.34c 1.5476-2 $ SS316 in test region
    25055.34c 9.7963-4 26000.34c 5.7589-2
    28000.34c 9.7128-3 42000.34c 1.0503-3
m3 14000.34c 8.1608-4 24000.34c 1.5025-2 $ SS316 in source reflector
    25055.34c 1.3561-3 26000.34c 5.8331-2
    28000.34c 9.1456-3 42000.34c 1.0254-3
m4 7014.34c 3.8810-5 8016.34c 1.0400-5 $ air
c ----- materials for dosimetry reactions -----
m5 2003.34c 1.0 $ He-3 (n,p)
m6 5010.03y 1.0 $ B-10 (n,a) a-prod.
m7 7014.34c 1.0 $ N-14 (n,p)
m8 13027.03y 1.0 $ Al-27 (n,a)
m9 22000.03y 1.0 $ Ti-0 (n,x)Sc-46, Sc-47, Sc-48
m10 25055.03y 1.0 $ Mn-55(n,g)
m11 26054.03y 1.0 $ Fe-54(n,p)
m12 26056.03y 1.0 $ Fe-56(n,p)
m13 27059.34c 1.0 $ Co-59(n,2n), (n,g), (n,a), (n,p)
m14 28058.03y 1.0 $ Ni-58(n,2n), (n,p)
m15 29063.03y 1.0 $ Cu-63(n,2n), (n,g), (n,a)
m16 29065.34c 1.0 $ Cu-65(n,2n), (n,g)
m17 30064.03y 1.0 $ Zn-64(n,p)
m18 40090.03y 1.0 $ Zr-90(n,2n)
m19 41093.03y 1.0 $ Nb-93(n,2n)Nb-92m
m20 49115.03y 1.0 $ In-115(n,n')In-115m
m21 74186.03y 1.0 $ W-186(n,g)
m22 79197.03y 1.0 $ Au-197(n,g)
m23 92235.03y 1.0 $ U-235(n,f)
m24 92238.03y 1.0 $ U-238(n,f)
c ----- materials for (n,g) reactions of the assembly itself -----
m31 1001.34c 1.0 $ Hydrogen
m32 8016.34c 1.0 $ Oxygen
m33 14000.34c 1.0 $ Silicon
m34 24000.34c 1.0 $ Chromium
c 25055.03y please refer m10
m35 26000.34c 1.0 $ Iron
m36 28000.34c 1.0 $ Nickel
m37 42000.34c 1.0 $ Molybdenum
c
c * tally specification cards *
c *****
fc12 >>>>>>>> neutron reaction rate surface (r=8cm) <<<<<<<<<<
f12:n 3 4 5 6 7 8 9 10 11 12
    13 14 15 16 17 18 19
fm12 (1) (1 1 1) (1 1 2) (1 1 102)
    (1 5 103) (1 6 107) (1 6 207) (1 7 103) (1 8 107)
    (1 9 210) (1 9 211) (1 9 212) (1 10 102) (1 11 103)
    (1 12 103) (1 13 16) (1 13 102) (1 13 103) (1 13 107)
    (1 14 16) (1 14 103) (1 15 16) (1 15 102) (1 15 107)
    (1 16 16) (1 16 102) (1 17 103) (1 18 16) (1 19 16)
    (1 20 51) (1 21 102) (1 22 102) (1 23 18) (1 24 18)
    (1 33 102) (1 34 102) (1 35 102) (1 36 102) (1 37 102)
fs12 -32
sd12 201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
    201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
fql2 s e f m
e12 15.488
fc22 >>>>>>>> neutron reaction rate surface (r=4cm) <<<<<<<<<<
f22:n 3 4 5 6 7 8 9 10 11 12
    13 14 15 16 17 18 19
fm22 (1) (1 1 1) (1 1 2) (1 1 102)
    (1 5 103) (1 6 107) (1 6 207) (1 7 103) (1 8 107)
    (1 9 210) (1 9 211) (1 9 212) (1 10 102) (1 11 103)
    (1 12 103) (1 13 16) (1 13 102) (1 13 103) (1 13 107)
    (1 14 16) (1 14 103) (1 15 16) (1 15 102) (1 15 107)
    (1 16 16) (1 16 102) (1 17 103) (1 18 16) (1 19 16)

```

Fig. 2.8 Continued.

```

(1 20 51) (1 21 102) (1 22 102) (1 23 18) (1 24 18)
(1 33 102) (1 34 102) (1 35 102) (1 36 102) (1 37 102)
fs22 -31
sd22 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
fq22 s e f m
e22 15.488
fc34 >>>>>>>>> neutron reaction rate cell (r=4cm) <<<<<<<<<<<<
f34:n 34
fm34 (1) (1 1 1) (1 1 2) (1 1 102)
(1 5 103) (1 6 107) (1 6 207) (1 7 103) (1 8 107)
(1 9 210) (1 9 211) (1 9 212) (1 10 102) (1 11 103)
(1 12 103) (1 13 16) (1 13 102) (1 13 103) (1 13 107)
(1 14 16) (1 14 103) (1 15 16) (1 15 102) (1 15 107)
(1 16 16) (1 16 102) (1 17 103) (1 18 16) (1 19 16)
(1 20 51) (1 21 102) (1 22 102) (1 23 18) (1 24 18)
(1 33 102) (1 34 102) (1 35 102) (1 36 102) (1 37 102)
e34 15.488
fq34 s e f m
fc42 >>>>>>>>> neutron spectrum surface (r=4cm) <<<<<<<<<<<<
f42:n 3 5 7 9 11 14 17 19
fs42 -31
sd42 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
fc52 >>>>>>>>> neutron spectrum-decade surface (r=4cm) <<<<<<<<<<<<
f52:n 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19
fs52 -31
sd52 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
e52 1e-7 1e-6 1e-5 1e-4 1e-3 1e-2 1e-1 1e+0 1e+1 15.488
fc64 >>>>>>>>> neutron spectrum cell (r=4cm) <<<<<<<<<<<<
f64:n 34
fc72 >>>>>>>>> neutron energy-reaction rate surface (r=8cm) <<<<<<<<<<<<
f72:n 3 5 7 9 11 14 17 19
fm72 (1) (1 1 1) (1 1 2) (1 1 102)
fs72 -32
sd72 201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
201.0619 11108.67 201.0619 11108.67 201.0619 11108.67
201.0619 11108.67 201.0619 11108.67
fc82 >>>>>>>>> neutron energy-reaction rate surface (r=4cm) <<<<<<<<<<<<
f82:n 3 5 7 9 11 14 17 19
fm82 (1) (1 1 1) (1 1 2) (1 1 102)
(1 5 103) (1 6 107) (1 6 207) (1 7 103) (1 10 102)
(1 13 102) (1 15 102) (1 16 102) (1 20 51) (1 21 102)
(1 22 102) (1 23 18) (1 24 18)
(1 33 102) (1 34 102) (1 35 102) (1 36 102) (1 37 102)
e82 1e-7 1e-6 1e-5 1e-4 1e-3 1e-2 1e-1 1e+0 1e+1 15.488
fs82 -31
sd82 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
fc102 >>>>>>>>> photon spectrum surface (r=4cm) <<<<<<<<<<<<
f102:p 3 4 5 6 7 8 9 10 11 12
13 14 15 16 17 18 19
e102 1.0000-02 2.0000-02 3.0000-02 4.5000-02 6.0000-02
4.0000-01 5.0000-01 5.2000-01 6.0000-01 7.0000-01
8.0000-01 9.0000-01 1.0000+00 1.1300+00 1.2500+00
1.3800+00 1.5000+00 1.7500+00 2.0000+00 2.2500+00
2.5000+00 3.0000+00 3.5000+00 4.0000+00 4.5000+00
5.0000+00 5.5000+00 6.0000+00 6.5000+00 7.0000+00
7.5000+00 8.0000+00 9.0000+00 1.0000+01 1.2000+01
1.4000+01
fs102 -31
sd102 50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
50.26548 11259.47 50.26548 11259.47 50.26548 11259.47
-----
c
fq0 s m e f
e0 1.0010-11 3.2241-07
5.3156-07 8.7640-07 1.4449-06 2.3823-06 3.9278-06
6.4758-06 1.0677-05 1.7603-05 2.9023-05 4.7850-05
7.8891-05 1.3007-04 2.1445-04 3.5357-04 5.8293-04
9.6110-04 1.2341-03 1.5846-03 2.0346-03 2.6125-03
3.3546-03 4.3073-03 5.5307-03 7.1016-03 9.1186-03
1.1709-02 1.5034-02 1.9304-02 2.1874-02 2.4787-02
2.8087-02 3.1827-02 3.6065-02 4.0867-02 4.6308-02

```

Fig. 2.8 Continued.

```

5.2474-02 5.9461-02 6.7378-02 7.6349-02 8.6515-02
9.8035-02 1.1109-01 1.2588-01 1.4264-01 1.6163-01
1.8315-01 2.0754-01 2.3517-01 2.6649-01 3.0197-01
8.0000-02 1.0000-01 1.5000-01 2.0000-01 3.0000-01
3.4217-01 3.8774-01 4.3936-01 4.9786-01 5.6415-01
6.3927-01 7.2438-01 8.2084-01 9.3013-01 1.0540+00
1.1943+00 1.3533+00 1.5335+00 1.7377+00 1.8498+00
1.9691+00 2.0961+00 2.2313+00 2.3752+00 2.5284+00
2.6914+00 2.8650+00 3.0498+00 3.2465+00 3.4559+00
3.6787+00 3.9160+00 4.1686+00 4.4374+00 4.7236+00
5.0282+00 5.3525+00 5.6978+00 6.0652+00 6.4564+00
6.8728+00 7.3161+00 7.7879+00 8.2902+00 8.8249+00
9.3940+00 9.9999+00 1.0157+01 1.0317+01 1.0480+01
1.0645+01 1.0812+01 1.0983+01 1.1156+01 1.1331+01
1.1510+01 1.1691+01 1.1875+01 1.2062+01 1.2252+01
1.2445+01 1.2641+01 1.2840+01 1.3042+01 1.3248+01
1.3456+01 1.3668+01 1.3883+01 1.4102+01 1.4324+01
1.4550+01 1.4779+01 1.5012+01 1.5248+01 1.5488+01
c *****
c * problem cutoff cards *
c *****
phys:n 16.0 0.0
phys:p 30.0 0 0
phys:e 30.0 1 1 1 1 1 1 1 1
cut:n 0 0.0 -0.5 -0.25 0
cut:p 0 0.0099 -0.5 -0.25 0
nps 2000000
ctme 1000000
c *****
c * user data arrays *
c *****
idum 1
rdum 0.0 0.0 0.0
c *****
c * peripheral cards *
c *****
prtmp 30000000 30000000 1 1
lost 10 10
print

```

Fig. 2.8 Continued.

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```

FNS-GRTUNCL BLKCN1F #1 - SUS316 '91-09-11
#1 - AIR/SUS316 <FUSION-J3> n-125 + g-40
O
1S$
0
4 5 2 39 75 165
300 5 169 78 0 300
1 2 1 30000 10 0
1 0 18 0 0 37
1 1 1 1 1
2**
1.0 0.0 0.0 0.0 0.0
T
1**
FO.0
2**
1I0.0 20.0 1I25.0 29.0 1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
28I0.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8S$
39R1 5Q39
32R2 7R1 59Q39
39R1 8Q39
9S$
-241 -247
10S$
' 241 = AIR / 247 = SUS316 /
4I241 246 2Q6
4I247 252 9Q6
11S$
6Z 4I61 66 4I67 72
6Z 4I163 168 4I139 144 4I187 192
4I55 60 4I97 102 4I145 150
4I103 108 4I109 114 4I151 156
12**
6R0.0 6R3.8810-5 6R1.0400-5
6R0.0 6R9.7128-3 6R1.5476-2 6R1.0503-3 6R7.1697-5 6R9.8440-4
6R9.7963-4 6R4.3162-5 6R1.8780-6 6R5.7589-2
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 2.8133E-07 1.1132E-05 7.0699E-05 2.9725E-04 5.8035E-03
1.1174E-01 5.0083E-01 2.9325E-01 3.5848E-02 1.9167E-03 2.2345E-03
2.1223E-03 1.5259E-03 9.3736E-04 7.3617E-04 5.2773E-04 2.7017E-04
1.7811E-04 1.8328E-04 2.3002E-04 2.9362E-04 4.2296E-04 2.8769E-04
2.2497E-04 2.1734E-04 8.6941E-04 1.1876E-03 1.5784E-03 1.3262E-03
1.4116E-03 1.4346E-03 2.1877E-03 2.2324E-03 2.4385E-03 2.5503E-03
2.5201E-03 2.8233E-03 2.9695E-03 3.1546E-03 3.6912E-03 3.6241E-03
3.5154E-03 4.0251E-03 4.0676E-03 4.2225E-03 4.3285E-03 4.1782E-03
4.0598E-03 3.8551E-03 3.7352E-03 3.8356E-03 4.0109E-03 4.0103E-03
7.3721E-03 7.7382E-03 7.6206E-03 7.2109E-03 6.8743E-03 6.8912E-03
6.9001E-03 6.5590E-03 5.9411E-03 5.7141E-03 5.3731E-03 4.8503E-03
4.5656E-03 3.9063E-03 3.5676E-03 3.1742E-03 2.8645E-03 2.5666E-03
2.1491E-03 1.6690E-03 1.5367E-03 1.4715E-03 1.1850E-03 7.2317E-04
6.0680E-04 4.8332E-04 4.6588E-04 4.9846E-04 3.4556E-04 2.2581E-04
1.7049E-04 1.9573E-04 1.3066E-04 1.1007E-04 1.4885E-04 9.4420E-05
1.7731E-04 9.3409E-05 7.5281E-05 4.8565E-05 1.4022E-04 5.9894E-05

```

Fig. 2.9 Input data of FNSUNCL for the DOT analysis of the Assembly #1 with FUSION-J3 library (125-n + 40-γ).

```

3.6855E-05 4.8798E-05 1.7405E-05 2.5103E-05 2.5085E-05 2.4342E-05
3.7830E-05 1.1205E-05 4.9533E-06 2.2206E-05 5.0575E-06 1.4315E-06
4.4221E-07 2.1665E-07 1.2984E-07 1.1197E-07 1.2533E-07 7.9222E-08
4.8207E-08 2.9786E-08 1.7825E-08 1.0563E-08 1.7191E-08
40R0.0
# DETECTOR NO. 36      ANGLE = 175.0
0.0      0.0      0.0      0.0      0.0      0.0
0.0      3.7835E-07 1.1441E-05 7.1589E-05 3.2069E-04 5.9072E-03
1.1362E-01 5.0424E-01 2.9650E-01 3.6687E-02 2.1034E-03 2.3824E-03
2.3643E-03 1.5373E-03 1.0950E-03 9.0216E-04 5.8232E-04 3.0937E-04

```

Input data in this space are omitted in this figure. They are almost the same as the data contained in Fig. 2.5 except that gamma-ray source distribution, 40R0.0, has to be added after 125 neutron source distribution at each angle.

```

9.7926E-05 8.0374E-05 6.9982E-05 6.6729E-05 6.6152E-05 5.3031E-05
1.0042E-04 7.6437E-05 7.0560E-05 4.7636E-05 3.9790E-05 2.7772E-05
2.6856E-05 1.9386E-05 1.8523E-05 1.9948E-05 1.1482E-05 9.8805E-06
1.9937E-05 1.0053E-05 6.7864E-06 6.9047E-06 2.0054E-06 1.3301E-06
1.1166E-06 8.5386E-07 4.0943E-07 2.1118E-07 6.9261E-08 3.9982E-08
2.3521E-08 1.3766E-08 7.9062E-09 4.4338E-09 7.5075E-09
40R0.0
T      T

```

Fig. 2.9 Continued.

```

FNS-DOT3.5      BLKCNID      #1 - SUS316      '91-09-11
' #1 - AIR/SUS316 <FUSION-J3> n-125 + g-40
O
61$$
      0          5          2          39          75          165
      4          5          169         78          0          0
      300        1          160          1          1          0
      0          0          1          15          15          3
      6          2          0          0          0          0
      0          0          0          0          0          0
      0          0          0          0          3          0
      0          0          0          0          0          0
      0          0          2          1          1          0
      0          0          0          0          0          8
      0
62$$
      2          3          4          14          15          9
      10         11         12         13          8          60
      0
63**
      0.0        1.000E-02    0.0        0.0        0.0        0.0
      0.0        0.0        0.0        0.0        0.0        0.0
      0.0        0.0        0.0        0.0        0.0        0.0
T
7**
      -0.21082   -0.14907  1M1
      -0.42164   -0.39441   -0.14907  1M2
      -0.55777   -0.53748   -0.39441   -0.14907  1M3
      -0.66667   -0.64979   -0.53748   -0.39441   -0.14907  1M4
      -0.76012   -0.74536   -0.64979   -0.53748   -0.39441   -0.14907
1M5
      -0.84327   -0.82999   -0.74536   -0.64979   -0.53748   -0.39441
      -0.14907  1M6
      -0.91894   -0.90676   -0.82999   -0.74536   -0.64979   -0.53748
      -0.39441   -0.14907  1M7
      -0.98883   -0.97753   -0.90676   -0.82999   -0.74536   -0.64979
      -0.53748   -0.39441   -0.14907  1M8
1Q80
3R-0.97753  5R-0.90676  7R-0.82999  9R-0.74536  11R-0.64979  13R-0.53748
15R-0.39441 17R-0.14907 3R0.97753  5R0.90676  7R0.82999  9R0.74536
11R0.64979 13R0.53748 15R0.39441 17R0.14907
T
6**
      0.0        2R0.13586-1    0.0        4R0.97681-2
      0.0        0.64738-2    0.50390-2    0.64738-2  1N3
      0.0        0.64634-2  2R0.71124-2    0.64634-2  1N4
      0.0        0.64634-2    0.14381-2    0.36342-2    0.14381-2    0.64634-2
      0.0        1N5
      0.0        0.64738-2    0.71124-2    0.36342-2  1N3    1Q6
      0.0        0.97681-2    0.50390-2    0.71124-2    0.14381-2    0.71124-2
      0.0        0.50390-2    0.97681-2  1N7
      0.0        0.13586-1    0.97681-2  2R0.64738-2  1N4    1Q8
1Q80
T
3**
F0.0
T
1**
F0.0
2**
1I0.0    20.0    1I25.0    29.0    1I30.0    31.0    53I32.0    140.0
1I140.8    141.8    1I142.8    146.8    4I151.8    201.8
4**
28I0.0    58.0    1I59.0    60.0    1I61.0    65.0    2I70.0    100.0
5**
F1.0
8$$
39R1          5Q39
32R2    7R1    59Q39
39R1          8Q39
9$$
-241    -247
10$$
' 241 = AIR / 247 = SUS316 /
      4I241    246    2Q6
      4I247    252    9Q6
11$$
6Z    4I61    66    4I67    72
6Z    4I163    168    4I139    144    4I187    192
      4I55    60    4I97    102    4I145    150
      4I103    108    4I109    114    4I151    156
12**
6R0.0    6R3.8810-5    6R1.0400-5
6R0.0    6R9.7128-3    6R1.5476-2    6R1.0503-3    6R7.1697-5    6R9.8440-4
      6R9.7963-4    6R4.3162-5    6R1.8780-6    6R5.7589-2
T      T

