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THE RELATIVE IMPORTANCE OF NEUTRON CAPTURE AND INELASTIC-SCATTERING INTERACTIONS TO THE SECONDARY GAMMA-RAY DOSE TRANSMITTED THROUGH LAMINATED TUNGSTEN AND LITHIUM HYDRIDE SNAP REACTOR SHIELDS*

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ABSTRACT

Calculations have been made of the spacial and neutron energy dependence of the neutron captures and inelastic scatterings that contribute to the secondary gamma-ray dose transmitted through a laminated tungsten (Hevimet) and lithium hydride shield adjacent to a SNAP reactor. Four shield configurations were considered: a 5-cm-thick slab of Hevimet alone; the Hevimet followed by a 30.5-cm thickness of LiH; the Hevimet preceded by the LiH; and the Hevimet preceded and followed by the LiH. For each configuration both a forward calculation and an adjoint calculation were performed with the one-dimensional discrete ordinates code ANISN, the forward calculation yielding neutron fluences within the shield and the adjoint calculation yielding probabilities that a gamma ray of a given energy originating at a given position in the shield would contribute to the transmitted dose. The results from the two calculations were convoluted with gamma-ray production data to determine the spacial distribution of the neutron interactions contributing to the exit secondary gamma-ray dose. The calculations show, as was expected, that in each configuration essentially all of the exit secondary gamma-ray dose is due to neutron interactions in the Hevimet, with the contribution from the last half of the Hevimet being a factor of 3 to 5 higher than that from the first half. When LiH follows the Hevimet, 80% of the exit gamma-ray dose is produced by neutron captures, with nearly half of them occurring at neutron energies between 3.06 eV and 0.111 MeV. When LiH does not follow the Hevimet, the importance of neutron inelastic scatterings approaches that of the captures.

I. INTRODUCTION

In designing SNAP reactor shields, which have stringent weight limitations, it is important to know how the production of secondary gamma rays within the shield varies with the energy of the neutron source and with the shield configuration. Since tungsten and lithium hydride are frequently proposed as gamma-ray and neutron shields respectively for SNAP systems,[1] a calculational study was made of the secondary gamma-ray dose transmitted through these materials when they are exposed to neutrons from a SNAP reactor. The purpose of the study was to determine the importance of the gamma-ray production cross sections as a function of neutron energy in order to guide cross-section measurements and evaluations.

The study consisted of three parts. In the first, the relative contributions to the gamma-ray dose by neutron interactions per unit volume within various intervals of a shield consisting entirely of tungsten (Hevimet) were studied as a function of the type of interaction and the energy of the interacting neutron. In the second, the contributions to the total exit secondary gamma-ray dose by various regions of a laminated tungsten and lithium hydride shield were determined, also as a function of the type of interaction and the energy of the interacting neutron. Finally, the probability that a neutron leaving the reactor with a given energy would produce a gamma ray in a laminated shield that would contribute to the exit dose was calculated for the neutron energies included in the reactor leakage spectrum.

II. CALCULATIONAL PROCEDURE

For each configuration studied both an adjoint calculation and a forward calculation were performed with the one-dimensional discrete ordinates code ANISN.[2] In the adjoint calculation a given exit gamma-ray dose response was assumed and the probability that a gamma ray of a given energy originating at a given position in the shield would contribute to that dose was determined. In the forward calculation the penetration of neutrons from the reactor to positions throughout the shield was determined. The results from these two calculations, convoluted with selected gamma-ray production data, revealed the origin of

the exit secondary gamma-ray dose as it was distributed in space and neutron energy.

Mathematically, the procedure is described as follows. Let $V(x,E_\gamma)$ be the contribution that a gamma ray of energy E_γ born at space point x in the shield makes to the exit dose, and let $Y(E_\gamma,E_n)$ be the macroscopic cross section for the production of gamma rays of energy E_γ by a neutron of energy E_n. Then the contribution of gamma rays of all energies due to a neutron of energy E_n interacting at space point x, as determined from the adjoint calculation, is given by

$$P(x,E_n) = \sum_{\text{All } E_\gamma} V(x,E_\gamma)\ Y(E_\gamma,E_n) \quad .$$

This quantity is multiplied by a specific neutron flux $\phi(x,E_n)$ obtained from the forward calculation to determine the total contribution made to the gamma-ray dose by neutrons of energy E_n interacting at space point x:

$$C(x,E_n) = \phi(x,E_n)\ P(x,E_n) \quad .$$

The calculations utilized an S_{16} quadrature and a P_3 set of coupled cross sections consisting of 27 neutron groups and 60 gamma-ray groups as shown in Tables 1 and 2. The neutron interaction cross sections were obtained from the ENDF/B file[3] and the GAM-II data base,[4] and the gamma-ray interaction cross sections were taken from the MUG data base.[5] Secondary gamma-ray production cross sections were generated with the POPOP4 code[6] using data sets from the POPOP4 library. The 87-group structure was developed by coupling the neutron and gamma-ray cross sections and placing them on tape for use in the calculation.[7]

The gamma-ray dose responses, shown in Table 3, were taken from Rockwell,[8] and the neutron source, shown in Table 4, was obtained from a discrete ordinates calculation for another problem.[9]

The calculations were performed for four combinations of Hevimet with lithium hydride. The Hevimet was a 5.08-cm-thick slab clad on each side with 0.3175 cm of aluminum. The number densities for the elements in the slab were as follows:

Table 1. Neutron Group Structure

Groups	Energy Band (MeV)
1	1.22(+1)-1.49(+1) *
2	1.00(+1)-1.22(+1)
3	8.19(0)-1.00(+1)
4	6.70(0)-8.19(0)
5	5.49(0)-6.70(0)
6	4.49(0)-5.49(0)
7	3.68(0)-4.49(0)
8	3.01(0)-3.68(0)
9	2.47(0)-3.01(0)
10	2.02(0)-2.47(0)
11	1.65(0)-2.02(0)
12	1.35(0)-1.65(0)
13	1.11(0)-1.35(0)
14	9.07(-1)-1.11(0)
15	6.08(-1)-9.07(-1)
16	4.08(-1)-6.08(-1)
17	1.11(-1)-4.08(-1)
18	1.04(-2)-1.11(-1)
19	3.35(-3)-1.04(-2)
20	5.83(-4)-3.35(-3)
21	1.01(-4)-5.83(-4)
22	2.90(-5)-1.01(-4)
23	1.07(-5)-2.90(-5)
24	3.06(-6)-1.07(-5)
25	1.13(-6)-3.06(-6)
26	4.14(-7)-1.13(-6)
27	0.0 -4.14(-7)

*Read: 1.49×10^{1}.

Table 2. Gamma-Ray Group Structure

Group	Energy Bands (MeV)	Group	Energy Bands (MeV)
1	1.08(+1)-1.10(+1)*	31	4.80(0) -5.00(0)
2	1.06(+1)-1.08(+1)	32	4.60(0) -4.80(0)
3	1.04(+1)-1.06(+1)	33	4.40(0) -4.60(0)
4	1.02(+1)-1.04(+1)	34	4.20(0) -4.40(0)
5	1.00(+1)-1.02(+1)	35	4.00(0) -4.20(0)
6	9.80(0) -1.00(+1)	36	3.80(0) -4.00(0)
7	9.60(0) -8.80(0)	37	3.60(0) -3.80(0)
8	9.40(0) -9.60(0)	38	3.40(0) -3.60(0)
9	9.20(0) -9.40(0)	39	3.20(0) -3.40(0)
10	9.00(0) -9.20(0)	40	3.00(0) -3.20(0)
11	8.80(0) -9.00(0)	41	2.80(0) -3.00(0)
12	8.60(0) -8.80(0)	42	2.60(0) -2.80(0)
13	8.40(0) -8.60(0)	43	2.40(0) -2.60(0)
14	8.20(0) -8.40(0)	44	2.20(0) -2.40(0)
15	8.00(0) -8.20(0)	45	2.00(0) -2.20(0)
16	7.80(0) -8.00(0)	46	1.80(0) -2.00(0)
17	7.60(0) -7.80(0)	47	1.60(0) -1.80(0)
18	7.40(0) -7.60(0)	48	1.40(0) -1.60(0)
19	7.20(0) -7.40(0)	49	1.20(0) -1.40(0)
20	7.00(0) -7.20(0)	50	1.00(0) -1.20(0)
21	6.80(0) -7.00(0)	51	9.00(-1)-1.00(0)
22	6.60(0) -6.80(0)	52	8.00(-1)-9.00(-1)
23	6.40(0) -6.60(0)	53	7.00(-1)-8.00(-1)
24	6.20(0) -6.40(0)	54	6.00(-1)-7.00(-1)
25	6.00(0) -6.20(0)	55	5.00(-1)-6.00(-1)
26	5.80(0) -6.00(0)	56	4.00(-1)-5.00(-1)
27	5.60(0) -5.80(0)	57	3.00(-1)-4.00(-1)
28	5.40(0) -5.60(0)	58	2.00(-1)-3.00(-1)
29	5.20(0) -5.40(0)	59	1.00(-1)-2.00(-1)
30	5.00(0) -5.20(0)	60	1.00(-2)-1.00(-1)

*Read: 1.10×10^{1}.

Table 3. Gamma-Ray Dose Responses[a]

Energy Group	Dose Rate [(r/hr)/(photon/cm^2)/sec]	Energy Group	Dose Rate [(r/hr)/(photon/cm^2)/sec]
1	1.16(-5)[b]	31	6.20(-6)
2	1.14(-5)	32	6.00(-6)
3	1.12(-5)	33	5.80(-6)
4	1.10(-5)	34	5.60(-6)
5	1.08(-5)	35	5.40(-6)
6	1.06(-5)	36	5.20(-6)
7	1.05(-5)	37	5.00(-6)
8	1.03(-5)	38	4.80(-6)
9	1.01(-5)	39	4.60(-6)
10	1.00(-5)	40	4.40(-6)
11	9.80(-6)	41	4.20(-6)
12	9.60(-6)	42	4.00(-6)
13	9.40(-6)	43	3.77(-6)
14	9.30(-6)	44	3.56(-6)
15	9.10(-6)	45	3.35(-6)
16	8.90(-6)	46	3.14(-6)
17	8.70(-6)	47	2.90(-6)
18	8.50(-6)	48	2.64(-6)
19	8.40(-6)	49	2.38(-6)
20	8.20(-6)	50	2.09(-6)
21	8.00(-6)	51	1.84(-6)
22	7.80(-6)	52	1.68(-6)
23	7.70(-6)	53	1.50(-6)
24	7.50(-6)	54	1.33(-6)
25	7.30(-6)	55	1.13(-6)
26	7.10(-6)	56	9.30(-7)
27	6.90(-6)	57	7.20(-7)
28	6.70(-6)	58	4.90(-7)
29	6.50(-6)	59	2.65(-7)
30	6.30(-6)	60	1.32(-7)

[a]From Rockwell, ref. 3

[b]Read: 1.16×10^{-5}.

Table 4. Neutron Source Spectrum

Group	Flux [(neutrons/cm^2)/sec]
1	1.1360(-5)*
2	6.1127(-5)
3	2.2189(-4)
4	5.8882(-4)
5	1.2182(-3)
6	2.0616(-3)
7	2.9755(-3)
8	3.4743(-3)
9	4.0037(-3)
10	6.4668(-3)
11	7.9135(-3)
12	7.7091(-3)
13	6.3817(-3)
14	5.7970(-3)
15	8.7878(-3)
16	8.6232(-3)
17	1.8391(-2)
18	1.3667(-2)
19	6.5133(-3)
20	7.2663(-3)
21	6.0584(-3)
22	4.0554(-3)
23	2.9014(-3)
24	3.0939(-3)
25	2.3549(-3)
26	2.1033(-3)
27	5.4441(-3)

*Read: 1.1360×10^{-5}.

Aluminum (cladding)		0.0603 atoms/barn•cm
Copper	Hevimet	0.0040984 atoms/barn•cm
Nickel	Hevimet	0.0130803 atoms/barn•cm
Tungsten	Hevimet	0.0498920 atoms/barn•cm

The lithium hydride slabs were 30.48 cm thick. The lithium was taken to be 7.4% ^{6}Li and 92.6% ^{7}Li. The densities of lithium and hydrogen were taken as 0.64167 and 0.09084 g/cm^3 respectively.

The first shield configuration, shown in sketch (a) of Fig. 1, consisted of Hevimet alone. The second configuration consisted of the Hevimet followed by lithium hydride. In the third configuration the lithium hydride was positioned between the source and the Hevimet, and in the fourth configuration the lithium hydride was placed on both sides of the Hevimet. The dimensions of configurations 2, 3, and 4 can be deduced from sketch (b) of Fig. 1.

Two series of calculations were performed for each configuration. In the first only the contribution from the neutron capture reaction was calculated, and in the other the contribution from the combined neutron capture and inelastic scattering reactions was determined. The contributions from the two reactions could thus be isolated. Inelastic scatterings were calculated only for neutron energies greater than 0.111 MeV, since contributions by this interaction for lower energy neutrons would be negligible.

In the calculations the aluminum-clad Hevimet was divided into 18 spacial intervals, each of which was 0.3175 cm thick. In the first two configurations the intervals were identified as intervals 1 through 18 with intervals 1 and 18 corresponding to the aluminum cladding. In the last two configurations the 18 intervals were identified as intervals 13 through 30, with intervals 13 and 30 corresponding to the aluminum cladding. In each configuration, four intervals within the Hevimet were selected for analysis: the outer interval on each side of the slab and the two center intervals. In the first two configurations these were intervals 2, 9, 10, and 17; in the last two configurations they were intervals 14, 21, 22, and 29 (see Fig. 1).

The lithium hydride was divided into 12 spacial intervals, each interval being 2.54 cm thick. Depending on the location of the lithium

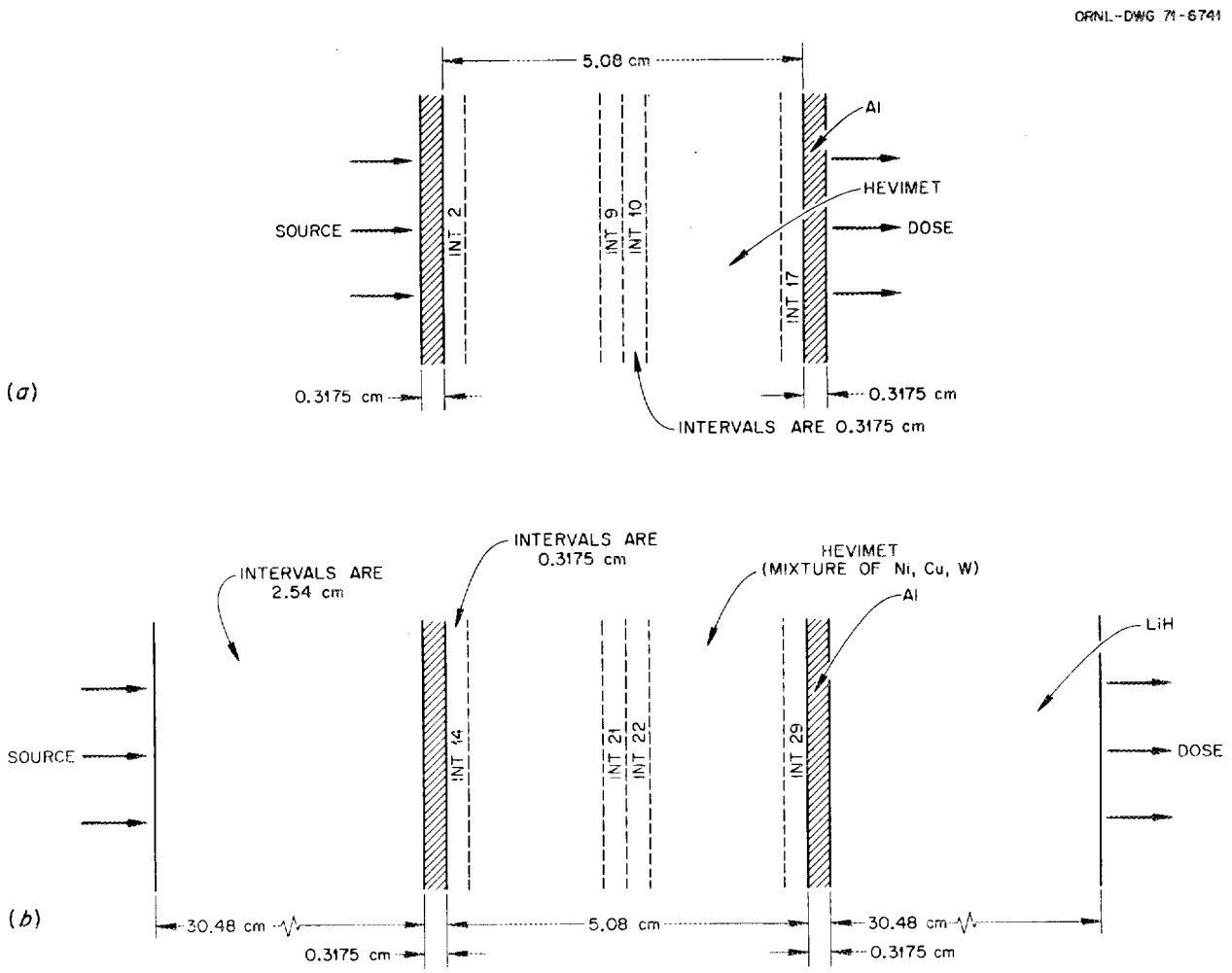

Fig. 1. Configurations for Which Calculations Were Performed. (a) Hevimet Alone (Configuration 1); (b) Hevimet Combined with LiH (Configurations 2, 3, and 4). Note: When LiH does not precede the Hevimet, as in Configuration 2, space interval 14 becomes space interval 2 as it is in Configuration 1.

hydride, the intervals were identified as intervals 1-12, 19-30, or 31-42.