```

Fig. 2.10 Input data of the DOT analysis for the Assembly #1 with FUSION-J3 library (125-n + 40-γ).

```

FNS-GRTUNCL #1F42F #1 - SUS316 '92-04-07
#1 - AIR/SUS316 <FUSION-40> n-42 + g-21
O
1S$
0 5 2 39 75 63
4 5 67 78 0 300
300 2 1 30000 10 0
1 0 18 0 0 37
1 1 1 1 1
2**
1.0 0.0 0.0 0.0 0.0
T
1**
FO.0
2**
1I0.0 20.0 1I25.0 29.0 1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
28I0.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8S$
39R1 5Q39
32R2 7R1 59Q39
39R1 8Q39
9S$
-241 -247
10S$
241 = AIR / 247 = SUS316 /
4I241 246 2Q6
4I247 252 9Q6
11S$
6Z 4I61 66 4I67 72
6Z 4I163 168 4I139 144 4I187 192
4I55 60 4I97 102 4I145 150
4I103 108 4I109 114 4I151 156
12**
6R0.0 6R3.8810-5 6R1.0400-5
6R0.0 6R9.7128-3 6R1.5476-2 6R1.0503-3 6R7.1697-5 6R9.8440-4
6R9.7963-4 6R4.3162-5 6R1.8780-6 6R5.7589-2
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.4793E-02 0.9460E+00 0.7066E-02 0.1480E-02 0.1812E-02 0.2678E-02
0.2626E-02 0.3422E-02 0.4506E-02 0.4909E-02 0.5521E-02 0.6431E-02
0.1414E-01 0.1580E-01 0.1805E-01 0.1774E-01 0.1672E-01 0.1540E-01
0.1783E-01 0.1488E-01 0.1154E-01 0.8511E-02 0.5765E-02 0.3866E-02
0.3299E-02 0.1006E-02 0.3998E-03 0.2581E-03 0.1176E-03 0.7449E-04
0.4676E-04 0.1107E-04 0.2489E-04 0.3854E-05 0.5468E-06 0.2313E-06
0.1803E-06 0.1314E-06 0.6025E-07 0.2851E-07 0.8407E-08 0.1652E-07
21R0.0
DETECTOR NO. 36 ANGLE = 175.0
0.4897E-02 0.9557E+00 0.7782E-02 0.1637E-02 0.2036E-02 0.3704E-02
0.3028E-02 0.3610E-02 0.4643E-02 0.5214E-02 0.5858E-02 0.6742E-02
0.1500E-01 0.1660E-01 0.1903E-01 0.1872E-01 0.1765E-01 0.1611E-01
0.1856E-01 0.1573E-01 0.1194E-01 0.9087E-02 0.5965E-02 0.4116E-02
0.3281E-02 0.1014E-02 0.3794E-03 0.2443E-03 0.1071E-03 0.6865E-04
0.5159E-04 0.1235E-04 0.1975E-04 0.2706E-05 0.5471E-06 0.4220E-06
0.3445E-06 0.2131E-06 0.9651E-07 0.4552E-07 0.1348E-07 0.2589E-07
21R0.0
DETECTOR NO. 35 ANGLE = 170.0
0.3967E-02 0.7880E+00 0.6903E-02 0.1369E-02 0.1846E-02 0.2294E-02

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Fig. 2.11 Input data of FNSUNCL for the DOT analysis of the Assembly #1 with FUSION-40 library (42-n + 21-γ).

0.2210E-02	0.2837E-02	0.3610E-02	0.4005E-02	0.4820E-02	0.5421E-02
0.1350E-01	0.1378E-01	0.1682E-01	0.1560E-01	0.1539E-01	0.1331E-01
0.1523E-01	0.1345E-01	0.9662E-02	0.7250E-02	0.4322E-02	0.3812E-02
0.2484E-02	0.6255E-03	0.2230E-03	0.1786E-03	0.5739E-04	0.4655E-04
0.3855E-04	0.6554E-05	0.8882E-05	0.1525E-05	0.2967E-06	0.1714E-06
0.9649E-07	0.4646E-07	0.2047E-07	0.9401E-08	0.2664E-08	0.4362E-08
21R0.0					
DETECTOR NO. 34 ANGLE = 165.0					
0.5095E-02	0.8479E+00	0.5683E-02	0.1185E-02	0.1719E-02	0.2313E-02
0.2054E-02	0.2833E-02	0.3491E-02	0.3867E-02	0.4588E-02	0.5168E-02
0.1143E-01	0.1320E-01	0.1491E-01	0.1471E-01	0.1404E-01	0.1283E-01
0.1476E-01	0.1272E-01	0.9429E-02	0.6792E-02	0.4369E-02	0.3252E-02
0.2366E-02	0.6540E-03	0.2584E-03	0.2312E-03	0.7763E-04	0.5574E-04
0.3950E-04	0.8236E-05	0.8176E-05	0.1675E-05	0.9104E-06	0.3708E-06
0.7442E-07	0.3582E-07	0.1512E-07	0.6565E-08	0.1839E-08	0.3466E-08
21R0.0					
DETECTOR NO. 33 ANGLE = 160.0					
0.7523E-02	0.8371E+00	0.4936E-02	0.1046E-02	0.1465E-02	0.2135E-02
0.1821E-02	0.2576E-02	0.3106E-02	0.3355E-02	0.4016E-02	0.4541E-02
0.1017E-01	0.1176E-01	0.1326E-01	0.1307E-01	0.1257E-01	0.1165E-01
0.1334E-01	0.1081E-01	0.8454E-02	0.6088E-02	0.3973E-02	0.2852E-02
0.2081E-02	0.6214E-03	0.2563E-03	0.2018E-03	0.6899E-04	0.5780E-04
0.3422E-04	0.9699E-05	0.7897E-05	0.1436E-05	0.3108E-06	0.1440E-06
0.1015E-06	0.5158E-07	0.2206E-07	0.9734E-08	0.2750E-08	0.5170E-08
21R0.0					
DETECTOR NO. 32 ANGLE = 155.0					
0.2119E-01	0.7627E+00	0.4385E-02	0.9556E-03	0.1209E-02	0.1955E-02
0.1610E-02	0.2219E-02	0.2688E-02	0.2938E-02	0.3599E-02	0.4027E-02
0.9020E-02	0.1030E-01	0.1173E-01	0.1155E-01	0.1119E-01	0.1046E-01
0.1190E-01	0.9600E-02	0.7543E-02	0.5422E-02	0.3519E-02	0.2490E-02
0.1812E-02	0.5532E-03	0.2312E-03	0.1622E-03	0.6006E-04	0.5357E-04
0.2873E-04	0.7980E-05	0.6582E-05	0.1260E-05	0.1756E-06	0.1182E-06
0.5567E-07	0.3352E-07	0.1544E-07	0.6044E-08	0.1650E-08	0.2832E-08
21R0.0					
DETECTOR NO. 31 ANGLE = 150.0					
0.1781E-01	0.6112E+00	0.3859E-02	0.9849E-03	0.1026E-02	0.1796E-02
0.1384E-02	0.1979E-02	0.2395E-02	0.2549E-02	0.3144E-02	0.3499E-02
0.7941E-02	0.9107E-02	0.1038E-01	0.1015E-01	0.9884E-02	0.9285E-02
0.1047E-01	0.8370E-02	0.6612E-02	0.4755E-02	0.3079E-02	0.2157E-02
0.1583E-02	0.4928E-03	0.1984E-03	0.1310E-03	0.5239E-04	0.4674E-04
0.2492E-04	0.7003E-05	0.4379E-05	0.9406E-06	0.1372E-06	0.6014E-07
0.5246E-07	0.2844E-07	0.6983E-08	0.2150E-08	0.5498E-09	0.9646E-09
21R0.0					
DETECTOR NO. 30 ANGLE = 145.0					
0.1862E-01	0.6039E+00	0.3540E-02	0.9799E-03	0.9510E-03	0.1727E-02
0.1368E-02	0.1932E-02	0.2326E-02	0.2386E-02	0.2972E-02	0.3308E-02
0.7532E-02	0.8640E-02	0.9916E-02	0.9669E-02	0.9362E-02	0.8791E-02
0.9867E-02	0.7848E-02	0.6212E-02	0.4463E-02	0.2911E-02	0.2020E-02
0.1481E-02	0.4770E-03	0.1839E-03	0.1158E-03	0.4944E-04	0.4422E-04
0.2122E-04	0.3956E-05	0.5335E-05	0.1076E-05	0.1436E-06	0.2066E-06
0.1737E-06	0.8433E-07	0.2582E-07	0.1087E-07	0.3117E-08	0.5797E-08
21R0.0					
DETECTOR NO. 29 ANGLE = 140.0					
0.2234E-01	0.6618E+00	0.3373E-02	0.9880E-03	0.9449E-03	0.1704E-02
0.1423E-02	0.1973E-02	0.2343E-02	0.2362E-02	0.2940E-02	0.3300E-02
0.7548E-02	0.8635E-02	0.9881E-02	0.9580E-02	0.9280E-02	0.8717E-02
0.9776E-02	0.7794E-02	0.6168E-02	0.4416E-02	0.2908E-02	0.2001E-02
0.1459E-02	0.5050E-03	0.1919E-03	0.1162E-03	0.5087E-04	0.4404E-04
0.2274E-04	0.3738E-05	0.6894E-05	0.1200E-05	0.3779E-06	0.4310E-06
0.1580E-06	0.7622E-07	0.3189E-07	0.1378E-07	0.3925E-08	0.7347E-08
21R0.0					
DETECTOR NO. 28 ANGLE = 135.0					
0.6833E-01	0.7078E+00	0.3241E-02	0.1072E-02	0.1031E-02	0.1706E-02
0.1426E-02	0.1981E-02	0.2366E-02	0.2419E-02	0.3040E-02	0.3445E-02
0.7745E-02	0.8754E-02	0.1001E-01	0.9684E-02	0.9351E-02	0.8787E-02
0.9880E-02	0.7910E-02	0.6220E-02	0.4485E-02	0.2990E-02	0.2040E-02
0.1483E-02	0.5491E-03	0.2068E-03	0.1297E-03	0.5417E-04	0.4347E-04
0.2328E-04	0.3828E-05	0.7688E-05	0.1764E-05	0.1571E-05	0.5530E-06
0.1650E-06	0.8322E-07	0.3523E-07	0.1547E-07	0.4498E-08	0.8593E-08
21R0.0					
DETECTOR NO. 27 ANGLE = 130.0					
0.1258E+00	0.7769E+00	0.3150E-02	0.1104E-02	0.1112E-02	0.1672E-02
0.1466E-02	0.2066E-02	0.2475E-02	0.2532E-02	0.3227E-02	0.3667E-02
0.7990E-02	0.8872E-02	0.1013E-01	0.9839E-02	0.9462E-02	0.8939E-02
0.1007E-01	0.8149E-02	0.6355E-02	0.4605E-02	0.3080E-02	0.2120E-02
0.1539E-02	0.5949E-03	0.2268E-03	0.1433E-03	0.6627E-04	0.4397E-04
0.2244E-04	0.4769E-05	0.9775E-05	0.4765E-05	0.1286E-05	0.2822E-06
0.1010E-06	0.5262E-07	0.2165E-07	0.9124E-08	0.2604E-08	0.5353E-08
21R0.0					
DETECTOR NO. 26 ANGLE = 125.0					
0.2479E+00	0.6962E+00	0.2991E-02	0.1100E-02	0.1125E-02	0.1659E-02
0.1517E-02	0.2184E-02	0.2628E-02	0.2655E-02	0.3232E-02	0.3661E-02
0.7896E-02	0.8742E-02	0.1001E-01	0.9693E-02	0.9328E-02	0.8838E-02
0.9955E-02	0.8054E-02	0.6305E-02	0.4578E-02	0.3078E-02	0.2115E-02
0.1548E-02	0.6113E-03	0.2330E-03	0.1548E-03	0.6937E-04	0.4431E-04
0.2315E-04	0.5011E-05	0.1387E-04	0.5280E-05	0.6935E-06	0.1224E-06
0.3692E-07	0.2129E-07	0.7743E-08	0.2643E-08	0.6703E-09	0.1540E-08

Fig. 2.11 Continued.


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21R0.0
DETECTOR NO. 25      ANGLE = 120.0
0.4421E+00  0.4997E+00  0.2810E-02  0.1062E-02  0.1103E-02  0.1743E-02
0.1697E-02  0.2244E-02  0.2598E-02  0.2638E-02  0.3179E-02  0.3588E-02
0.7674E-02  0.8452E-02  0.9732E-02  0.9407E-02  0.9051E-02  0.8570E-02
0.9647E-02  0.7830E-02  0.6152E-02  0.4455E-02  0.3024E-02  0.2049E-02
0.1512E-02  0.6097E-03  0.2453E-03  0.1488E-03  0.6551E-04  0.4692E-04
0.2339E-04  0.8378E-05  0.1069E-04  0.6106E-05  0.6550E-06  0.1520E-06
0.6078E-07  0.3258E-07  0.1282E-07  0.5105E-08  0.1422E-08  0.2742E-08
21R0.0
DETECTOR NO. 24      ANGLE = 115.0
0.6628E+00  0.2940E+00  0.2608E-02  0.1078E-02  0.1141E-02  0.1824E-02
0.1834E-02  0.2296E-02  0.2551E-02  0.2617E-02  0.3094E-02  0.3484E-02
0.7466E-02  0.8227E-02  0.9456E-02  0.9127E-02  0.8815E-02  0.8354E-02
0.9412E-02  0.7662E-02  0.5992E-02  0.4351E-02  0.2963E-02  0.2011E-02
0.1479E-02  0.6046E-03  0.2511E-03  0.1474E-03  0.6611E-04  0.4944E-04
0.2570E-04  0.1155E-04  0.1092E-04  0.4503E-05  0.5559E-06  0.2349E-06
0.9902E-07  0.5073E-07  0.2091E-07  0.8860E-08  0.2536E-08  0.5015E-08
21R0.0
DETECTOR NO. 23      ANGLE = 110.0
0.7465E+00  0.2254E+00  0.2442E-02  0.1216E-02  0.1326E-02  0.1824E-02
0.1841E-02  0.2226E-02  0.2500E-02  0.2568E-02  0.3022E-02  0.3384E-02
0.7281E-02  0.7981E-02  0.9181E-02  0.8878E-02  0.8574E-02  0.8103E-02
0.9113E-02  0.7464E-02  0.5832E-02  0.4242E-02  0.2880E-02  0.1936E-02
0.1465E-02  0.5837E-03  0.2524E-03  0.1406E-03  0.7778E-04  0.4652E-04
0.2544E-04  0.1161E-04  0.8481E-05  0.4450E-05  0.1136E-05  0.2206E-06
0.8657E-07  0.4457E-07  0.1829E-07  0.7692E-08  0.2232E-08  0.4531E-08
21R0.0
DETECTOR NO. 22      ANGLE = 105.0
0.8691E+00  0.1076E+00  0.2312E-02  0.1279E-02  0.1411E-02  0.1765E-02
0.1779E-02  0.2147E-02  0.2427E-02  0.2498E-02  0.2903E-02  0.3261E-02
0.7040E-02  0.7691E-02  0.8870E-02  0.8572E-02  0.8293E-02  0.7842E-02
0.8849E-02  0.7206E-02  0.5625E-02  0.4072E-02  0.2789E-02  0.1871E-02
0.1405E-02  0.5557E-03  0.2502E-03  0.1348E-03  0.7204E-04  0.4693E-04
0.2477E-04  0.1058E-04  0.9917E-05  0.3611E-05  0.1075E-05  0.1266E-06
0.4350E-07  0.2355E-07  0.9119E-08  0.3490E-08  0.9216E-09  0.2092E-08
21R0.0
DETECTOR NO. 21      ANGLE = 100.0
0.9733E+00  0.1124E-01  0.2342E-02  0.1251E-02  0.1371E-02  0.1685E-02
0.1739E-02  0.2066E-02  0.2285E-02  0.2397E-02  0.2810E-02  0.3169E-02
0.6823E-02  0.7439E-02  0.8590E-02  0.8299E-02  0.8008E-02  0.7568E-02
0.8547E-02  0.6939E-02  0.5430E-02  0.3925E-02  0.2672E-02  0.1807E-02
0.1341E-02  0.5271E-03  0.2414E-03  0.1291E-03  0.6698E-04  0.4428E-04
0.2347E-04  0.1035E-04  0.9451E-05  0.3610E-05  0.1137E-05  0.1784E-06
0.6643E-07  0.3445E-07  0.1410E-07  0.5851E-08  0.1636E-08  0.3396E-08
21R0.0
DETECTOR NO. 20      ANGLE = 95.0
0.9903E+00  0.9511E-02  0.2334E-02  0.1209E-02  0.1340E-02  0.1596E-02
0.1640E-02  0.1952E-02  0.2185E-02  0.2299E-02  0.2663E-02  0.2984E-02
0.6494E-02  0.7100E-02  0.8226E-02  0.7928E-02  0.7628E-02  0.7199E-02
0.8141E-02  0.6565E-02  0.5119E-02  0.3683E-02  0.2502E-02  0.1710E-02
0.1252E-02  0.4893E-03  0.2168E-03  0.1209E-03  0.5879E-04  0.4289E-04
0.2248E-04  0.8902E-05  0.8579E-05  0.1882E-05  0.1949E-05  0.6530E-06
0.1084E-06  0.5244E-07  0.2396E-07  0.1129E-07  0.3307E-08  0.6660E-08
21R0.0
DETECTOR NO. 19      ANGLE = 90.0
0.9972E+00  0.8147E-02  0.2357E-02  0.1166E-02  0.1248E-02  0.1499E-02
0.1587E-02  0.1850E-02  0.1992E-02  0.2090E-02  0.2384E-02  0.2680E-02
0.5824E-02  0.6350E-02  0.7353E-02  0.7096E-02  0.6824E-02  0.6382E-02
0.7187E-02  0.5737E-02  0.4488E-02  0.3194E-02  0.2171E-02  0.1479E-02
0.1118E-02  0.4347E-03  0.1920E-03  0.1004E-03  0.5267E-04  0.3776E-04
0.2050E-04  0.8168E-05  0.7549E-05  0.1674E-05  0.1875E-05  0.6285E-06
0.1025E-06  0.4955E-07  0.2251E-07  0.1061E-07  0.3112E-08  0.6260E-08
21R0.0
DETECTOR NO. 18      ANGLE = 85.0
0.7330E+00  0.7503E-02  0.2376E-02  0.1163E-02  0.1249E-02  0.1513E-02
0.1608E-02  0.1883E-02  0.2035E-02  0.2158E-02  0.2476E-02  0.2737E-02
0.5893E-02  0.6391E-02  0.7400E-02  0.7092E-02  0.6730E-02  0.6264E-02
0.7049E-02  0.5540E-02  0.4365E-02  0.3125E-02  0.2102E-02  0.1457E-02
0.1132E-02  0.4430E-03  0.2098E-03  0.1003E-03  0.5333E-04  0.3704E-04
0.2529E-04  0.8411E-05  0.8818E-05  0.1357E-05  0.6366E-06  0.7508E-06
0.4445E-06  0.9272E-07  0.1918E-07  0.9044E-08  0.2648E-08  0.5372E-08
21R0.0
DETECTOR NO. 17      ANGLE = 80.0
0.8423E+00  0.7192E-02  0.2467E-02  0.1200E-02  0.1299E-02  0.1528E-02
0.1664E-02  0.1965E-02  0.2153E-02  0.2300E-02  0.2596E-02  0.2848E-02
0.6156E-02  0.6654E-02  0.7705E-02  0.7397E-02  0.7066E-02  0.6653E-02
0.7496E-02  0.5903E-02  0.4626E-02  0.3335E-02  0.2254E-02  0.1562E-02
0.1187E-02  0.5010E-03  0.2320E-03  0.1178E-03  0.6171E-04  0.4055E-04
0.2637E-04  0.1097E-04  0.9429E-05  0.1757E-05  0.7000E-06  0.6499E-06
0.3938E-06  0.7231E-07  0.1077E-07  0.4983E-08  0.1444E-08  0.3322E-08
21R0.0
DETECTOR NO. 16      ANGLE = 75.0
0.9200E+00  0.6842E-02  0.2508E-02  0.1233E-02  0.1328E-02  0.1512E-02
0.1652E-02  0.1990E-02  0.2176E-02  0.2321E-02  0.2639E-02  0.2901E-02
0.6250E-02  0.6733E-02  0.7843E-02  0.7564E-02  0.7252E-02  0.6840E-02
0.7709E-02  0.6156E-02  0.4778E-02  0.3458E-02  0.2371E-02  0.1635E-02

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Fig. 2.11 Continued.

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0.1228E-02 0.5287E-03 0.2486E-03 0.1274E-03 0.6799E-04 0.4031E-04
0.2740E-04 0.1169E-04 0.1015E-04 0.2127E-05 0.7684E-06 0.2184E-06
0.1096E-06 0.1645E-06 0.9663E-07 0.4550E-07 0.1356E-07 0.2580E-07
21R0.0
DETECTOR NO. 15 ANGLE = 70.0
0.9621E+00 0.6493E-02 0.2471E-02 0.1200E-02 0.1330E-02 0.1543E-02
0.1686E-02 0.1959E-02 0.2151E-02 0.2310E-02 0.2649E-02 0.2909E-02
0.6254E-02 0.6723E-02 0.7865E-02 0.7604E-02 0.7304E-02 0.6923E-02
0.7767E-02 0.6246E-02 0.4836E-02 0.3511E-02 0.2419E-02 0.1658E-02
0.1261E-02 0.5280E-03 0.2569E-03 0.1368E-03 0.6430E-04 0.4850E-04
0.2824E-04 0.1132E-04 0.1080E-04 0.2135E-05 0.7384E-06 0.2578E-06
0.1272E-06 0.1684E-06 0.9736E-07 0.4575E-07 0.1359E-07 0.2570E-07
21R0.0
DETECTOR NO. 14 ANGLE = 65.0
0.9807E+00 0.6139E-02 0.2406E-02 0.1206E-02 0.1370E-02 0.1522E-02
0.1657E-02 0.1955E-02 0.2149E-02 0.2295E-02 0.2622E-02 0.2876E-02
0.6204E-02 0.6685E-02 0.7810E-02 0.7564E-02 0.7285E-02 0.6934E-02
0.7764E-02 0.6259E-02 0.4839E-02 0.3538E-02 0.2439E-02 0.1667E-02
0.1271E-02 0.5348E-03 0.2571E-03 0.1366E-03 0.6929E-04 0.5103E-04
0.2684E-04 0.1311E-04 0.9459E-05 0.1630E-05 0.6376E-06 0.2146E-06
0.8209E-07 0.3944E-07 0.1747E-07 0.7933E-08 0.2187E-08 0.4557E-08
21R0.0
DETECTOR NO. 13 ANGLE = 60.0
0.9904E+00 0.5816E-02 0.2273E-02 0.1259E-02 0.1454E-02 0.1541E-02
0.1676E-02 0.1938E-02 0.2122E-02 0.2277E-02 0.2604E-02 0.2852E-02
0.6154E-02 0.6616E-02 0.7773E-02 0.7527E-02 0.7245E-02 0.6877E-02
0.7718E-02 0.6240E-02 0.4793E-02 0.3547E-02 0.2420E-02 0.1672E-02
0.1301E-02 0.5554E-03 0.2395E-03 0.1364E-03 0.6605E-04 0.5934E-04
0.2761E-04 0.1102E-04 0.1010E-04 0.1367E-05 0.5212E-06 0.1778E-06
0.6646E-07 0.3186E-07 0.1414E-07 0.6275E-08 0.1720E-08 0.3732E-08
21R0.0
DETECTOR NO. 12 ANGLE = 55.0
0.1005E+01 0.5524E-02 0.2134E-02 0.1283E-02 0.1509E-02 0.1593E-02
0.1732E-02 0.1934E-02 0.2089E-02 0.2230E-02 0.2578E-02 0.2816E-02
0.6084E-02 0.6532E-02 0.7707E-02 0.7493E-02 0.7165E-02 0.6821E-02
0.7670E-02 0.6196E-02 0.4774E-02 0.3528E-02 0.2397E-02 0.1690E-02
0.1276E-02 0.5554E-03 0.2414E-03 0.1421E-03 0.6715E-04 0.5662E-04
0.2924E-04 0.1215E-04 0.9405E-05 0.9462E-06 0.3587E-06 0.2708E-06
0.1316E-06 0.6342E-07 0.2816E-07 0.1285E-07 0.3701E-08 0.7451E-08
21R0.0
DETECTOR NO. 11 ANGLE = 50.0
0.1009E+01 0.5332E-02 0.2044E-02 0.1200E-02 0.1447E-02 0.1621E-02
0.1785E-02 0.1954E-02 0.2088E-02 0.2208E-02 0.2569E-02 0.2799E-02
0.6050E-02 0.6445E-02 0.7645E-02 0.7459E-02 0.7105E-02 0.6762E-02
0.7618E-02 0.6134E-02 0.4727E-02 0.3511E-02 0.2405E-02 0.1680E-02
0.1253E-02 0.5650E-03 0.2529E-03 0.1376E-03 0.6771E-04 0.5731E-04
0.3105E-04 0.1140E-04 0.9189E-05 0.1052E-05 0.3949E-06 0.2843E-06
0.1367E-06 0.6592E-07 0.2921E-07 0.1336E-07 0.3832E-08 0.7713E-08
21R0.0
DETECTOR NO. 10 ANGLE = 45.0
0.1017E+01 0.5169E-02 0.1961E-02 0.1100E-02 0.1346E-02 0.1592E-02
0.1776E-02 0.1967E-02 0.2126E-02 0.2241E-02 0.2570E-02 0.2791E-02
0.6016E-02 0.6351E-02 0.7572E-02 0.7395E-02 0.7054E-02 0.6708E-02
0.7552E-02 0.6057E-02 0.4681E-02 0.3502E-02 0.2409E-02 0.1656E-02
0.1250E-02 0.5722E-03 0.2498E-03 0.1448E-03 0.6520E-04 0.5105E-04
0.3148E-04 0.1100E-04 0.1048E-04 0.2225E-05 0.3471E-06 0.2153E-06
0.1053E-06 0.5063E-07 0.2232E-07 0.1017E-07 0.2927E-08 0.5853E-08
21R0.0
DETECTOR NO. 9 ANGLE = 40.0
0.1027E+01 0.5054E-02 0.1919E-02 0.1028E-02 0.1276E-02 0.1525E-02
0.1705E-02 0.1965E-02 0.2162E-02 0.2254E-02 0.2574E-02 0.2798E-02
0.5991E-02 0.6289E-02 0.7518E-02 0.7344E-02 0.6982E-02 0.6643E-02
0.7489E-02 0.6014E-02 0.4661E-02 0.3450E-02 0.2392E-02 0.1641E-02
0.1254E-02 0.5524E-03 0.2601E-03 0.1441E-03 0.6710E-04 0.4945E-04
0.3303E-04 0.1381E-04 0.9530E-05 0.1998E-05 0.3151E-06 0.2482E-06
0.1200E-06 0.5775E-07 0.2546E-07 0.1145E-07 0.3258E-08 0.6603E-08
21R0.0
DETECTOR NO. 8 ANGLE = 35.0
0.1028E+01 0.4976E-02 0.1892E-02 0.9430E-03 0.1184E-02 0.1461E-02
0.1643E-02 0.1922E-02 0.2119E-02 0.2222E-02 0.2605E-02 0.2834E-02
0.6010E-02 0.6254E-02 0.7439E-02 0.7277E-02 0.6948E-02 0.6590E-02
0.7417E-02 0.5940E-02 0.4642E-02 0.3408E-02 0.2344E-02 0.1634E-02
0.1251E-02 0.5377E-03 0.2794E-03 0.1335E-03 0.7167E-04 0.4952E-04
0.2800E-04 0.1304E-04 0.1085E-04 0.2851E-05 0.4313E-06 0.1869E-06
0.8998E-07 0.4314E-07 0.1868E-07 0.8220E-08 0.2285E-08 0.4621E-08
21R0.0
DETECTOR NO. 7 ANGLE = 30.0
0.1031E+01 0.4906E-02 0.1869E-02 0.8988E-03 0.1138E-02 0.1403E-02
0.1579E-02 0.1870E-02 0.2075E-02 0.2164E-02 0.2565E-02 0.2800E-02
0.5989E-02 0.6284E-02 0.7419E-02 0.7201E-02 0.6896E-02 0.6504E-02
0.7348E-02 0.5915E-02 0.4580E-02 0.3376E-02 0.2293E-02 0.1612E-02
0.1256E-02 0.5465E-03 0.2614E-03 0.1375E-03 0.8326E-04 0.4058E-04
0.2660E-04 0.1012E-04 0.1123E-04 0.3562E-05 0.1018E-05 0.3380E-06
0.8357E-07 0.4008E-07 0.1730E-07 0.7606E-08 0.2111E-08 0.4382E-08
21R0.0
DETECTOR NO. 6 ANGLE = 25.0
0.1032E+01 0.4899E-02 0.1857E-02 0.8429E-03 0.1092E-02 0.1357E-02

```

Fig. 2.11 Continued.

```

0.1526E-02 0.1827E-02 0.2024E-02 0.2103E-02 0.2525E-02 0.2769E-02
0.5956E-02 0.6247E-02 0.7398E-02 0.7171E-02 0.6846E-02 0.6458E-02
0.7254E-02 0.5881E-02 0.4536E-02 0.3337E-02 0.2294E-02 0.1571E-02
0.1225E-02 0.5600E-03 0.2619E-03 0.1327E-03 0.7243E-04 0.4367E-04
0.2380E-04 0.1087E-04 0.1012E-04 0.3290E-05 0.1112E-05 0.4268E-06
0.1233E-06 0.5929E-07 0.2590E-07 0.1163E-07 0.3305E-08 0.6823E-08
21R0.0
DETECTOR NO. 5 ANGLE = 20.0
0.1042E+01 0.4884E-02 0.1866E-02 0.8471E-03 0.1093E-02 0.1284E-02
0.1454E-02 0.1792E-02 0.1984E-02 0.2047E-02 0.2479E-02 0.2737E-02
0.5888E-02 0.6170E-02 0.7337E-02 0.7139E-02 0.6801E-02 0.6441E-02
0.7198E-02 0.5814E-02 0.4498E-02 0.3323E-02 0.2251E-02 0.1535E-02
0.1229E-02 0.5530E-03 0.2577E-03 0.1364E-03 0.7043E-04 0.4420E-04
0.2468E-04 0.1151E-04 0.7297E-05 0.2537E-05 0.1455E-05 0.6119E-06
0.1914E-06 0.9148E-07 0.4032E-07 0.1844E-07 0.5389E-08 0.1069E-07
21R0.0
DETECTOR NO. 4 ANGLE = 15.0
0.1038E+01 0.4915E-02 0.1870E-02 0.8282E-03 0.1069E-02 0.1257E-02
0.1418E-02 0.1777E-02 0.1950E-02 0.2002E-02 0.2419E-02 0.2694E-02
0.5903E-02 0.6082E-02 0.7263E-02 0.7097E-02 0.6779E-02 0.6400E-02
0.7161E-02 0.5759E-02 0.4452E-02 0.3305E-02 0.2218E-02 0.1516E-02
0.1214E-02 0.5485E-03 0.2479E-03 0.1393E-03 0.6521E-04 0.4327E-04
0.2681E-04 0.1350E-04 0.7482E-05 0.1978E-05 0.1269E-05 0.7107E-06
0.2586E-06 0.1238E-06 0.5461E-07 0.2501E-07 0.7316E-08 0.1460E-07
21R0.0
DETECTOR NO. 3 ANGLE = 10.0
0.1041E+01 0.4997E-02 0.1867E-02 0.7934E-03 0.1030E-02 0.1226E-02
0.1379E-02 0.1755E-02 0.1939E-02 0.1978E-02 0.2375E-02 0.2667E-02
0.5756E-02 0.6038E-02 0.7222E-02 0.7054E-02 0.6744E-02 0.6347E-02
0.7139E-02 0.5721E-02 0.4421E-02 0.3276E-02 0.2209E-02 0.1533E-02
0.1189E-02 0.5400E-03 0.2425E-03 0.1400E-03 0.6703E-04 0.3831E-04
0.3058E-04 0.1431E-04 0.8407E-05 0.1448E-05 0.4438E-06 0.2901E-06
0.3407E-06 0.2133E-06 0.9531E-07 0.4413E-07 0.1299E-07 0.2533E-07
21R0.0
DETECTOR NO. 2 ANGLE = 5.0
0.1044E+01 0.5059E-02 0.1867E-02 0.7745E-03 0.1005E-02 0.1248E-02
0.1386E-02 0.1730E-02 0.1913E-02 0.1956E-02 0.2361E-02 0.2674E-02
0.5745E-02 0.6029E-02 0.7204E-02 0.7078E-02 0.6748E-02 0.6348E-02
0.7151E-02 0.5740E-02 0.4438E-02 0.3260E-02 0.2233E-02 0.1545E-02
0.1196E-02 0.5227E-03 0.2454E-03 0.1372E-03 0.7030E-04 0.3757E-04
0.2997E-04 0.1380E-04 0.8877E-05 0.1952E-05 0.1126E-05 0.6908E-06
0.2196E-06 0.6280E-07 0.2657E-07 0.1154E-07 0.3146E-08 0.6682E-08
21R0.0
DETECTOR NO. 1 ANGLE = 0.0
0.1044E+01 0.5070E-02 0.1869E-02 0.7831E-03 0.1006E-02 0.1229E-02
0.1366E-02 0.1709E-02 0.1907E-02 0.1954E-02 0.2372E-02 0.2684E-02
0.5729E-02 0.6016E-02 0.7197E-02 0.7069E-02 0.6748E-02 0.6359E-02
0.7151E-02 0.5763E-02 0.4426E-02 0.3270E-02 0.2247E-02 0.1542E-02
0.1186E-02 0.4988E-03 0.2672E-03 0.1327E-03 0.6920E-04 0.4381E-04
0.2605E-04 0.1226E-04 0.7991E-05 0.2345E-05 0.1565E-05 0.7789E-06
0.2293E-06 0.6818E-07 0.2883E-07 0.1272E-07 0.3540E-08 0.7214E-08
21R0.0
T T

```

Fig. 2.11 Continued.

```

FNS-DOT3.5      #1D42F      #1 - SUS316      '92-04-07
' #1 - AIR/SUS316 <FUSION-40> n-42 + g-21
O
61$$
    0          5          2          39          75          63
    4          5          67          78          0          0
    300        1          160         1          1          0
    0          0          1          15         15         3
    6          2          0          0          0          0
    0          0          0          0          0          0
    0          0          0          0          3          0
    0          0          0          0          0          0
    0          0          2          1          1          0
    0          0          0          0          0          8
    0
62$$
    2          3          4          14          15          9
    10         11         12         13         8         60
    0
63**
    0.0        1.000E-02   0.0        0.0        0.0        0.0
    0.0        0.0        0.0        0.0        0.0        0.0
    0.0        0.0        0.0        0.0        0.0        0.0
T
7**
-0.21082    -0.14907   1M1
-0.42164    -0.39441   -0.14907   1M2
-0.55777    -0.53748   -0.39441   -0.14907   1M3
-0.66667    -0.64979   -0.53748   -0.39441   -0.14907   1M4
-0.76012    -0.74536   -0.64979   -0.53748   -0.39441   -0.14907
1M5
-0.84327    -0.82999   -0.74536   -0.64979   -0.53748   -0.39441
-0.14907    1M6
-0.91894    -0.90676   -0.82999   -0.74536   -0.64979   -0.53748
-0.39441    -0.14907   1M7
-0.98883    -0.97753   -0.90676   -0.82999   -0.74536   -0.64979
-0.53748    -0.39441   -0.14907   1M8
1Q80
3R-0.97753  5R-0.90676  7R-0.82999  9R-0.74536  11R-0.64979  13R-0.53748
15R-0.39441 17R-0.14907 3R0.97753  5R0.90676  7R0.82999  9R0.74536
11R0.64979 13R0.53748 15R0.39441 17R0.14907
T
6**
0.0          2R0.13586-1  0.0          4R0.97681-2
0.0          0.64738-2    0.50390-2    0.64738-2  1N3
0.0          0.64634-2    2R0.71124-2  0.64634-2  1N4
0.0          0.64634-2    0.14381-2    0.36342-2  0.14381-2  0.64634-2
1N5
0.0          0.64738-2    0.71124-2    0.36342-2  1N3  1Q6
0.0          0.97681-2    0.50390-2    0.71124-2  0.14381-2  0.71124-2
0.50390-2    0.97681-2  1N7
0.0          0.13586-1  0.97681-2  2R0.64738-2  1N4  1Q8
1Q80
T
3**
F0.0
T
1**
F0.0
2**
110.0      20.0      1I25.0      29.0      1I30.0      31.0      53I32.0      140.0
1I140.8    141.8      1I142.8      146.8      4I151.8      201.8
4**
28I0.0     58.0      1I59.0      60.0      1I61.0      65.0      2I70.0      100.0
5**
F1.0
8$$
39R1      7R1      5Q39
32R2      59Q39
39R1      8Q39
9$$
-241      -247
10$$
' 241 = AIR / 247 = SUS316 /
    4I241      246      2Q6
    4I247      252      9Q6
11$$
6Z        4I161      66      4I67      72
6Z        4I163      168      4I139      144      4I187      192
        4I155      60      4I97      102      4I145      150
        4I103      108      4I109      114      4I151      156
12**
6R0.0     6R3.8810-5  6R1.0400-5
6R0.0     6R9.7128-3  6R1.5476-2  6R1.0503-3  6R7.1697-5  6R9.8440-4
        6R9.7963-4  6R4.3162-5  6R1.8780-6  6R5.7589-2
T      T

```

Fig. 2.12 Input data of the DOT analysis for the Assembly #1 with FUSION-40 library (42-n + 21-γ).

```

FNS-GRTUNCL  BLK1FTAB  #1 - SUS316  '92-03-10
#1 - AIR/SUS316  <JSSTD> n-125 + g-40
O
1$$
      0      5      2      39      75      165
      3      4      168      0      0      18
      18     1      1      30000     10      0
      1      0      18      0      0      37
      1      1      1      1      1
2**
1.0      0.0      0.0      0.0      0.0
T
13$$ 4I3161 3166 4I3167 3172 4I3080 3085
T
1**
FO.0
2**
1I10.0 20.0 1I25.0 29.0 1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
28I10.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8$$
39R1      5Q39
32R2      7R1      59Q39
39R1      8Q39
9$$
-13      -1
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0      -0.996195      -0.984808      -0.965926      -0.939693      -0.906308
-0.866025      -0.819152      -0.766044      -0.707107      -0.642788      -0.573576
-0.5      -0.422618      -0.342020      -0.258809      -0.173648      -0.087156
0.0      0.087156      0.173648      0.258809      0.342020      0.422618
0.5      0.573576      0.642788      0.707107      0.766044      0.819152
0.866025      0.906308      0.939693      0.965926      0.984808      0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567      1.1785      0.97312      1.0221      0.99500      0.91711
0.74641      0.73360      0.79463      0.88820      1.0175      1.0581
1.0532      1.0657      1.0783      1.0797      1.0840      1.0945
1.0902      0.82512      0.93854      1.0180      1.0603      1.0782
1.0872      1.1009      1.1043      1.1113      1.1204      1.1200
1.1219      1.1216      1.1314      1.1266      1.1284      1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37  ANGLE = 180.0
0.0      0.0      0.0      0.0      0.0      0.0
0.0      2.8133E-07  1.1132E-05  7.0699E-05  2.9725E-04  5.8035E-03

```

The rest of the data are just the same as those in Fig. 2.9.

Fig. 2.13 Input data of FNSUNCL for the DOT analysis of the Assembly #1 with JSSTD library (125-n + 40-γ).

```

FNS-DOT3.5      BLKCN1D      #1 - SUS316      '91-03-16
#1 - AIR/SUS316 <JSSTD L> n-125 + g-40
O
61$$
0
0 5 2 39 75 165
3 4 168 0 0 18
18 1 160 1 1 0
0 0 1 15 15 3
6 2 0 0 0 0
0 0 0 0 0 0
0 0 0 0 3 0
0 0 0 0 0 0
0 0 2 1 1 0
0 0 0 0 0 0
0 0 0 0 0 0
62$$
2 3 4 14 15 9
10 11 12 13 8 60
0
63**
0.0 1.000E-02 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 0.0 0.0 0.0 0.0 0.0
T
7**
-0.21082 -0.14907 1M1
-0.42164 -0.39441 -0.14907 1M2
-0.55777 -0.53748 -0.39441 -0.14907 1M3
-0.66667 -0.64979 -0.53748 -0.39441 -0.14907 1M4
-0.76012 -0.74536 -0.64979 -0.53748 -0.39441 -0.14907
1M5
-0.84327 -0.82999 -0.74536 -0.64979 -0.53748 -0.39441
-0.14907 1M6
-0.91894 -0.90676 -0.82999 -0.74536 -0.64979 -0.53748
-0.39441 -0.14907 1M7
-0.98883 -0.97753 -0.90676 -0.82999 -0.74536 -0.64979
-0.53748 -0.39441 -0.14907 1M8
1Q80
3R-0.97753 5R-0.90676 7R-0.82999 9R-0.74536 11R-0.64979 13R-0.53748
15R-0.39441 17R-0.14907 3R0.97753 5R0.90676 7R0.82999 9R0.74536
11R0.64979 13R0.53748 15R0.39441 17R0.14907
T
6**
0.0 2R0.13586-1 0.0 4R0.97681-2
0.0 0.64738-2 0.50390-2 0.64738-2 1N3
0.0 0.64634-2 2R0.71124-2 0.64634-2 1N4
0.0 0.64634-2 0.14381-2 0.36342-2 0.14381-2 0.64634-2
1N5
0.0 0.64738-2 0.71124-2 0.36342-2 1N3 1Q6
0.0 0.97681-2 0.50390-2 0.71124-2 0.14381-2 0.71124-2
0.50390-2 0.97681-2 1N7
0.0 0.13586-1 0.97681-2 2R0.64738-2 1N4 1Q8
1Q80
T
13$$ 4I3161 3166 4I3167 3172 4I3080 3085
T
3**
FO.0
T
1**
FO.0
2**
1I0.0 20.0 1I25.0 29.0 1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
4**
28I0.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
5**
F1.0
8$$
39R1 5Q39
32R2 7R1 59Q39
39R1 8Q39
9$$
-13 -1
T T

```

Fig. 2.14 Input data of the DOT analysis for the Assembly #1 with JSSTD L library (125-n + 40-γ).

```

FNS-GRTUNCL #1F42S #1 - SUS316 #1 - SUS316 '92-04-08
#1 - AIR/SUS316 <JSSTD L> n-42 + g-21
O
1$$
0 5 2 39 75 63
3 4 66 0 0 18
18 1 1 30000 10 0
1 0 18 0 0 37
1 1 1 1 1
2**
1.0 0.0 0.0 0.0 0.0
T
13$$ 4I3161 3166 4I3167 3172 4I3080 3085
T
1**
F0.0
2**
1I0.0 20.0 1I25.0 29.0 1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
F0.0
4**
28I0.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8$$
39R1 5Q39
32R2 7R1 59Q39
39R1 8Q39
9$$
-13 -1
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.4793E-02 0.9460E+00 0.7066E-02 0.1480E-02 0.1812E-02 0.2678E-02
0.2626E-02 0.3422E-02 0.4506E-02 0.4909E-02 0.5521E-02 0.6431E-02

```

The rest of the data are just the same as those in Fig. 2.11.

Fig. 2.15 Input data of FNSUNCL for the DOT analysis of the Assembly #1 with JSSTD L library (42-n + 21- γ).

```

FNS-DOT3.5      #1D42S      #1 - SUS316      '92-04-08
#1 - AIR/SUS316 <JSSTD L> n-42 + g-21

O
61$$
0      5      2      39      75      63
3      4      66      0      0      18
18     1      160     1      1      0
0      0      1      15     15     3
6      2      0      0      0      0
0      0      0      0      0      0
0      0      0      0      3      0
0      0      0      0      0      0
0      0      2      1      1      0
0      0      0      0      0      0
0

62$$
2      3      4      14     15     9
10     11     12     13     8      60
0

63**
0.0      1.000E-02 0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0

T
7**
-0.21082 -0.14907 1M1
-0.42164 -0.39441 -0.14907 1M2
-0.55777 -0.53748 -0.39441 -0.14907 1M3
-0.66667 -0.64979 -0.53748 -0.39441 -0.14907 1M4
-0.76012 -0.74536 -0.64979 -0.53748 -0.39441 -0.14907

1M5
-0.84327 -0.82999 -0.74536 -0.64979 -0.53748 -0.39441
-0.14907 1M6
-0.91894 -0.90676 -0.82999 -0.74536 -0.64979 -0.53748
-0.39441 -0.14907 1M7
-0.98883 -0.97753 -0.90676 -0.82999 -0.74536 -0.64979
-0.53748 -0.39441 -0.14907 1M8

1Q80
3R-0.97753 5R-0.90676 7R-0.82999 9R-0.74536 11R-0.64979 13R-0.53748
15R-0.39441 17R-0.14907 3R0.97753 5R0.90676 7R0.82999 9R0.74536
11R0.64979 13R0.53748 15R0.39441 17R0.14907

T
6**
0.0      2R0.13586-1 0.0      4R0.97681-2
0.0      0.64738-2 0.50390-2 0.64738-2 1N3
0.0      0.64634-2 2R0.71124-2 0.64634-2 1N4
0.0      0.64634-2 0.14381-2 0.36342-2 0.14381-2 0.64634-2

1N5
0.0      0.64738-2 0.71124-2 0.36342-2 1N3 1Q6
0.0      0.97681-2 0.50390-2 0.71124-2 0.14381-2 0.71124-2
0.50390-2 0.97681-2 1N7
0.0      0.13586-1 0.97681-2 2R0.64738-2 1N4 1Q8

1Q80
T
13$$      4I3161 3166 4I3167 3172 4I3080 3085

T
3**
FO.0
T
1**
FO.0
2**
1I0.0      20.0      1I25.0      29.0      1I30.0      31.0      53I32.0      140.0
1I140.8      141.8      1I142.8      146.8      4I151.8      201.8

4**
28I0.0      58.0      1I59.0      60.0      1I61.0      65.0      2I70.0      100.0

5**
F1.0
8$$
39R1      5Q39
32R2      7R1      59Q39
39R1      8Q39

9$$
-13      -1
T      T

```

Fig. 2.16 Input data of the DOT analysis for the Assembly #1 with JSSTD L library (42-n + 21-γ).


```

FNS-GRTUNCL BLKCN2F #2 - SUS316 '91-09-12
#2 - AIR/SUS316 <FUSION-J3> n-125 + g-42
O
1SS
    0      5      3      45      125      165
    4      5      169     138      0      300
    300     2      1      30000     10      0
    1      0      18      0      0      37
    1      1      1      1
2**
1.0      0.0      0.0      0.0      0.0
T
1**
F0.0
2**
3I-101.3    -61.3    1I-56.3    -52.3    1I-51.3    -50.3    -49.3
6I-48.0     1I-34.0    1I-32.0    -31.0    28I-30.0    28.0    1I29.0
1I30.0     31.0     53I32.0    140.0
1I140.8     141.8    1I142.8    146.8    4I151.8    201.8
3**
F0.0
4**
2I0.0      6.0      6.383     6.7      7.3     14I8.0    1I38.0    1I40.0    41.0
7I42.0     58.0     1I59.0     60.0     1I61.0    65.0     2I70.0    100.0
6**
1.0
7**
1.0
8SS
45R1      7Q45
4R1      34R3     7R1      14Q45
24R1     14R3     7R1      32Q45
38R2     7R1      59Q45
45R1      8Q45
9SS
-241     -247     -253
10SS
' 241 = AIR / 247 = SUS316 /
    4I241     246     2Q6
    4I247     252     9Q6
    4I253     258     9Q6
11SS
6Z      4I161     66      4I167     72
6Z      4I163     168     4I139     144     4I187     192
        4I55     60      4I197     102     4I145     150
        4I103    108     4I109     114     4I151     156
6Z      4I163     168     4I139     144     4I187     192
        4I55     60      4I197     102     4I145     150
        4I103    108     4I109     114     4I151     156
12**
6R0.0     6R3.8810-5  6R1.0400-5
6R0.0     6R9.7128-3  6R1.5476-2  6R1.0503-3  6R7.1697-5  6R9.8440-4
        6R9.7963-4  6R4.3162-5  6R1.8780-6  6R5.7589-2
6R0.0     6R9.1456-3  6R1.5025-2  6R1.0254-3  6R1.9855-4  6R8.1608-4
        6R1.3561-3  6R4.7828-5  6R4.5072-6  6R5.8331-2
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0      -0.996195   -0.984808   -0.965926   -0.939693   -0.906308
-0.866025 -0.819152   -0.766044   -0.707107   -0.642788   -0.573576
-0.5      -0.422618   -0.342020   -0.258809   -0.173648   -0.087156
0.0       0.087156    0.173648    0.258809    0.342020    0.422618
0.5       0.573576    0.642788    0.707107    0.766044    0.819152
0.866025  0.906308    0.939693    0.965926    0.984808    0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567     1.1785     0.97312     1.0221     0.99500     0.91711
0.74641    0.73360    0.79463     0.88820    1.0175     1.0581
1.0532     1.0657     1.0783     1.0797     1.0840     1.0945
1.0902     0.82512    0.93854     1.0180     1.0603     1.0782
1.0872     1.1009     1.1043     1.1113     1.1204     1.1200
1.1219     1.1216     1.1314     1.1266     1.1284     1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.0      0.0      0.0      0.0      0.0
0.0      2.8133E-07  1.1132E-05  7.0699E-05  2.9725E-04  5.8035E-03

```

The rest of the data are just the same as those in Fig. 2.9.

Fig. 2.17 Input data of FNSUNCL for the DOT analysis of the Assembly #2 with FUSION-J3 library (125-n + 40-γ).

```

FNS-DOT3.5      BLKCN2D      #2 - SUS316      '91-09-12
' #2 - AIR/SUS316 <FUSION-J3> n-125 + g-42
O
61$$
      0          5          3          45          125          165
      4          5          169          138          0          0
300   300        1          160          1          1          0
      0          0          1          15          15          3
      6          2          0          0          0          0
      0          0          0          0          0          0
      0          0          0          0          3          0
      0          0          0          0          0          0
      0          0          2          1          1          0
      0          0          0          0          0          8
      0
62$$
      2          3          4          14          15          9
10    10         11         12         13         8          60
      0
63**
      0.0          1.000E-02      0.0          0.0          0.0          0.0
      0.0          0.0          0.0          0.0          0.0          0.0
      0.0          0.0          0.0          0.0          0.0          0.0
T
7**
-0.21082      -0.14907      1M1
-0.42164      -0.39441      -0.14907      1M2
-0.55777      -0.53748      -0.39441      -0.14907      1M3
-0.66667      -0.64979      -0.53748      -0.39441      -0.14907      1M4
-0.76012      -0.74536      -0.64979      -0.53748      -0.39441      -0.14907
1M5
-0.84327      -0.82999      -0.74536      -0.64979      -0.53748      -0.39441
-0.14907      1M6
-0.91894      -0.90676      -0.82999      -0.74536      -0.64979      -0.53748
-0.39441      -0.14907      1M7
-0.98883      -0.97753      -0.90676      -0.82999      -0.74536      -0.64979
-0.53748      -0.39441      -0.14907      1M8
1Q80
3R-0.97753      5R-0.90676      7R-0.82999      9R-0.74536      11R-0.64979      13R-0.53748
15R-0.39441      17R-0.14907      3R0.97753      5R0.90676      7R0.82999      9R0.74536
11R0.64979      13R0.53748      15R0.39441      17R0.14907
T
6**
      0.0          2R0.13586-1          0.0          4R0.97681-2
      0.0          0.64738-2          0.50390-2          0.64738-2      1N3
      0.0          0.64634-2      2R0.71124-2          0.64634-2      1N4
      0.0          0.64634-2          0.14381-2          0.36342-2          0.14381-2          0.64634-2
1N5
      0.0          0.64738-2          0.71124-2          0.36342-2      1N3          1Q6
      0.0          0.97681-2          0.50390-2          0.71124-2          0.14381-2          0.71124-2
      0.50390-2          0.97681-2      1N7
      0.0          0.13586-1          0.97681-2      2R0.64738-2      1N4          1Q8
1Q80
T
3**
FO.0
T
1**
FO.0
2**
3I-101.3      -61.3          1I-56.3          -52.3          1I-51.3          -50.3          -49.3
6I-48.0          1I-34.0          1I-32.0          -31.0          28I-30.0          28.0          1I29.0
1I30.0          31.0          53I32.0          140.0
1I140.8          141.8          1I142.8          146.8          4I151.8          201.8
4**
2I0.0          6.0          6.383          6.7          7.3          14I8.0          1I38.0          1I40.0          4I.0
7I42.0          58.0          1I59.0          60.0          1I61.0          65.0          2I70.0          100.0
5**
F1.0
8$$
45R1
4R1          34R3          7R1          14Q45
24R1          14R3          7R1          32Q45
38R2          7R1          59Q45
45R1          8Q45
9$$
-241          -247          -253
10$$
' 241 = AIR / 247 = SUS316 /
      4I241          246          2Q6
      4I247          252          9Q6
      4I253          258          9Q6
11$$
6Z          4I61          66          4I67          72
6Z          4I163          168          4I139          144          4I187          192
          4I55          60          4I97          102          4I145          150

```

Fig. 2.18 Input data of the DOT analysis for the Assembly #2 with FUSION-J3 library (125-n + 40-γ).

	4I103	108	4I109	114	4I151	156
6Z	4I163	168	4I139	144	4I187	192
	4I55	60	4I97	102	4I145	150
	4I103	108	4I109	114	4I151	156
12**						
6R0.0	6R3.8810-5	6R1.0400-5				
6R0.0	6R9.7128-3	6R1.5476-2	6R1.0503-3	6R7.1697-5	6R9.8440-4	
	6R9.7963-4	6R4.3162-5	6R1.8780-6	6R5.7589-2		
6R0.0	6R9.1456-3	6R1.5025-2	6R1.0254-3	6R1.9855-4	6R8.1608-4	
	6R1.3561-3	6R4.7828-5	6R4.5072-6	6R5.8331-2		
T	T					

Fig. 2.18 Continued.

```

FNS-GRUNCL BLKCN2F #2 - SUS316 '91-09-12
#2 - AIR/SUS316 <FUSION-40> n-40 + g-21
O
1$$
0 0 5 3 45 125 63
4 5 67 138 0 300
300 2 1 30000 10 0
1 0 18 0 0 37
1 1 1 1 1
2**
1.0 0.0 0.0 0.0 0.0
T
1**
FO.0
2**
3I-101.3 -61.3 1I-56.3 -52.3 1I-51.3 -50.3 -49.3
6I-48.0 1I-34.0 1I-32.0 -31.0 28I-30.0 28.0 1I29.0
1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
2I0.0 6.0 6.383 6.7 7.3 14I8.0 1I38.0 1I40.0 41.0
7I42.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8$$
45R1 7Q45
4R1 34R3 7R1 14Q45
24R1 14R3 7R1 32Q45
38R2 7R1 59Q45
45R1 8Q45
9$$
-241 -247 -253
10$$
' 241 = AIR / 247 = SUS316 /
4I241 246 2Q6
4I247 252 9Q6
4I253 258 9Q6
11$$
6Z 4I61 66 4I67 72
6Z 4I163 168 4I139 144 4I187 192
4I55 60 4I97 102 4I145 150
4I103 108 4I109 114 4I151 156
6Z 4I163 168 4I139 144 4I187 192
4I55 60 4I97 102 4I145 150
4I103 108 4I109 114 4I151 156
12**
6R0.0 6R3.8810-5 6R1.0400-5
6R0.0 6R9.7128-3 6R1.5476-2 6R1.0503-3 6R7.1697-5 6R9.8440-4
6R9.7963-4 6R4.3162-5 6R1.8780-6 6R5.7589-2
6R0.0 6R9.1456-3 6R1.5025-2 6R1.0254-3 6R1.9855-4 6R8.1608-4
6R1.3561-3 6R4.7828-5 6R4.5072-6 6R5.8331-2
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
    
```

Fig. 2.19 Input data of FNSUNCL for the DOT analysis of the Assembly #2 with FUSION-40 library (42-n + 21-γ).

0.0	0.087156	0.173648	0.258809	0.342020	0.422618
0.5	0.573576	0.642788	0.707107	0.766044	0.819152
0.866025	0.906308	0.939693	0.965926	0.984808	0.996195
1.0					

14**
 NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE

1.1567	1.1785	0.97312	1.0221	0.99500	0.91711
0.74641	0.73360	0.79463	0.88820	1.0175	1.0581
1.0532	1.0657	1.0783	1.0797	1.0840	1.0945
1.0902	0.82512	0.93854	1.0180	1.0603	1.0782
1.0872	1.1009	1.1043	1.1113	1.1204	1.1200
1.1219	1.1216	1.1314	1.1266	1.1284	1.1314
1.1312					

15**
 NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
 DETECTOR NO. 37 ANGLE = 180.0

0.4793E-02	0.9460E+00	0.7066E-02	0.1480E-02	0.1812E-02	0.2678E-02
0.2626E-02	0.3422E-02	0.4506E-02	0.4909E-02	0.5521E-02	0.6431E-02

The rest of the data are just the same as those in Fig. 2.11.

Fig. 2.19 Continued.

FNS-DOT3.5 #2D42F #2 - SUS316 '92-04-07
 #2 - AIR/SUS316 <FUSION-40> n-42 + g-21

O

61\$\$	0	5	3	45	125	63
	4	5	67	138	0	0
	300	1	160	1	1	0
	0	0	1	15	15	3
	6	2	0	0	0	0
	0	0	0	0	0	0
	0	0	0	0	3	0
	0	0	0	0	0	0
	0	0	2	1	1	0
	0	0	0	0	0	8
	0					
62\$\$	2	3	4	14	15	9
	10	11	12	13	8	60
	0	0				

63**

0.0	1.000E-02	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0

T

7**

-0.21082	-0.14907	1M1			
-0.42164	-0.39441	-0.14907	1M2		
-0.55777	-0.53748	-0.39441	-0.14907	1M3	
-0.66667	-0.64979	-0.53748	-0.39441	-0.14907	1M4
-0.76012	-0.74536	-0.64979	-0.53748	-0.39441	-0.14907

1M5

-0.84327	-0.82999	-0.74536	-0.64979	-0.53748	-0.39441
-0.14907	1M6				
-0.91894	-0.90676	-0.82999	-0.74536	-0.64979	-0.53748
-0.39441	-0.14907	1M7			
-0.98883	-0.97753	-0.90676	-0.82999	-0.74536	-0.64979
-0.53748	-0.39441	-0.14907	1M8		

1Q80

3R-0.97753	5R-0.90676	7R-0.82999	9R-0.74536	11R-0.64979	13R-0.53748
15R-0.39441	17R-0.14907	3R0.97753	5R0.90676	7R0.82999	9R0.74536
11R0.64979	13R0.53748	15R0.39441	17R0.14907		

T

6**

0.0	2R0.13586-1		0.0	4R0.97681-2
0.0	0.64738-2	0.50390-2	0.64738-2	1N3
0.0	0.64634-2	2R0.71124-2	0.64634-2	1N4

Fig. 2.20 Input data of the DOT analysis for the Assembly #2 with FUSION-40 library (42-n + 21-γ).

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```

0.0      0.64634-2  0.14381-2  0.36342-2  0.14381-2  0.64634-2
      1N5
0.0      0.64738-2  0.71124-2  0.36342-2  1N3      1Q6
0.0      0.97681-2  0.50390-2  0.71124-2  0.14381-2  0.71124-2
      0.50390-2  0.97681-2  1N7
0.0      0.13586-1  0.97681-2  2R0.64738-2  1N4      1Q8
1Q80
T
3**
FO.0
T
1**
FO.0
2**
3I-101.3  -61.3  1I-56.3  -52.3  1I-51.3  -50.3  -49.3
6I-48.0  1I-34.0  1I-32.0  -31.0  28I-30.0  28.0  1I29.0
1I30.0  31.0  53I32.0  140.0
1I140.8  141.8  1I142.8  146.8  4I151.8  201.8
4**
2I0.0  6.0  6.383  6.7  7.3  14I8.0  1I38.0  1I40.0  41.0
7I42.0  58.0  1I59.0  60.0  1I61.0  65.0  2I70.0  100.0
5**
F1.0
8$$
45R1      7Q45
4R1      34R3  7R1  14Q45
24R1     14R3  7R1  32Q45
38R2     7R1  59Q45
45R1      8Q45
9$$
-241     -247     -253
10$$
241 = AIR / 247 = SUS316 /
      4I241     246     2Q6
      4I247     252     9Q6
      4I253     258     9Q6
11$$
6Z      4I61     66     4I67     72
6Z      4I163    168    4I139    144    4I187    192
      4I55     60     4I97     102    4I145    150
      4I103    108    4I109    114    4I151    156
6Z      4I163    168    4I139    144    4I187    192
      4I55     60     4I97     102    4I145    150
      4I103    108    4I109    114    4I151    156
12**
6R0.0    6R3.8810-5  6R1.0400-5
6R0.0    6R9.7128-3  6R1.5476-2  6R1.0503-3  6R7.1697-5  6R9.8440-4
      6R9.7963-4  6R4.3162-5  6R1.8780-6  6R5.7589-2
6R0.0    6R9.1456-3  6R1.5025-2  6R1.0254-3  6R1.9855-4  6R8.1608-4
      6R1.3561-3  6R4.7828-5  6R4.5072-6  6R5.8331-2
T      T

```

Fig. 2.20 Continued.

```

FNS-GRTUNCL BLK2FTAB #2 - SUS316 '92-03-10
#2 - AIR/SUS316 <JSSTD L> n-125 + g-40
O
15$
      0      5      3      45      125      165
      3      4      168      0      0      18
      18      1      1      30000      10      0
      1      0      18      0      0      37
      1      1      1      1
2**
1.0      0.0      0.0      0.0      0.0
T
13$$ 4I3161 3166 4I3167 3172 4I3080 3085
T
1**
FO.0
2**
3I-101.3 -61.3 1I-56.3 -52.3 1I-51.3 -50.3 -49.3
6I-48.0 1I-34.0 1I-32.0 -31.0 28I-30.0 28.0 1I29.0
1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
2I0.0 6.0 6.383 6.7 7.3 14I8.0 1I38.0 1I40.0 41.0
7I42.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8$$
45R1 7Q45
4R1 34R3 7R1 14Q45
24R1 14R3 7R1 32Q45
38R2 7R1 59Q45
45R1 8Q45
9$$
-13 -1 -7
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.0 0.0 0.0 0.0 0.0 0.0
0.0 2.8133E-07 1.1132E-05 7.0699E-05 2.9725E-04 5.8035E-03

```

The rest of the data are just the same as those in Fig. 2.9.

Fig. 2.21 Input data of FNSUNCL for the DOT analysis of the Assembly #2 with JSSTD L library (125-n + 40-γ).

```

FNS-DOT3.5      BLKCN2D      #2 - SUS316      '91-03-16
#2 - AIR/SUS316 <JSSTD L> n-125 + g-40
O
61$$
0
0      0      5      3      45      125      165
3      4      168      0      0      0      18
18     1      160      1      1      1      0
0      0      1      15      15      3
6      2      0      0      0      0      0
0      0      0      0      0      0      0
0      0      0      0      0      3      0
0      0      0      0      0      0      0
0      0      2      1      1      0      0
0      0      0      0      0      0      0
0      0      0      0      0      0      0
62$$
2      3      4      14      15      9
10     11     12     13     8      60
0

63**
0.0      1.000E-02  0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0
T
7**
-0.21082  -0.14907  1M1
-0.42164  -0.39441  -0.14907  1M2
-0.55777  -0.53748  -0.39441  -0.14907  1M3
-0.66667  -0.64979  -0.53748  -0.39441  -0.14907  1M4
-0.76012  -0.74536  -0.64979  -0.53748  -0.39441  -0.14907
1M5
-0.84327  -0.82999  -0.74536  -0.64979  -0.53748  -0.39441
-0.14907  1M6
-0.91894  -0.90676  -0.82999  -0.74536  -0.64979  -0.53748
-0.39441  -0.14907  1M7
-0.98883  -0.97753  -0.90676  -0.82999  -0.74536  -0.64979
-0.53748  -0.39441  -0.14907  1M8
1Q80
3R-0.97753  5R-0.90676  7R-0.82999  9R-0.74536  11R-0.64979  13R-0.53748
15R-0.39441  17R-0.14907  3R0.97753  5R0.90676  7R0.82999  9R0.74536
11R0.64979  13R0.53748  15R0.39441  17R0.14907
T
6**
0.0      2R0.13586-1      0.0      4R0.97681-2
0.0      0.64738-2      0.50390-2      0.64738-2  1N3
0.0      0.64634-2      2R0.71124-2      0.64634-2  1N4
0.0      0.64634-2      0.14381-2      0.36342-2      0.14381-2      0.64634-2
1N5
0.0      0.64738-2      0.71124-2      0.36342-2  1N3      1Q6
0.0      0.97681-2      0.50390-2      0.71124-2      0.14381-2      0.71124-2
0.50390-2      0.97681-2  1N7
0.0      0.13586-1      0.97681-2      2R0.64738-2  1N4      1Q8
1Q80
T
13$$      4I3161  3166      4I3167  3172      4I3080  3085
T
3**
F0.0
T
1**
F0.0
2**
3I-101.3      -61.3      1I-56.3      -52.3      1I-51.3      -50.3      -49.3
6I-48.0      1I-34.0      1I-32.0      -31.0      28I-30.0      28.0      1I29.0
1I30.0      31.0      53I32.0      140.0
1I140.8      141.8      1I142.8      146.8      4I151.8      201.8
4**
2I0.0      6.0      6.383      6.7      7.3      14I8.0      1I38.0      1I40.0      41.0
7I42.0      58.0      1I59.0      60.0      1I61.0      65.0      2I70.0      100.0
5**
F1.0
8$$
45R1      7Q45
4R1      34R3      7R1      14Q45
24R1      14R3      7R1      32Q45
38R2      7R1      59Q45
45R1      8Q45
9$$
-13  -1  -7
T      T

```

Fig. 2.22 Input data of the DOT analysis for the Assembly #2 with JSSTD L library (125-n + 40-γ).

```

FNS-GRTUNCL #2F42S #2 - SUS316 '92-04-08
#2 - AIR/SUS316 <JSSTD L> n-42 + g-21
O
1$$
0
3 5 3 45 125 63
3 4 66 0 0 18
18 1 1 30000 10 0
1 0 18 0 0 37
1 1 1 1 1
2**
1.0 0.0 0.0 0.0 0.0
T
13$$ 4I3161 3166 4I3167 3172 4I3080 3085
T
1**
FO.0
2**
3I-101.3 -61.3 1I-56.3 -52.3 1I-51.3 -50.3 -49.3
6I-48.0 1I-34.0 1I-32.0 -31.0 28I-30.0 28.0 1I29.0
1I30.0 31.0 53I32.0 140.0
1I140.8 141.8 1I142.8 146.8 4I151.8 201.8
3**
FO.0
4**
2I0.0 6.0 6.383 6.7 7.3 14I8.0 1I38.0 1I40.0 41.0
7I42.0 58.0 1I59.0 60.0 1I61.0 65.0 2I70.0 100.0
6**
1.0
7**
1.0
8$$
45R1 7Q45
4R1 34R3 7R1 14Q45
24R1 14R3 7R1 32Q45
38R2 7R1 59Q45
45R1 8Q45
9$$
-13 -1 -7
13**
NEW WATER COOLED TARGET - ANGULAR COSINE DISTRIBUTION TABLE
-1.0 -0.996195 -0.984808 -0.965926 -0.939693 -0.906308
-0.866025 -0.819152 -0.766044 -0.707107 -0.642788 -0.573576
-0.5 -0.422618 -0.342020 -0.258809 -0.173648 -0.087156
0.0 0.087156 0.173648 0.258809 0.342020 0.422618
0.5 0.573576 0.642788 0.707107 0.766044 0.819152
0.866025 0.906308 0.939693 0.965926 0.984808 0.996195
1.0
14**
NEW WATER COOLED TARGET - ANGULAR SOURCE INTENSITY TABLE
1.1567 1.1785 0.97312 1.0221 0.99500 0.91711
0.74641 0.73360 0.79463 0.88820 1.0175 1.0581
1.0532 1.0657 1.0783 1.0797 1.0840 1.0945
1.0902 0.82512 0.93854 1.0180 1.0603 1.0782
1.0872 1.1009 1.1043 1.1113 1.1204 1.1200
1.1219 1.1216 1.1314 1.1266 1.1284 1.1314
1.1312
15**
NEW WATER COOLED TARGET - ANGULAR SOURCE SPECTRA TABLE
DETECTOR NO. 37 ANGLE = 180.0
0.4793E-02 0.9460E+00 0.7066E-02 0.1480E-02 0.1812E-02 0.2678E-02
0.2626E-02 0.3422E-02 0.4506E-02 0.4909E-02 0.5521E-02 0.6431E-02

```

The rest of the data are just the same as those in Fig. 2.11.

Fig. 2.23 Input data of FNSUNCL for the DOT analysis of the Assembly #2 with JSSTD L library (42-n + 21-γ).