The detailed results for all the energy and spacial intervals are tabulated in Appendix A.

III. CONTRIBUTIONS TO SECONDARY GAMMA-RAY DOSE BY SELECTED SPACIAL INTERVALS IN THE HEVIMET

The contributions to the exit secondary gamma-ray dose due to the various neutron interactions per unit volume within three selected spacial intervals in the Hevimet are summarized in Table 5, and the corresponding fractional values are given in Table 6. Note that the column headings in Table 5 have letter designations which must be referred to in order to interpret the entries in Table 6. The three intervals shown for each configuration represent the spacial interval in the Hevimet nearest the source (2 or 14), the spacial interval at the center of the Hevimet region (9 or 21), and the spacial interval farthest from the source (17 or 29). Their locations within the various configurations are shown in Fig. 1. (Corresponding results obtained for intervals 10 and 22 are not included because of their similarity to the results for intervals 9 and 21 respectively.)

The results in Table 5 were obtained by integrating over the neutron energy to collapse the 27-group structure into four energy groups corresponding roughly to a thermal-neutron group, a fast-neutron group, and two intermediate groups. Histograms which compare the results for a given interaction in one spacial interval in terms of all 27 energy groups are presented in Appendix B.

Table 5 shows that in all four configurations the most important spacial interval in the Hevimet is the back interval (17 or 29), the unit volume dose contribution from this interval being higher than those from the other two spacial intervals by factors of from about 4 to 18. The table also shows that in all four configurations the first interval is more important than the center interval.

A comparison of configurations 1 and 2 indicates that the addition of the lithium hydride behind the Hevimet reduces the contribution to

Table 5. Contribution to Transmitted Gamma-Ray Dose per Unit Volume of Spacial Interval as a Function of Neutron Energy Interval and Reaction Type

Spacial Interval in Hevimet*	Contribution per Unit Volume of Spacial Interval							
	By (n,γ) Reactions					By (n,n'γ) Reactions,	By (n,γ) + (n,n'γ) Reactions	
	0 - 3.06 eV (a)**	3.06 eV-0.583 keV (b)	0.583 keV-0.111 MeV (c)	0.111 MeV-14.9 MeV (d)	0 - 14.9 MeV (e)	0.111 MeV-14.9 MeV (f)	0.111 MeV-14.9 MeV (g)	0 - 14.9 MeV (h)
			Configuration 1 (Hevimet Only)					
2 (front)	3.18(-7)	8.77(-7)	1.41(-7)	4.99(-8)	1.39(-6)	1.26(-7)	1.75(-7)	1.51(-6)
9 (center)	8.33(-8)	2.53(-8)	2.32(-7)	1.57(-7)	4.98(-7)	2.61(-7)	4.18(-7)	7.58(-7)
17 (back)	1.81(-7)	1.96(-8)	9.57(-7)	1.25(-6)	2.41(-6)	3.22(-6)	4.47(-6)	5.63(-6)
			Configuration 2 (Hevimet-LiH)					
2 (front)	1.58(-7)	4.34(-7)	7.07(-8)	2.49(-8	6.88(-7)	5.34(-8)	7.83(-8)	7.41(-7)
9 (center)	4.12(-8)	1.36(-8)	1.26(-7)	7.59(-8)	2.57(-7)	1.01(-7)	1.77(-7)	3.58(-7)
17 (back)	2.46(-7)	4.30(-6)	1.04(-6)	3.77(-7)	5.96(-6)	6.33(-7)	1.01(-6)	6.60(-6)
			Configuration 3 (LiH-Hevimet)					
14 (front)	9.19(-11)	1.46(-9)	2.28(-10)	4.49(-11)	1.82(-9)	1.20(-10)	1.65(-10)	1.94(-9)
21 (center)	6.20(-11)	5.14(-11)	3.96(-10)	2.07(-10)	7.17(-10)	5.26(-10)	7.33(-10)	1.24(-9)
29 (back)	1.62(-10)	3.57(-11)	1.52(-9)	1.77(-9)	3.49(-9)	7.50(-9)	9.27(-9)	1.10(-8)
			Configuration 4 (LiH-Hevimet-LiH)					
14 (front)	4.61(-11)	7.30(-10)	1.16(-10)	2.27(-11)	9.15(-10)	5.21(-11)	7.48(-11)	9.68(-10)
21 (center)	3.28(-11)	2.70(-11)	2.14(-10)	1.02(-10)	3.75(-10)	2.09(-10)	3.11(-10)	5.84(-10)
29 (back)	3.40(-10)	6.49(-9)	1.58(-9)	5.50(-10)	8.96(-9)	1.54(-9)	2.09(-9)	1.05(-8)

*Refer to Fig. 1 for location of space interval with respect to source and detector.
**Letter designation for reference to entries in Table 6.

Table 6. Fractional Contribution to Transmitted Gamma-Ray Dose per Unit Volume of Spacial Interval as a Function of Neutron Energy Interval and Reaction Type (Refer to Table 5)

Spacial Interval in Hevimet[a]	Fractional Contribution per Unit Volume of Spacial Interval							Total Dose per Unit Volume, h
	(n,γ) Reactions					(n,n',γ) Reactions, f/h	High-Energy Reactions, g/h	
	a/h[b] (a/e)	b/h (b/e)	c/h (c/e)	d/h (d/e)	e/h			
				Configuration 1 (Hevimet Only)				
2 (front)	0.22 (0.23)	0.58 (0.63)	0.09 (0.10)	0.03 (0.04)	0.92	0.08	0.12	1.51(-6)[c]
9 (center)	0.10 (0.15)	0.02 (0.04)	0.30 (0.47)	0.22 (0.34)	0.64	0.36	0.58	8.83(-7)
17 (back)	0.032 (0.08)	0.004 (0.01)	0.174 (0.39)	0.22 (0.52)	0.43	0.57	0.79	5.63(-6)
				Configuration 2 (Hevimet-LiH)				
2 (front)	0.21 (0.23)	0.59 (0.63)	0.09 (0.10)	0.04 (0.04)	0.93	0.07	0.11	7.41(-7)
9 (center)	0.10 (0.14)	0.03 (0.05)	0.36 (0.50)	0.22 (0.31)	0.71	0.29	0.51	4.17(-7)
17 (back)	0.03 (0.04)	0.65 (0.72)	0.16 (0.18)	0.06 (0.06)	0.90	0.10	0.15	6.60(-6)
				Configuration 3 (LiH-Hevimet)				
14 (front)	0.05 (0.05)	0.75 (0.80)	0.12 (0.13)	0.02 (0.02)	0.94	0.06	0.09	1.94(-9)
21 (center)	0.04 (0.08)	0.03 (0.05)	0.31 (0.55)	0.17 (0.32)	0.55	0.45	0.62	1.48(-9)
29 (back)	0.015 (0.05)	0.003 (0.01)	0.14 (0.43)	0.16 (0.51)	0.32	0.68	0.84	1.10(-8)
				Configuration 4 (LiH-Hevimet-LiH)				
14 (front)	0.05 (0.05)	0.75 (0.80)	0.12 (0.13)	0.02 (0.02)	0.95	0.05	0.08	9.68(-10)
21 (center)	0.06 (0.08)	0.03 (0.06)	0.36 (0.57)	0.18 (0.29)	0.63	0.37	0.55	6.94(-10)
29 (back)	0.03 (0.04)	0.62 (0.72)	0.15 (0.18)	0.05 (0.06)	0.85	0.15	0.20	1.05(-8)

[a]The front spacial interval is nearest the source (refer to Fig. 1).

[b]See Table 5 for numerical values of letters.

[c]Read: 1.51×10^{-6}.

the secondary gamma-ray dose from the front and center intervals by a factor of 2 but does not change the relative importance of the contributing interactions within these spacial intervals. In both configurations more than 90% of the dose from the front interval and about 70% of the dose from the center interval are due to neutron captures (see Table 6). Also in both configurations 63% of the captures in the front interval that contribute to the dose occur in the neutron energy interval between 3.06 eV and 0.583 keV, and 80% of those in the center interval occur at neutron energies greater than 0.583 keV.

For the back interval (interval 17) the addition of lithium hydride behind the Hevimet changes the character of the contributing interactions both as to type and as to neutron energy. Whereas in configuration 1 high-energy neutron interactions (> 0.111 MeV) account for close to 80% of the dose from interval 17, with the largest fraction due to inelastic scatterings, in configuration 2 the high-energy interactions account for only 15% of the dose from this spacial interval and neutron captures in the energy interval from 3.06 eV to 0.583 keV dominate. A comparison of spacial intervals 2 and 17 in configuration 2 reveals that the relative importance of capture and inelastic-scattering interactions is approximately the same for the two intervals.

Placing the lithium hydride between the source and the Hevimet instead of behind the Hevimet attenuates the incident neutrons and drastically reduces the secondary dose contributions per unit volume for all spacial intervals within the Hevimet -- as much as a factor of 800 for the front spacial interval (compare interval 2 in configuration 1 with interval 14 in configuration 3) and as much as a factor of 500 for the back interval (compare interval 17 with interval 29). As would be expected, the energy spectrum of the captured neutrons throughout the Hevimet is altered by the preceding lithium hydride: low-energy captures contribute only 5% of the dose from the front spacial interval when the lithium hydride is present, whereas they contribute 23% of the dose from this spacial interval when the lithium hydride is not present. Compensating increases occur in other intervals, primarily in the interval between 3.06 eV to 0.583 keV. It is noted, however, that the total relative

contributions to the exit dose by captures and inelastic scatterings in the front spacial intervals of configurations 1 and 3 are approximately the same: 92% by captures and 8% by inelastic scatterings in configuration 1; 94% by captures and 6% by inelastic scatterings in configuration 3. For the other two spacial intervals, the importance of the capture reactions is somewhat decreased in configuration 3. For the back spacial interval, inelastic-scattering reactions account for 68% of the dose contribution in configuration 3, whereas in configuration 1 (no lithium hydride) they account for 57% and in configuration 2 (lithium hydride behind the Hevimet but not in front ot it) they account for only 10%.

The effects of the additional lithium hydride in configuration 4 are the same as those observed for configuration 2. That is, the unit-volume dose contributions from the front and center intervals are reduced by a factor of 2 over those in configuration 3, but the relative importance of the contributing interactions in these intervals is not altered. The total contribution from the back interval (interval 29) remains essentially unchanged, but the important interactions shift from high-energy captures and inelastic scatterings to captures in the neutron energy interval from 3.06 eV to 0.583 keV.

IV. CONTRIBUTIONS TO SECONDARY GAMMA-RAY DOSE BY ALL REGIONS OF THE SHIELD

Table 7 gives the total contribution to the exit secondary gamma-ray dose by specified regions within the configurations. These contributions were obtained by integrating the dose per unit volume over the volume of each of the intervals within the designated region and combining the results. Table 8 gives the corresponding fractional contributions to the dose by the same spacial regions; that is, the contribution shown in Table 7 for each region divided by the total contribution for the configuration . In each case, the total contribution is shown in brackets as the last entry for the configuration. (Note: The fractional values in Table 8 are based on the total gamma-ray dose exiting from each configuration and thus the corresponding entries for different configurations cannot be compared directly. All the entries in Table 7 are directly comparable, however.)

Table 7. Contribution to Transmitted Gamma-Ray Dose by Various Spacial Regions as a Function of Neutron Energy and Reaction Types

Spacial Interval(s)	Contribution by: n,γ Reactions 0.0-3.06 eV	n,γ Reactions 3.06 eV-0.583 keV	n,γ Reactions 0.583 keV-0.111 MeV	n,γ Reactions 0.111 MeV-14.9 MeV	n,γ Reactions 0.0-14.9 MeV	n,n',γ Reactions 0.111 MeV-14.9 MeV	(nγ + n,n',γ) Reactions 0.111 MeV-14.9 MeV	(nγ + n,n',γ) Reactions 0-14.9 MeV
Configuration 1 (Hevimet Only)								
1 (Al)	3.59(-9)	3.16(-10)	3.84(-10)	2.66(-10)	4.55(-9)	8.34(-9)	8.61(-9)	1.29(-8)
2-9 (Hev)	3.69(-7)	5.19(-7)	4.21(-7)	2.28(-7)	1.54(-6)	4.16(-7)	6.44(-7)	1.95(-6)
10-17 (Hev)	2.87(-7)	5.02(-8)	1.36(-6)	1.36(-6)	3.06(-6)	2.88(-6)	4.24(-6)	5.94(-6)
18 (Al)	1.27(-9)	2.72(-12)	7.77(-9)	1.07(-8)	1.98(-8)	2.11(-7)	2.22(-7)	2.31(-7)
1-18 (total)	6.61(-7)	5.70(-7)	1.79(-6)	1.60(-6)	4.62(-6)	3.52(-6)	5.12(-6)	8.14(-6)
Configuration 2 (Hevimet-LiH)								
1 (Al)	1.84(-9)	1.62(-10)	1.99(-10)	1.37(-10)	2.34(-9)	3.73(-9)	3.87(-9)	6.07(-9)
2-9 (Hev)	1.81(-7)	2.57(-7)	2.19(-7)	1.12(-7)	7.69(-7)	1.68(-7)	2.80(-7)	9.38(-7)
10-17 (Hev)	2.36(-7)	1.86(-6)	1.08(-6)	5.18(-7)	3.69(-6)	7.62(-7)	1.28(-6)	4.45(-6)
18 (Al)	2.08(-9)	1.43(-9)	3.75(-9)	2.57(-9)	9.83(-9)	2.86(-8)	3.12(-8)	3.85(-8)
19-30 (LiH)	4.08(-8)	2.39(-8)	2.90(-9)	1.87(-7)	2.55(-7)	0	1.87(-7)	2.55(-7)
1-30 (total)	4.62(-7)	2.14(-6)	1.30(-6)	8.20(-7)	4.73(-6)	9.60(-7)	1.78(-6)	5.69(-6)
Configuration 3 (LiH-Hevimet)								
1-12 (LiH)	1.98(-9)	9.53(-10)	1.01(-10)	3.92(-10)	3.43(-9)	0	3.92(-10)	3.43(-9)
13 (Al)	5.54(-13)	3.21(-13)	4.03(-13)	1.98(-13)	1.48(-12)	6.73(-12)	6.93(-12)	8.21(-12)
14-21 (Hev)	1.70(-10)	9.41(-10)	7.32(-10)	2.79(-10)	2.12(-9)	7.05(-10)	9.84(-10)	2.83(-9)
22-29 (Hev)	2.47(-10)	9.53(-11)	2.20(-9)	1.90(-9)	4.45(-9)	6.61(-9)	8.51(-9)	1.11(-8)
30 (Al)	1.09(-12)	5.01(-15)	1.17(-11)	1.51(-11)	2.78(-11)	5.67(-10)	5.82(-10)	5.95(-10)
1-30 (total)	2.49(-9)	1.99(-9)	3.05(-9)	2.59(-9)	1.00(-8)	7.91(-9)	1.05(-8)	1.79(-8)
Configuration 4 (LiH-Hevimet-LiH)								
1-12 (LiH)	9.05(-10)	4.36(-10)	4.64(-11)	1.54(-10)	1.54(-9)	0	1.54(-10)	1.54(-9)
13 (Al)	2.87(-13)	1.66(-13)	2.13(-13)	1.04(-13)	7.70(-13)	3.09(-12)	3.19(-12)	3.86(-12)
14-21 (Hev)	8.62(-11)	4.70(-10)	3.82(-10)	1.39(-10)	1.08(-9)	2.90(-10)	4.29(-10)	1.37(-9)
22-29 (Hev)	2.86(-10)	2.81(-9)	1.68(-9)	7.38(-10)	5.52(-9)	1.80(-9)	2.54(-9)	7.32(-9)
30 (Al)	2.94(-12)	2.16(-12)	5.61(-12)	3.72(-12)	1.44(-11)	8.32(-11)	8.69(-11)	9.76(-11)
31-42 (LiH)	6.67(-11)	3.91(-11)	4.73(-12)	4.43(-10)	5.54(-10)	0	4.43(-10)	5.54(-10)
1-42 (total)	1.35(-9)	3.76(-9)	2.12(-9)	1.48(-9)	8.71(-9)	2.17(-9)	3.65(-9)	1.09(-8)