```

FNS-DOT3.5      #2D42S      #2 - SUS316      '92-04-08
#2 - AIR/SUS316 <JSSTD L> n-42 + g-21
O
61$$
0
0      0      5      3      45      125      063
3      4      66      0      0      0      18
18     1      160     1      1      1      0
0      0      1      30     30     3      3
6      2      0      0      0      0      0
0      0      0      0      0      0      0
0      0      0      0      0      3      0
0      0      0      0      0      0      0
0      0      2      1      1      1      0
0      0      0      0      0      0      0
0
62$$
2      3      4      14     15     9
10     11     12     13     8      60
0
63**
0.0      1.000E-03  0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0
0.0      0.0      0.0      0.0      0.0      0.0
T
7**
-0.21082  -0.14907  1M1
-0.42164  -0.39441  -0.14907  1M2
-0.55777  -0.53748  -0.39441  -0.14907  1M3
-0.66667  -0.64979  -0.53748  -0.39441  -0.14907  1M4
-0.76012  -0.74536  -0.64979  -0.53748  -0.39441  -0.14907
1M5
-0.84327  -0.82999  -0.74536  -0.64979  -0.53748  -0.39441
-0.14907  1M6
-0.91894  -0.90676  -0.82999  -0.74536  -0.64979  -0.53748
-0.39441  -0.14907  1M7
-0.98883  -0.97753  -0.90676  -0.82999  -0.74536  -0.64979
-0.53748  -0.39441  -0.14907  1M8
1Q80
3R-0.97753  5R-0.90676  7R-0.82999  9R-0.74536  11R-0.64979  13R-0.53748
15R-0.39441  17R-0.14907  3R0.97753  5R0.90676  7R0.82999  9R0.74536
11R0.64979  13R0.53748  15R0.39441  17R0.14907
T
6**
0.0      2R0.13586-1  0.0      4R0.97681-2
0.0      0.64738-2  0.50390-2  0.64738-2  1N3
0.0      0.64634-2  2R0.71124-2  0.64634-2  1N4
0.0      0.64634-2  0.14381-2  0.36342-2  0.14381-2  0.64634-2
1N5
0.0      0.64738-2  0.71124-2  0.36342-2  1N3  1Q6
0.0      0.97681-2  0.50390-2  0.71124-2  0.14381-2  0.71124-2
0.50390-2  0.97681-2  1N7
0.0      0.13586-1  0.97681-2  2R0.64738-2  1N4  1Q8
1Q80
T
13$$      4I3161  3166      4I3167  3172      4I3080  3085
T
3**
F0.0
T
1**
F0.0
2**
3I-101.3  -61.3  1I-56.3  -52.3  1I-51.3  -50.3  -49.3
6I-48.0  1I-34.0  1I-32.0  -31.0  28I-30.0  28.0  1I29.0
1I30.0  31.0  53I32.0  140.0
1I140.8  141.8  1I142.8  146.8  4I151.8  201.8
4**
2I0.0  6.0  6.383  6.7  7.3  14I8.0  1I38.0  1I40.0  41.0
7I42.0  58.0  1I59.0  60.0  1I61.0  65.0  2I70.0  100.0
5**
F1.0
8$$
45R1      7Q45
4R1      34R3  7R1      14Q45
24R1     14R3  7R1      32Q45
38R2     7R1      59Q45
45R1      8Q45
9$$
-13  -1  -7
T      T

```

Fig. 2.24 Input data of the DOT analysis for the Assembly #2 with JSSTD L library (42-n + 21-γ).

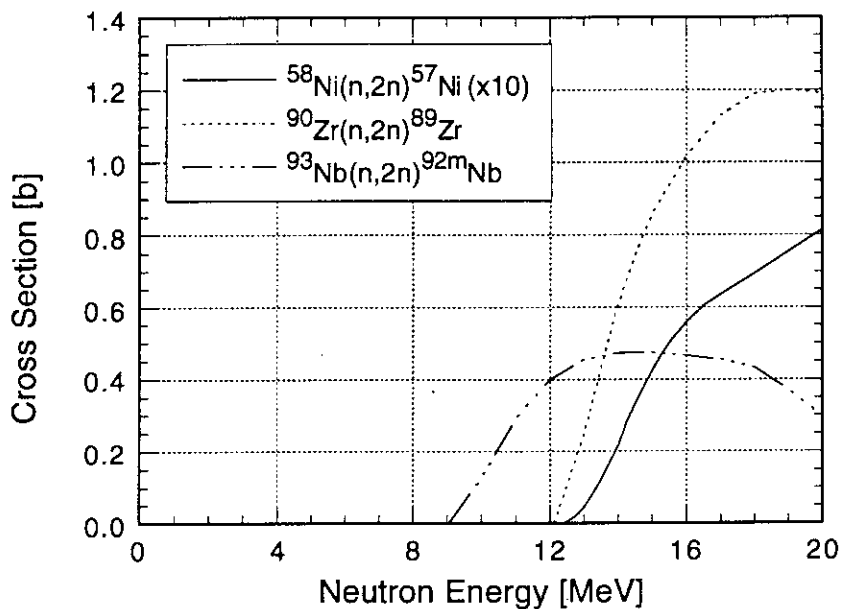


Fig. 3.1 Dosimetry reaction cross sections of the high threshold reactions, $^{58}\text{Ni}(n,2n)^{57}\text{Ni}$, $^{90}\text{Zr}(n,2n)^{89}\text{Zr}$ and $^{93}\text{Nb}(n,2n)^{92m}\text{Nb}$, taken from the JENDL Dosimetry File.

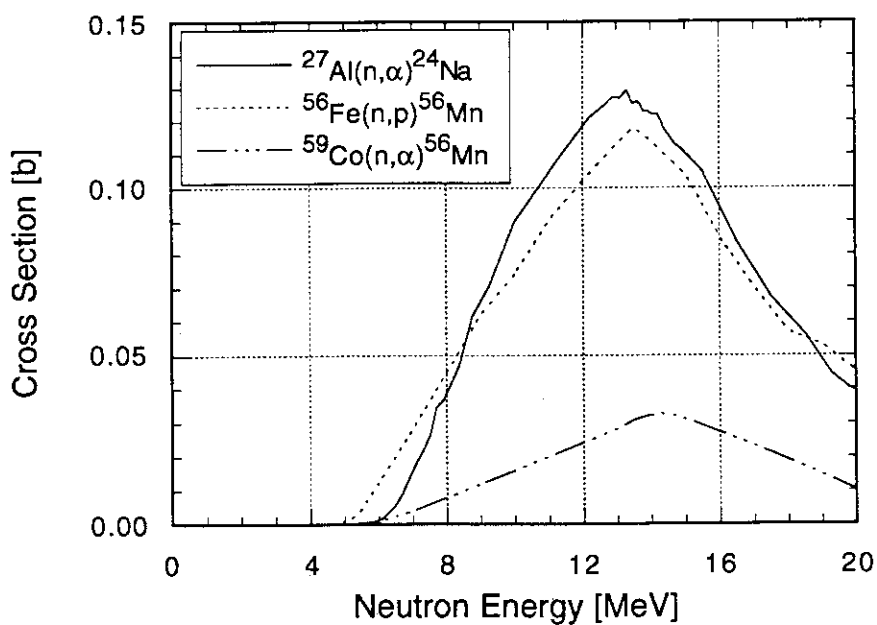


Fig. 3.2 Dosimetry reaction cross sections of the medium threshold reactions, $^{27}\text{Al}(n,\alpha)^{24}\text{Na}$, $^{56}\text{Fe}(n,p)^{56}\text{Mn}$ and $^{59}\text{Co}(n,\alpha)^{56}\text{Mn}$, taken from the JENDL Dosimetry File.

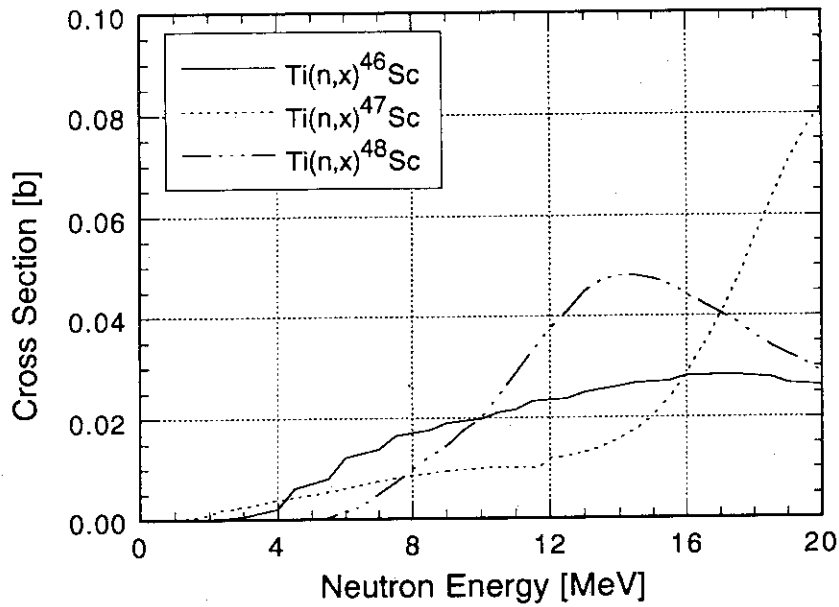


Fig. 3.3 Dosimetry reaction cross sections of the medium threshold reactions, $Ti(n,x)^{46}Sc$, $Ti(n,x)^{47}Sc$ and $Ti(n,x)^{48}Sc$, taken from the JENDL Dosimetry File.

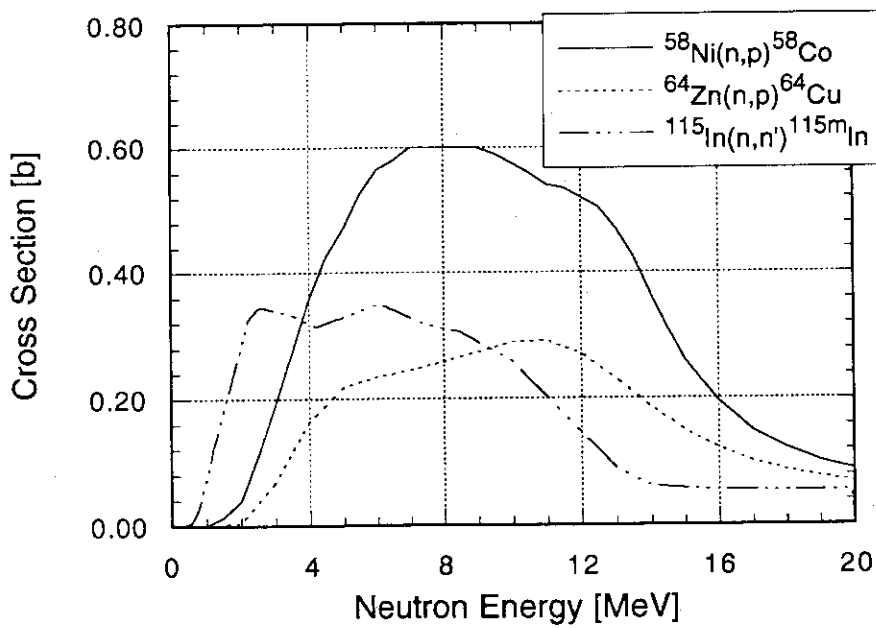


Fig. 3.4 Dosimetry reaction cross sections of the low threshold reactions, $^{58}Ni(n,p)^{58}Co$, $^{64}Zn(n,p)^{64}Cu$ and $^{115}In(n,n')^{115m}In$, taken from the JENDL Dosimetry File.

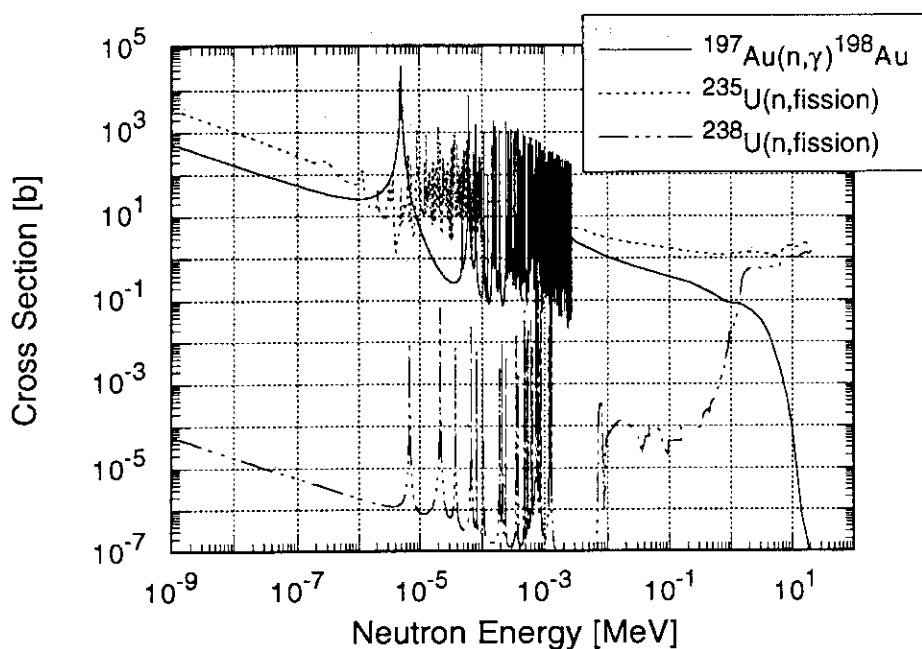


Fig. 3.5 Reaction cross section of ¹⁹⁷Au(n,γ)¹⁹⁸Au and fission cross sections of ²³⁵U and ²³⁸U taken from the JENDL Dosimetry File.

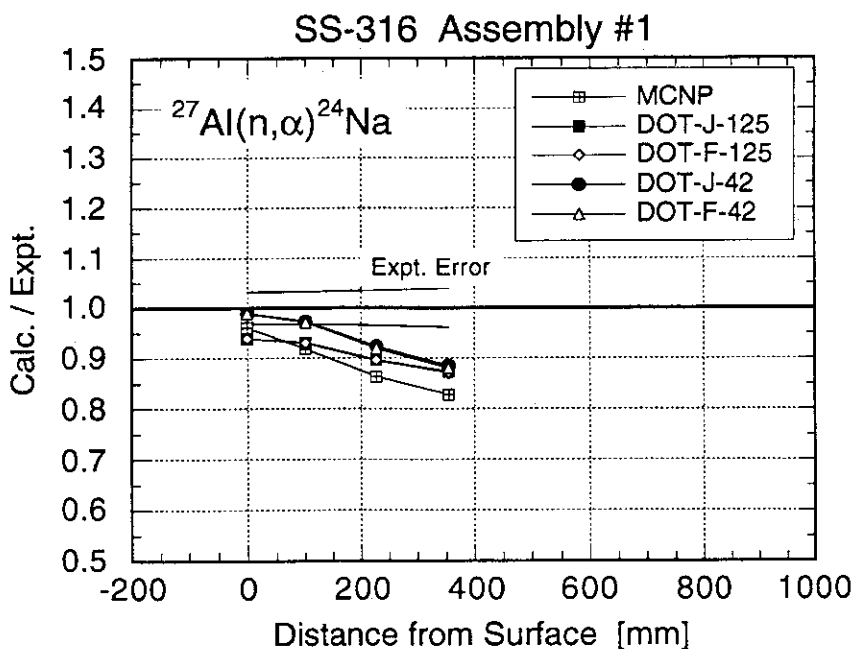


Fig. 3.6 The C/E ratios of the ²⁷Al(n,α)²⁴Na reaction rate in the Assembly #1.

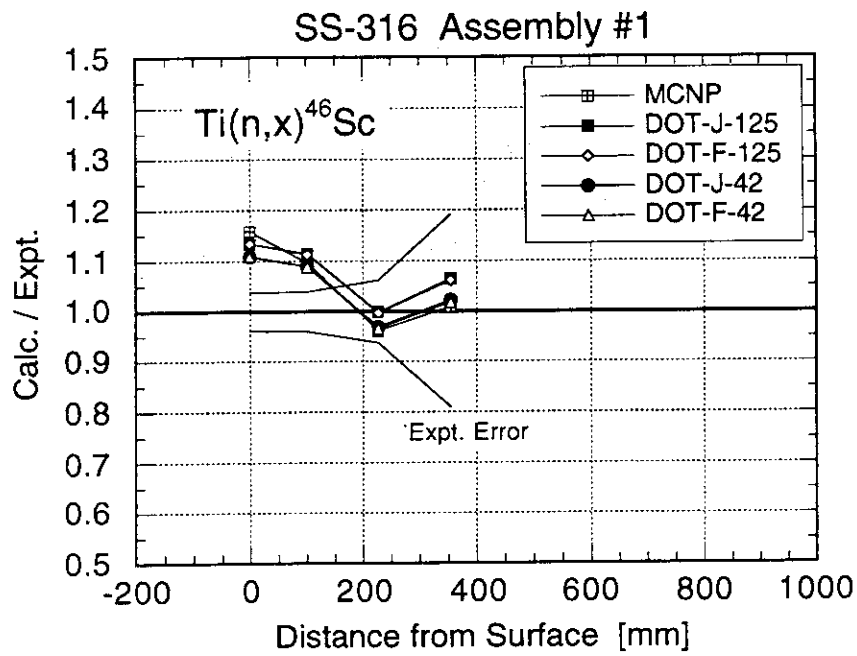


Fig. 3.7 The C/E ratios of the $Ti(n,x)^{46}Sc$ reaction rate in the Assembly #1.

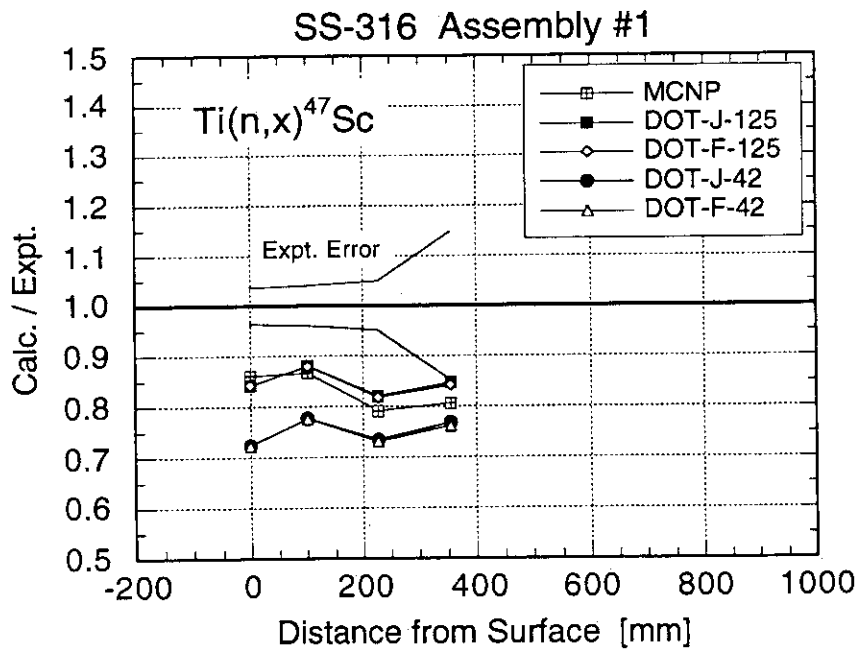


Fig. 3.8 The C/E ratios of the $Ti(n,x)^{47}Sc$ reaction rate in the Assembly #1.

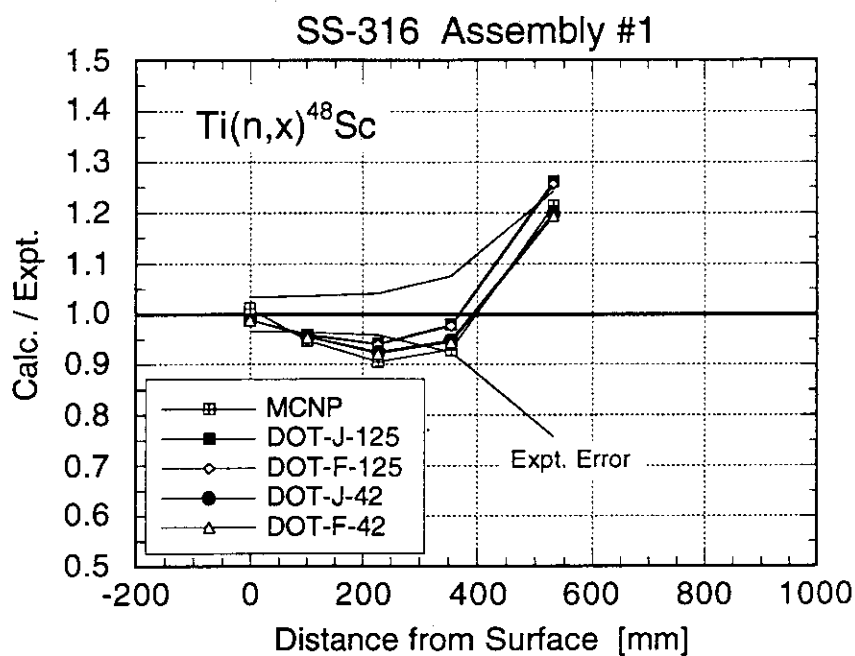


Fig. 3.9 The C/E ratios of the $Ti(n,x)^{48}Sc$ reaction rate in the Assembly #1.

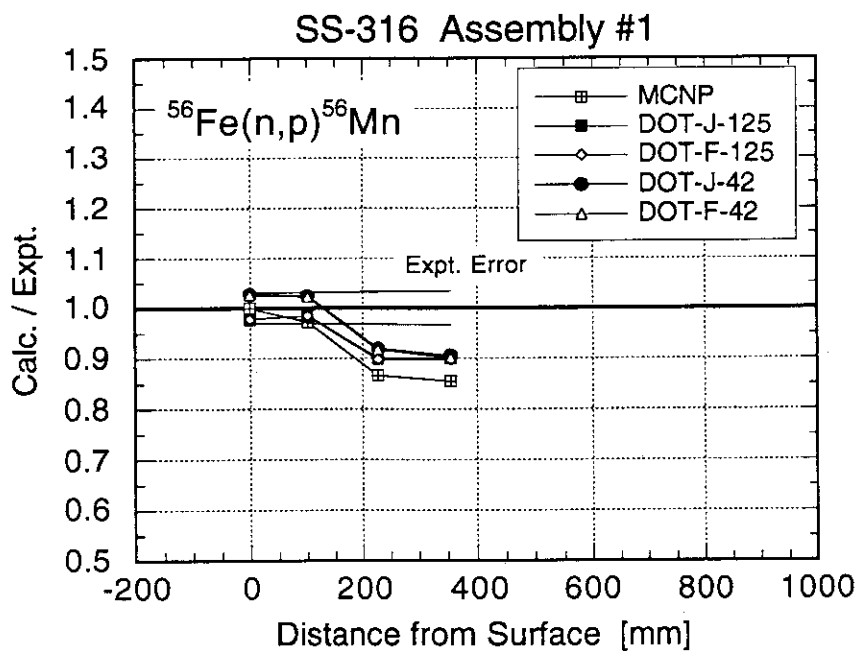


Fig. 3.10 The C/E ratios of the $Fe(n,x)^{56}Mn$ reaction rate in the Assembly #1.

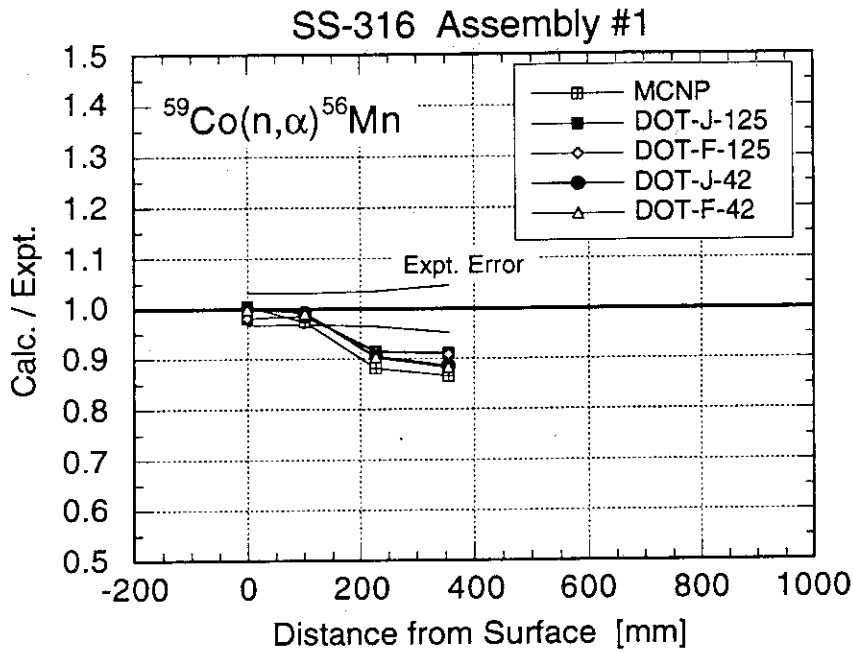


Fig. 3.11 The C/E ratios of the $^{59}\text{Co}(n,\alpha)^{56}\text{Mn}$ reaction rate in the Assembly #1.

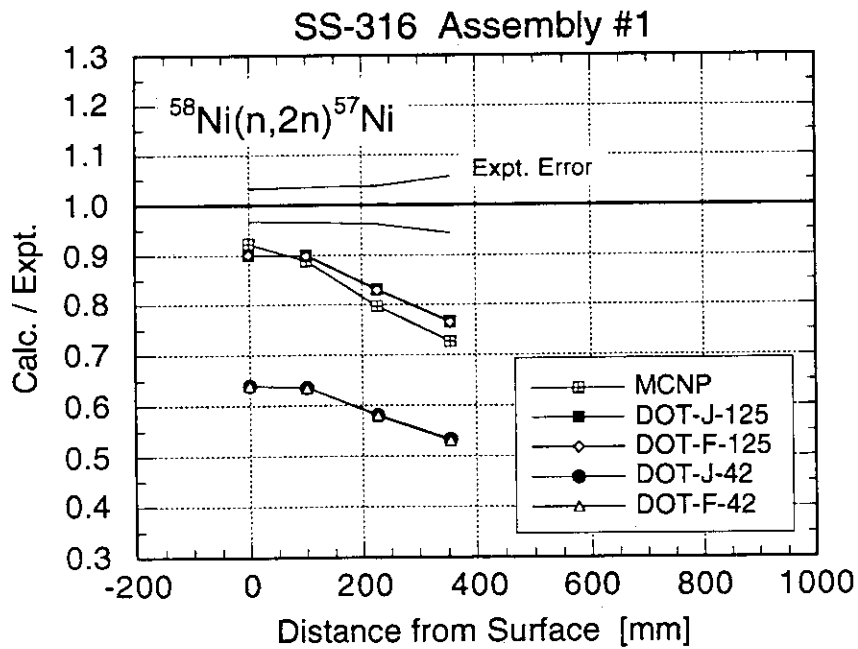


Fig. 3.12 The C/E ratios of the $^{58}\text{Ni}(n,2n)^{57}\text{Ni}$ reaction rate in the Assembly #1.

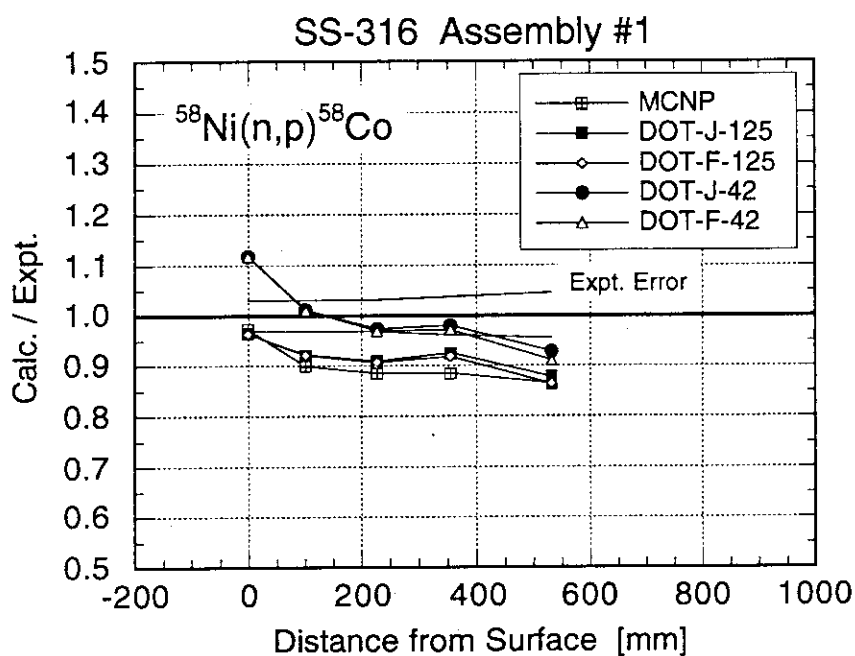


Fig. 3.13 The C/E ratios of the $^{58}\text{Ni}(n,p)^{58}\text{Co}$ reaction rate in the Assembly #1.

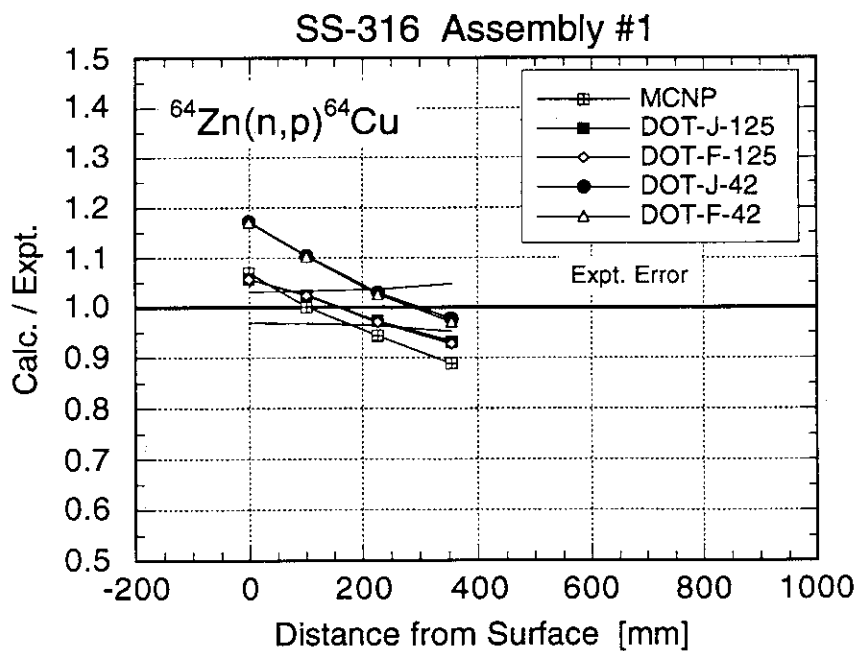


Fig. 3.14 The C/E ratios of the $^{64}\text{Zn}(n,p)^{64}\text{Cu}$ reaction rate in the Assembly #1.

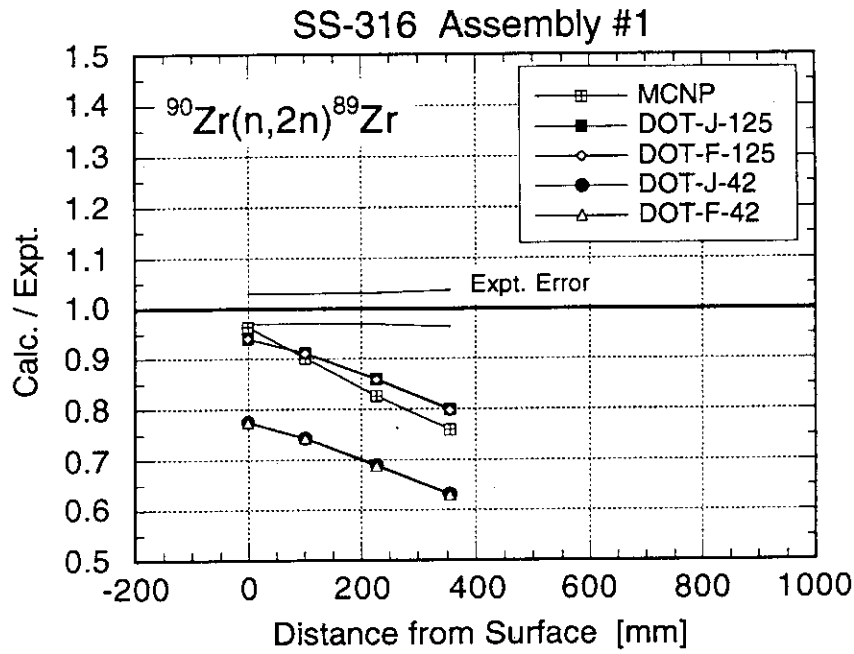


Fig. 3.15 The C/E ratios of the $^{90}\text{Zr}(n,2n)^{89}\text{Zr}$ reaction rate in the Assembly #1.

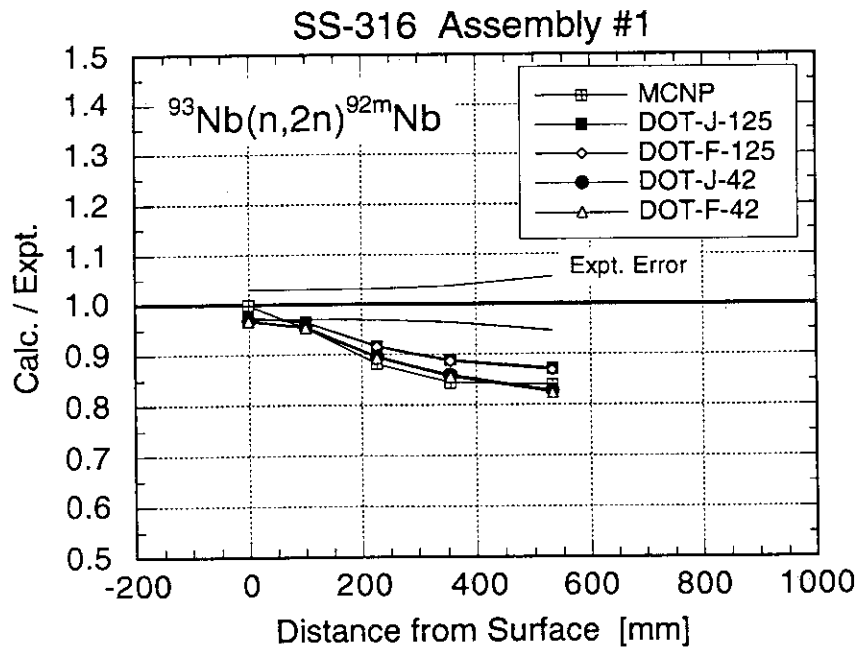


Fig. 3.16 The C/E ratios of the $^{93}\text{Nb}(n,2n)^{92m}\text{Nb}$ reaction rate in the Assembly #1.

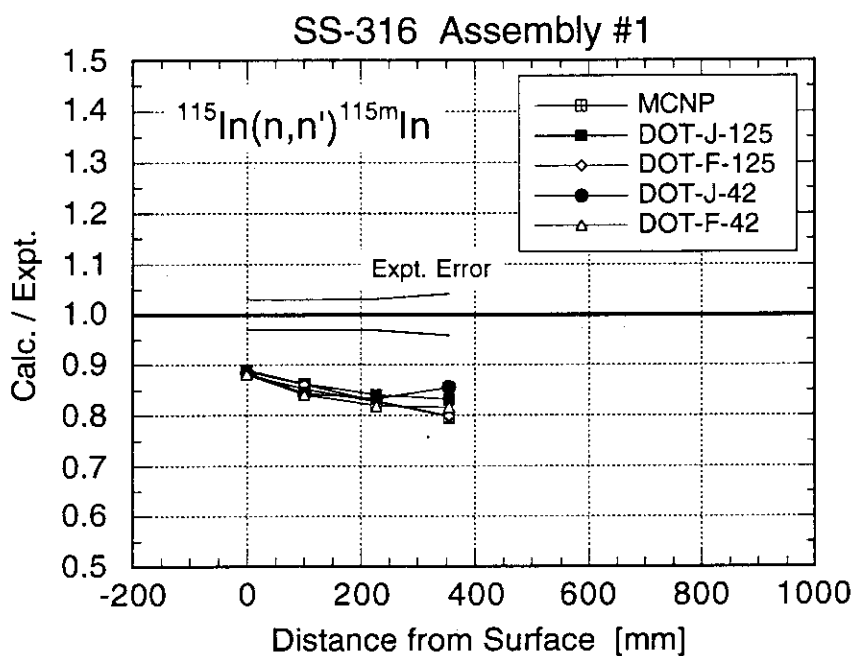


Fig. 3.17 The C/E ratios of the $^{115}\text{In}(n,n')^{115\text{m}}\text{In}$ reaction rate in the Assembly #1.

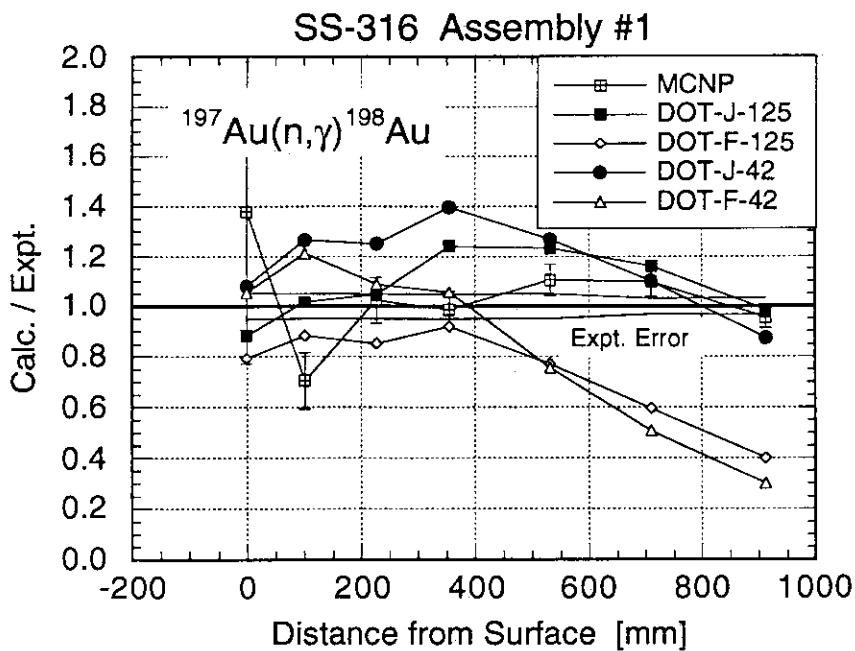


Fig. 3.18 The C/E ratios of the $^{197}\text{Au}(n,\gamma)^{198}\text{Au}$ reaction rate in the Assembly #1.

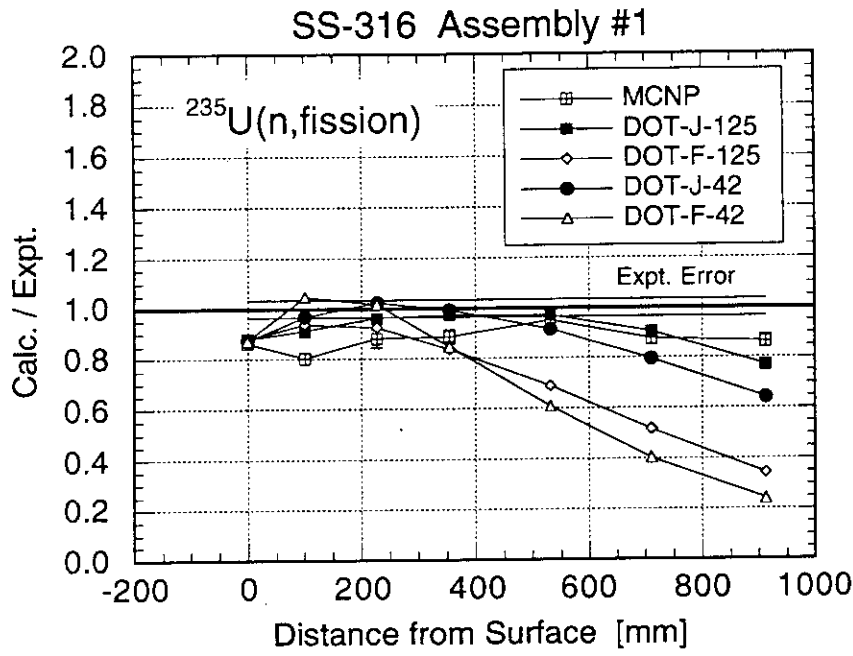


Fig. 3.19 The C/E ratios of the $^{235}\text{U}(n,\text{fission})$ reaction rate in the Assembly #1.

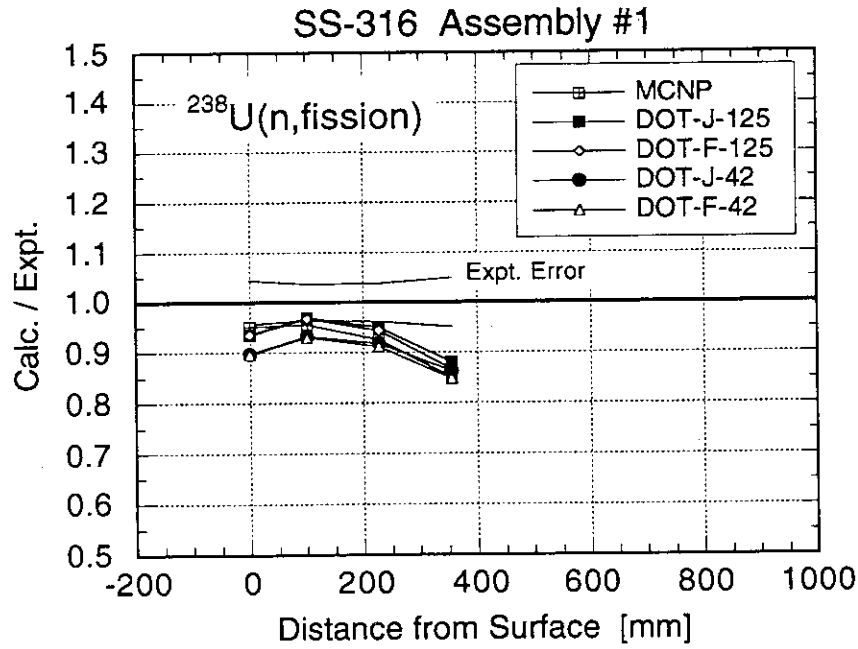


Fig. 3.20 The C/E ratios of the $^{238}\text{U}(n,\text{fission})$ reaction rate in the Assembly #1.

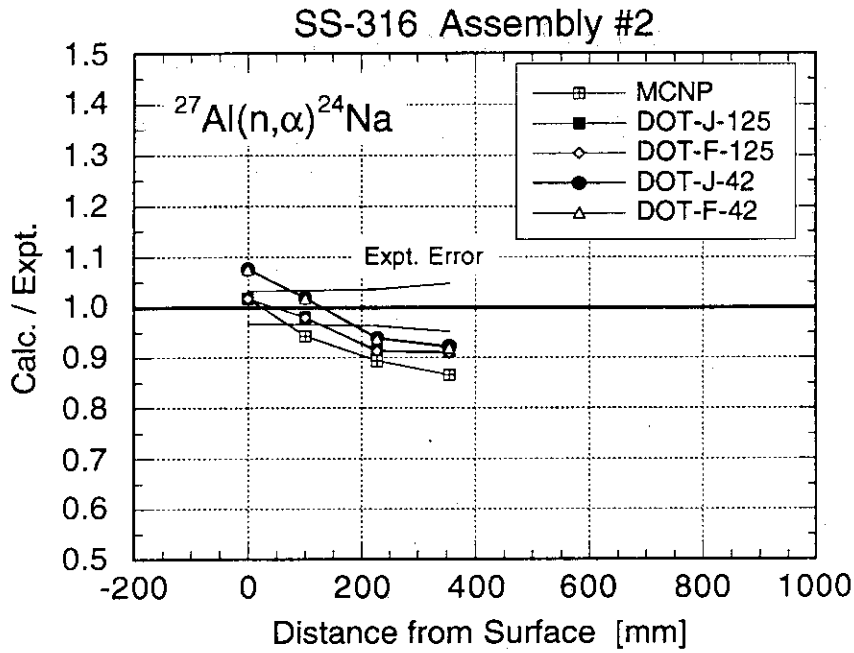


Fig. 3.21 The C/E ratios of the $^{27}\text{Al}(n,\alpha)^{24}\text{Na}$ reaction rate in the Assembly #2.

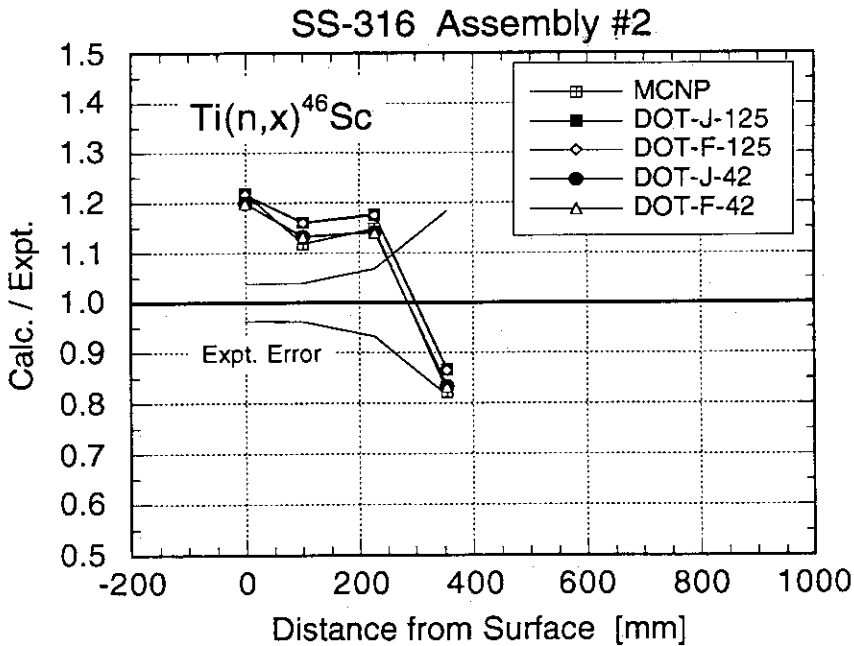


Fig. 3.22 The C/E ratios of the $\text{Ti}(n,x)^{46}\text{Sc}$ reaction rate in the Assembly #2.

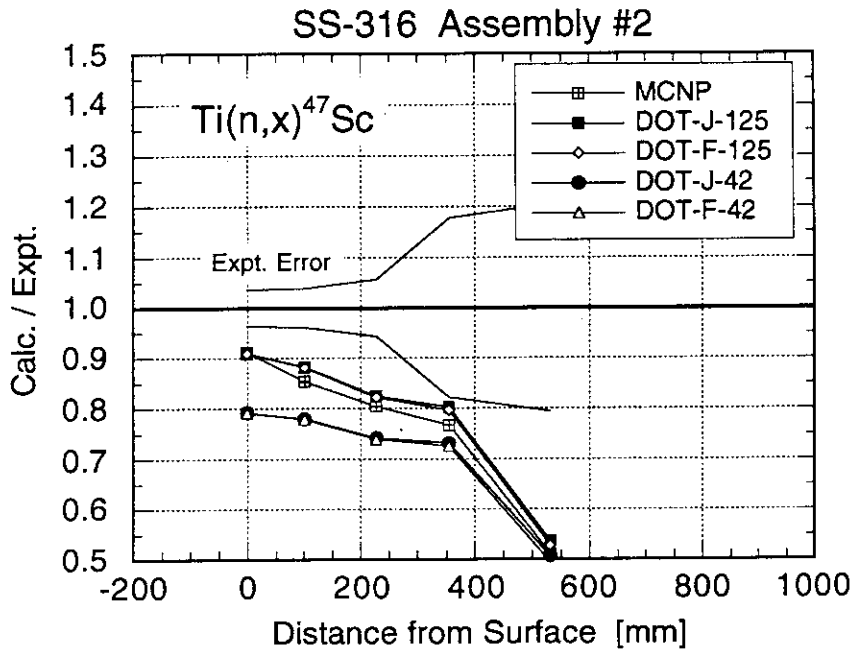


Fig. 3.23 The C/E ratios of the $Ti(n,x)^{47}Sc$ reaction rate in the Assembly #2.

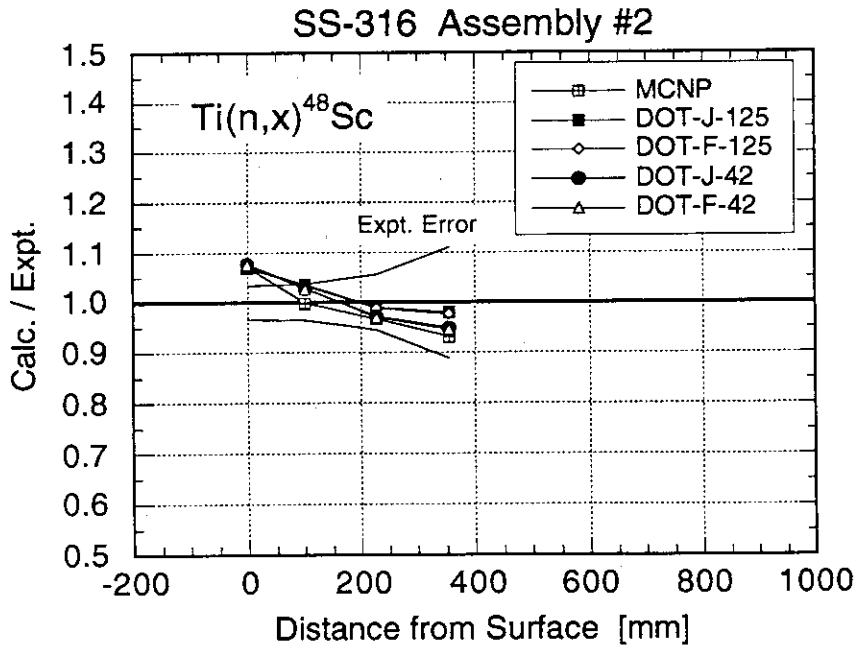


Fig. 3.24 The C/E ratios of the $Ti(n,x)^{48}Sc$ reaction rate in the Assembly #2.

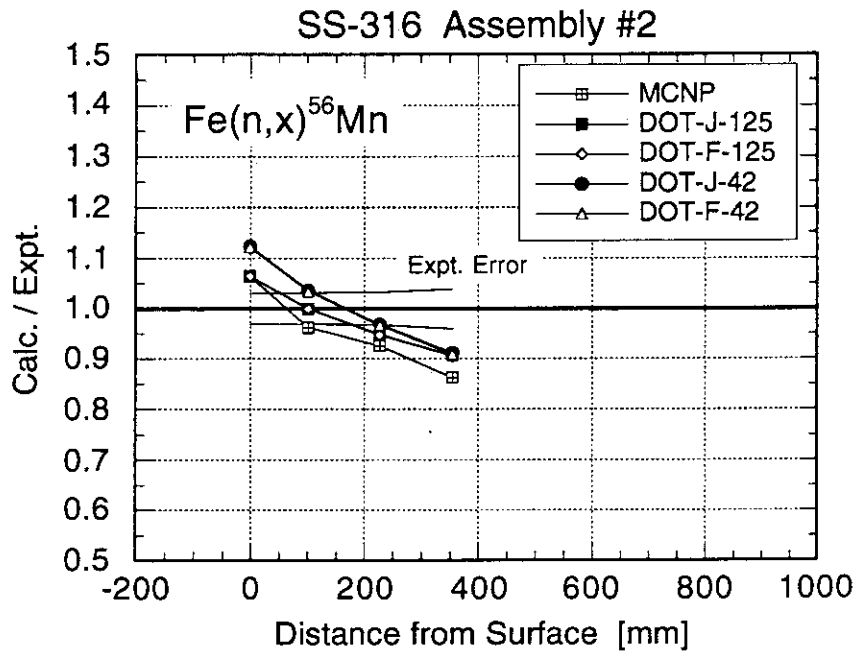