Table 8. Fractional Contribution to Transmitted Gamma-Ray Dose by Various Spacial Regions as a Function of Neutron Energy and Reaction Types

Spacial Interval(s)	Material	Fractional Contribution[a] by n,γ Reactions 0-3.06 eV	3.06 eV-0.583 keV	0.583 keV-0.111 MeV	0.111-14.9 MeV	0-14.9 MeV	n,n',γ Reactions, 0.111-14.9 MeV	(n,γ + n,n',γ) Reactions 0.111-14.9 MeV	0-14.9 MeV
				Configuration 1 (Hevimet Only)					
1	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-9	2.54 cm Hev	0.05	0.06	0.05	0.03	0.19	0.05	0.08	0.24
10-17	2.54 cm Hev	0.04	0.01	0.17	0.17	0.38	0.35	0.52	0.73
18	0.3175 cm Al	0.0	0.00	0.00	0.00	0.00	0.03	0.03	0.03
1-18 (total)		0.08	0.07	0.22	0.20	0.57	0.43	0.63	1.00 [8.14(-6)][b]
				Configuration 2 (Hevimet-LiH)					
1	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2-9	2.54 cm Hev	0.03	0.05	0.04	0.02	0.14	0.03	0.05	0.17
10-17	2.54 cm Hev	0.04	0.33	0.19	0.09	0.65	0.13	0.22	0.78
18	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01
19-30	30.48 cm LiH	0.01	0.00	0.00	0.03	0.04	0.00	0.03	0.04
1-30 (total		0.08	0.38	0.23	0.14	0.83	0.17	0.31	1.00 [5.69(-6)]
				Configuration 3 (LiH-Hevimet)					
1-12	30.48 cm LiH	0.11	0.05	0.01	0.02	0.19	0.00	0.02	0.19
13	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14-21	2.54 cm Hev	0.01	0.05	0.04	0.02	0.12	0.04	0.05	0.16
22-29	2.54 cm Hev	0.01	0.01	0.12	0.11	0.25	0.37	0.48	0.62
30	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03
1-30 (total)		0.14	0.11	0.17	0.15	0.56	0.44	0.58	1.00 [1.79(-8)]
				Configuration 4 (LiH-Hevimet-LiH)					
1-12	30.48 cm LiH	0.08	0.04	0.00	0.01	0.14	0.00	0.01	0.14
13	0.3175 cm Al	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14-21	2.54 cm Hev	0.01	0.04	0.04	0.01	0.10	0.03	0.04	0.13
22-29	2.54 cm Hev	0.03	0.26	0.15	0.07	0.51	0.17	0.23	0.67
30	0.3175 cm Al	0.00	0.00	0.00	0.00	0.0	0.01	0.01	0.01
31-42	30.48 cm LiH	0.01	0.00	0.00	0.04	0.05	0.00	0.04	0.05
1-42 (total)		0.13	0.34	0.19	0.14	0.80	0.21	0.34	1.00 [1.09(-8)]

[a] Due to roundoff, some rows and columns do not total correctly.

[b] The number in brackets is the total contribution for the configuration as shown in Table 7.

Tables 7 and 8 show that the trends observed in Section III for the contribution per unit volume from three spacial intervals in the Hevimet are reflected in the total contributions to the dose made by the Hevimet. In all four configurations the contribution by the second half of the Hevimet dominates the exit dose; it contributes about 75% of the dose in configurations 1 and 2 and about 65% in configurations 3 and 4. The first half of the Hevimet never contributes more than about 25% of the dose (in configuration 1) and usually no more than about 15%.

Neutron capture reactions in a lithium hydride region preceding the Hevimet, as in configurations 3 and 4, contribute 15-20% of the exit secondary gamma-ray dose. Captures in a lithium hydride region following the Hevimet, as in configurations 2 and 4, contribute less than 5% of the exit dose.

When lithium hydride follows the Hevimet about 80% of the total exit secondary gamma-ray dose is due to neutron captures throughout the configuration, as compared to about 55% when no lithium hydride follows the Hevimet. Also when lithium hydride follows the Hevimet, high-energy neutron interactions (captures and inelastic scatterings) account for about 30% of the exit dose, as compared to 60% when no lithium hydride follows the Hevimet.

In configuration 1, neutron captures and inelastic scatterings in the second half of the Hevimet contribute about equally to the exit dose, but in configuration 2, with lithium hydride behind the Hevimet, the contribution from inelastic scatterings in the Hevimet is considerably reduced, as is also the contribution from high-energy neutron captures. In configuration 2 the largest contribution from the back half of the Hevimet is due to the capture of neutrons in the 3.06 eV to 0.583 keV range. Placing the lithium hydride in front of the Hevimet does not greatly affect the fractional contribution by high-energy neutron inelastic scatterings from the second half of the Hevimet (compare configurations 1 and 3) but it substantially reduces the fractional contribution from neutron captures in this region. The reductions in the dose contribution due to captures occur in all energy intervals except

the interval from 3.06 eV to 0.583 keV, in which the fractional contribution is approximately the same.

Placing the lithium hydride in front of the Hevimet also reduces the capture in the front half of the Hevimet. For neutrons with energies less than 3.06 eV most of the captures occur in the lithium hydride itself. There is essentially no contribution due to low-energy neutron captures in a lithium hydride region following the Hevimet, but a small contribution from high-energy neutron captures in the lithium hydride occurs.

In summary, Tables 7 and 8 show that when Hevimet is adjacent to the source it contributes more than 95% of the exit secondary gamma-ray dose regardless of whether or not it is followed by a lithium hydride region. When lithium hydride is interposed between the source and the Hevimet, the Hevimet contributes approximately 80% of the exit secondary dose. The contribution from the last half of the Hevimet is always a factor of 3 to 5 higher than that from the first half. When lithium hydride follows the Hevimet, 80% of the exit dose is produced by neutron captures, with nearly half of them occurring at neutron energies between 3.06 eV and 0.111 MeV. When lithium hydride does not follow the Hevimet, the importance of neutron inelastic scatterings approaches that of the captures.

V. PROBABILITIES THAT SOURCE NEUTRONS CONTRIBUTE TO SECONDARY GAMMA-RAY DOSE

The probability that a neutron of a given energy incident upon the shield configuration would contribute to the secondary gamma-ray dose exiting from the configuration was determined by extracting from the adjoint cases the adjoint outward boundary current. This was done by inputting the dose due to one photon per second per square centimeter as the dose response.

The resulting calculated probabilities for the four configurations are given in Table 9 and Fig. 2.[10] These data show that the source neutrons have the greatest probability of contributing to the exit secondary dose when the configuration consists of Hevimet alone, and a somewhat lower

Table 9. Probability Incident Neutron Produces Gamma Rays That Contribute to Exit Dose

Neutron Energy Group*	Probability of Contribution			
	Conf. 1 (Hevimet)	Conf. 2 (Hevimet-LiH)	Conf. 3 (LiH-Hevimet)	Conf. 4 (LiH-Hevimet-LiH)
1	5.47(-4)	2.34(-4)	4.23(-5)	1.92(-5)
2	5.48(-4)	2.35(-4)	2.67(-5)	1.23(-5)
3	5.45(-4)	2.25(-4)	1.65(-5)	7.66(-6)
4	5.65(-4)	2.25(-4)	9.44(-6)	4.55(-6)
5	5.46(-4)	2.18(-4)	4.68(-6)	2.44(-6)
6	4.46(-4)	1.84(-4)	2.47(-6)	1.42(-6)
7	3.56(-4)	1.54(-4)	1.53(-6)	9.50(-7)
8	2.77(-4)	1.29(-4)	1.06(-6)	6.97(-7)
9	2.14(-4)	1.11(-4)	7.01(-7)	4.85(-7)
10	1.65(-4)	9.82(-5)	4.46(-7)	3.16(-7)
11	1.28(-4)	8.88(-5)	2.92(-7)	2.05(-7)
12	9.47(-5)	8.03(-5)	1.94(-7)	1.30(-7)
13	6.75(-5)	7.19(-5)	1.33(-7)	8.31(-8)
14	5.74(-5)	7.07(-5)	9.80(-8)	5.66(-8)
15	5.08(-5)	6.82(-5)	7.22(-8)	3.78(-8)
16	5.21(-5)	6.93(-5)	5.28(-8)	2.56(-8)
17	5.84(-5)	6.95(-5)	4.30(-8)	2.07(-8)
18	8.32(-5)	6.59(-5)	4.45(-8)	2.14(-8)
19	1.09(-4)	5.95(-5)	4.54(-8)	2.14(-8)
20	7.49(-5)	3.40(-5)	4.85(-8)	2.33(-8)
21	3.85(-5)	1.90(-5)	5.15(-8)	2.48(-8)
22	5.94(-5)	2.89(-5)	5.48(-8)	2.59(-8)
23	4.71(-5)	1.75(-5)	5.63(-8)	2.72(-8)
24	5.37(-5)	2.71(-5)	6.04(-8)	2.91(-8)
25	1.88(-4)	7.64(-5)	6.44(-8)	3.10(-8)
26	1.77(-4)	7.29(-5)	6.62(-8)	3.20(-8)
27	7.26(-5)	3.48(-5)	7.73(-8)	3.74(-8)

*Group 1 = 12-15 MeV; Group 27 = 0-0.4 eV (refer to Table 1 for complete energy group structure).

Fig. 2. Probabilities That Source Neutrons Will Produce Gamma Rays That Contribute to the Exit Dose.

probability when it consists of Hevimet followed by lithium hydride. In both these configurations, the probability that the neutron will contribute to the exit dose increases with increasing neutron energy for energies greater than 1 MeV. Other energies in which the probabilities are highest are 0.4 to 3 eV and 0.3 to 1.5 keV.

When lithium hydride precedes the Hevimet, the probability that a source neutron will contribute to the exit secondary gamma-ray dose is much lower, all neutrons having approximately equal probability except those in the energy region from 1 MeV to 14.9 MeV, for which the probability is greater. Additional lithium hydride following the Hevimet decreases the probability in all energy groups only slightly.

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APPENDIX A. TABLES OF DOSE CONTRIBUTIONS

This appendix presents the detailed results of the calculations in tabular form for all four configurations. Two tables are given for each configuration; the first one presents the contributions to the gamma-ray dose by neutron capture reactions (n,γ) and the second one the contributions to the gamma-ray dose by all neutron reactions $(n,\gamma + n,n',\gamma)$. The reader is referred to Table 1 for the neutron energy group structure and to Fig. 1 for the location of the spacial intervals.

Note: In reading the entries interpret as follows: 4.82240E-14 = 4.82240×10^{-14}.

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 1 (HEVIMET ONLY) (N, γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	4.82240E-14	1.72280E-13	3.90320E-14	1.50940E-12	3.15300E-12	5.34690E-12	6.39950E-12	1.05790E-11
2	7.02180E-13	4.29190E-12	1.84530E-12	5.47350E-11	1.31220E-10	2.54910E-10	4.23270E-10	6.13420E-10
3	6.29340E-13	3.85160E-12	1.66560E-12	4.87490E-11	1.16390E-10	2.25330E-10	3.73510E-10	5.36540E-10
4	6.28810E-13	3.84420E-12	1.67120E-12	4.85650E-11	1.16170E-10	2.25540E-10	3.75150E-10	5.39910E-10
5	6.70000E-13	4.08860E-12	1.78560E-12	5.16270E-11	1.23770E-10	2.40830E-10	4.01620E-10	5.78470E-10
6	7.40250E-13	4.50990E-12	1.97710E-12	5.69050E-11	1.36560E-10	2.65870E-10	4.43820E-10	6.38330E-10
7	8.35960E-13	5.08560E-12	2.23730E-12	6.40980E-11	1.53820E-10	2.99310E-10	4.99640E-10	7.16770E-10
8	9.58780E-13	5.82510E-12	2.57070E-12	7.33150E-11	1.75840E-10	3.41780E-10	5.70290E-10	8.15580E-10
9	1.11410E-12	6.76070E-12	2.99250E-12	8.49590E-11	2.03590E-10	3.95220E-10	6.58960E-10	9.39370E-10
10	1.31090E-12	7.94650E-12	3.52730E-12	9.97040E-11	2.38690E-10	4.62690E-10	7.70830E-10	1.09520E-09
11	1.56290E-12	9.46460E-12	4.21260E-12	1.18560E-10	2.83550E-10	5.48820E-10	9.13390E-10	1.29340E-09
12	1.90340E-12	1.15160E-11	5.13940E-12	1.44040E-10	3.44130E-10	6.65080E-10	1.10570E-09	1.56030E-09
13	2.37910E-12	1.43810E-11	6.43360E-12	1.79570E-10	4.28470E-10	8.26500E-10	1.37210E-09	1.92900E-09
14	3.02910E-12	1.82970E-11	8.20680E-12	2.28100E-10	5.43560E-10	1.04660E-09	1.73490E-09	2.42940E-09
15	4.04980E-12	2.44500E-11	1.09960E-11	3.04260E-10	7.23990E-10	1.39130E-09	2.30170E-09	3.20970E-09
16	5.77600E-12	3.48660E-11	1.57300E-11	4.33000E-10	1.02860E-09	1.97210E-09	3.25560E-09	4.51990E-09
17	9.02060E-12	5.44980E-11	2.47090E-11	6.75010E-10	1.60020E-09	3.05920E-09	5.03710E-09	6.96320E-09
18	9.70560E-13	3.41140E-12	8.22110E-13	2.89690E-11	5.93200E-11	9.73390E-11	1.14080E-10	1.77060E-10