Fig. 3.25 The C/E ratios of the $Fe(n,x)^{56}Mn$ reaction rate in the Assembly #2.

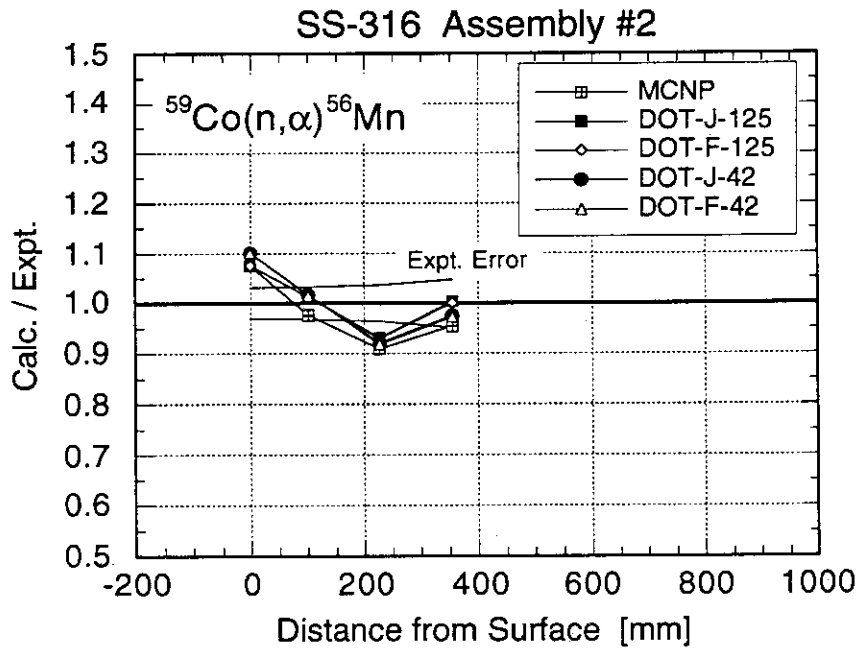


Fig. 3.26 The C/E ratios of the $^{59}Co(n,\alpha)^{56}Mn$ reaction rate in the Assembly #2.

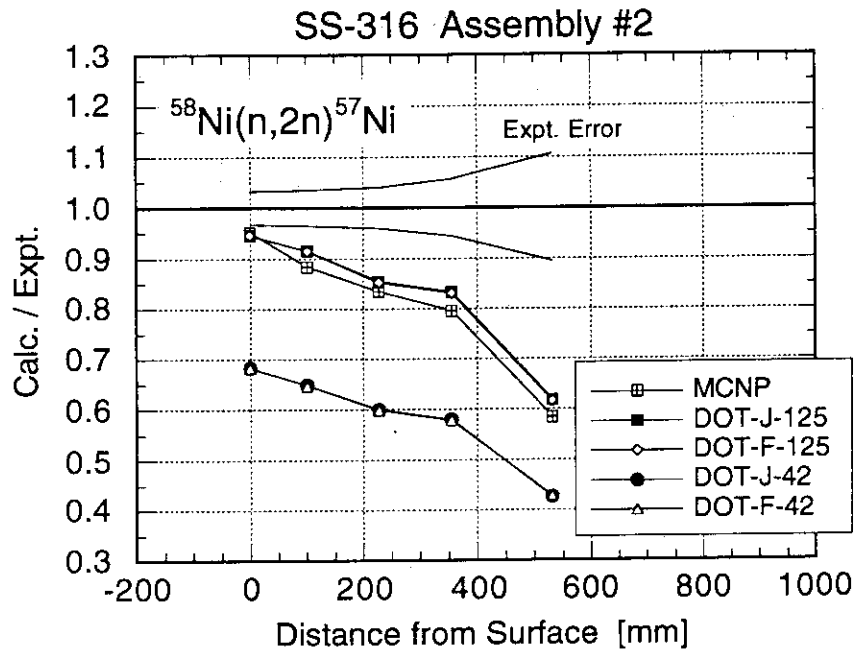


Fig. 3.27 The C/E ratios of the $^{58}\text{Ni}(n,2n)^{57}\text{Ni}$ reaction rate in the Assembly #2.

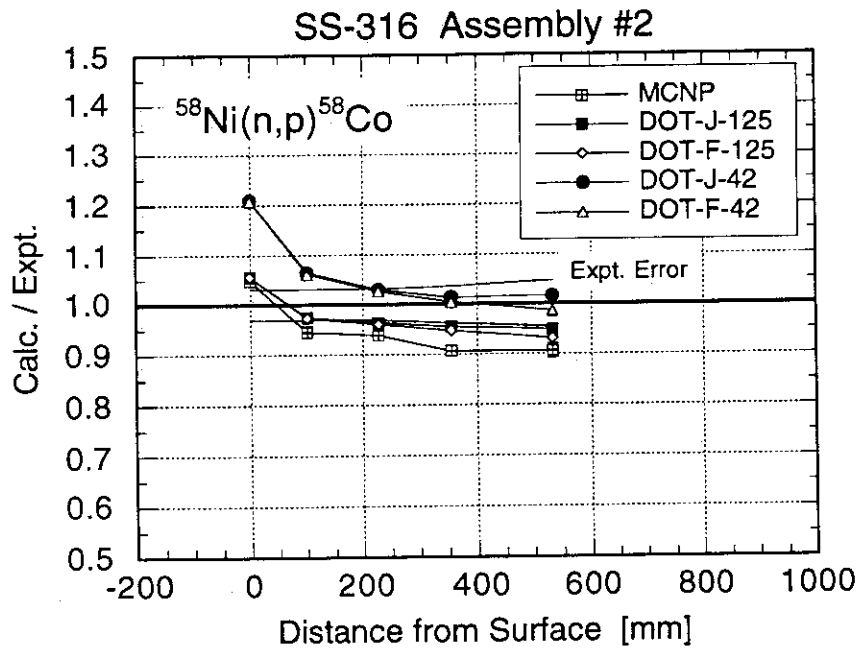


Fig. 3.28 The C/E ratios of the $^{58}\text{Ni}(n,p)^{58}\text{Co}$ reaction rate in the Assembly #2.

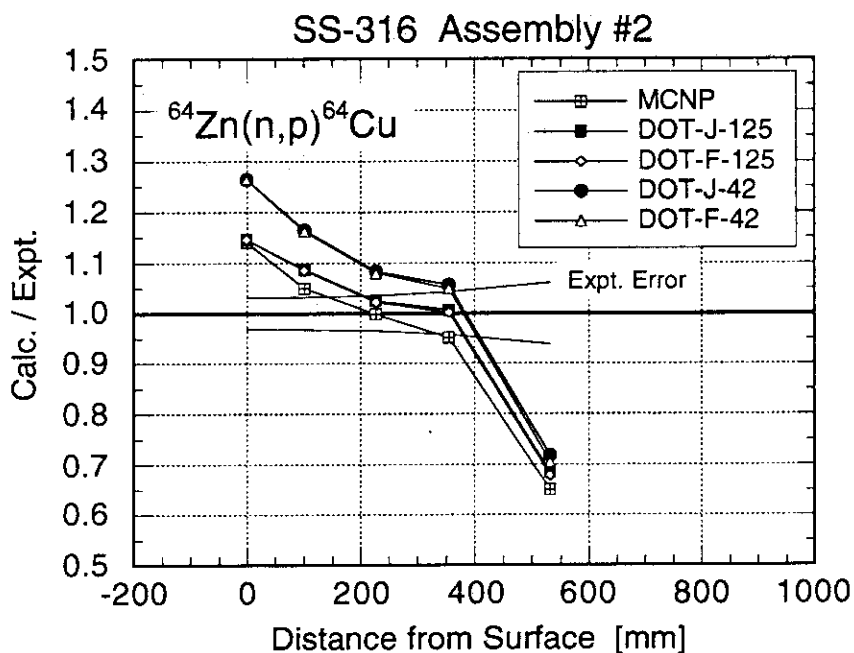


Fig. 3.29 The C/E ratios of the $^{64}\text{Zn}(n,p)^{64}\text{Cu}$ reaction rate in the Assembly #2.

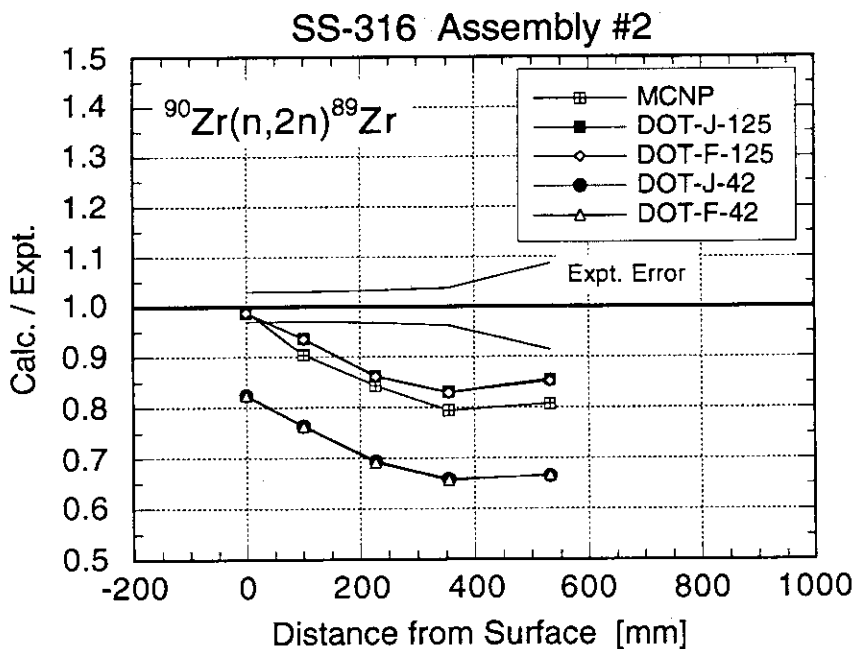


Fig. 3.30 The C/E ratios of the $^{90}\text{Zr}(n,2n)^{89}\text{Zr}$ reaction rate in the Assembly #2.

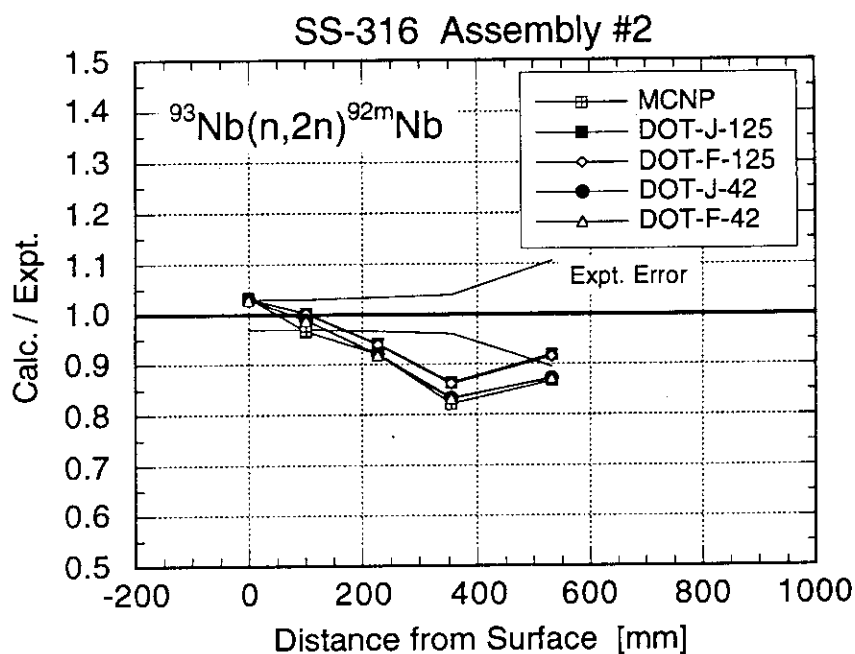


Fig. 3.31 The C/E ratios of the $^{93}\text{Nb}(n,2n)^{92m}\text{Nb}$ reaction rate in the Assembly #2.

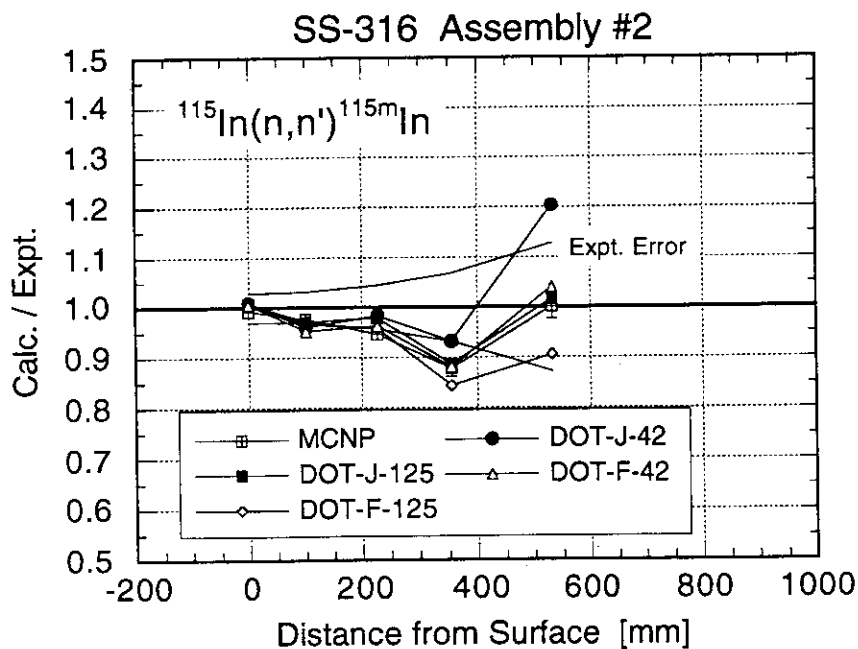


Fig. 3.32 The C/E ratios of the $^{115}\text{In}(n,n')^{115m}\text{In}$ reaction rate in the Assembly #2.

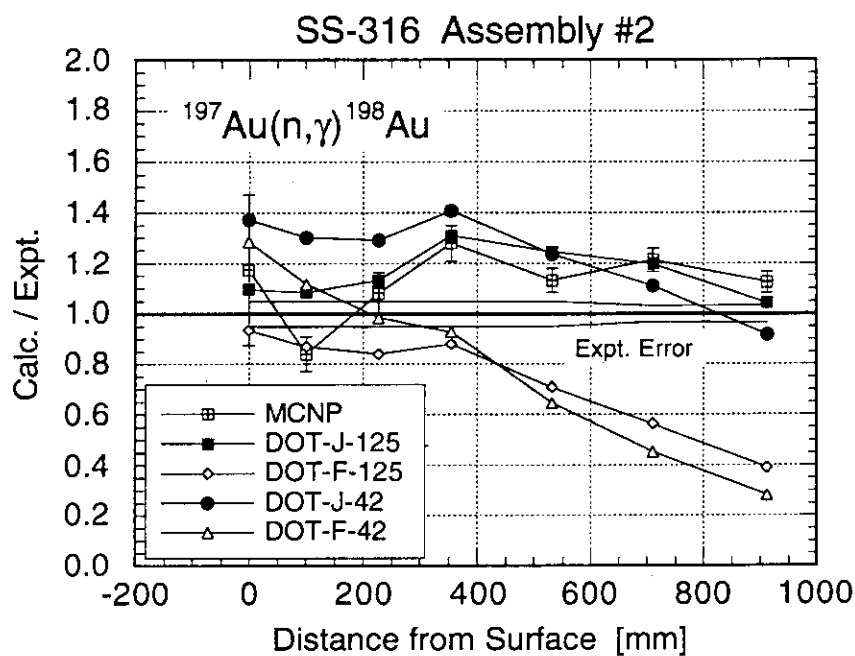


Fig. 3.33 The C/E ratios of the $^{197}\text{Au}(n,\gamma)^{198}\text{Au}$ reaction rate in the Assembly #2.

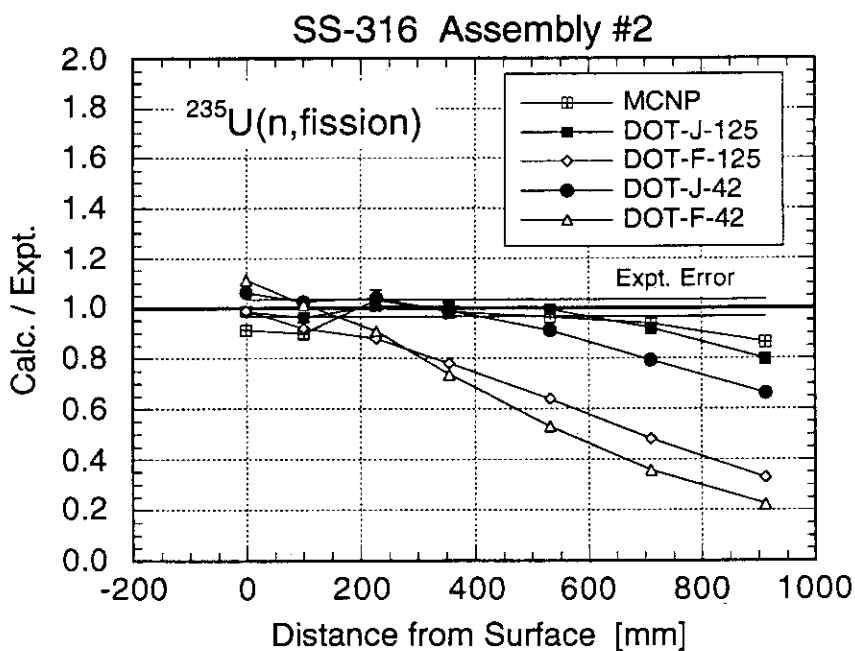


Fig. 3.34 The C/E ratios of the $^{235}\text{U}(n,\text{fission})$ reaction rate in the Assembly #2.

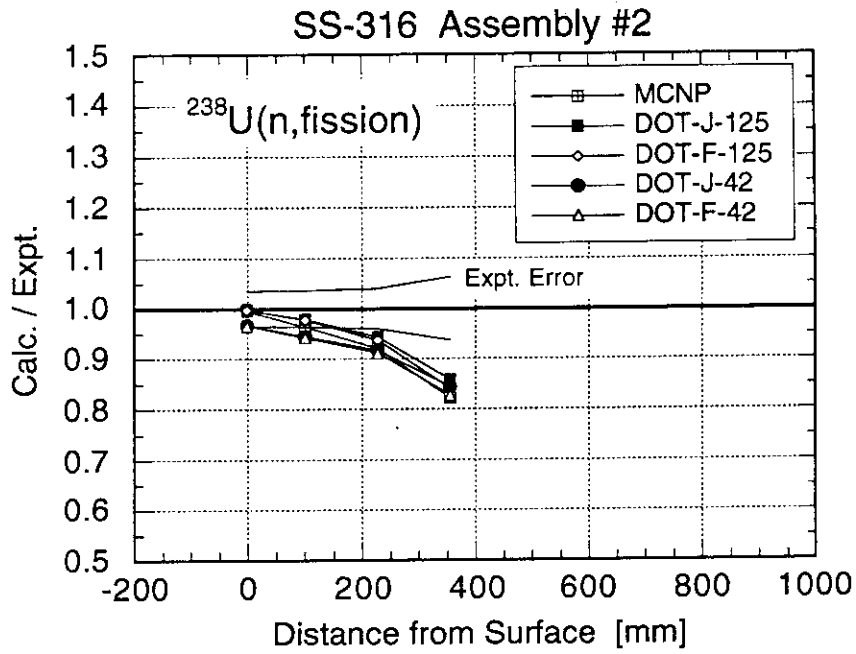


Fig. 3.35 The C/E ratios of the $^{238}\text{U}(n,\text{fission})$ reaction rate in the Assembly #2.

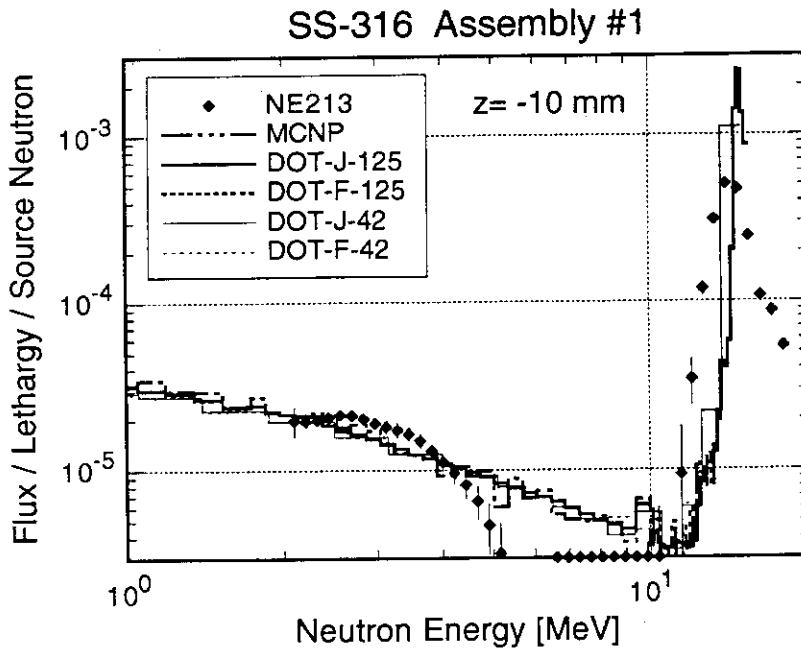


Fig. 3.36 The measured and calculated neutron spectra in MeV energy region at the front surface of the Assembly #1.

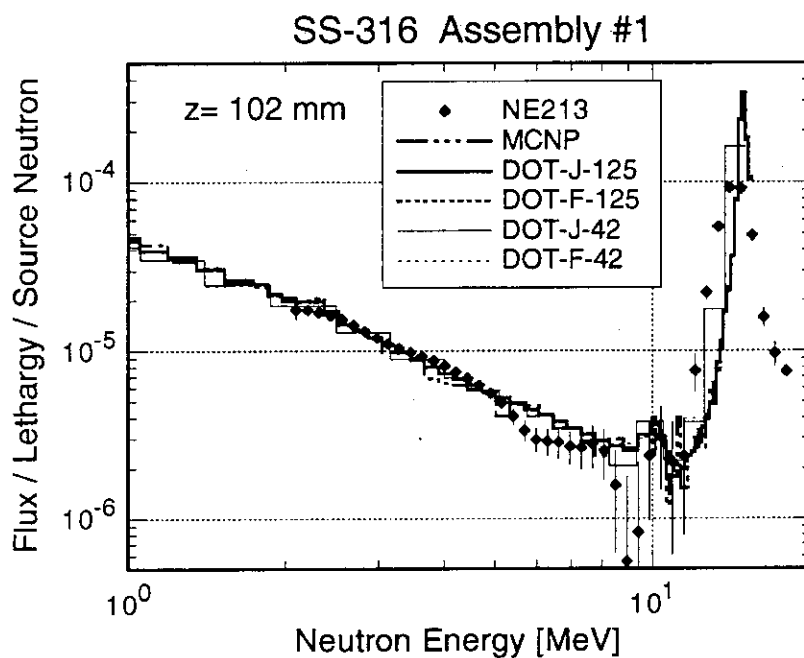


Fig. 3.37 The measured and calculated neutron spectra in MeV energy region at 102 mm depth in the Assembly #1.

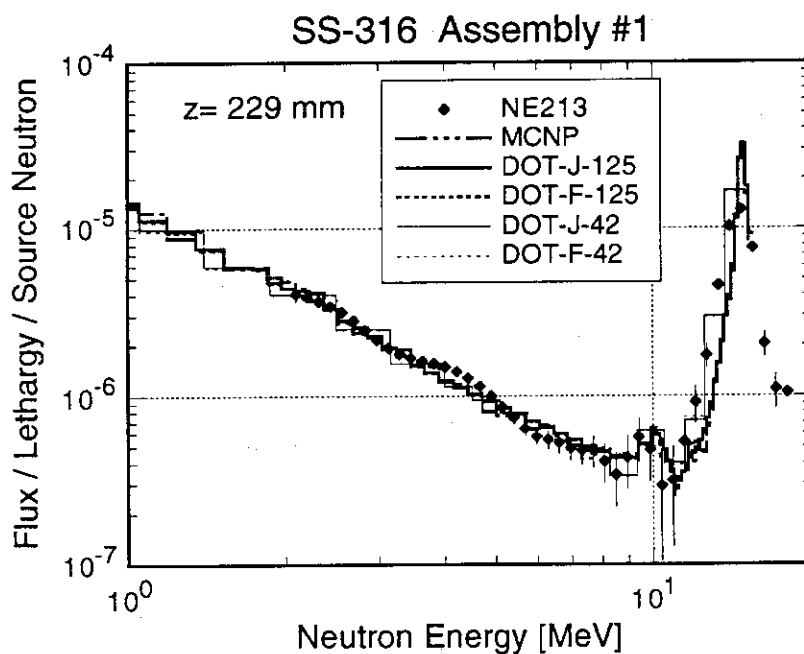


Fig. 3.38 The measured and calculated neutron spectra in MeV energy region at 229 mm depth in the Assembly #1.

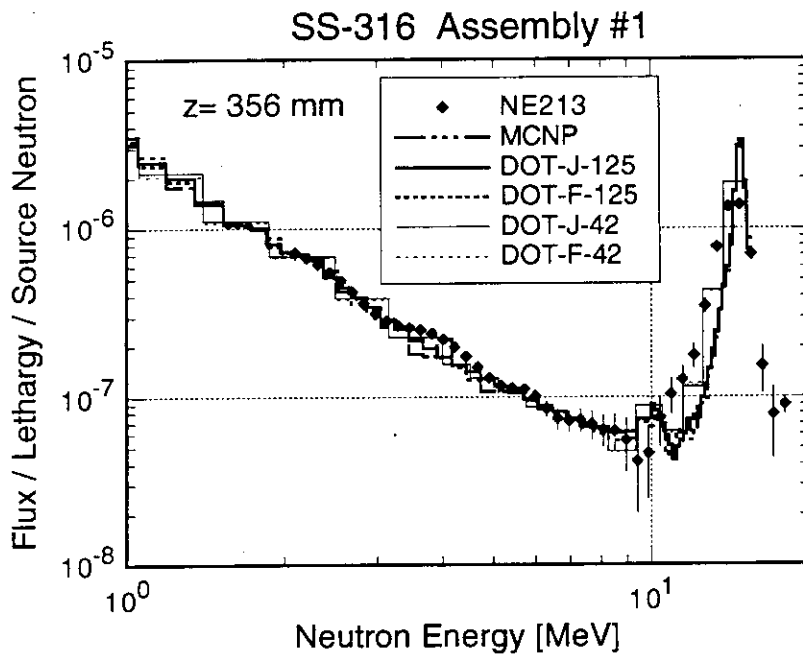


Fig. 3.39 The measured and calculated neutron spectra in MeV energy region at 356 mm depth in the Assembly #1.

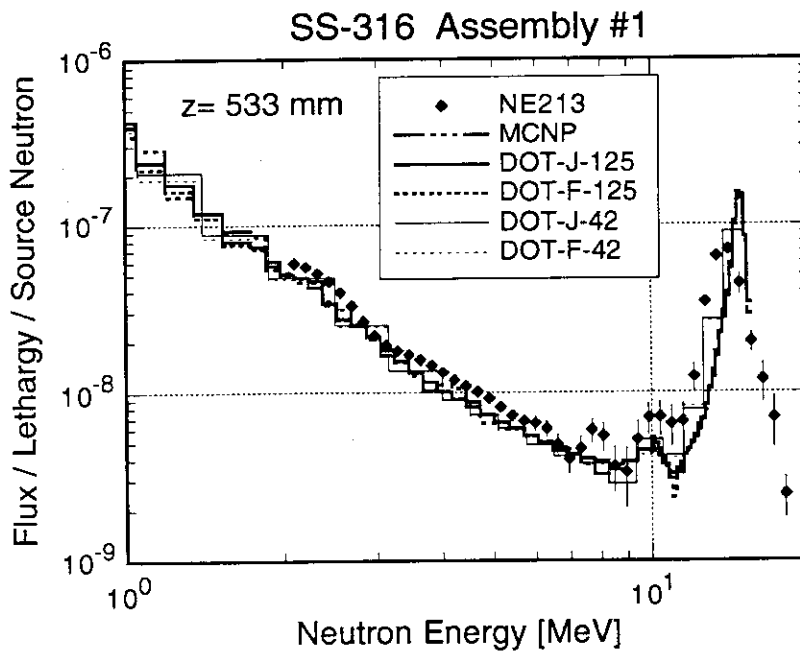


Fig. 3.40 The measured and calculated neutron spectra in MeV energy region at 533 mm depth in the Assembly #1.

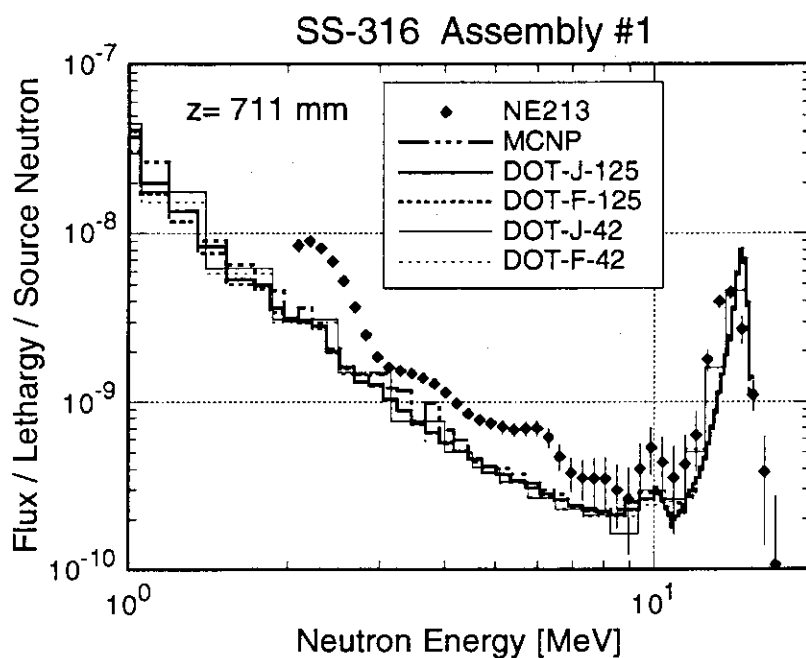


Fig. 3.41 The measured and calculated neutron spectra in MeV energy region at 711 mm depth in the Assembly #1.

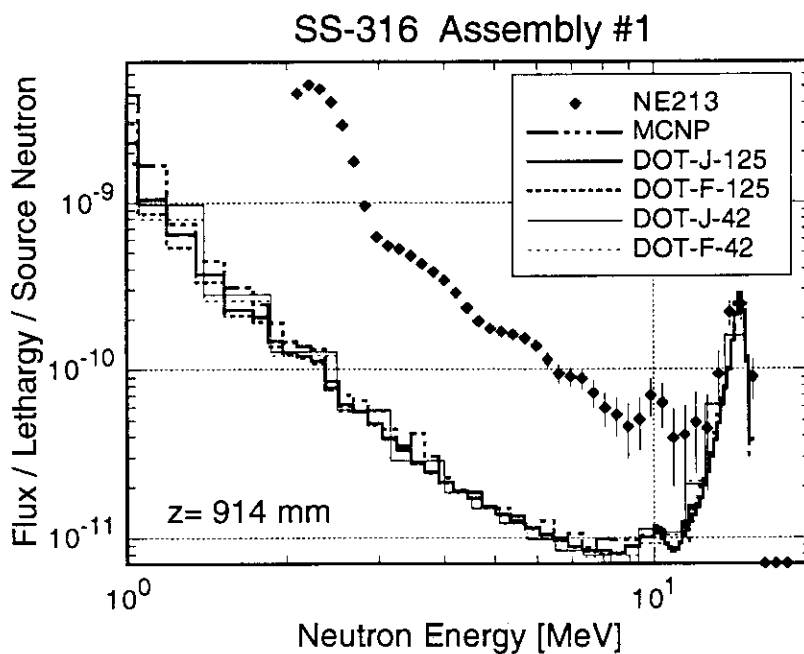


Fig. 3.42 The measured and calculated neutron spectra in MeV energy region at 914 mm depth in the Assembly #1.

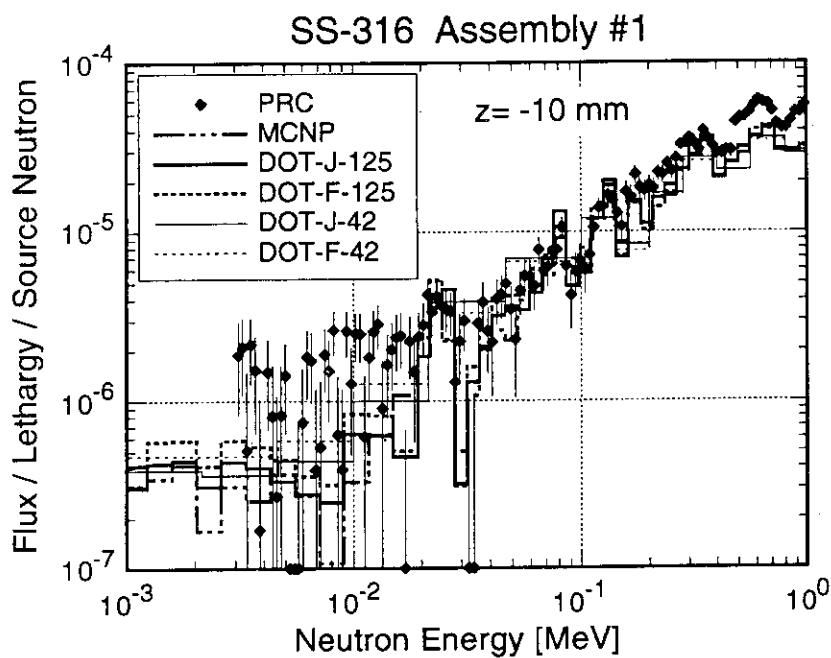


Fig. 3.43 The measured and calculated neutron spectra in keV energy region at the front surface of the Assembly #1.

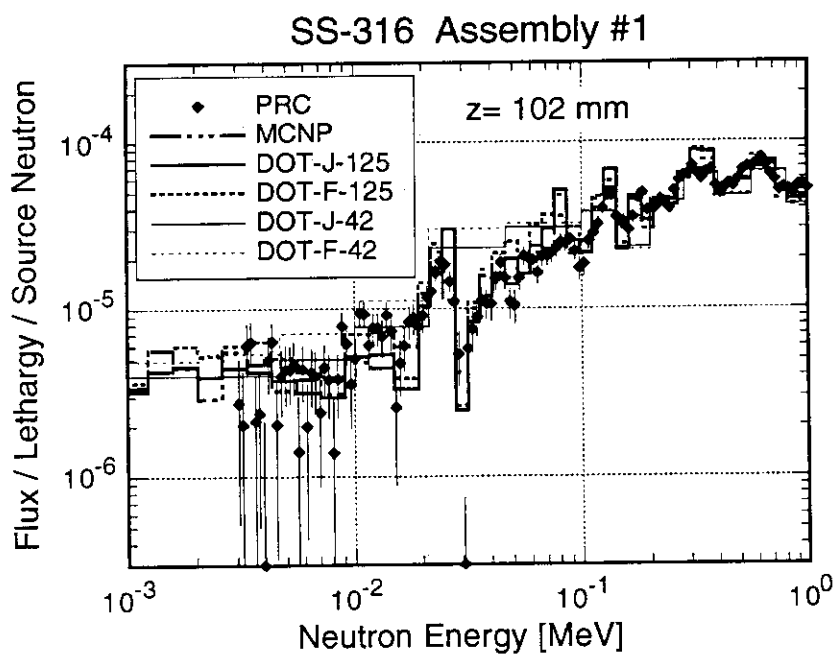


Fig. 3.44 The measured and calculated neutron spectra in keV energy region at 102 mm depth in the Assembly #1.

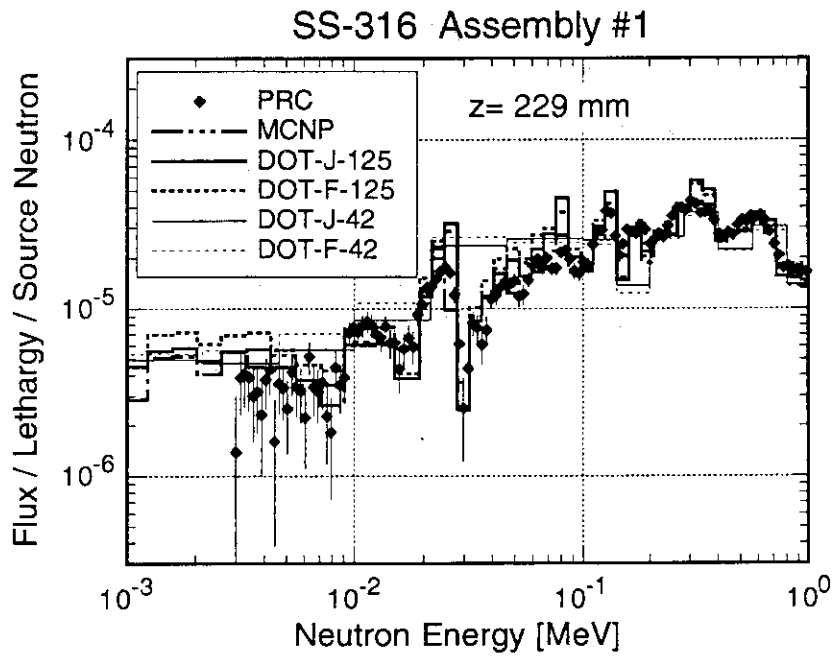


Fig. 3.45 The measured and calculated neutron spectra in keV energy region at 229 mm depth in the Assembly #1.

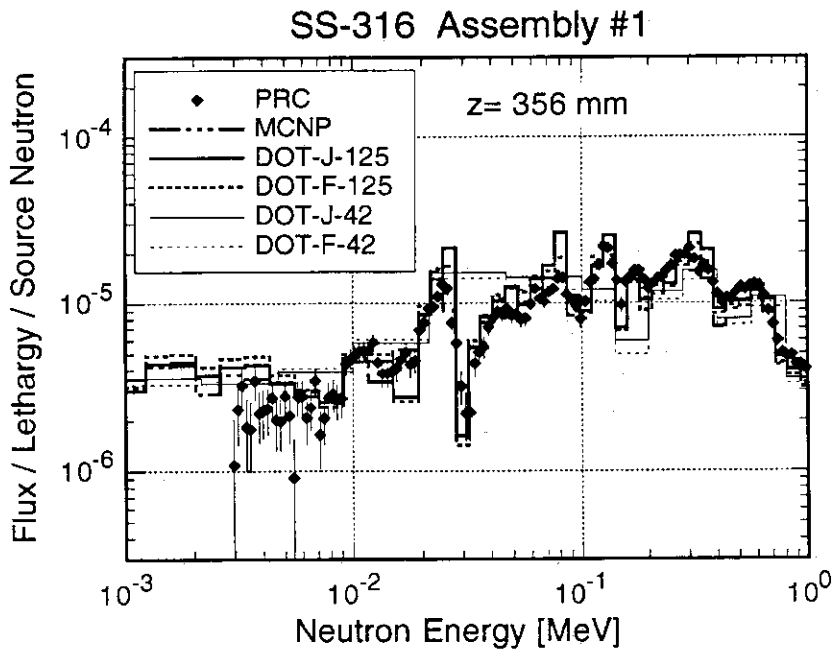