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	1.25120E-11	2.02140E-11	2.89060E-11	2.54360E-11	2.21490E-11	2.23720E-11	6.00580E-11	9.69980E-11
2	7.72290E-10	1.44670E-09	2.09630E-09	2.43700E-09	2.46500E-09	2.97450E-09	5.82580E-09	7.25869E-09
3	6.76630E-10	1.27890E-09	1.87890E-09	2.24980E-09	2.39270E-09	2.98820E-09	5.34060E-09	8.01340E-09
4	6.84990E-10	1.30150E-09	1.93050E-09	2.35490E-09	2.58040E-09	3.30660E-09	7.34140E-09	9.41129E-09
5	7.35710E-10	1.40250E-09	2.09620E-09	2.59290E-09	2.90060E-09	3.79880E-09	8.69630E-09	1.12710E-08
6	8.11710E-10	1.55130E-09	2.33410E-09	2.92140E-09	3.32310E-09	4.43660E-09	1.04020E-08	1.36010E-08
7	9.10270E-10	1.74330E-09	2.63910E-09	3.33810E-09	3.85170E-09	5.23120E-09	1.25150E-08	1.64830E-08
8	1.03400E-09	1.98400E-09	3.02020E-09	3.85680E-09	4.50600E-09	6.21310E-09	1.51250E-08	2.00410E-08
9	1.18870E-09	2.28450E-09	3.49530E-09	4.50210E-09	5.31720E-09	7.43170E-09	1.83640E-08	2.44540E-08
10	1.38310E-09	2.66180E-09	4.09130E-09	5.31050E-09	6.33050E-09	8.95340E-09	2.24120E-08	2.99560E-08
11	1.62980E-09	3.14010E-09	4.84610E-09	6.33260E-09	7.60830E-09	1.08710E-08	2.75120E-08	3.68650E-08
12	1.96150E-09	3.78240E-09	5.85820E-09	7.70000E-09	9.30940E-09	1.34160E-08	3.42580E-08	4.59610E-08
13	2.41820E-09	4.66520E-09	7.24640E-09	9.56960E-09	1.16220E-08	1.68620E-08	4.33630E-08	5.81510E-08
14	3.03620E-09	5.85830E-09	9.12040E-09	1.20880E-08	1.47190E-08	2.14590E-08	5.54590E-08	7.42079E-08
15	3.99700E-09	7.70940E-09	1.20190E-08	1.59630E-08	1.94420E-08	2.84130E-08	7.36300E-08	9.80629E-08
16	5.60560E-09	1.08010E-08	1.68430E-08	2.23680E-08	2.71590E-08	3.96390E-08	1.02740E-07	1.35720E-07
17	8.59560E-09	1.65300E-08	2.57270E-08	3.40260E-08	4.09310E-08	5.92000E-08	1.53100E-07	1.99050E-07
18	2.00540E-10	3.31870E-10	5.13660E-10	5.20000E-10	5.42320E-10	6.90070E-10	2.45890E-09	4.10200E-09

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 1 (HEVIMET ONLY) (Nγ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	5.21260E-10	7.45390E-10	3.71730E-10	9.19240E-11	1.56560E-10	2.02890E-10	2.26440E-10	4.10510E-10
2	2.31570E-08	2.37780E-08	2.82300E-08	8.85649E-08	1.92000E-07	1.82360E-07	2.57150E-07	2.45160E-07
3	2.61980E-08	2.50220E-08	3.07360E-08	7.44369E-08	1.12830E-07	1.05540E-07	2.61910E-08	7.19289E-08
4	3.15680E-08	2.95830E-08	3.42270E-08	7.13749E-08	7.19519E-08	6.68380E-08	3.70790E-09	2.58330E-08
5	3.85420E-08	3.51830E-08	4.09840E-08	6.89079E-08	4.74320E-08	4.41710E-08	1.02190E-09	1.01830E-08
6	4.72340E-08	4.21460E-08	4.86260E-08	6.94799E-08	3.33730E-08	3.05340E-08	5.36140E-10	4.23070E-09
7	5.79870E-08	5.06830E-08	5.81150E-08	6.99779E-08	2.30760E-08	1.94920E-08	3.30720E-10	1.82240E-09
8	7.12730E-08	6.10970E-08	6.94259E-08	7.23180E-08	1.85360E-08	1.35530E-08	2.26490E-10	8.08430E-10
9	8.77299E-08	7.37899E-08	8.29889E-08	7.52469E-08	1.53030E-08	9.46520E-09	1.58990E-10	3.69340E-10
10	1.08190E-07	8.92719E-08	9.91619E-08	7.97979E-08	1.43040E-08	6.80470E-09	1.15140E-10	1.75350E-10
11	1.33750E-07	1.08170E-07	1.18370E-07	8.53919E-08	1.37430E-08	5.06920E-09	8.77570E-11	8.86500E-11
12	1.67080E-07	1.32220E-07	1.42140E-07	9.32869E-08	1.43200E-08	3.84890E-09	7.03900E-11	5.08600E-11
13	2.11390E-07	1.63350E-07	1.71430E-07	1.03210E-07	1.50980E-08	3.20090E-09	5.50570E-11	3.46250E-11
14	2.68760E-07	2.01890E-07	2.05600E-07	1.14440E-07	1.64670E-08	2.69940E-09	5.38580E-11	3.09170E-11
15	3.52610E-07	2.55860E-07	2.49490E-07	1.28200E-07	1.78410E-08	2.51250E-09	5.30690E-11	3.21510E-11
16	4.82270E-07	3.34720E-07	3.06490E-07	1.43570E-07	1.94220E-08	2.36640E-09	5.11280E-11	3.78980E-11
17	6.93480E-07	4.50540E-07	3.61450E-07	1.45140E-07	1.73390E-08	2.15980E-09	6.14190E-11	4.37940E-11
18	2.39890E-08	1.88330E-08	5.51580E-09	1.19800E-10	7.25370E-12	1.30570E-12	7.68990E-15	1.47890E-14

INT.	GRP. 25	GRP. 26	GRP. 27
1	6.42010E-10	9.35970E-10	9.71849E-09
2	3.97610E-08	3.99930E-08	2.38440E-07
3	3.36910E-08	3.32980E-08	1.38580E-07
4	3.17270E-08	3.09080E-08	8.99680E-08
5	2.94840E-08	2.83230E-08	6.49629E-08
6	2.98870E-08	2.84170E-08	4.33580E-08
7	3.05750E-08	2.87390E-08	3.21680E-08
8	3.17030E-08	2.94820E-08	2.44080E-08
9	3.32380E-08	3.05910E-08	1.94840E-08
10	3.52130E-08	3.20870E-08	1.56610E-08
11	3.76910E-08	3.40250E-08	1.30170E-08
12	4.10660E-08	3.67330E-08	1.10940E-08
13	4.56650E-08	4.05050E-08	9.84659E-09
14	5.13230E-08	4.51690E-08	8.97360E-09
15	5.98200E-08	5.22780E-08	8.66930E-09
16	7.28979E-08	6.33319E-08	8.89310E-09
17	9.19619E-08	7.96419E-08	9.77399E-09
18	1.69170E-09	2.04970E-09	2.71070E-10

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 1 (HEVIMET ONLY) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	5.05970E-11	2.12090E-10	7.74420E-11	2.01030E-09	3.57340E-09	4.89310E-09	5.40700E-09	4.31680E-09
2	8.27410E-11	5.27770E-10	2.38750E-10	7.37300E-09	1.51930E-08	1.94610E-08	2.02190E-08	1.72490E-08
3	7.55510E-11	4.80910E-10	2.18280E-10	6.63950E-09	1.36530E-08	1.75280E-08	1.83220E-08	1.56200E-08
4	7.69740E-11	4.87700E-10	2.21960E-10	6.69080E-09	1.38130E-08	1.78840E-08	1.89050E-08	1.62790E-08
5	8.37130E-11	5.27450E-10	2.40480E-10	7.19780E-09	1.49240E-08	1.94750E-08	2.08000E-08	1.80710E-08
6	9.45040E-11	5.92100E-10	2.70180E-10	8.03280E-09	1.67040E-08	2.19380E-08	2.36370E-08	2.06710E-08
7	1.09170E-10	6.80120E-10	3.10440E-10	9.16610E-09	1.90990E-08	2.52150E-08	2.73800E-08	2.40740E-08
8	1.28240E-10	7.94290E-10	3.62450E-10	1.06270E-08	2.21740E-08	2.94140E-08	3.21740E-08	2.84260E-08
9	1.52820E-10	9.40910E-10	4.29060E-10	1.24900E-08	2.60870E-08	3.47660E-08	3.82970E-08	3.39930E-08
10	1.84620E-10	1.12980E-09	5.14680E-10	1.48740E-08	3.10960E-08	4.16280E-08	4.61720E-08	4.11680E-08
11	2.26540E-10	1.37730E-09	6.26410E-10	1.79670E-08	3.75930E-08	5.05550E-08	5.64560E-08	5.05610E-08
12	2.83870E-10	1.71490E-09	7.78550E-10	2.21650E-08	4.64020E-08	6.26919E-08	7.05110E-08	6.34739E-08
13	3.64480E-10	2.18830E-09	9.91880E-10	2.80360E-08	5.87090E-08	7.95599E-08	8.98609E-08	8.10080E-08
14	4.80020E-10	2.86090E-09	1.29310E-09	3.62490E-08	7.59259E-08	1.03380E-07	1.17590E-07	1.06510E-07
15	6.64280E-10	3.92960E-09	1.77090E-09	4.92160E-08	1.03080E-07	1.40970E-07	1.61300E-07	1.46650E-07
16	9.86580E-10	5.78750E-09	2.59890E-09	7.14929E-08	1.49730E-07	2.05780E-07	2.37070E-07	2.16530E-07
17	1.62610E-09	9.44330E-09	4.22370E-09	1.14530E-07	2.39870E-07	3.31930E-07	3.85880E-07	3.54880E-07
18	9.53730E-10	3.94100E-09	1.53830E-09	3.70050E-08	6.63379E-08	9.25029E-08	1.06700E-07	8.59989E-08

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	2.12020E-09	9.71000E-10	1.07940E-09	1.06760E-09	6.36920E-10	3.16080E-11	6.00630E-11	9.69980E-11
2	1.47100E-08	1.58860E-08	1.29290E-08	7.54600E-09	3.80500E-09	3.63700E-09	6.19040E-09	7.26840E-09
3	1.34100E-08	1.46860E-08	1.21410E-08	7.28180E-09	3.80980E-09	3.71800E-09	6.77870E-09	8.02819E-09
4	1.41300E-08	1.56370E-08	1.30810E-08	7.97760E-09	4.24590E-09	4.19260E-09	7.90270E-09	9.43540E-09
5	1.58040E-08	1.76420E-08	1.49080E-08	9.20740E-09	4.94270E-09	4.91710E-09	9.43420E-09	1.13120E-08
6	1.81690E-08	2.04440E-08	1.74420E-08	1.08910E-08	5.87740E-09	5.87360E-09	1.13860E-08	1.36700E-08
7	2.12430E-08	2.40880E-08	2.07430E-08	1.30880E-08	7.08790E-09	7.09930E-09	1.38410E-08	1.66000E-08
8	2.51750E-08	2.87650E-08	2.49980E-08	1.59300E-08	8.65040E-09	8.66590E-09	1.69330E-08	2.02440E-08
9	3.02130E-08	3.47840E-08	3.05040E-08	1.96270E-08	1.06820E-08	1.06870E-08	2.08630E-08	2.48090E-08
10	3.67190E-08	4.25910E-08	3.76810E-08	2.44740E-08	1.33470E-08	1.33210E-08	2.59220E-08	3.05860E-08
11	4.52580E-08	5.29020E-08	4.72350E-08	3.09800E-08	1.69360E-08	1.68380E-08	3.25650E-08	3.80040E-08
12	5.70090E-08	6.71159E-08	6.03949E-08	3.99410E-08	2.18850E-08	2.17000E-08	4.17210E-08	4.80650E-08
13	7.29199E-08	8.64499E-08	7.85240E-08	5.25030E-08	2.89690E-08	2.86870E-08	5.48250E-08	6.21399E-08
14	9.61879E-08	1.14920E-07	1.05280E-07	7.10849E-08	3.94600E-08	3.90100E-08	7.39780E-08	8.20199E-08
15	1.32800E-07	1.59910E-07	1.47790E-07	1.00880E-07	5.65750E-08	5.60140E-08	1.05650E-07	1.14020E-07
16	1.96680E-07	2.38900E-07	2.22860E-07	1.53970E-07	8.75439E-08	8.69549E-08	1.63350E-07	1.70320E-07
17	3.23770E-07	3.97520E-07	3.74660E-07	2.62310E-07	1.51730E-07	1.51020E-07	2.83140E-07	2.81310E-07
18	4.49820E-08	4.32230E-08	5.72470E-08	6.64569E-08	5.25510E-08	8.05329E-09	2.46330E-09	4.10200E-09

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 1 (HEVIMET ONLY) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	5.21260E-10	7.45390E-10	3.71730E-10	9.19240E-11	1.56560E-10	2.02890E-10	2.26440E-10	4.10510E-10
2	2.31690E-08	2.37780E-08	2.82300E-08	8.85649E-08	1.92000E-07	1.82360E-07	2.57150E-07	2.45160E-07
3	2.62160E-08	2.50220E-08	3.07360E-08	7.44369E-08	1.12830E-07	1.05540E-07	2.61910E-08	7.19289E-08
4	3.15990E-08	2.95830E-08	3.42270E-08	7.13749E-08	7.19519E-08	6.68380E-08	3.70790E-09	2.58330E-08
5	3.85940E-08	3.51830E-08	4.09840E-08	6.89079E-08	4.74320E-08	4.41710E-08	1.02190E-09	1.01830E-08
6	4.73230E-08	4.21460E-08	4.86260E-08	6.94799E-08	3.33730E-08	3.05340E-08	5.36140E-10	4.23070E-09
7	5.81430E-08	5.06830E-08	5.81150E-08	6.99779E-08	2.30760E-08	1.94920E-08	3.30720E-10	1.82240E-09
8	7.15459E-08	6.10970E-08	6.94259E-08	7.23180E-08	1.85360E-08	1.35530E-08	2.26490E-10	8.08430E-10
9	8.82109E-08	7.37899E-08	8.29889E-08	7.52469E-08	1.53030E-08	9.46520E-09	1.58990E-10	3.69340E-10
10	1.09050E-07	8.92719E-08	9.91619E-08	7.97979E-08	1.43040E-08	6.80470E-09	1.15140E-10	1.75350E-10
11	1.35310E-07	1.08170E-07	1.18370E-07	8.53919E-08	1.37430E-08	5.06920E-09	8.77570E-11	8.86500E-11
12	1.69980E-07	1.32220E-07	1.42140E-07	9.32869E-08	1.43200E-08	3.84890E-09	7.03900E-11	5.08600E-11
13	2.16880E-07	1.63350E-07	1.71430E-07	1.03210E-07	1.50980E-08	3.20090E-09	5.50570E-11	3.46250E-11
14	2.79500E-07	2.01890E-07	2.05600E-07	1.14440E-07	1.64670E-08	2.69940E-09	5.38580E-11	3.09170E-11
15	3.74410E-07	2.55860E-07	2.49490E-07	1.28200E-07	1.78410E-08	2.51250E-09	5.30690E-11	3.21510E-11
16	5.29030E-07	3.34720E-07	3.06490E-07	1.43570E-07	1.94220E-08	2.36640E-09	5.11280E-11	3.78980E-11
17	8.02610E-07	4.50540E-07	3.61450E-07	1.45140E-07	1.73390E-08	2.15980E-09	6.14190E-11	4.37940E-11
18	2.39890E-08	1.88330E-08	5.51580E-09	1.19800E-10	7.25370E-12	1.30570E-12	7.68990E-15	1.47890E-14

INT.	GRP. 25	GRP. 26	GRP. 27
1	6.42010E-10	9.35970E-10	9.71849E-09
2	3.97610E-08	3.99930E-08	2.38440E-07
3	3.36910E-08	3.32980E-08	1.38580E-07
4	3.17270E-08	3.09080E-08	8.99680E-08
5	2.94840E-08	2.83230E-08	6.49629E-08
6	2.98870E-08	2.84170E-08	4.33580E-08
7	3.05750E-08	2.87390E-08	3.21680E-08
8	3.17030E-08	2.94820E-08	2.44080E-08
9	3.32380E-08	3.05910E-08	1.94840E-08
10	3.52130E-08	3.20870E-08	1.56610E-08
11	3.76910E-08	3.40250E-08	1.30170E-08
12	4.10660E-08	3.67330E-08	1.10940E-08
13	4.56650E-08	4.05050E-08	9.84659E-09
14	5.13230E-08	4.51690E-08	8.97360E-09
15	5.98200E-08	5.22780E-08	8.66930E-09
16	7.28979E-08	6.33319E-08	8.89310E-09
17	9.19619E-08	7.96419E-08	9.77399E-09
18	1.69170E-09	2.04970E-09	2.71070E-10