Fig. 3.46 The measured and calculated neutron spectra in keV energy region at 356 mm depth in the Assembly #1.

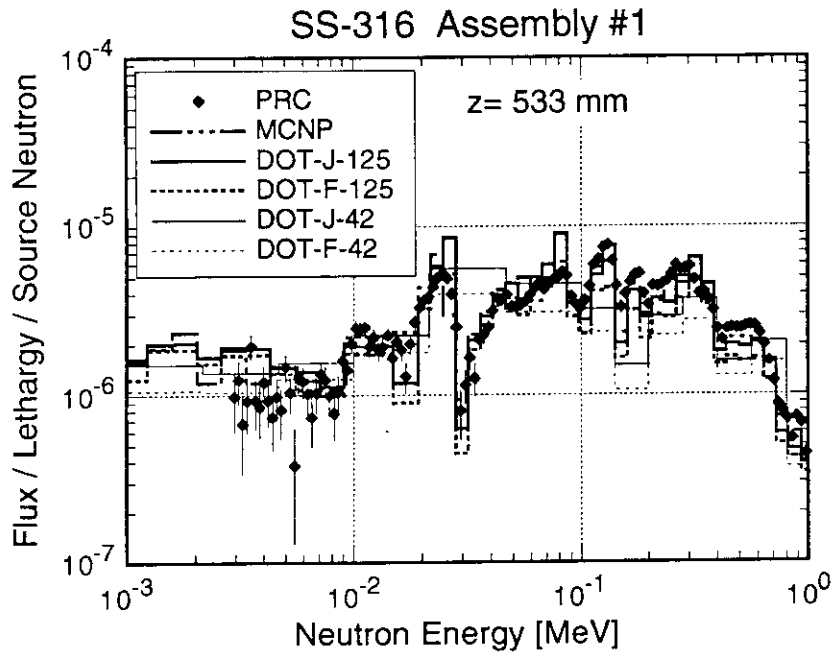


Fig. 3.47 The measured and calculated neutron spectra in keV energy region at 533 mm depth in the Assembly #1.

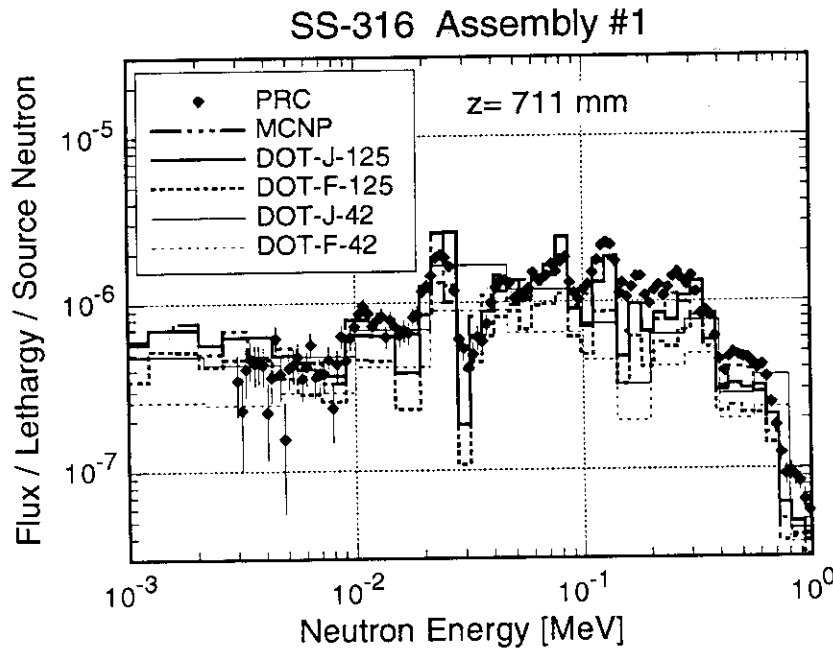


Fig. 3.48 The measured and calculated neutron spectra in keV energy region at 711 mm depth in the Assembly #1.

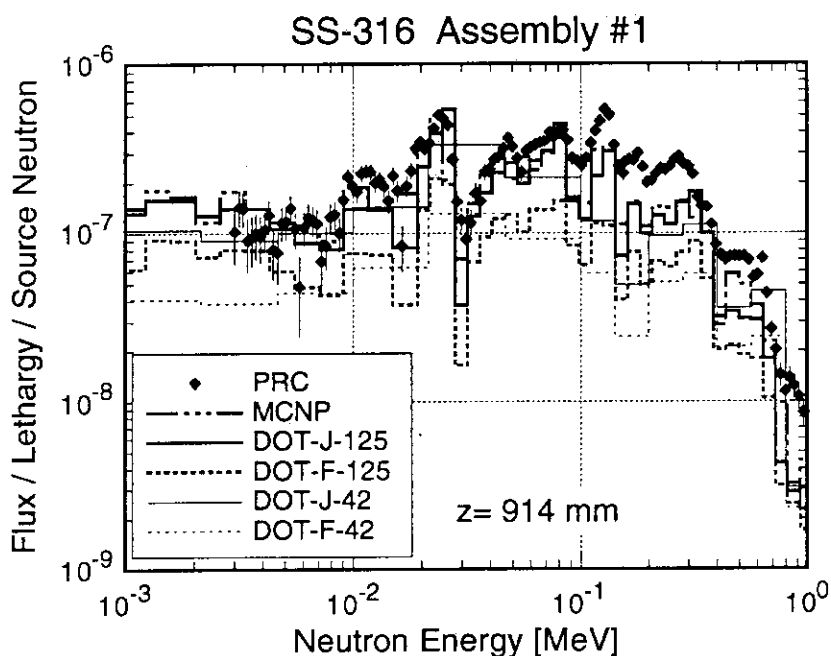


Fig. 3.49 The measured and calculated neutron spectra in keV energy region at 914 mm depth in the Assembly #1.

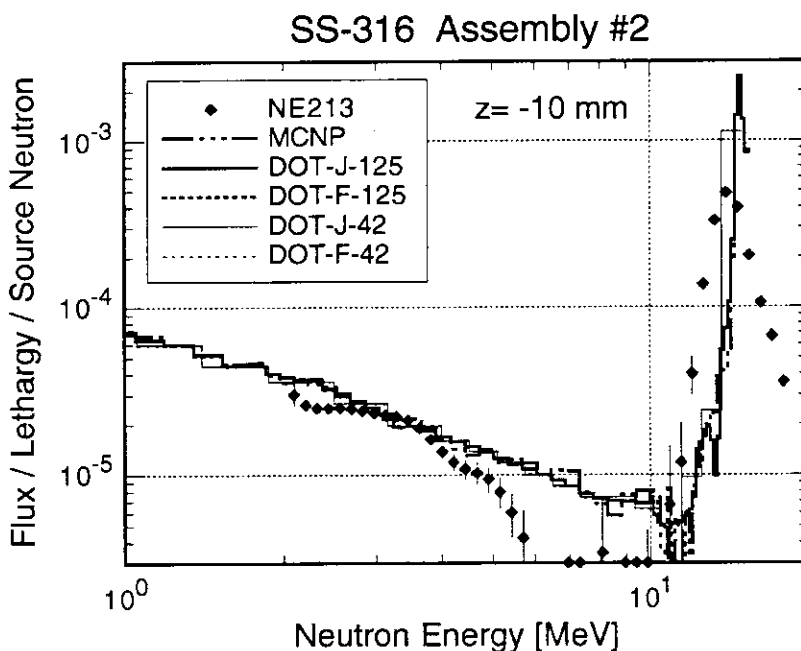


Fig. 3.50 The measured and calculated neutron spectra in MeV energy region at the front surface of the Assembly #2.

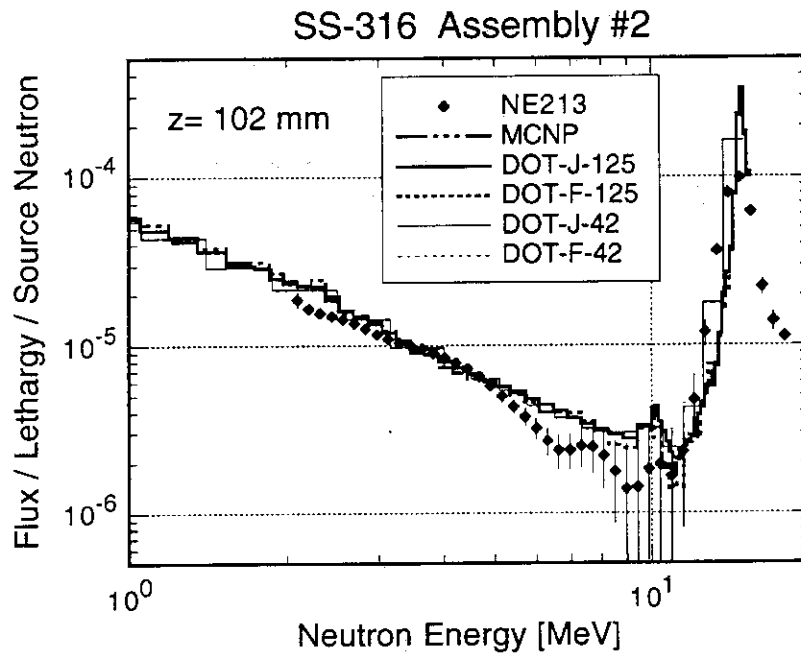


Fig. 3.51 The measured and calculated neutron spectra in MeV energy region at 102 mm depth in the Assembly #2.

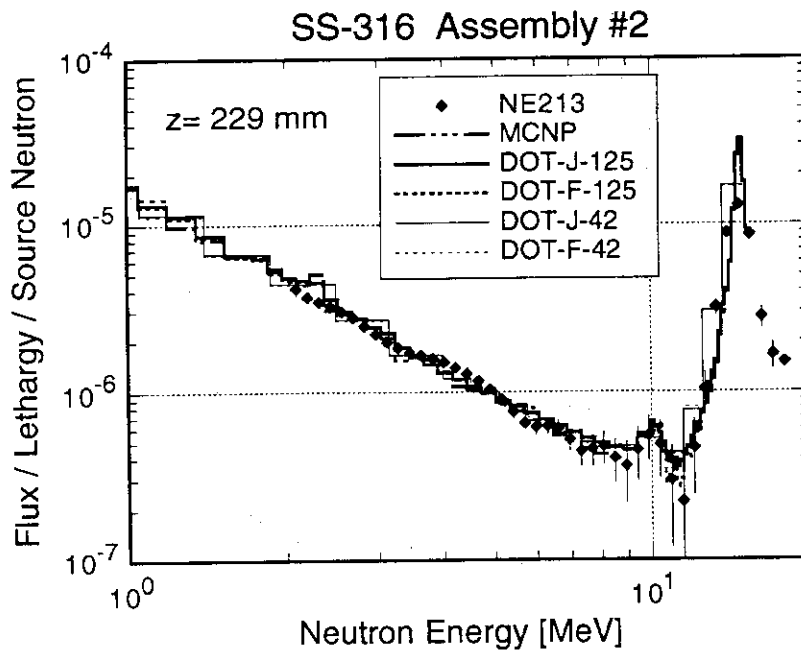


Fig. 3.52 The measured and calculated neutron spectra in MeV energy region at 229 mm depth in the Assembly #2.

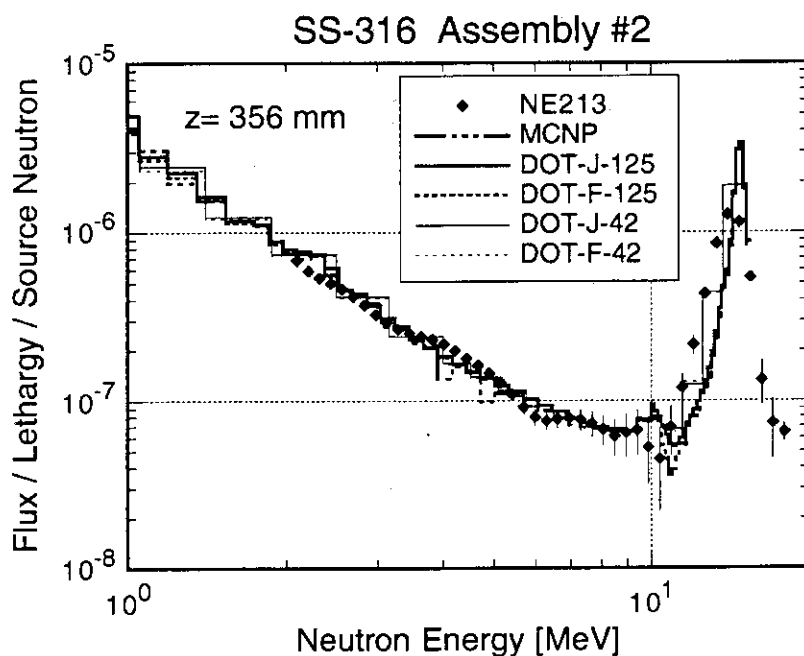


Fig. 3.53 The measured and calculated neutron spectra in MeV energy region at 356 mm depth in the Assembly #2.

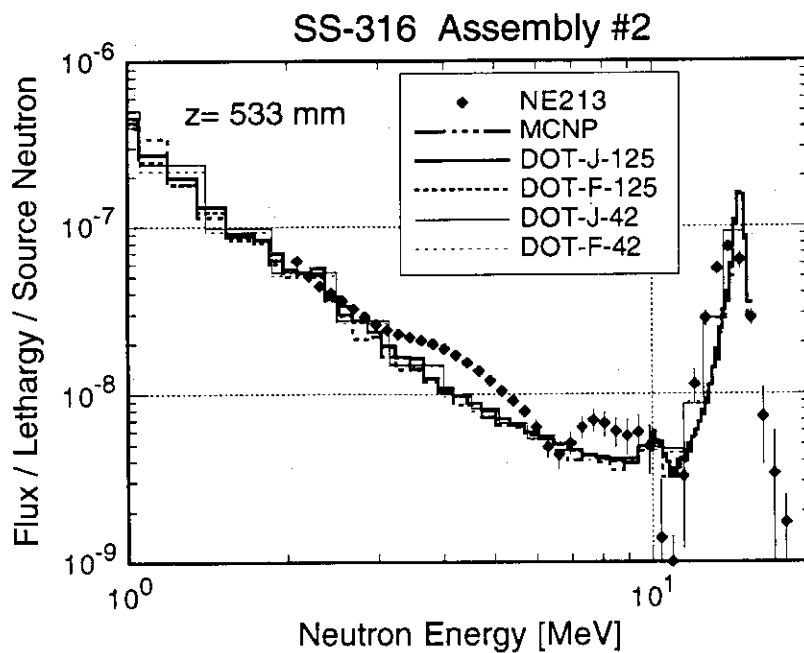


Fig. 3.54 The measured and calculated neutron spectra in MeV energy region at 533 mm depth in the Assembly #2.

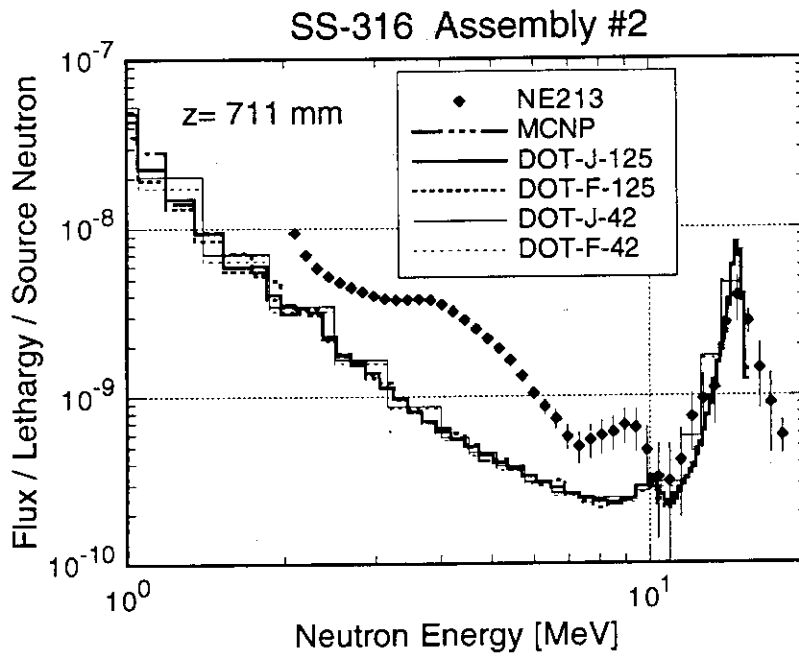


Fig. 3.55 The measured and calculated neutron spectra in MeV energy region at 711 mm depth in the Assembly #2.

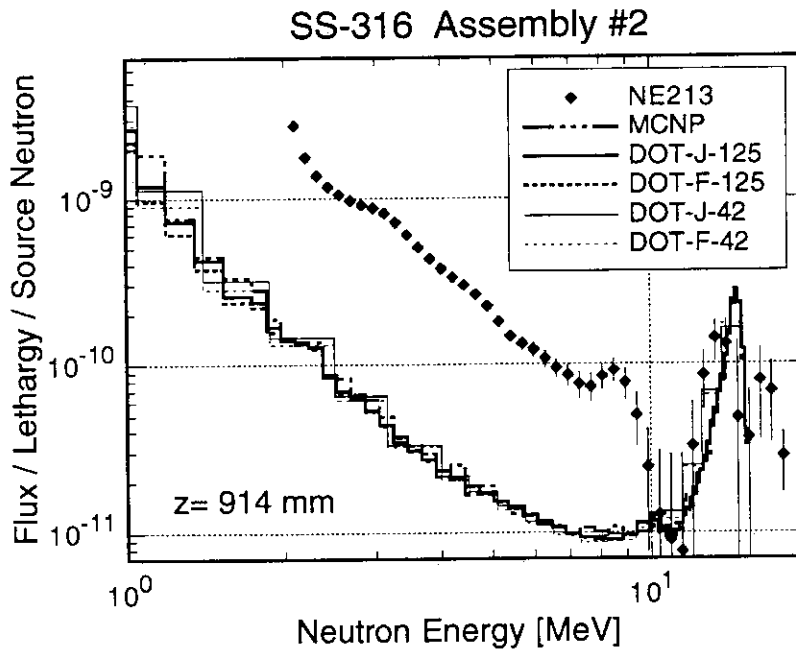


Fig. 3.56 The measured and calculated neutron spectra in MeV energy region at 914 mm depth in the Assembly #2.

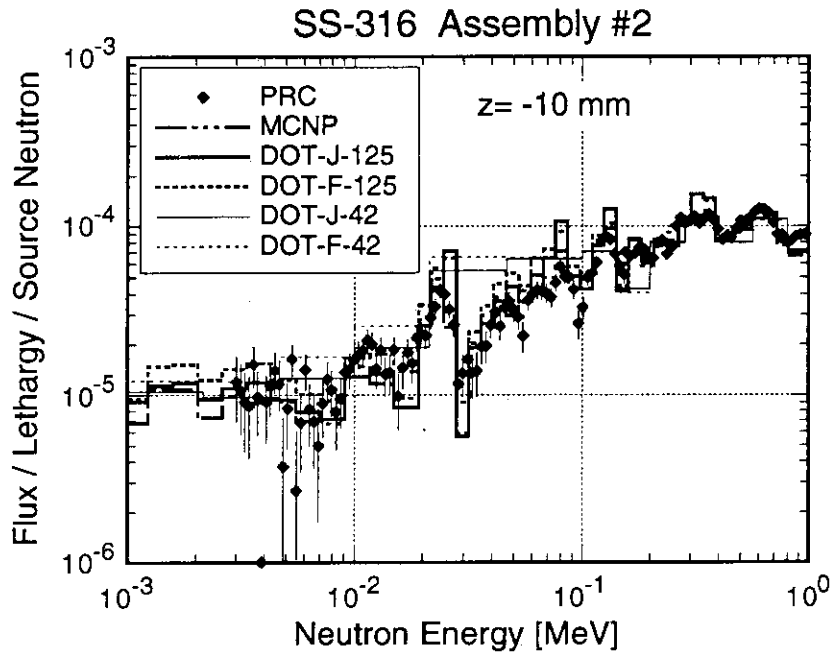


Fig. 3.57 The measured and calculated neutron spectra in keV energy region at the front surface of the Assembly #2.

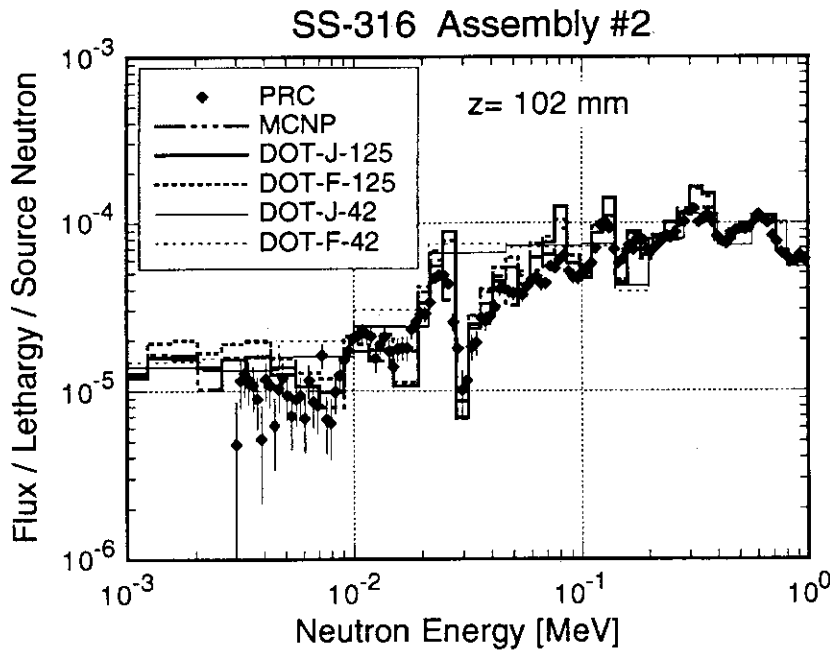


Fig. 3.58 The measured and calculated neutron spectra in keV energy region at 102 mm depth in the Assembly #2.

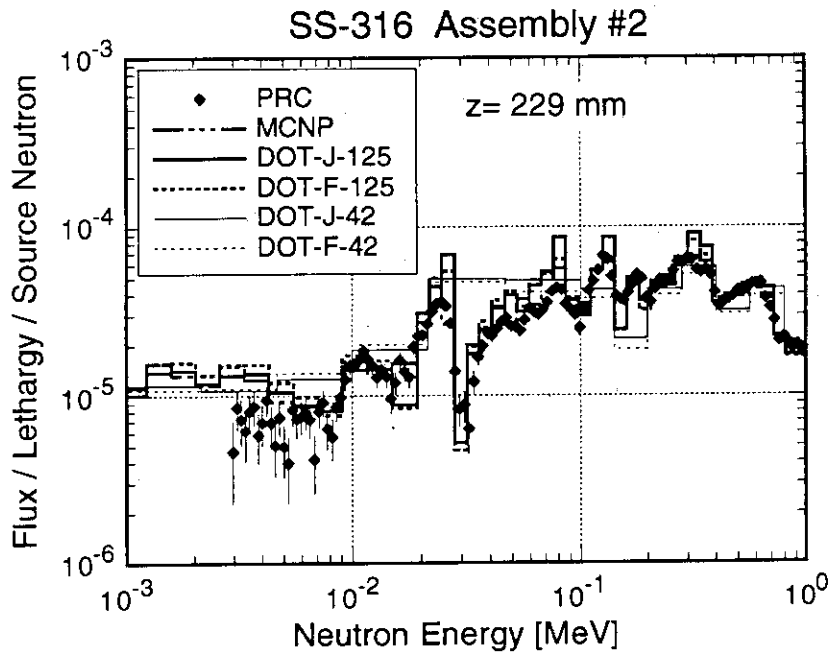


Fig. 3.59 The measured and calculated neutron spectra in keV energy region at 229 mm depth in the Assembly #2.

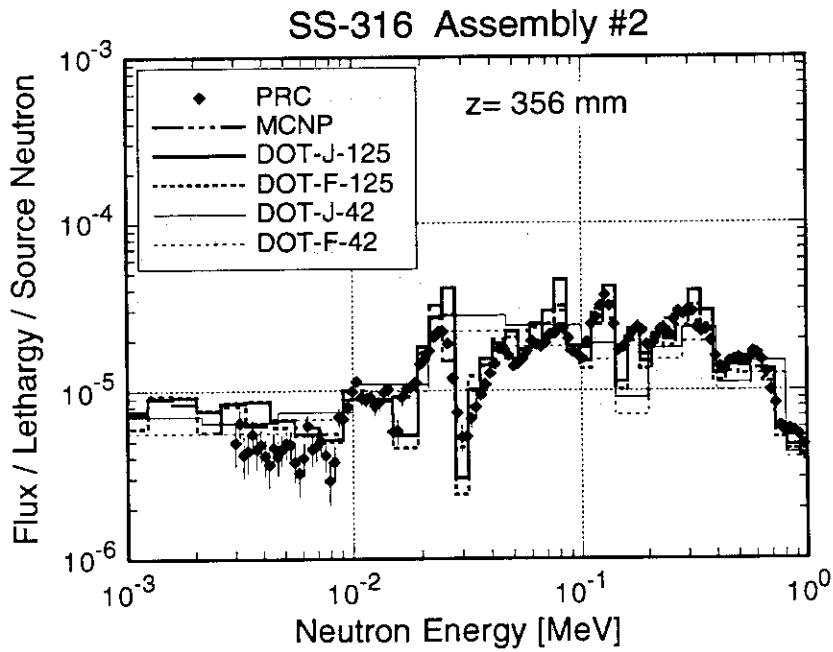


Fig. 3.60 The measured and calculated neutron spectra in keV energy region at 356 mm depth in the Assembly #2.

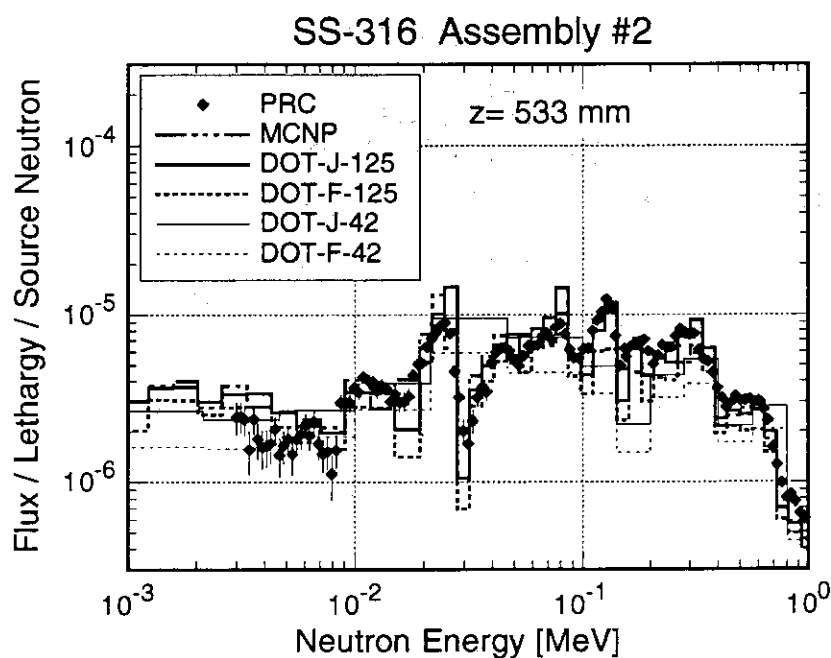


Fig. 3.61 The measured and calculated neutron spectra in keV energy region at 533 mm depth in the Assembly #2.

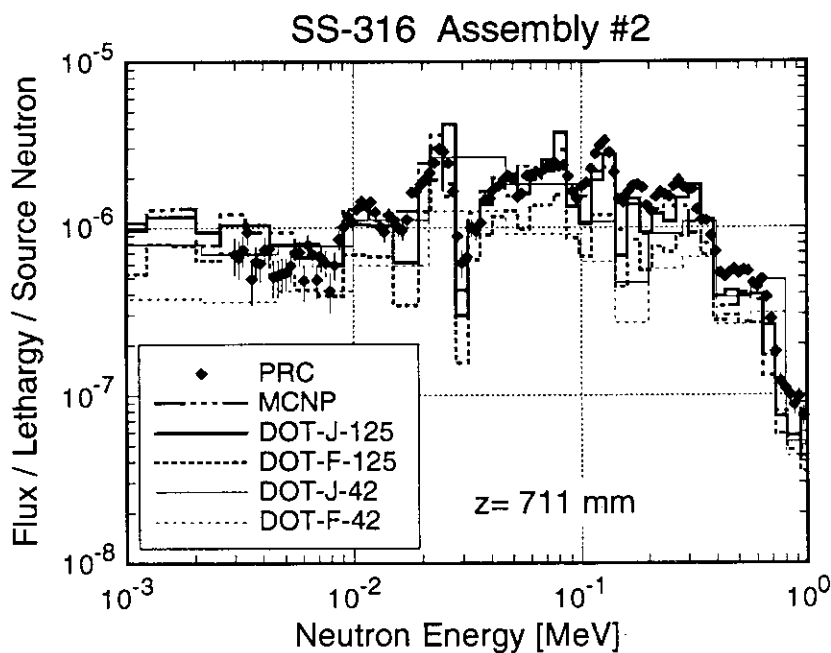


Fig. 3.62 The measured and calculated neutron spectra in keV energy region at 711 mm depth in the Assembly #2.

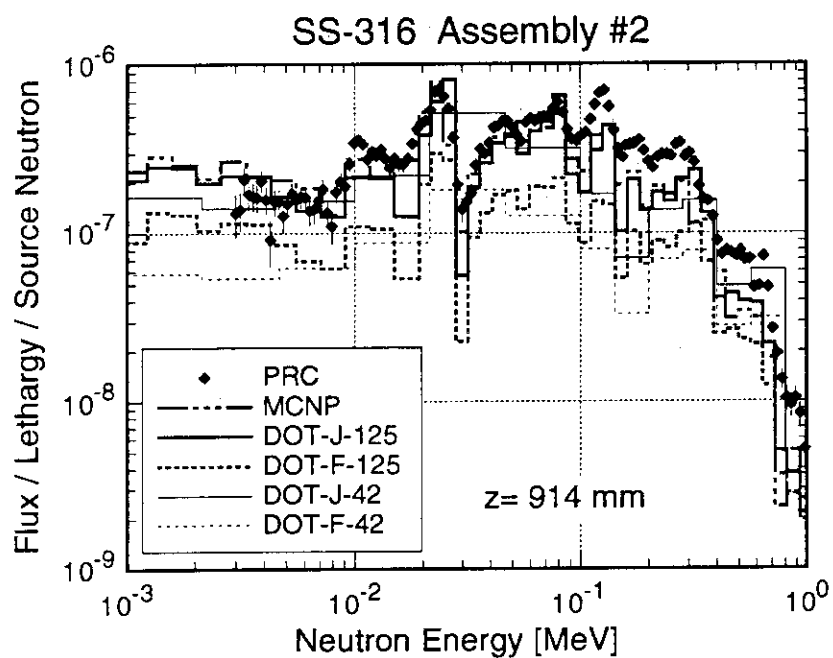


Fig. 3.63 The measured and calculated neutron spectra in keV energy region at 914 mm depth in the Assembly #2.

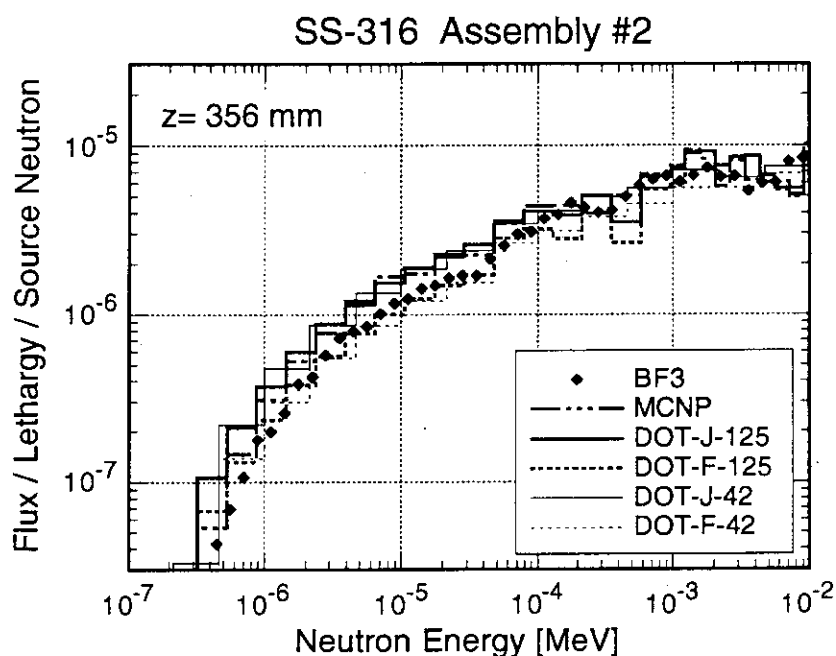


Fig. 3.64 The measured and calculated neutron spectra in eV energy region at 356 mm depth in the Assembly #2.

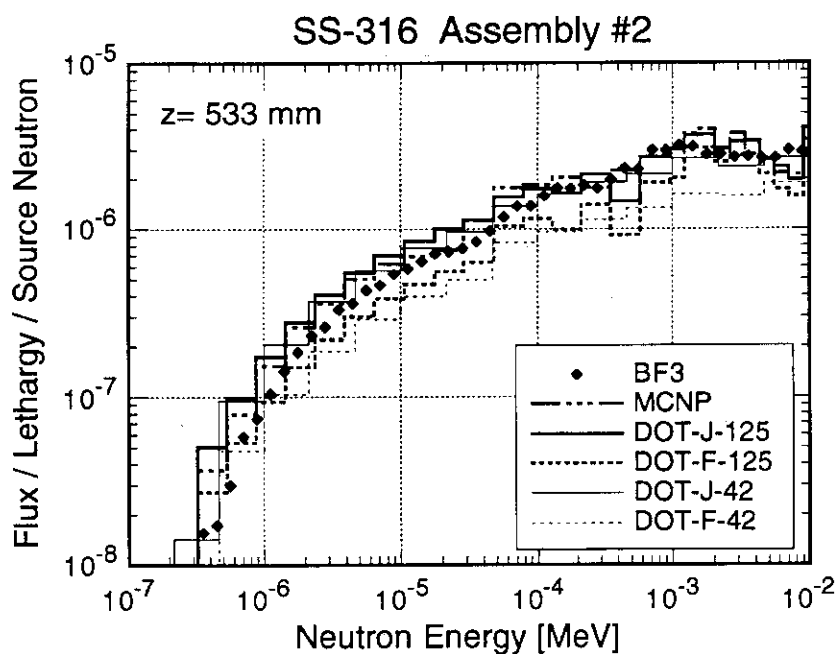


Fig. 3.65 The measured and calculated neutron spectra in eV energy region at 533 mm depth in the Assembly #2.

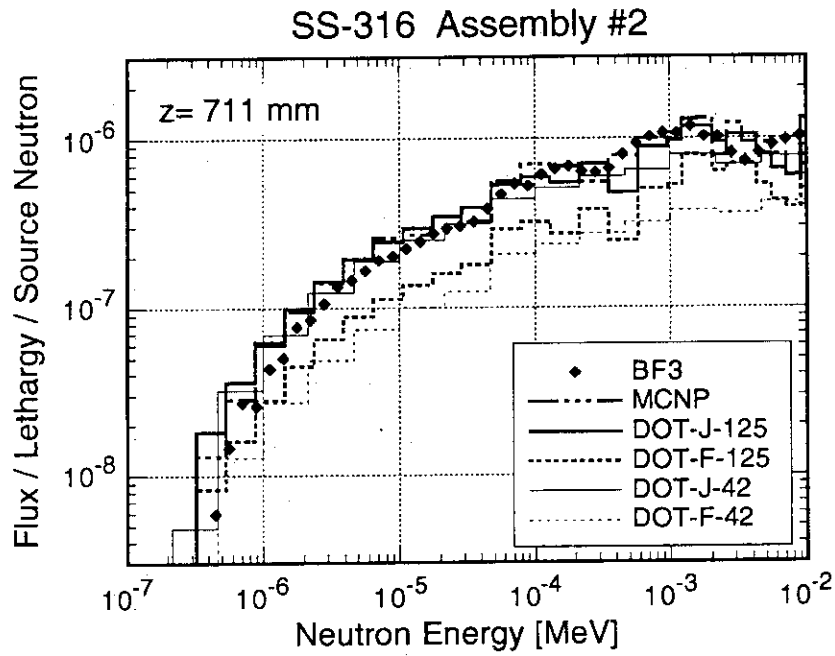


Fig. 3.66 The measured and calculated neutron spectra in eV energy region at 711 mm depth in the Assembly #2.

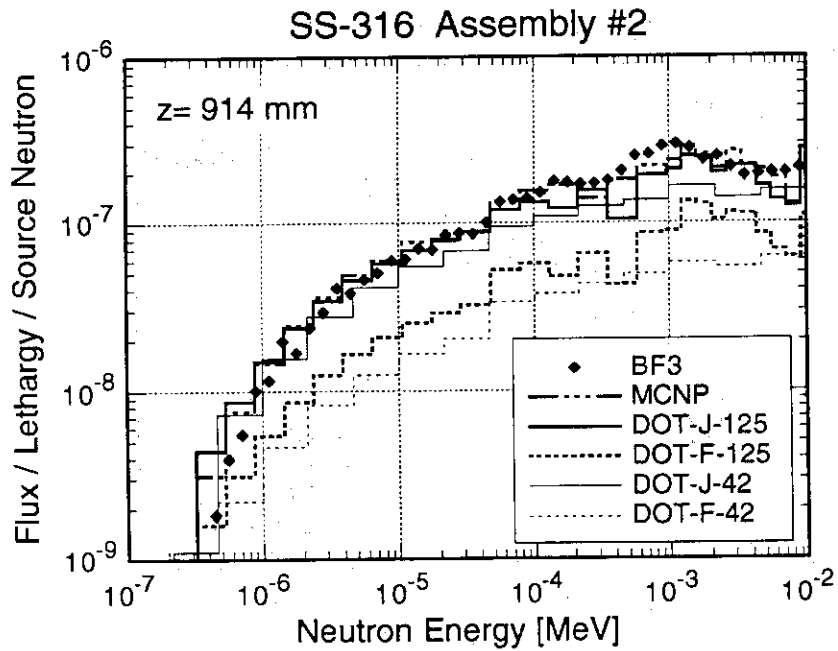


Fig. 3.67 The measured and calculated neutron spectra in eV energy region at 914 mm depth in the Assembly #2.

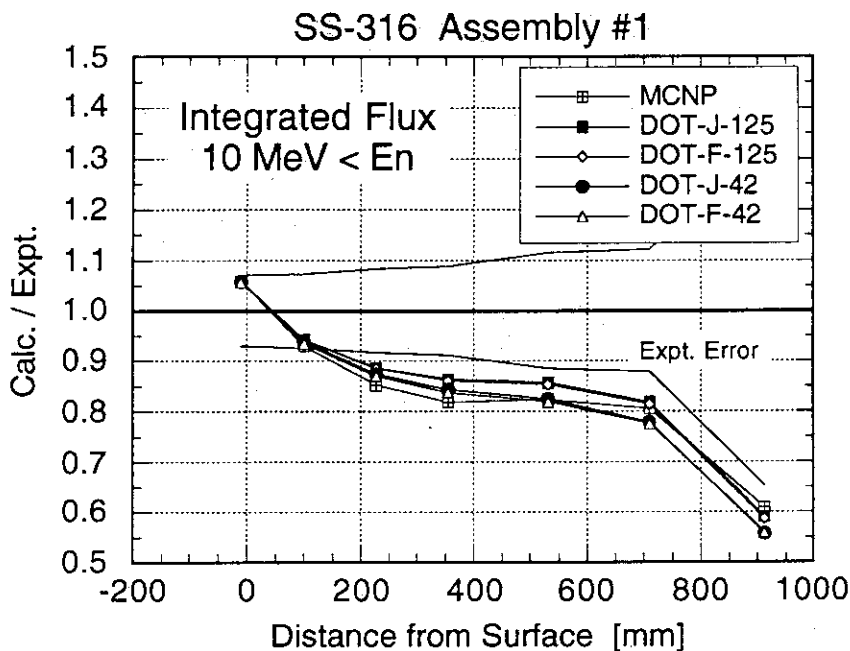


Fig. 3.68 The C/E ratios of the integrated neutron flux above 10 MeV in the Assembly #1.

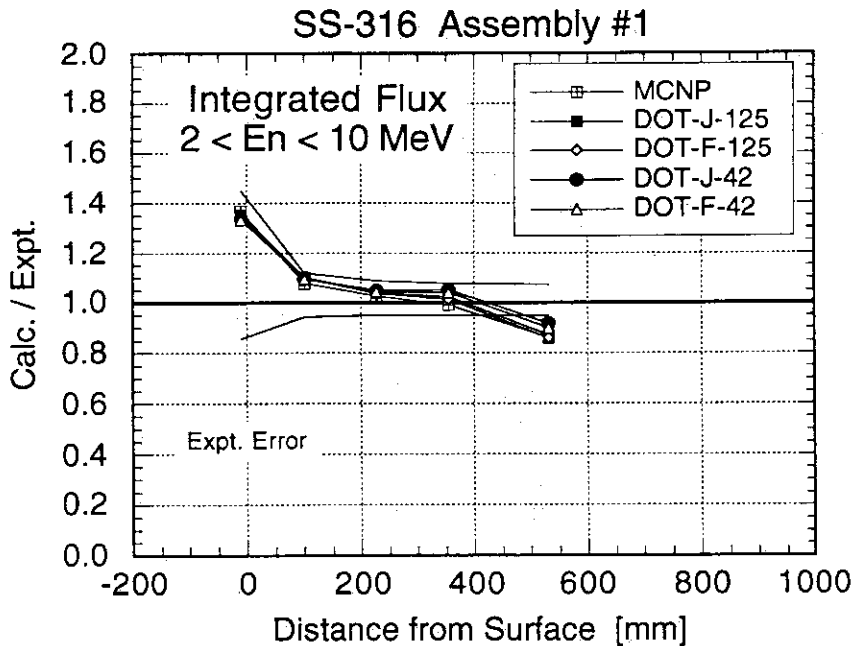


Fig. 3.69 The C/E ratios of the integrated neutron flux between 2 and 10 MeV in the Assembly #1.

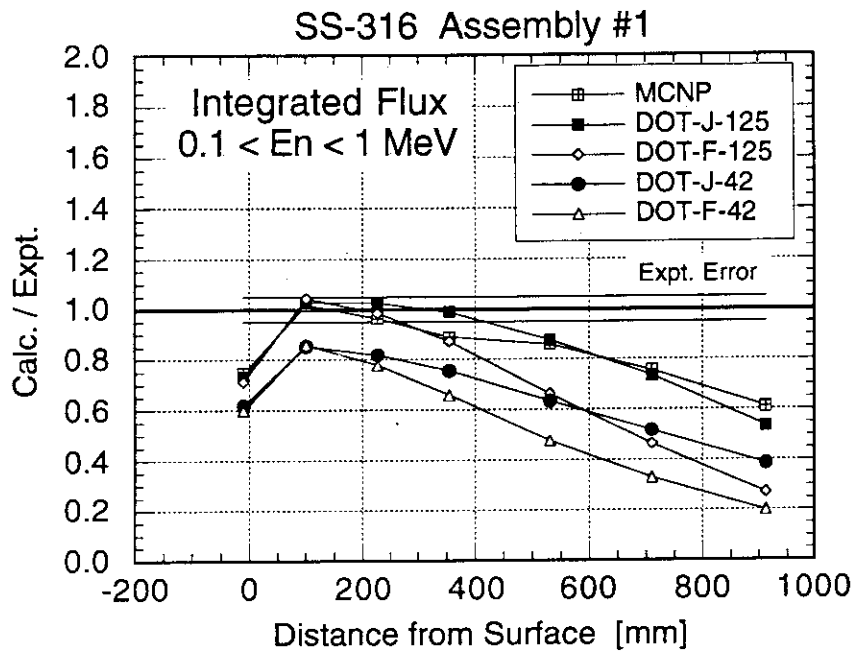


Fig. 3.70 The C/E ratios of the integrated neutron flux between 0.1 and 1 MeV in the Assembly #1.

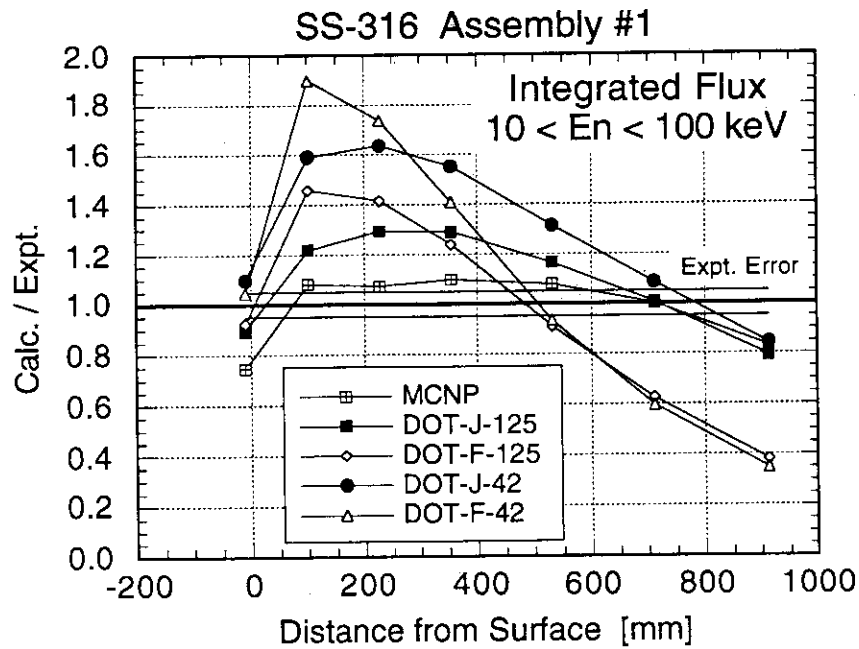


Fig. 3.71 The C/E ratios of the integrated neutron flux between 10 and 100 keV in the Assembly #1.

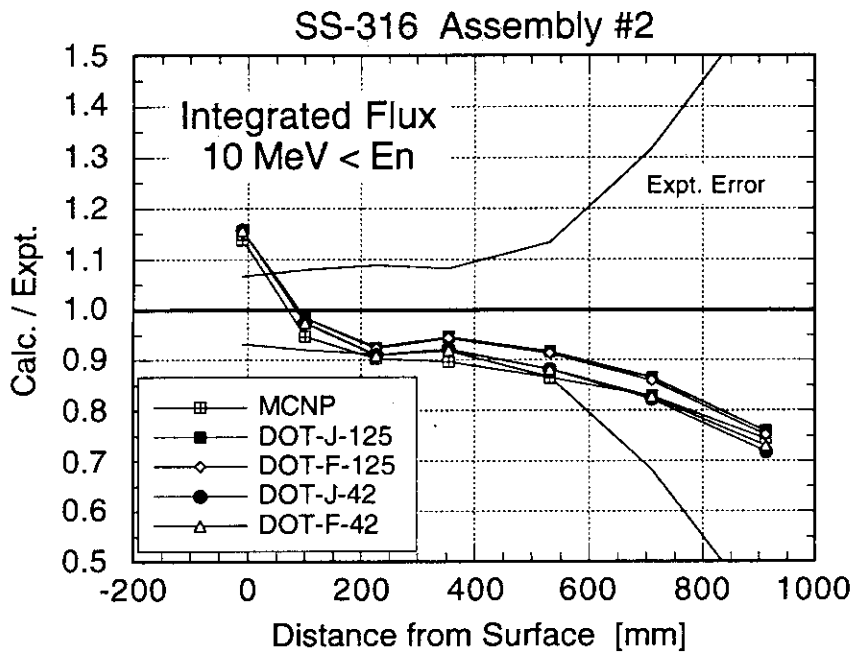


Fig. 3.72 The C/E ratios of the integrated neutron flux above 10 MeV in the Assembly #2.

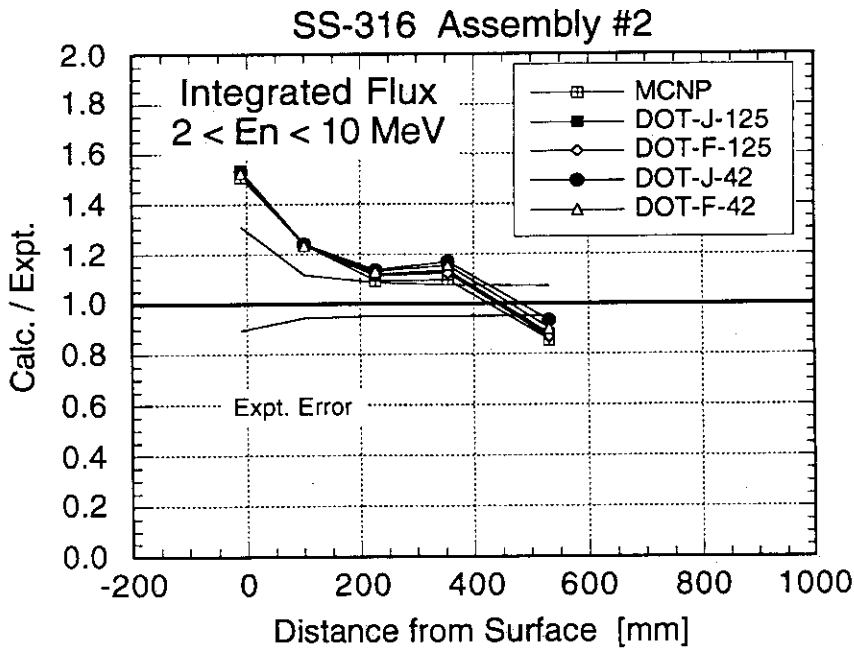


Fig. 3.73 The C/E ratios of the integrated neutron flux between 2 and 10 MeV in the Assembly #2.

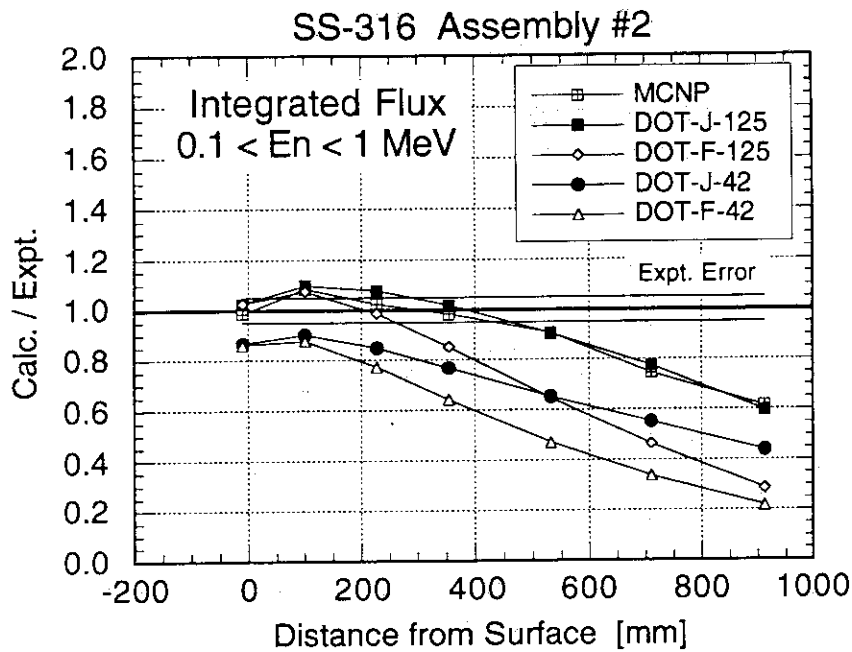


Fig. 3.74 The C/E ratios of the integrated neutron flux between 0.1 and 1 MeV in the Assembly #2.

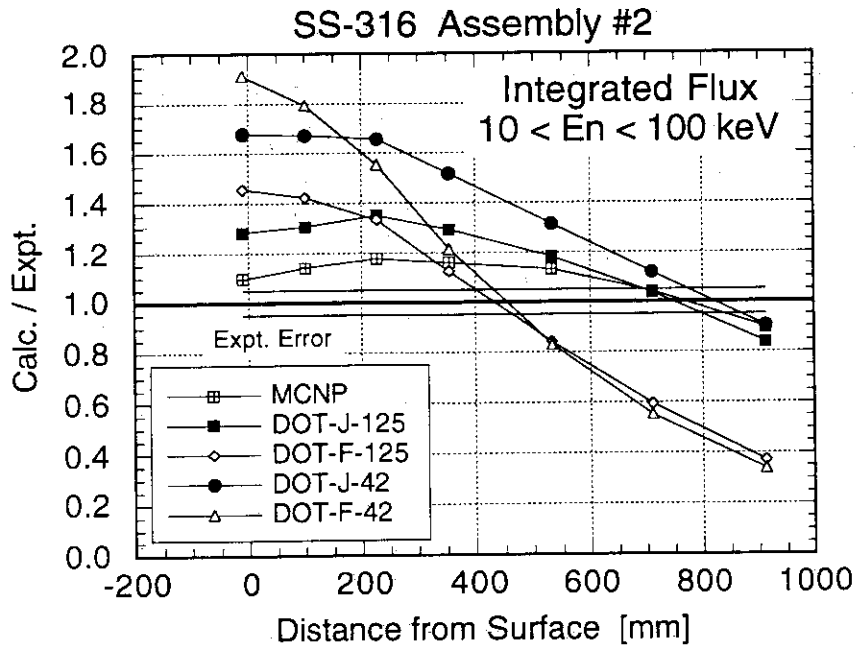


Fig. 3.75 The C/E ratios of the integrated neutron flux between 10 and 100 keV in the Assembly #2.

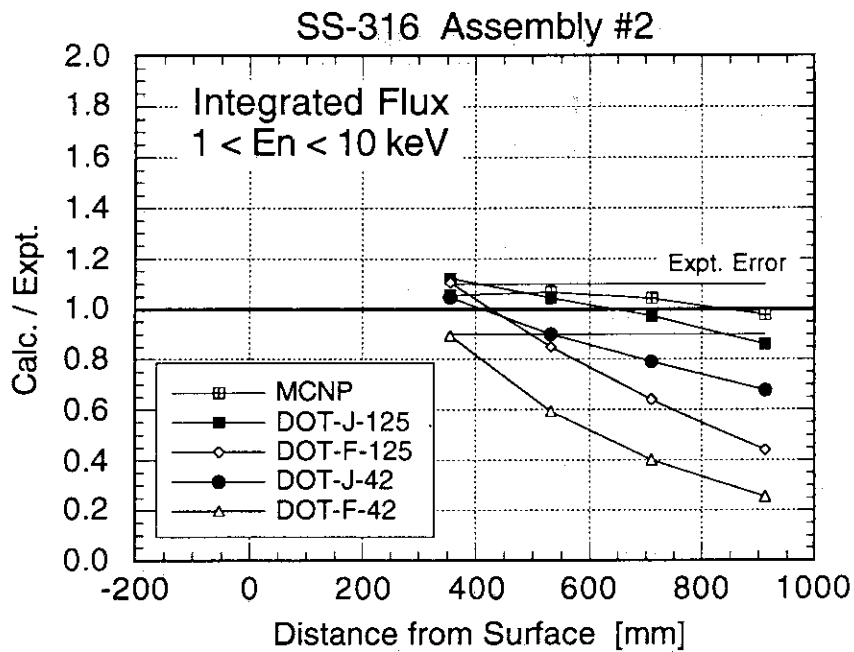


Fig. 3.76 The C/E ratios of the integrated neutron flux between 1 and 10 keV in the Assembly #2.

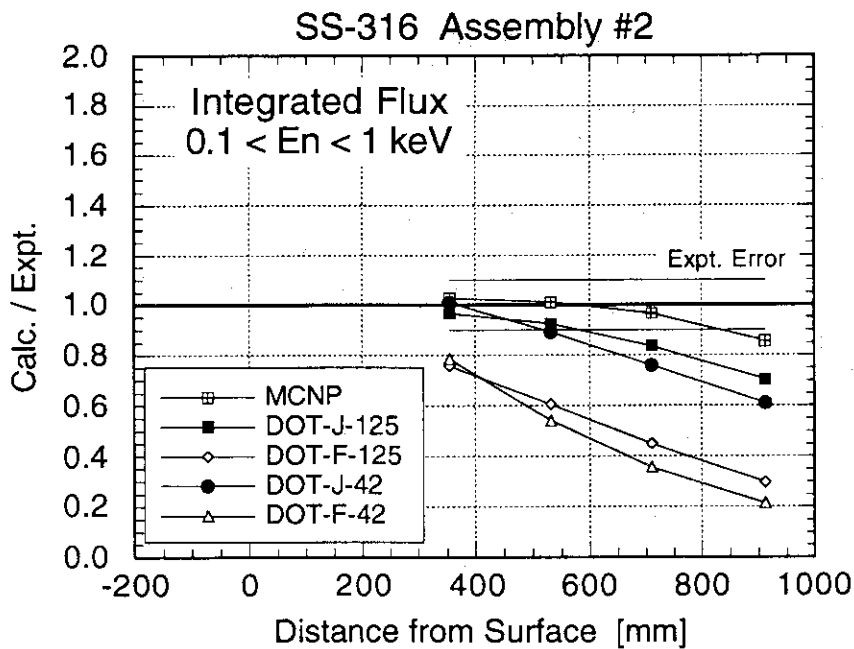


Fig. 3.77 The C/E ratios of the integrated neutron flux between 0.1 and 1 keV in the Assembly #2.

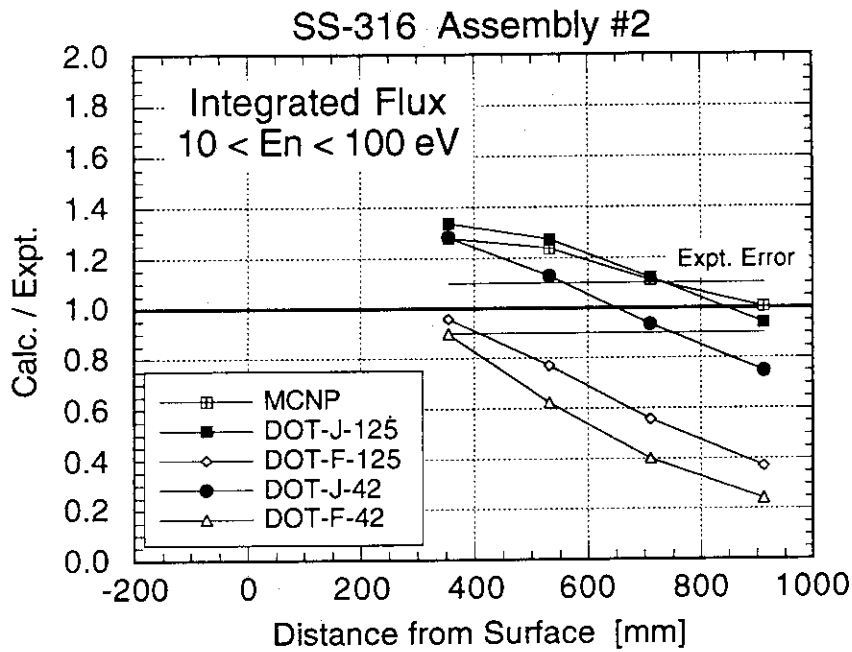


Fig. 3.78 The C/E ratios of the integrated neutron flux between 10 and 100 eV in the Assembly #2.

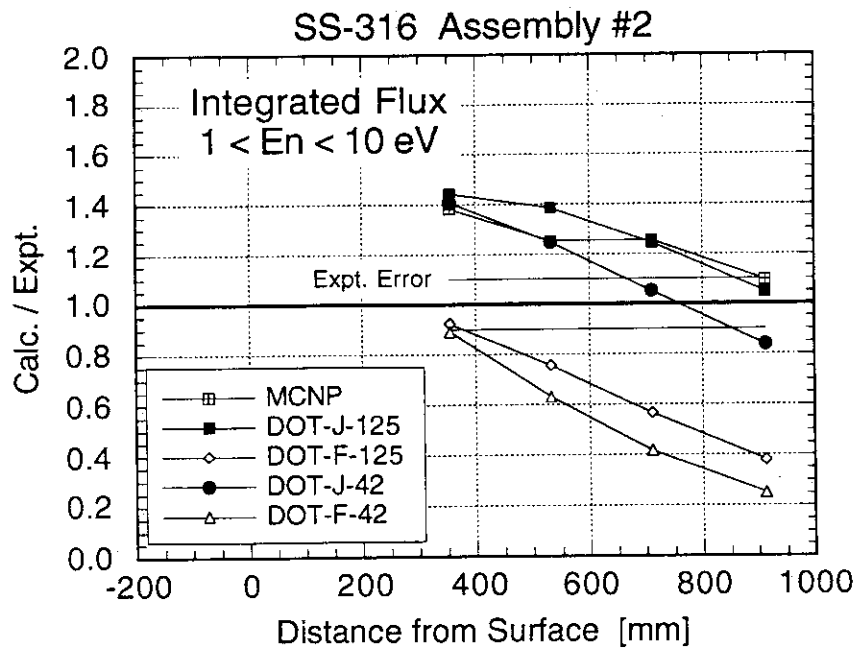


Fig. 3.79 The C/E ratios of the integrated neutron flux between 1 and 10 eV in the Assembly #2.

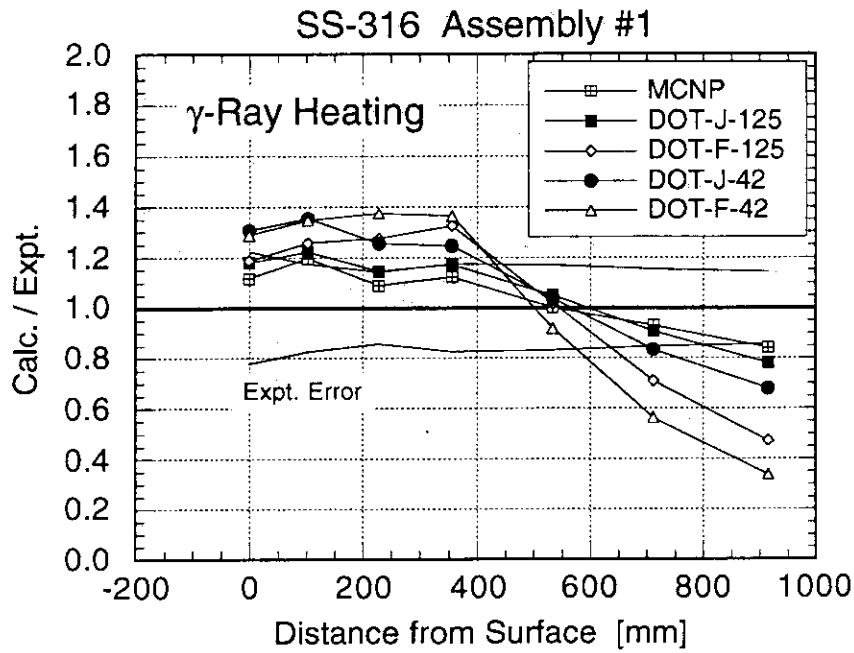


Fig. 3.80 The C/E ratios of the gamma-ray heating rate of SS316 in the Assembly #1.

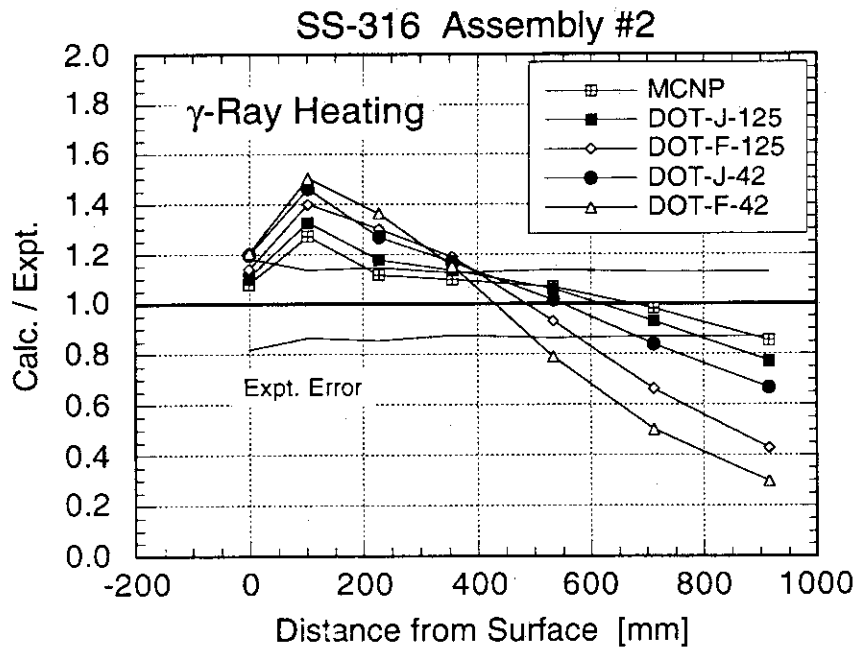


Fig. 3.81 The C/E ratios of the gamma-ray heating rate of SS316 in the Assembly #2.

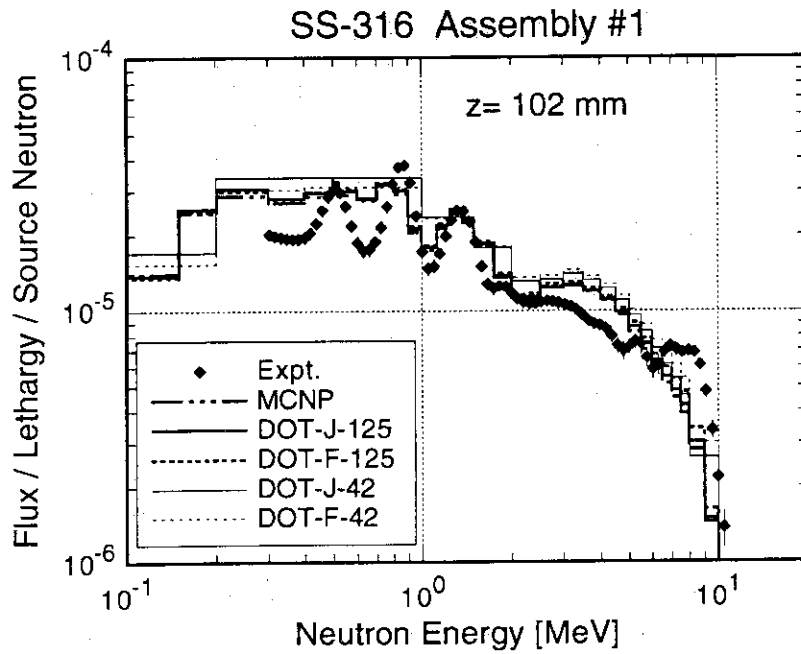


Fig. 3.82 The measured and calculated gamma-ray spectra at 102 mm depth in the Assembly #1.

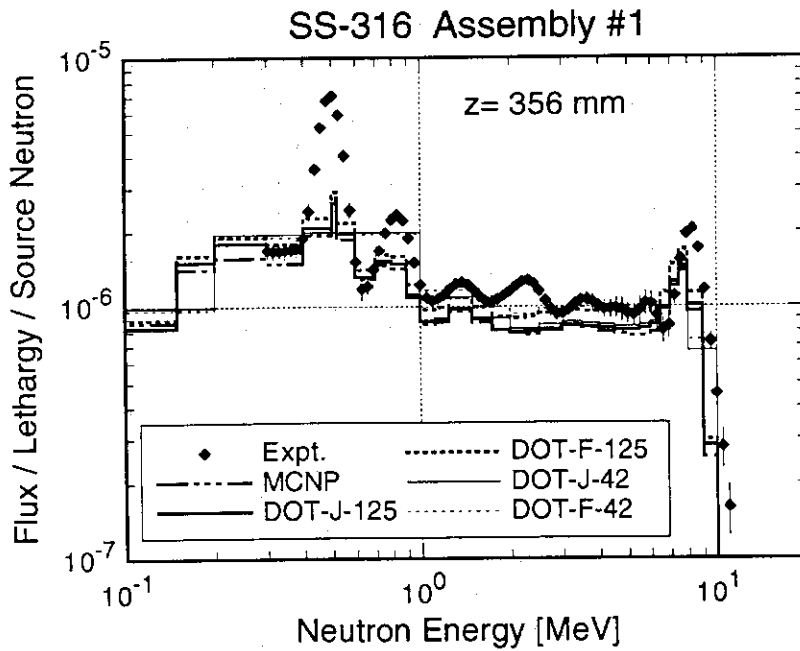


Fig. 3.83 The measured and calculated gamma-ray spectra at 356 mm depth in the Assembly #1.

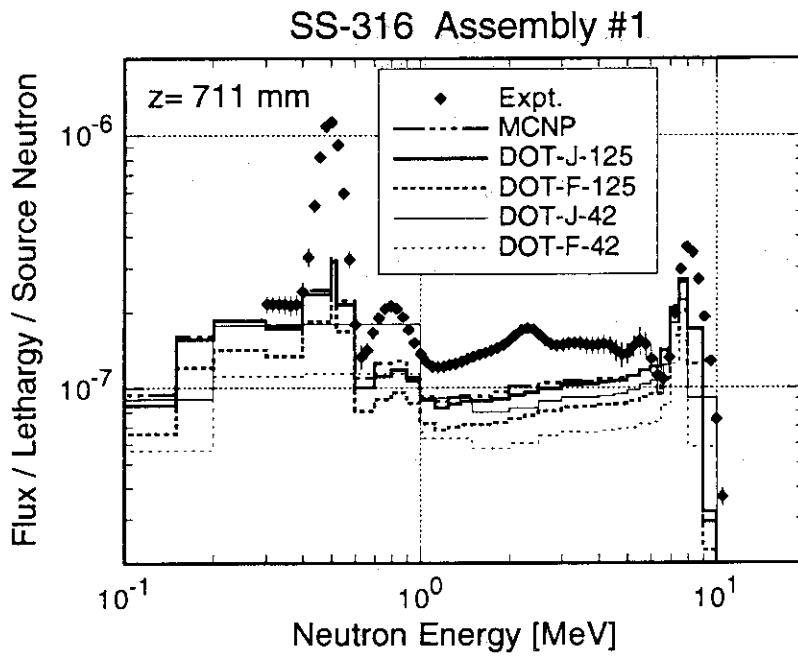


Fig. 3.84 The measured and calculated gamma-ray spectra at 711 mm depth in the Assembly #1.

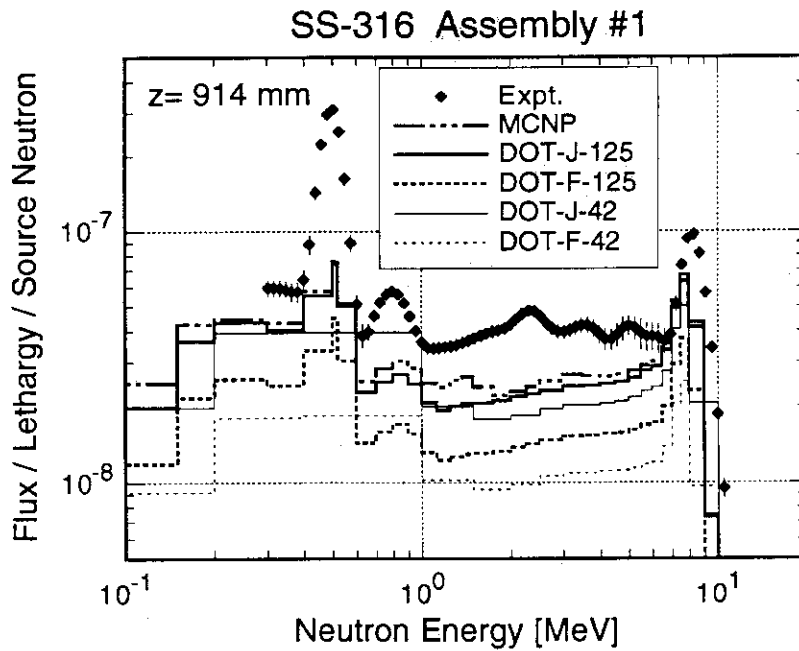


Fig. 3.85 The measured and calculated gamma-ray spectra at 914 mm depth in the Assembly #1.

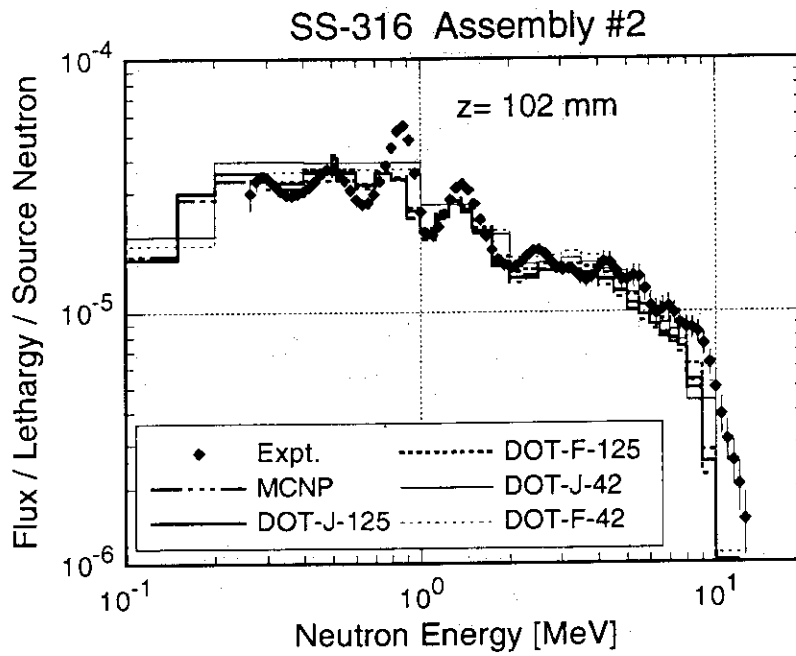


Fig. 3.86 The measured and calculated gamma-ray spectra at 102 mm depth in the Assembly #2.

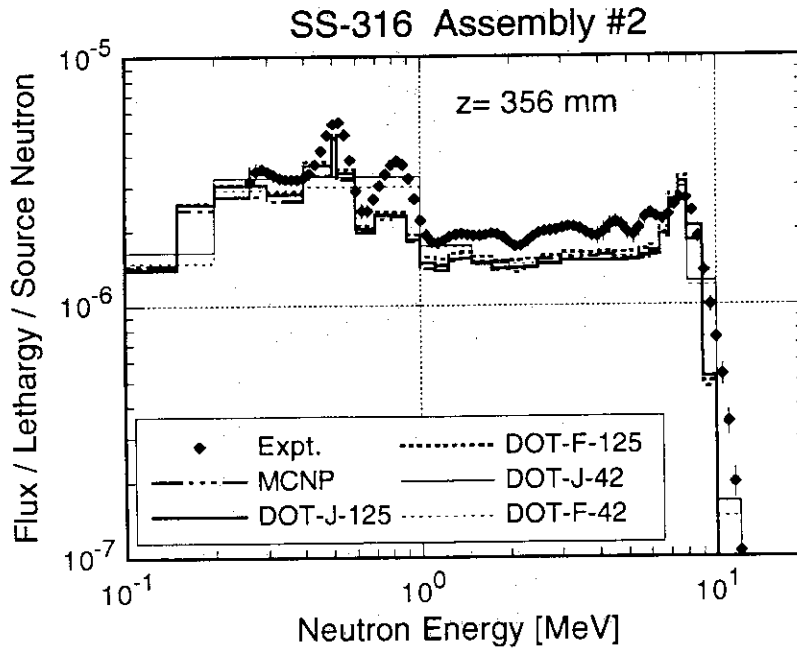


Fig. 3.87 The measured and calculated gamma-ray spectra at 356 mm depth in the Assembly #2.

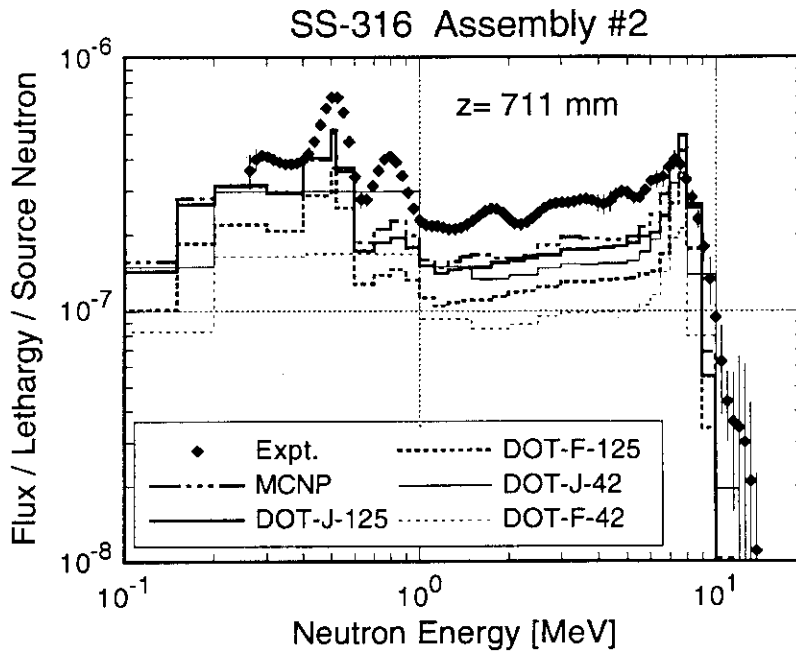


Fig. 3.88 The measured and calculated gamma-ray spectra at 711 mm depth in the Assembly #2.

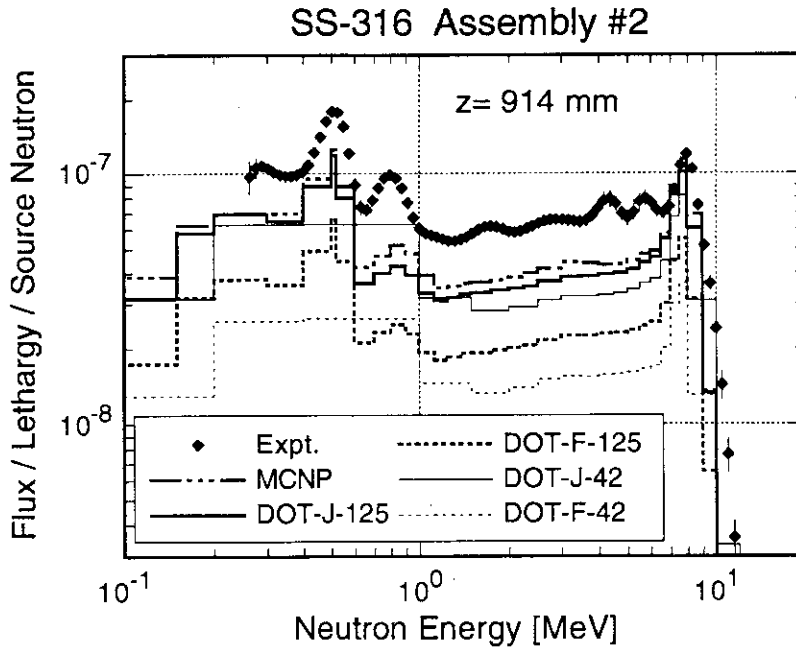


Fig. 3.89 The measured and calculated gamma-ray spectra at 914 mm depth in the Assembly #2.