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	2.47090E-14	8.82750E-14	2.00080E-14	7.73390E-13	1.61570E-12	2.74010E-12	3.28010E-12	5.42380E-12
2	3.43850E-13	2.10300E-12	9.05380E-13	2.68510E-11	6.44090E-11	1.25280E-10	2.08200E-10	3.01980E-10
3	3.06440E-13	1.87670E-12	8.12920E-13	2.37820E-11	5.68130E-11	1.10140E-10	1.82760E-10	2.62820E-10
4	3.04220E-13	1.86110E-12	8.10790E-13	2.35400E-11	5.63490E-11	1.09560E-10	1.82440E-10	2.62940E-10
5	3.21700E-13	1.96470E-12	8.60190E-13	2.48380E-11	5.95910E-11	1.16140E-10	1.93930E-10	2.79810E-10
6	3.52310E-13	2.14800E-12	9.44710E-13	2.71400E-11	6.51810E-11	1.27130E-10	2.12540E-10	3.06340E-10
7	3.93780E-13	2.39760E-12	1.05880E-12	3.02590E-11	7.26790E-11	1.41690E-10	2.36960E-10	3.40810E-10
8	4.46190E-13	2.71340E-12	1.20300E-12	3.41980E-11	8.21010E-11	1.59930E-10	2.67390E-10	3.83640E-10
9	5.10950E-13	3.10390E-12	1.38160E-12	3.90620E-11	9.37150E-11	1.82350E-10	3.04780E-10	4.36180E-10
10	5.90670E-13	3.58440E-12	1.60210E-12	4.50410E-11	1.07970E-10	2.09850E-10	3.50620E-10	5.00610E-10
11	6.89040E-13	4.17800E-12	1.87550E-12	5.24190E-11	1.25550E-10	2.43760E-10	4.07100E-10	5.79950E-10
12	8.11610E-13	4.91710E-12	2.21770E-12	6.15980E-11	1.47420E-10	2.85890E-10	4.77260E-10	6.78530E-10
13	9.65950E-13	5.84850E-12	2.65150E-12	7.31500E-11	1.74920E-10	3.38830E-10	5.65450E-10	8.02440E-10
14	1.16330E-12	7.04000E-12	3.21130E-12	8.79050E-11	2.10040E-10	4.06390E-10	6.77940E-10	9.60640E-10
15	1.42060E-12	8.59640E-12	3.95190E-12	1.07140E-10	2.55800E-10	4.94390E-10	8.24520E-10	1.16720E-09
16	1.76260E-12	1.06700E-11	4.96010E-12	1.32700E-10	3.16620E-10	6.11360E-10	1.01960E-09	1.44350E-09
17	2.24520E-12	1.36160E-11	6.45070E-12	1.68820E-10	4.02770E-10	7.77340E-10	1.29760E-09	1.84310E-09
18	1.78800E-13	6.30680E-13	1.61090E-13	5.34400E-12	1.10280E-11	1.82770E-11	2.17890E-11	3.50250E-11
19	1.50840E-11	7.87920E-11	1.34500E-11	1.51360E-10	3.07340E-10	5.25260E-10	8.24880E-10	9.64170E-10
20	1.13130E-11	5.71680E-11	1.15740E-11	1.05180E-10	2.05110E-10	3.37040E-10	5.25160E-10	6.35270E-10
21	8.83330E-12	4.33330E-11	9.80170E-12	7.59380E-11	1.43160E-10	2.27610E-10	3.50930E-10	4.33730E-10
22	7.00680E-12	3.34010E-11	8.34020E-12	5.62690E-11	1.02700E-10	1.58170E-10	2.40880E-10	2.96480E-10
23	5.66170E-12	2.62790E-11	7.11340E-12	4.21520E-11	7.44000E-11	1.10930E-10	1.66330E-10	2.09750E-10
24	4.65070E-12	2.10310E-11	6.11090E-12	3.23240E-11	5.53190E-11	8.01080E-11	1.18450E-10	1.47710E-10
25	3.89040E-12	1.71540E-11	5.29370E-12	2.50460E-11	4.14750E-11	5.82150E-11	8.46300E-11	1.06830E-10
26	3.32300E-12	1.42920E-11	4.64170E-12	1.97680E-11	3.17330E-11	4.33080E-11	6.19990E-11	7.74800E-11
27	2.91060E-12	1.22160E-11	4.14190E-12	1.59140E-11	2.47320E-11	3.27670E-11	4.60970E-11	5.78530E-11
28	2.63030E-12	1.07760E-11	3.80790E-12	1.33140E-11	2.00510E-11	2.58440E-11	3.57610E-11	4.44330E-11
29	2.48060E-12	9.92130E-12	3.77310E-12	1.23670E-11	1.80420E-11	2.26080E-11	3.07220E-11	3.80800E-11
30	2.46310E-12	9.60380E-12	4.10890E-12	1.31750E-11	1.85760E-11	2.25230E-11	2.98400E-11	3.62650E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,Y) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	6.41710E-12	1.03660E-11	1.48230E-11	1.30480E-11	1.13710E-11	1.14940E-11	3.09220E-11	4.99900E-11
2	3.80670E-10	7.13220E-10	1.03380E-09	1.20270E-09	1.21870E-09	1.47410E-09	2.89590E-09	3.61900E-09
3	3.31970E-10	6.27550E-10	9.22090E-10	1.10520E-09	1.17810E-09	1.47550E-09	3.14230E-09	3.98560E-09
4	3.34260E-10	6.35120E-10	9.42150E-10	1.15070E-09	1.26430E-09	1.62530E-09	3.62370E-09	4.66430E-09
5	3.56740E-10	6.79980E-10	1.01630E-09	1.25900E-09	1.41280E-09	1.85680E-09	4.27090E-09	5.56070E-09
6	3.90710E-10	7.46450E-10	1.12310E-09	1.40810E-09	1.60750E-09	2.15430E-09	5.07820E-09	6.67330E-09
7	4.34390E-10	8.31540E-10	1.25860E-09	1.59500E-09	1.84820E-09	2.52030E-09	5.06510E-09	8.03250E-09
8	4.88550E-10	9.36700E-10	1.42540E-09	1.82430E-09	2.14170E-09	2.96610E-09	7.26760E-09	9.68880E-09
9	5.55000E-10	1.06550E-09	1.62930E-09	2.10380E-09	2.49860E-09	3.50830E-09	8.73170E-09	1.17050E-08
10	6.36480E-10	1.22300E-09	1.87830E-09	2.44490E-09	2.93330E-09	4.16860E-09	1.05180E-08	1.41610E-08
11	7.36940E-10	1.41690E-09	2.18400E-09	2.86330E-09	3.46590E-09	4.97600E-09	1.27040E-08	1.71610E-08
12	8.61870E-10	1.65720E-09	2.56220E-09	3.38020E-09	4.12210E-09	5.96960E-09	1.53910E-08	2.08330E-08
13	1.01910E-09	1.95850E-09	3.03510E-09	4.02530E-09	4.93820E-09	7.19990E-09	1.87140E-08	2.53470E-08
14	1.22020E-09	2.34220E-09	3.63480E-09	4.84120E-09	5.96510E-09	8.73780E-09	2.28500E-08	3.09190E-08
15	1.48370E-09	2.84160E-09	4.41110E-09	5.89220E-09	7.27810E-09	1.06830E-08	2.80520E-08	3.78480E-08
16	1.83810E-09	3.50710E-09	5.43730E-09	7.27060E-09	8.97910E-09	1.31570E-08	3.46100E-08	4.64350E-08
17	2.35650E-09	4.46540E-09	6.89520E-09	9.19800E-09	1.13020E-08	1.64010E-08	4.31210E-08	5.71950E-08
18	4.14840E-11	6.72210E-11	1.02970E-10	1.05340E-10	1.12760E-10	1.42890E-10	5.21400E-10	8.89310E-10
19	1.13500E-09	1.40260E-09	1.76990E-09	2.04180E-09	1.97320E-09	1.98490E-09	1.43310E-08	5.19600E-10
20	7.53370E-10	8.65970E-10	1.04860E-09	1.17970E-09	1.12750E-09	1.09610E-09	7.86640E-09	2.73520E-10
21	5.22310E-10	5.70020E-10	6.69880E-10	7.42790E-10	7.07310E-10	6.54500E-10	4.65510E-09	1.58280E-10
22	3.60910E-10	3.77690E-10	4.40320E-10	4.81380E-10	4.53810E-10	4.14690E-10	2.91710E-09	9.55710E-11
23	2.55690E-10	2.60930E-10	2.91450E-10	3.14050E-10	2.99030E-10	2.56390E-10	1.76780E-09	5.99320E-11
24	1.81100E-10	1.79420E-10	2.00560E-10	2.13760E-10	1.97640E-10	1.71010E-10	1.16560E-09	3.66810E-11
25	1.30920E-10	1.27450E-10	1.37530E-10	1.44680E-10	1.36110E-10	1.13200E-10	7.59670E-10	2.45320E-11
26	9.51830E-11	9.05950E-11	9.77560E-11	1.01920E-10	9.31980E-11	7.85640E-11	5.22640E-10	1.61020E-11
27	7.09440E-11	6.66170E-11	6.98520E-11	7.19700E-11	6.69280E-11	5.45600E-11	3.56630E-10	1.12650E-11
28	5.44490E-11	5.02050E-11	5.25790E-11	5.37720E-11	4.86800E-11	4.03470E-11	2.62340E-10	8.11420E-12
29	4.64380E-11	4.22920E-11	4.32550E-11	4.37450E-11	4.02220E-11	3.22920E-11	2.11810E-10	6.41680E-12
30	4.35800E-11	3.88430E-11	3.95480E-11	3.95710E-11	3.52360E-11	2.86050E-11	1.81050E-10	5.51690E-12

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	2.70410E-10	3.86670E-10	1.92590E-10	4.71540E-11	8.02180E-11	1.03960E-10	1.16020E-10	2.10330E-10
2	1.16140E-08	1.19810E-08	1.43880E-08	4.43460E-08	9.54249E-08	9.02409E-08	1.26350E-07	1.22010E-07
3	1.31470E-08	1.26840E-08	1.58130E-08	3.72790E-08	5.58210E-08	5.19460E-08	1.28000E-08	3.56160E-08
4	1.58260E-08	1.50490E-08	1.78160E-08	3.58070E-08	3.54400E-08	3.26960E-08	1.80130E-09	1.27170E-08
5	1.92810E-08	1.79580E-08	2.15280E-08	3.47560E-08	2.32870E-08	2.14620E-08	4.93150E-10	4.97870E-09
6	2.35600E-08	2.15820E-08	2.58220E-08	3.53770E-08	1.63820E-08	1.47420E-08	2.57400E-10	2.05200E-09
7	2.88100E-08	2.60370E-08	3.12180E-08	3.62740E-08	1.14570E-08	9.39029E-09	1.58080E-10	8.75900E-10
8	3.52350E-08	3.14910E-08	3.77910E-08	3.85780E-08	9.43849E-09	6.62820E-09	1.10680E-10	3.88340E-10
9	4.30900E-08	3.81590E-08	4.58550E-08	4.20480E-08	8.33610E-09	4.97400E-09	8.60220E-11	1.89050E-10
10	5.26910E-08	4.63110E-08	5.57460E-08	4.77640E-08	8.70370E-09	4.37940E-09	6.65590E-11	1.32770E-10
11	6.44350E-08	5.63040E-08	6.79319E-08	5.66260E-08	1.05150E-08	5.39540E-09	9.45820E-11	2.27390E-10
12	7.88239E-08	6.85969E-08	8.30319E-08	7.07469E-08	1.52810E-08	9.55080E-09	1.55040E-10	7.18010E-10
13	9.64969E-08	8.38160E-08	1.01910E-07	9.39039E-08	2.78810E-08	2.08790E-08	3.59540E-10	2.62640E-09
14	1.18280E-07	1.02820E-07	1.25770E-07	1.32260E-07	5.96010E-08	5.05940E-08	1.08980E-09	1.02150E-08
15	1.45300E-07	1.26890E-07	1.56570E-07	2.00680E-07	1.49900E-07	1.29700E-07	6.43250E-09	4.13490E-08
16	1.78800E-07	1.57860E-07	1.97030E-07	3.21360E-07	4.00130E-07	3.42720E-07	7.51770E-08	1.76770E-07
17	2.21290E-07	2.01160E-07	2.56060E-07	5.82780E-07	1.26450E-06	1.02260E-06	1.17980E-06	8.34030E-07
18	6.02530E-09	7.37730E-09	3.75250E-09	6.72840E-10	1.07930E-09	1.12280E-09	9.85390E-10	1.32980E-09
19	5.20810E-12	1.03470E-11	1.49150E-10	2.35620E-10	4.45450E-10	5.21040E-10	5.45710E-10	8.17830E-10
20	2.39350E-12	6.51960E-12	1.06200E-10	2.07200E-10	4.41530E-10	5.67060E-10	6.46310E-10	1.02390E-09
21	1.28120E-12	3.37470E-12	5.78460E-11	1.17660E-10	2.76350E-10	3.76040E-10	4.39130E-10	7.13370E-10
22	7.09130E-13	1.91770E-12	3.22220E-11	6.71040E-11	1.57850E-10	2.19860E-10	2.63960E-10	4.33480E-10
23	4.14760E-13	1.08410E-12	1.82670E-11	3.71820E-11	8.82660E-11	1.22230E-10	1.45320E-10	2.39350E-10
24	2.50030E-13	6.58960E-13	1.09180E-11	2.21470E-11	5.19750E-11	7.21860E-11	8.57470E-11	1.40470E-10
25	1.59240E-13	4.03690E-13	6.66340E-12	1.36070E-11	3.14110E-11	4.29420E-11	5.16290E-11	8.50580E-11
26	9.94700E-14	2.62130E-13	4.29670E-12	8.64170E-12	2.01600E-11	2.75080E-11	3.25780E-11	5.33770E-11
27	6.92330E-14	1.73180E-13	2.83330E-12	5.73540E-12	1.30950E-11	1.81450E-11	2.15140E-11	3.52100E-11
28	4.74400E-14	1.23480E-13	2.01640E-12	4.04860E-12	9.22380E-12	1.25460E-11	1.48640E-11	2.43370E-11
29	3.65550E-14	9.11250E-14	1.48740E-12	2.91300E-12	6.76560E-12	9.28390E-12	1.08640E-11	1.76860E-11
30	2.64550E-14	6.67080E-14	1.04740E-12	2.01020E-12	4.47230E-12	5.89710E-12	6.98740E-12	1.13220E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH)

(N,γ) REACTIONS

INT.	GRP. 25	GRP. 26	GRP. 27
1	3.29370E-10	4.79910E-10	4.98000E-09
2	1.97660E-08	1.98290E-08	1.18380E-07
3	1.67090E-08	1.64510E-08	6.85810E-08
4	1.57060E-08	1.52160E-08	4.66240E-08
5	1.45930E-08	1.39030E-08	2.89430E-08
6	1.48070E-08	1.39130E-08	2.04290E-08
7	1.52080E-08	1.40550E-08	1.52810E-08
8	1.59050E-08	1.44400E-08	1.15670E-08
9	1.69320E-08	1.50660E-08	9.19480E-09
10	1.83930E-08	1.59910E-08	7.43040E-09
11	2.04790E-08	1.73280E-08	6.36160E-09
12	2.35130E-08	1.92740E-08	5.89070E-09
13	2.80420E-08	2.21690E-08	6.36390E-09
14	3.50250E-08	2.66130E-08	8.44900E-09
15	4.62260E-08	3.37190E-08	1.45560E-08
16	6.48669E-08	4.55020E-08	3.04010E-08
17	9.95979E-08	6.77269E-08	7.87339E-08
18	1.75620E-09	1.66130E-09	3.13390E-09
19	7.66790E-10	7.23840E-10	2.17230E-09
20	8.99850E-10	8.41030E-10	2.74460E-09
21	6.70330E-10	6.33050E-10	1.90520E-09
22	3.93000E-10	3.72520E-10	1.18930E-09
23	2.26040E-10	2.12710E-10	6.60830E-10
24	1.27690E-10	1.21820E-10	3.87240E-10
25	7.94780E-11	7.42810E-11	2.34830E-10
26	4.86040E-11	4.64960E-11	1.46960E-10
27	3.27910E-11	3.07070E-11	9.73300E-11
28	2.20860E-11	2.12090E-11	6.66270E-11
29	1.64680E-11	1.53540E-11	4.90680E-11
30	1.02140E-11	9.67730E-12	2.99130E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	2.52950E-11	1.05480E-10	3.82630E-11	9.87820E-10	1.69140E-09	2.24360E-09	2.41520E-09	1.90150E-09
2	3.79180E-11	2.43490E-10	1.10470E-10	3.41540E-09	6.93390E-09	8.64560E-09	8.69610E-09	7.22720E-09
3	3.43180E-11	2.20020E-10	1.00230E-10	3.05190E-09	6.18130E-09	7.72170E-09	7.81440E-09	6.49300E-09
4	3.46220E-11	2.21040E-10	1.01040E-10	3.04830E-09	6.19760E-09	7.80470E-09	7.98700E-09	6.70570E-09
5	3.72320E-11	2.36540E-10	1.08400E-10	3.24660E-09	6.62720E-09	8.40910E-09	8.69460E-09	7.36770E-09
6	4.15000E-11	2.62300E-10	1.20430E-10	3.58190E-09	7.33140E-09	9.35860E-09	9.76110E-09	8.33040E-09
7	4.72520E-11	2.97150E-10	1.36600E-10	4.03340E-09	8.27040E-09	1.06090E-08	1.11520E-08	9.57390E-09
8	5.45860E-11	3.41510E-10	1.57150E-10	4.60530E-09	9.45360E-09	1.21800E-08	1.28970E-08	1.11330E-08
9	6.37870E-11	3.97010E-10	1.82830E-10	5.31600E-09	1.09220E-08	1.41300E-08	1.50690E-08	1.30790E-08
10	7.53170E-11	4.66230E-10	2.14850E-10	6.19630E-09	1.27380E-08	1.65490E-08	1.77730E-08	1.55110E-08
11	8.98240E-11	5.52990E-10	2.54990E-10	7.29110E-09	1.49960E-08	1.95640E-08	2.11570E-08	1.85680E-08
12	1.08260E-10	6.62650E-10	3.05780E-10	8.66360E-09	1.78270E-08	2.33490E-08	2.54240E-08	2.24400E-08
13	1.31950E-10	8.02950E-10	3.70870E-10	1.04040E-08	2.14110E-08	2.81540E-08	3.08640E-08	2.74010E-08
14	1.62830E-10	9.84940E-10	4.55630E-10	1.26390E-08	2.60110E-08	3.43330E-08	3.78860E-08	3.38380E-08
15	2.03920E-10	1.22600E-09	5.68690E-10	1.55660E-08	3.20240E-08	4.24270E-08	4.71290E-08	4.23720E-08
16	2.59430E-10	1.55040E-09	7.23270E-10	1.94550E-08	4.00080E-08	5.31950E-08	5.94860E-08	5.38860E-08
17	3.38700E-10	2.01310E-09	9.51050E-10	2.49060E-08	5.11740E-08	6.82920E-08	7.69469E-08	7.04899E-08
18	1.66500E-10	6.79640E-10	2.74740E-10	6.05620E-09	1.00780E-08	1.33290E-08	1.48610E-08	1.20330E-08
19	1.50840E-11	7.87920E-11	1.34500E-11	1.51360E-10	3.07340E-10	5.25260E-10	8.24880E-10	9.64170E-10
20	1.13130E-11	5.71680E-11	1.15740E-11	1.05180E-10	2.05110E-10	3.37040E-10	5.25160E-10	6.35270E-10
21	8.83330E-12	4.33330E-11	9.80170E-12	7.59380E-11	1.43160E-10	2.27610E-10	3.50930E-10	4.33730E-10
22	7.00680E-12	3.34010E-11	8.34020E-12	5.62690E-11	1.02700E-10	1.58170E-10	2.40880E-10	2.96480E-10
23	5.66170E-12	2.62790E-11	7.11340E-12	4.21520E-11	7.44000E-11	1.10930E-10	1.66330E-10	2.09750E-10
24	4.65070E-12	2.10310E-11	6.11090E-12	3.23240E-11	5.53190E-11	8.01080E-11	1.18450E-10	1.47710E-10
25	3.89040E-12	1.71540E-11	5.29370E-12	2.50460E-11	4.14750E-11	5.82150E-11	8.46300E-11	1.06830E-10
26	3.32300E-12	1.42920E-11	4.64170E-12	1.97680E-11	3.17330E-11	4.33080E-11	6.19990E-11	7.74800E-11
27	2.91060E-12	1.22160E-11	4.14190E-12	1.59140E-11	2.47320E-11	3.27670E-11	4.60970E-11	5.78530E-11
28	2.63030E-12	1.07760E-11	3.80790E-12	1.33140E-11	2.00510E-11	2.58440E-11	3.57610E-11	4.44330E-11
29	2.48060E-12	9.92130E-12	3.77310E-12	1.23670E-11	1.80420E-11	2.26080E-11	3.07220E-11	3.80800E-11
30	2.46310E-12	9.60380E-12	4.10890E-12	1.31750E-11	1.85760E-11	2.25230E-11	2.98400E-11	3.62650E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,γ)(N,N',γ) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	9.23280E-10	3.89570E-10	4.26650E-10	4.21640E-10	2.52250E-10	1.47980E-11	3.09240E-11	4.99900E-11
2	6.11190E-09	6.56220E-09	5.38040E-09	3.22600E-09	1.73350E-09	1.72700E-09	3.03480E-09	3.62220E-09
3	5.52850E-09	6.01790E-09	5.00800E-09	3.08290E-09	1.71910E-09	1.75240E-09	3.30830E-09	3.99050E-09
4	5.77450E-09	6.34930E-09	5.34280E-09	3.34150E-09	1.89540E-09	1.95910E-09	3.83480E-09	4.67220E-09
5	6.39430E-09	7.08900E-09	6.02190E-09	3.81070E-09	2.17980E-09	2.27440E-09	4.54580E-09	5.57400E-09
6	7.26890E-09	8.11960E-09	6.95850E-09	4.44830E-09	2.55710E-09	2.68550E-09	5.44080E-09	6.69550E-09
7	8.39159E-09	9.44280E-09	8.16190E-09	5.26690E-09	3.03720E-09	3.20280E-09	6.54750E-09	8.07020E-09
8	9.80060E-09	1.11070E-08	9.68030E-09	6.30430E-09	3.64360E-09	3.84960E-09	7.91520E-09	9.75320E-09
9	1.15650E-08	1.31990E-08	1.15980E-08	7.62009E-09	4.41100E-09	4.66110E-09	9.60970E-09	1.18160E-08
10	1.37790E-08	1.58340E-08	1.40260E-08	9.29510E-09	5.38750E-09	5.68480E-09	1.17230E-08	1.43540E-08
11	1.65760E-08	1.91750E-08	1.71190E-08	1.14430E-08	6.64210E-09	6.98860E-09	1.43830E-08	1.75000E-08
12	2.01370E-08	2.34470E-08	2.10940E-08	1.42220E-08	8.27080E-09	8.67150E-09	1.77760E-08	2.14360E-08
13	2.47260E-08	2.89700E-08	2.62590E-08	1.78620E-08	1.04190E-08	1.08790E-08	2.21850E-08	2.64350E-08
14	3.07210E-08	3.62050E-08	3.30580E-08	2.26980E-08	1.33040E-08	1.38420E-08	2.80600E-08	3.29210E-08
15	3.87290E-08	4.58980E-08	4.22100E-08	2.92780E-08	1.72980E-08	1.79540E-08	3.61910E-08	4.16150E-08
16	4.96430E-08	5.91130E-08	5.47290E-08	3.83980E-08	2.29850E-08	2.38610E-08	4.79500E-08	5.37220E-08
17	6.56510E-08	7.84589E-08	7.31030E-08	5.19890E-08	3.17610E-08	3.30230E-08	6.64519E-08	7.18080E-08
18	6.38260E-09	5.22030E-09	6.75180E-09	7.88670E-09	6.28420E-09	8.78300E-10	5.21850E-10	8.89310E-10
19	1.13500E-09	1.40260E-09	1.76990E-09	2.04180E-09	1.97320E-09	1.98490E-09	1.43310E-08	5.19600E-10
20	7.53370E-10	8.65970E-10	1.04860E-09	1.17970E-09	1.12750E-09	1.09610E-09	7.86640E-09	2.73520E-10
21	5.22310E-10	5.70020E-10	6.69880E-10	7.42790E-10	7.07310E-10	6.54500E-10	4.65510E-09	1.58280E-10
22	3.60910E-10	3.77690E-10	4.40320E-10	4.81380E-10	4.53810E-10	4.14690E-10	2.91710E-09	9.55710E-11
23	2.55690E-10	2.60930E-10	2.91450E-10	3.14050E-10	2.99030E-10	2.56390E-10	1.76780E-09	5.99320E-11
24	1.81100E-10	1.79420E-10	2.00560E-10	2.13760E-10	1.97640E-10	1.71010E-10	1.16560E-09	3.66810E-11
25	1.30920E-10	1.27450E-10	1.37530E-10	1.44680E-10	1.36110E-10	1.13200E-10	7.59670E-10	2.45320E-11
26	9.51830E-11	9.05950E-11	9.77560E-11	1.01920E-10	9.31980E-11	7.85640E-11	5.22640E-10	1.61020E-11
27	7.09440E-11	6.66170E-11	6.98520E-11	7.19700E-11	6.69280E-11	5.45600E-11	3.58630E-10	1.12650E-11
28	5.44490E-11	5.02050E-11	5.25790E-11	5.37720E-11	4.86800E-11	4.03470E-11	2.62340E-10	8.11420E-12
29	4.64380E-11	4.22920E-11	4.32550E-11	4.37450E-11	4.02220E-11	3.22920E-11	2.11810E-10	6.41680E-12
30	4.35800E-11	3.88430E-11	3.95480E-11	3.95710E-11	3.52360E-11	2.86050E-11	1.81050E-10	5.51690E-12

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	2.70410E-10	3.86670E-10	1.92590E-10	4.71540E-11	8.02180E-11	1.03960E-10	1.16020E-10	2.10330E-10
2	1.16180E-08	1.19810E-08	1.43880E-08	4.43460E-08	9.54249E-08	9.02409E-08	1.26350E-07	1.22010E-07
3	1.31530E-08	1.26840E-08	1.58130E-08	3.72790E-08	5.58210E-08	5.19460E-08	1.28000E-08	3.56160E-08
4	1.58360E-08	1.50490E-08	1.78160E-08	3.58070E-08	3.54400E-08	3.26960E-08	1.80130E-09	1.27170E-08
5	1.92990E-08	1.79580E-08	2.15280E-08	3.47560E-08	2.32870E-08	2.14620E-08	4.93150E-10	4.97870E-09
6	2.35900E-08	2.15820E-08	2.58220E-08	3.53770E-08	1.63820E-08	1.47420E-08	2.57400E-10	2.05200E-09
7	2.88610E-08	2.60370E-08	3.12180E-08	3.62740E-08	1.14570E-08	9.39029E-09	1.58080E-10	8.75900E-10
8	3.53240E-08	3.14910E-08	3.77910E-08	3.85780E-08	9.43849E-09	6.62820E-09	1.10680E-10	3.88340E-10
9	4.32460E-08	3.81590E-08	4.58550E-08	4.20480E-08	8.33610E-09	4.97400E-09	8.60220E-11	1.89050E-10
10	5.29640E-08	4.63110E-08	5.57460E-08	4.77640E-08	8.70370E-09	4.37940E-09	6.65590E-11	1.32770E-10
11	6.49189E-08	5.63040E-08	6.79319E-08	5.66260E-08	1.05150E-08	5.39540E-09	9.45820E-11	2.27390E-10
12	7.96929E-08	6.85969E-08	8.30319E-08	7.07469E-08	1.52810E-08	9.55080E-09	1.55040E-10	7.18010E-10
13	9.80779E-08	8.38160E-08	1.01910E-07	9.39039E-08	2.78810E-08	2.08790E-08	3.59540E-10	2.62640E-09
14	1.21210E-07	1.02820E-07	1.25770E-07	1.32260E-07	5.96010E-08	5.05940E-08	1.08980E-09	1.02150E-08
15	1.50830E-07	1.26890E-07	1.56570E-07	2.00680E-07	1.49900E-07	1.29700E-07	6.43250E-09	4.13490E-08
16	1.89550E-07	1.57860E-07	1.97030E-07	3.21360E-07	4.00130E-07	3.42720E-07	7.51770E-08	1.76770E-07
17	2.42990E-07	2.01160E-07	2.56060E-07	5.82780E-07	1.26450E-06	1.02260E-06	1.17980E-06	8.34030E-07
18	6.02530E-09	7.37730E-09	3.75250E-09	6.72840E-10	1.07930E-09	1.12280E-09	9.85390E-10	1.32980E-09
19	5.20810E-12	1.03470E-11	1.49150E-10	2.35620E-10	4.45450E-10	5.21040E-10	5.45710E-10	8.17830E-10
20	2.39350E-12	6.51960E-12	1.06200E-10	2.07200E-10	4.41530E-10	5.67060E-10	6.46310E-10	1.02390E-09
21	1.28120E-12	3.37470E-12	5.78460E-11	1.17660E-10	2.76350E-10	3.76040E-10	4.39130E-10	7.13370E-10
22	7.09130E-13	1.91770E-12	3.22220E-11	6.71040E-11	1.57850E-10	2.19860E-10	2.63960E-10	4.33480E-10
23	4.14760E-13	1.08410E-12	1.82670E-11	3.71820E-11	8.82660E-11	1.22230E-10	1.45320E-10	2.39350E-10
24	2.50030E-13	6.58960E-13	1.09180E-11	2.21470E-11	5.19750E-11	7.21860E-11	8.57470E-11	1.40470E-10
25	1.59240E-13	4.03690E-13	6.66340E-12	1.36070E-11	3.14110E-11	4.29420E-11	5.16290E-11	8.50580E-11
26	9.94700E-14	2.62130E-13	4.29670E-12	8.64170E-12	2.01600E-11	2.75080E-11	3.25780E-11	5.33770E-11
27	6.92330E-14	1.73180E-13	2.83330E-12	5.73540E-12	1.30950E-11	1.81450E-11	2.15140E-11	3.52100E-11
28	4.74400E-14	1.23480E-13	2.01640E-12	4.04860E-12	9.22380E-12	1.25460E-11	1.48640E-11	2.43370E-11
29	3.65550E-14	9.11250E-14	1.48740E-12	2.91300E-12	6.76560E-12	9.28390E-12	1.08640E-11	1.76860E-11
30	2.64550E-14	6.67080E-14	1.04740E-12	2.01020E-12	4.47230E-12	5.89710E-12	6.98740E-12	1.13220E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 2 (HEVIMET-LIH) (N, γ) (N,N',γ) REACTIONS

INT.	GRP. 25	GRP. 26	GRP. 27
1	3.29370E-10	4.79910E-10	4.98000E-09
2	1.97660E-08	1.98290E-08	1.18380E-07
3	1.67090E-08	1.64510E-08	6.85810E-08
4	1.57060E-08	1.52160E-08	4.66240E-08
5	1.45930E-08	1.39030E-08	2.89430E-08
6	1.48070E-08	1.39130E-08	2.04290E-08
7	1.52080E-08	1.40550E-08	1.52810E-08
8	1.59050E-08	1.44400E-08	1.15670E-08
9	1.69320E-08	1.50660E-08	9.19480E-09
10	1.83930E-08	1.59910E-08	7.43040E-09
11	2.04790E-08	1.73280E-08	6.36160E-09
12	2.35130E-08	1.92740E-08	5.89070E-09
13	2.80420E-08	2.21690E-08	6.36390E-09
14	3.50250E-08	2.66130E-08	8.44900E-09
15	4.62260E-08	3.37190E-08	1.45560E-08
16	6.48669E-08	4.55020E-08	3.04010E-08
17	9.95979E-08	6.77269E-08	7.87339E-08
18	1.75620E-09	1.66130E-09	3.13390E-09
19	7.66790E-10	7.23840E-10	2.17230E-09
20	8.99850E-10	8.41030E-10	2.74460E-09
21	6.70330E-10	6.33050E-10	1.90520E-09
22	3.93000E-10	3.72520E-10	1.18930E-09
23	2.26040E-10	2.12710E-10	6.60830E-10
24	1.27690E-10	1.21820E-10	3.87240E-10
25	7.94780E-11	7.42810E-11	2.34830E-10
26	4.86040E-11	4.64960E-11	1.46960E-10
27	3.27910E-11	3.07070E-11	9.73300E-11
28	2.20860E-11	2.12090E-11	6.66270E-11
29	1.64680E-11	1.53540E-11	4.90680E-11
30	1.02140E-11	9.67730E-12	2.99130E-11

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	1.49910E-12	7.80830E-12	6.96080E-13	7.12720E-13	1.33740E-12	2.14220E-12	2.69440E-12	3.06230E-12
2	7.86410E-13	3.90320E-12	4.14120E-13	3.20730E-13	6.56030E-13	1.01740E-12	1.29110E-12	1.52270E-12
3	4.74710E-13	2.28640E-12	2.75500E-13	1.78970E-13	3.69350E-13	5.57820E-13	7.12880E-13	8.63000E-13
4	3.15000E-13	1.48300E-12	1.95920E-13	1.12970E-13	2.25950E-13	3.32850E-13	4.27020E-13	5.26320E-13
5	2.21440E-13	1.02060E-12	1.45580E-13	7.61100E-14	1.50620E-13	2.09740E-13	2.69250E-13	3.45600E-13
6	1.61910E-13	7.30080E-13	1.08000E-13	5.32290E-14	9.48010E-14	1.39920E-13	1.79650E-13	2.14210E-13
7	1.19210E-13	5.26130E-13	8.30810E-14	3.82350E-14	6.50590E-14	8.94210E-14	1.14370E-13	1.44310E-13
8	9.04340E-14	3.90500E-13	6.37760E-14	2.77390E-14	4.54850E-14	6.12930E-14	7.80260E-14	9.72380E-14
9	6.90350E-14	2.91390E-13	4.95310E-14	2.05930E-14	3.27390E-14	4.24430E-14	5.35550E-14	6.78090E-14
10	5.32730E-14	2.20000E-13	3.86050E-14	1.54000E-14	2.36740E-14	3.01650E-14	3.77890E-14	4.70460E-14
11	4.14650E-14	1.67460E-13	3.02990E-14	1.16810E-14	1.74170E-14	2.15120E-14	2.66740E-14	3.34060E-14
12	3.28190E-14	1.29710E-13	2.40800E-14	9.03600E-15	1.30830E-14	1.58320E-14	1.94540E-14	2.40560E-14
13	2.97430E-16	7.72760E-16	4.04440E-16	2.20780E-15	3.15710E-15	3.70880E-15	3.80590E-15	6.85280E-15
14	5.49520E-15	2.44440E-14	2.38920E-14	1.02170E-13	1.68580E-13	2.29090E-13	3.27430E-13	5.19030E-13
15	6.59250E-15	2.92120E-14	2.82790E-14	1.22210E-13	2.00980E-13	2.72250E-13	3.87540E-13	6.08740E-13
16	7.90460E-15	3.49360E-14	3.35840E-14	1.46330E-13	2.39980E-13	3.24090E-13	4.59920E-13	7.17930E-13
17	9.49260E-15	4.18780E-14	4.00320E-14	1.75600E-13	2.87240E-13	3.86760E-13	5.47360E-13	8.49830E-13
18	1.14300E-14	5.03500E-14	4.79020E-14	2.11340E-13	3.44860E-13	4.62980E-13	6.53540E-13	1.00940E-12
19	1.38140E-14	6.07790E-14	5.75800E-14	2.55310E-13	4.15630E-13	5.56350E-13	7.83320E-13	1.20370E-12
20	1.67710E-14	7.37080E-14	6.95730E-14	3.09830E-13	5.03220E-13	6.71630E-13	9.43200E-13	1.44190E-12
21	2.04810E-14	8.99290E-14	8.45970E-14	3.78190E-13	6.12780E-13	8.15480E-13	1.14220E-12	1.73700E-12
22	2.51930E-14	1.10520E-13	1.03660E-13	4.64940E-13	7.51580E-13	9.97230E-13	1.39300E-12	2.10710E-12
23	3.12620E-14	1.37050E-13	1.28180E-13	5.76640E-13	9.29850E-13	1.23000E-12	1.71340E-12	2.57770E-12
24	3.94880E-14	1.73010E-13	1.61400E-13	7.27930E-13	1.17100E-12	1.54430E-12	2.14500E-12	3.20930E-12
25	5.10310E-14	2.23460E-13	2.07970E-13	9.39870E-13	1.50790E-12	1.98200E-12	2.74410E-12	4.08160E-12
26	6.70100E-14	2.93310E-13	2.72400E-13	1.23320E-12	1.97320E-12	2.58490E-12	3.56690E-12	5.27360E-12
27	9.22150E-14	4.03560E-13	3.74060E-13	1.69560E-12	2.70510E-12	3.53080E-12	4.85450E-12	7.13090E-12
28	1.35250E-13	5.91980E-13	5.47750E-13	2.48470E-12	3.95100E-12	5.13600E-12	7.03330E-12	1.02600E-11
29	2.17570E-13	9.53139E-13	8.80680E-13	3.99370E-12	6.32400E-12	8.18130E-12	1.11540E-11	1.61490E-11
30	2.39750E-14	6.11060E-14	2.99010E-14	1.75580E-13	2.39780E-13	2.65990E-13	2.57800E-13	4.17920E-13

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	3.68970E-12	4.45880E-12	5.19540E-12	5.24070E-12	4.30090E-12	3.41320E-12	1.91190E-11	6.14110E-13
2	1.87970E-12	2.12440E-12	2.44380E-12	2.52760E-12	2.20000E-12	1.77480E-12	1.07530E-11	3.34650E-13
3	1.08250E-12	1.16820E-12	1.32820E-12	1.39060E-12	1.24760E-12	1.01790E-12	6.40700E-12	1.99690E-13
4	6.67080E-13	6.96310E-13	7.82320E-13	8.22150E-13	7.49120E-13	6.15040E-13	3.95230E-12	1.23480E-13
5	4.40470E-13	4.36330E-13	4.84050E-13	5.08260E-13	4.66730E-13	3.92620E-13	2.54790E-12	7.95790E-14
6	2.73910E-13	2.86390E-13	3.14490E-13	3.29430E-13	3.03510E-13	2.38770E-13	1.55520E-12	4.83720E-14
7	1.84530E-13	1.80300E-13	1.94740E-13	2.03070E-13	1.87300E-13	1.55840E-13	1.01610E-12	3.16160E-14
8	1.24100E-13	1.19540E-13	1.29780E-13	1.34670E-13	1.24140E-13	1.01590E-13	6.62420E-13	2.05170E-14
9	8.64440E-14	8.21410E-14	8.61720E-14	8.86880E-14	8.13880E-14	6.65700E-14	4.32540E-13	1.33520E-14
10	5.97490E-14	5.59650E-14	5.92660E-14	6.07180E-14	5.56810E-14	4.54940E-14	2.95750E-13	9.07550E-15
11	4.22800E-14	3.91870E-14	4.04260E-14	4.12130E-14	3.77690E-14	3.08890E-14	2.01500E-13	6.32630E-15
12	3.02550E-14	2.79150E-14	2.93340E-14	3.03230E-14	2.84540E-14	2.44430E-14	1.66180E-13	5.28650E-15
13	8.76980E-15	1.01800E-14	1.25630E-14	1.16140E-14	1.23360E-14	1.33690E-14	4.69050E-14	7.49880E-14
14	7.15070E-13	9.64820E-13	1.20870E-12	1.46710E-12	1.79600E-12	2.25150E-12	5.68460E-12	6.89330E-12
15	8.34530E-13	1.12810E-12	1.43380E-12	1.76670E-12	2.19750E-12	2.82770E-12	7.23590E-12	8.80110E-12
16	9.80030E-13	1.32820E-12	1.70170E-12	2.11910E-12	2.66410E-12	3.49280E-12	9.04150E-12	1.10720E-11
17	1.15520E-12	1.56930E-12	2.02300E-12	2.54080E-12	3.22190E-12	4.28920E-12	1.12180E-11	1.38350E-11
18	1.36640E-12	1.86030E-12	2.41030E-12	3.05020E-12	3.89610E-12	5.25580E-12	1.38740E-11	1.72200E-11
19	1.62260E-12	2.21340E-12	2.88070E-12	3.66970E-12	4.71710E-12	6.43800E-12	1.71350E-11	2.13840E-11
20	1.93530E-12	2.64460E-12	3.45600E-12	4.42880E-12	5.72360E-12	7.89270E-12	2.11610E-11	2.65280E-11
21	2.32140E-12	3.17690E-12	4.16630E-12	5.36750E-12	6.96830E-12	9.69660E-12	2.61640E-11	3.29180E-11
22	2.80370E-12	3.84180E-12	5.05410E-12	6.54070E-12	8.52370E-12	1.19540E-11	3.24290E-11	4.09050E-11
23	3.41420E-12	4.68300E-12	6.17690E-12	8.02500E-12	1.04870E-11	1.48050E-11	4.03410E-11	5.09570E-11
24	4.23080E-12	5.80710E-12	7.67620E-12	1.00040E-11	1.30970E-11	1.85870E-11	5.08160E-11	6.42000E-11
25	5.35350E-12	7.34970E-12	9.72970E-12	1.27090E-11	1.66460E-11	2.37140E-11	6.49660E-11	8.19620E-11
26	6.88040E-12	9.44410E-12	1.25130E-11	1.63620E-11	2.14120E-11	3.05690E-11	8.38100E-11	1.05400E-10
27	9.24950E-12	1.26860E-11	1.68050E-11	2.19660E-11	2.86610E-11	4.09180E-11	1.12090E-10	1.40160E-10
28	1.32210E-11	1.81030E-11	2.39420E-11	3.12110E-11	4.04800E-11	5.75960E-11	1.57360E-10	1.94940E-10
29	2.06450E-11	2.81890E-11	3.71040E-11	4.79910E-11	6.14880E-11	8.65320E-11	2.35480E-10	2.86620E-10
30	4.88910E-13	5.73430E-13	7.48260E-13	7.38150E-13	8.18380E-13	1.01130E-12	3.78980E-12	5.90650E-12

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	1.33270E-13	3.01810E-13	5.04060E-12	9.45140E-12	2.02230E-11	2.68110E-11	3.15090E-11	5.28090E-11
2	7.12860E-14	1.81430E-13	3.41120E-12	6.60650E-12	1.47710E-11	1.95860E-11	2.27410E-11	3.65570E-11
3	4.04440E-14	1.05670E-13	1.97480E-12	3.98490E-12	9.18060E-12	1.25250E-11	1.47970E-11	2.42130E-11
4	2.33130E-14	6.11520E-14	1.17060E-12	2.34100E-12	5.48120E-12	7.51020E-12	8.77640E-12	1.42370E-11
5	1.40130E-14	3.66990E-14	7.00980E-13	1.41590E-12	3.22800E-12	4.41380E-12	5.31510E-12	8.68520E-12
6	7.96150E-15	2.07480E-14	4.08030E-13	8.25330E-13	1.92090E-12	2.62170E-12	3.09640E-12	5.15350E-12
7	4.90040E-15	1.27770E-14	2.45350E-13	4.95780E-13	1.15790E-12	1.59860E-12	1.89880E-12	3.13320E-12
8	2.93890E-15	7.57430E-15	1.49000E-13	2.99190E-13	6.94550E-13	9.50860E-13	1.12740E-12	1.83750E-12
9	1.85030E-15	4.82110E-15	9.37770E-14	1.88110E-13	4.36180E-13	5.98980E-13	7.10670E-13	1.17070E-12
10	1.14490E-15	2.93560E-15	5.69550E-14	1.13940E-13	2.63090E-13	3.58730E-13	4.23500E-13	6.88630E-13
11	7.72960E-16	2.03430E-15	3.96580E-14	7.91140E-14	1.81670E-13	2.47550E-13	2.92870E-13	4.76840E-13
12	6.30030E-16	1.54400E-15	2.97630E-14	5.57640E-14	1.20010E-13	1.53280E-13	1.70110E-13	2.68040E-13
13	4.12080E-13	7.15590E-13	4.38920E-13	1.15400E-13	2.10020E-13	2.41370E-13	2.30290E-13	3.30320E-13
14	2.24860E-11	2.89130E-11	4.45990E-11	1.54890E-10	3.82530E-10	3.24600E-10	4.33320E-10	3.16510E-10
15	2.89570E-11	3.48100E-11	5.27480E-11	1.42000E-10	2.33080E-10	2.09110E-10	4.86540E-11	1.15060E-10
16	3.66340E-11	4.18200E-11	6.18910E-11	1.40160E-10	1.48000E-10	1.42420E-10	7.24930E-12	4.57910E-11
17	4.60390E-11	5.03660E-11	7.32310E-11	1.36680E-10	9.74560E-11	8.95620E-11	2.03830E-12	1.91760E-11
18	5.76200E-11	6.07270E-11	8.66350E-11	1.36890E-10	6.81500E-11	6.10670E-11	1.07440E-12	8.30840E-12
19	7.19150E-11	7.32820E-11	1.02610E-10	1.37340E-10	4.67590E-11	4.14620E-11	6.95580E-13	3.69310E-12
20	8.95890E-11	8.84930E-11	1.21580E-10	1.40550E-10	3.71230E-11	2.86210E-11	4.76300E-13	1.67780E-12
21	1.11520E-10	1.06960E-10	1.44090E-10	1.45030E-10	3.01960E-11	2.00530E-11	3.33550E-13	7.79070E-13
22	1.38840E-10	1.29440E-10	1.70820E-10	1.52150E-10	2.78300E-11	1.43650E-11	2.41000E-13	3.71920E-13
23	1.73050E-10	1.56840E-10	2.02430E-10	1.61230E-10	2.63240E-11	1.06360E-11	1.78910E-13	1.85400E-13
24	2.17700E-10	1.91700E-10	2.41500E-10	1.74310E-10	2.70900E-11	7.99280E-12	1.39330E-13	1.00860E-13
25	2.77100E-10	2.36790E-10	2.89570E-10	1.91070E-10	2.81900E-11	6.56040E-12	1.19410E-13	6.40650E-14
26	3.54130E-10	2.92640E-10	3.45590E-10	2.10000E-10	3.04680E-11	5.43790E-12	9.44130E-14	4.83240E-14
27	4.66570E-10	3.70860E-10	4.17660E-10	2.33540E-10	3.26920E-11	4.98030E-12	1.00290E-13	4.87200E-14
28	6.40140E-10	4.85210E-10	5.11560E-10	2.59990E-10	3.53980E-11	4.61250E-12	9.17710E-14	5.54050E-14
29	9.21770E-10	6.53110E-10	6.02570E-10	2.61790E-10	3.14020E-11	4.17400E-12	1.04810E-13	6.04990E-14
30	3.18660E-11	2.73070E-11	9.20110E-12	2.15630E-13	1.32310E-14	2.51770E-15	1.68420E-17	1.80560E-17

NEUTRON CONTRIBUTION TO GAMMA DOSE

(N,γ) REACTIONS

CONFIGURATION 3 (LIH-HEVIMET)

INT.	GRP. 25	GRP. 26	GRP. 27
1	5.20810E-11	5.36500E-11	2.28220E-10
2	3.35590E-11	3.25040E-11	1.06920E-10
3	2.23620E-11	2.08970E-11	6.67090E-11
4	1.30330E-11	1.23580E-11	3.96000E-11
5	8.09220E-12	7.58300E-12	2.42520E-11
6	4.74630E-12	4.53590E-12	1.42730E-11
7	2.92520E-12	2.80910E-12	8.85030E-12
8	1.68480E-12	1.58260E-12	5.08120E-12
9	1.07800E-12	1.04030E-12	3.33300E-12
10	6.44090E-13	5.91830E-13	1.83620E-12
11	4.36420E-13	4.17180E-13	1.35810E-12
12	2.47830E-13	2.29780E-13	6.96400E-13
13	3.72060E-13	3.49730E-13	1.02270E-12
14	3.10700E-11	2.05010E-11	4.02800E-11
15	2.90780E-11	1.90790E-11	2.55540E-11
16	2.92260E-11	1.89200E-11	1.79780E-11
17	2.97020E-11	1.89720E-11	1.33660E-11
18	3.05700E-11	1.92770E-11	1.00660E-11
19	3.17770E-11	1.97910E-11	7.97160E-12
20	3.33180E-11	2.05090E-11	6.37210E-12
21	3.52310E-11	2.14470E-11	5.27640E-12
22	3.75770E-11	2.26360E-11	4.46000E-12
23	4.04410E-11	2.41270E-11	3.89460E-12
24	4.42600E-11	2.61600E-11	3.52160E-12
25	4.94010E-11	2.89530E-11	3.32310E-12
26	5.56950E-11	3.23870E-11	3.23220E-12
27	6.50900E-11	3.75800E-11	3.32740E-12
28	7.95030E-11	4.56050E-11	3.60700E-12
29	1.00490E-10	5.74050E-11	4.15420E-12
30	1.85070E-12	1.47710E-12	1.17520E-13

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ)(N,N',γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	1.49910E-12	7.80830E-12	6.96080E-13	7.12720E-13	1.33740E-12	2.14220E-12	2.69440E-12	3.06230E-12
2	7.86410E-13	3.90320E-12	4.14120E-13	3.20730E-13	6.56030E-13	1.01740E-12	1.29110E-12	1.52270E-12
3	4.74710E-13	2.28640E-12	2.75500E-13	1.78970E-13	3.69350E-13	5.57820E-13	7.12880E-13	8.63000E-13
4	3.15000E-13	1.48300E-12	1.95920E-13	1.12970E-13	2.25950E-13	3.32850E-13	4.27020E-13	5.26320E-13
5	2.21440E-13	1.02060E-12	1.45580E-13	7.61100E-14	1.50620E-13	2.09740E-13	2.69250E-13	3.45600E-13
6	1.61910E-13	7.30080E-13	1.08000E-13	5.32290E-14	9.48010E-14	1.39920E-13	1.79650E-13	2.14210E-13
7	1.19210E-13	5.26130E-13	8.30810E-14	3.82350E-14	6.50590E-14	8.94210E-14	1.14370E-13	1.44310E-13
8	9.04340E-14	3.90500E-13	6.37760E-14	2.77390E-14	4.54850E-14	6.12930E-14	7.80260E-14	9.72380E-14
9	6.90350E-14	2.91390E-13	4.95310E-14	2.05930E-14	3.27390E-14	4.24430E-14	5.35550E-14	6.78090E-14
10	5.32730E-14	2.20000E-13	3.86050E-14	1.54000E-14	2.36740E-14	3.01650E-14	3.77890E-14	4.70460E-14
11	4.14650E-14	1.67460E-13	3.02990E-14	1.16810E-14	1.74170E-14	2.15120E-14	2.66740E-14	3.34060E-14
12	3.28190E-14	1.29710E-13	2.40800E-14	9.03600E-15	1.30830E-14	1.58320E-14	1.94540E-14	2.40560E-14
13	3.12060E-13	9.51320E-13	8.02430E-13	2.94050E-12	3.57810E-12	3.39410E-12	3.21580E-12	2.79640E-12
14	6.47590E-13	3.00610E-12	3.09150E-12	1.37630E-11	1.95190E-11	1.74910E-11	1.56440E-11	1.45980E-11
15	7.91430E-13	3.64740E-12	3.70610E-12	1.66450E-11	2.35760E-11	2.11790E-11	1.90110E-11	1.77230E-11
16	9.67570E-13	4.43210E-12	4.46020E-12	2.01600E-11	2.85330E-11	2.56970E-11	2.31750E-11	2.16460E-11
17	1.18600E-12	5.40220E-12	5.39120E-12	2.44810E-11	3.46320E-11	3.12740E-11	2.83470E-11	2.65470E-11
18	1.45920E-12	6.61030E-12	6.54590E-12	2.98320E-11	4.21840E-11	3.82010E-11	3.48050E-11	3.26870E-11
19	1.80410E-12	8.12810E-12	7.98940E-12	3.65090E-11	5.16050E-11	4.68670E-11	4.29240E-11	4.04250E-11
20	2.24330E-12	1.00500E-11	9.80930E-12	4.49090E-11	6.34560E-11	5.78000E-11	5.32120E-11	5.02520E-11
21	2.80950E-12	1.25160E-11	1.21300E-11	5.55970E-11	7.85210E-11	7.17360E-11	6.63820E-11	6.28560E-11
22	3.54810E-12	1.57140E-11	1.51250E-11	6.93580E-11	9.79120E-11	8.97190E-11	8.34390E-11	7.92040E-11
23	4.53140E-12	1.99440E-11	1.90600E-11	8.73830E-11	1.23280E-10	1.13310E-10	1.05910E-10	1.00770E-10
24	5.88910E-12	2.57630E-11	2.44510E-11	1.12010E-10	1.57890E-10	1.45570E-10	1.36790E-10	1.30550E-10
25	7.81810E-12	3.40020E-11	3.20630E-11	1.46740E-10	2.06620E-10	1.90790E-10	1.79710E-10	1.71400E-10
26	1.06190E-11	4.58610E-11	4.29200E-11	1.95980E-10	2.75620E-10	2.55330E-10	2.41760E-10	2.31200E-10
27	1.51260E-11	6.48600E-11	6.02430E-11	2.74280E-10	3.85150E-10	3.57760E-10	3.40200E-10	3.25810E-10
28	2.31020E-11	9.82630E-11	9.05000E-11	4.10250E-10	5.75080E-10	5.35910E-10	5.12170E-10	4.91520E-10
29	3.92200E-11	1.65160E-10	1.50540E-10	6.77610E-10	9.47950E-10	8.87700E-10	8.54450E-10	8.23020E-10
30	2.35590E-11	7.05920E-11	5.59490E-11	2.24280E-10	2.68150E-10	2.52770E-10	2.41140E-10	2.02980E-10

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ)(N,N',γ) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	3.68970E-12	4.45880E-12	5.19540E-12	5.24070E-12	4.30090E-12	3.41320E-12	1.91190E-11	6.14110E-13
2	1.87970E-12	2.12440E-12	2.44380E-12	2.52760E-12	2.20000E-12	1.77480E-12	1.07530E-11	3.34650E-13
3	1.08250E-12	1.16820E-12	1.32820E-12	1.39060E-12	1.24760E-12	1.01790E-12	6.40700E-12	1.99690E-13
4	6.67080E-13	6.96310E-13	7.82320E-13	8.22150E-13	7.49120E-13	6.15040E-13	3.95230E-12	1.23480E-13
5	4.40470E-13	4.36330E-13	4.84050E-13	5.08260E-13	4.66730E-13	3.92620E-13	2.54790E-12	7.95790E-14
6	2.73910E-13	2.86390E-13	3.14490E-13	3.29430E-13	3.03510E-13	2.38770E-13	1.55520E-12	4.83720E-14
7	1.84530E-13	1.80300E-13	1.94740E-13	2.03070E-13	1.87300E-13	1.55840E-13	1.01610E-12	3.16160E-14
8	1.24100E-13	1.19540E-13	1.29780E-13	1.34670E-13	1.24140E-13	1.01590E-13	6.62420E-13	2.05170E-14
9	8.64440E-14	8.21410E-14	8.61720E-14	8.86880E-14	8.13880E-14	6.65700E-14	4.32540E-13	1.33520E-14
10	5.97490E-14	5.59650E-14	5.92660E-14	6.07180E-14	5.56810E-14	4.54940E-14	2.95750E-13	9.07550E-15
11	4.22800E-14	3.91870E-14	4.04260E-14	4.12130E-14	3.77690E-14	3.08890E-14	2.01500E-13	6.32630E-15
12	3.02550E-14	2.79150E-14	2.93340E-14	3.03230E-14	2.84540E-14	2.44430E-14	1.66180E-13	5.28650E-15
13	1.48620E-12	4.89240E-13	4.69380E-13	4.87710E-13	3.54930E-13	1.88950E-14	4.69080E-14	7.49880E-14
14	1.36240E-11	1.05970E-11	7.45650E-12	4.54390E-12	2.77280E-12	2.75320E-12	6.04060E-12	6.90240E-12
15	1.65400E-11	1.29550E-11	9.26540E-12	5.71830E-12	3.49900E-12	3.51820E-12	7.73590E-12	8.81730E-12
16	2.02150E-11	1.59560E-11	1.15300E-11	7.17820E-12	4.38350E-12	4.42860E-12	9.73260E-12	1.11010E-11
17	2.48150E-11	1.97380E-11	1.43870E-11	9.02190E-12	5.49010E-12	5.55170E-12	1.21700E-11	1.38850E-11
18	3.05830E-11	2.45150E-11	1.80100E-11	1.13710E-11	6.89060E-12	6.95800E-12	1.51860E-11	1.73060E-11
19	3.78640E-11	3.05820E-11	2.26410E-11	1.43870E-11	8.68020E-12	8.73700E-12	1.89510E-11	2.15360E-11
20	4.71190E-11	3.83430E-11	2.86050E-11	1.82920E-11	1.09880E-11	1.10080E-11	2.36900E-11	2.67960E-11
21	5.90030E-11	4.83730E-11	3.63590E-11	2.34000E-11	1.39990E-11	1.39440E-11	2.97240E-11	3.33950E-11
22	7.44300E-11	6.14720E-11	4.65470E-11	3.01430E-11	1.79710E-11	1.77850E-11	3.75070E-11	4.17650E-11
23	9.48080E-11	7.88980E-11	6.02070E-11	3.92590E-11	2.33440E-11	2.29300E-11	4.77500E-11	5.25320E-11
24	1.22960E-10	1.03040E-10	7.91360E-11	5.18950E-11	3.07880E-11	3.00640E-11	6.18860E-11	6.71390E-11
25	1.61430E-10	1.36200E-10	1.05430E-10	6.97280E-11	4.14900E-11	4.03440E-11	8.21390E-11	8.75830E-11
26	2.17970E-10	1.85270E-10	1.44440E-10	9.62190E-11	5.74010E-11	5.55700E-11	1.11800E-10	1.16490E-10
27	3.07310E-10	2.63130E-10	2.06640E-10	1.38830E-10	8.33990E-11	8.06660E-11	1.60840E-10	1.62980E-10
28	4.63880E-10	4.00400E-10	3.16790E-10	2.14840E-10	1.30480E-10	1.26350E-10	2.50190E-10	2.44640E-10
29	7.77640E-10	6.77890E-10	5.40350E-10	3.69960E-10	2.27940E-10	2.20740E-10	4.35480E-10	4.05080E-10
30	1.09660E-10	7.46840E-11	8.33930E-11	9.43370E-11	7.93020E-11	1.18020E-11	3.79660E-12	5.90650E-12

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N,γ)(N,N',γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	1.33270E-13	3.01810E-13	5.04060E-12	9.45140E-12	2.02230E-11	2.68110E-11	3.15090E-11	5.28090E-11
2	7.12860E-14	1.81430E-13	3.41120E-12	6.60650E-12	1.47710E-11	1.95860E-11	2.27410E-11	3.65570E-11
3	4.04440E-14	1.05670E-13	1.97480E-12	3.98490E-12	9.18060E-12	1.25250E-11	1.47970E-11	2.42130E-11
4	2.33130E-14	6.11520E-14	1.17060E-12	2.34100E-12	5.48120E-12	7.51020E-12	8.77640E-12	1.42370E-11
5	1.40130E-14	3.66990E-14	7.00980E-13	1.41590E-12	3.22800E-12	4.41380E-12	5.31510E-12	8.68520E-12
6	7.96150E-15	2.07480E-14	4.08030E-13	8.25330E-13	1.92090E-12	2.62170E-12	3.09640E-12	5.15350E-12
7	4.90040E-15	1.27770E-14	2.45350E-13	4.95780E-13	1.15790E-12	1.59860E-12	1.89880E-12	3.13320E-12
8	2.93890E-15	7.57430E-15	1.49000E-13	2.99190E-13	6.94550E-13	9.50860E-13	1.12740E-12	1.83750E-12
9	1.85030E-15	4.82110E-15	9.37770E-14	1.88110E-13	4.36180E-13	5.98980E-13	7.10670E-13	1.17070E-12
10	1.14490E-15	2.93560E-15	5.69550E-14	1.13940E-13	2.63090E-13	3.58730E-13	4.23500E-13	6.88630E-13
11	7.72960E-16	2.03430E-15	3.96580E-14	7.91140E-14	1.81670E-13	2.47550E-13	2.92870E-13	4.76840E-13
12	6.30030E-16	1.54400E-15	2.97630E-14	5.57640E-14	1.20010E-13	1.53280E-13	1.70110E-13	2.68040E-13
13	4.12080E-13	7.15590E-13	4.38920E-13	1.15400E-13	2.10020E-13	2.41370E-13	2.30290E-13	3.30320E-13
14	2.24970E-11	2.89130E-11	4.45990E-11	1.54890E-10	3.82530E-10	3.24600E-10	4.33320E-10	3.16510E-10
15	2.89770E-11	3.48100E-11	5.27480E-11	1.42000E-10	2.33080E-10	2.09110E-10	4.86540E-11	1.15060E-10
16	3.66700E-11	4.18200E-11	6.18910E-11	1.40160E-10	1.48000E-10	1.42420E-10	7.24930E-12	4.57910E-11
17	4.61010E-11	5.03660E-11	7.32310E-11	1.36680E-10	9.74560E-11	8.95620E-11	2.03830E-12	1.91760E-11
18	5.77300E-11	6.07270E-11	8.66350E-11	1.36890E-10	6.81500E-11	6.10670E-11	1.07440E-12	8.30840E-12
19	7.21080E-11	7.32820E-11	1.02610E-10	1.37340E-10	4.67590E-11	4.14620E-11	6.95580E-13	3.69310E-12
20	8.99310E-11	8.84930E-11	1.21580E-10	1.40550E-10	3.71230E-11	2.86210E-11	4.76300E-13	1.67780E-12
21	1.12140E-10	1.06960E-10	1.44090E-10	1.45030E-10	3.01960E-11	2.00530E-11	3.33550E-13	7.79070E-13
22	1.39950E-10	1.29440E-10	1.70820E-10	1.52150E-10	2.78300E-11	1.43650E-11	2.41000E-13	3.71920E-13
23	1.75080E-10	1.56840E-10	2.02430E-10	1.61230E-10	2.63240E-11	1.06360E-11	1.78910E-13	1.85400E-13
24	2.21480E-10	1.91700E-10	2.41500E-10	1.74310E-10	2.70900E-11	7.99280E-12	1.39330E-13	1.00860E-13
25	2.84310E-10	2.36790E-10	2.89570E-10	1.91070E-10	2.81900E-11	6.56040E-12	1.19410E-13	6.40650E-14
26	3.68280E-10	2.92640E-10	3.45590E-10	2.10000E-10	3.04680E-11	5.43790E-12	9.44130E-14	4.83240E-14
27	4.95420E-10	3.70860E-10	4.17660E-10	2.33540E-10	3.26920E-11	4.98030E-12	1.00290E-13	4.87200E-14
28	7.02210E-10	4.85210E-10	5.11560E-10	2.59990E-10	3.53980E-11	4.61250E-12	9.17710E-14	5.54050E-14
29	1.06680E-09	6.53110E-10	6.02570E-10	2.61790E-10	3.14020E-11	4.17400E-12	1.04810E-13	6.04990E-14
30	3.18660E-11	2.73070E-11	9.20110E-12	2.15630E-13	1.32310E-14	2.51770E-15	1.68420E-17	1.80560E-17

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 3 (LIH-HEVIMET) (N, γ) (N,N',γ) REACTIONS

INT.	GRP. 25	GRP. 26	GRP. 27
1	5.20810E-11	5.36500E-11	2.28220E-10
2	3.35590E-11	3.25040E-11	1.06920E-10
3	2.23620E-11	2.08970E-11	6.67090E-11
4	1.30330E-11	1.23580E-11	3.96000E-11
5	8.09220E-12	7.58300E-12	2.42520E-11
6	4.74630E-12	4.53590E-12	1.42730E-11
7	2.92520E-12	2.80910E-12	8.85030E-12
8	1.68480E-12	1.58260E-12	5.08120E-12
9	1.07800E-12	1.04030E-12	3.33300E-12
10	6.44090E-13	5.91830E-13	1.83620E-12
11	4.36420E-13	4.17180E-13	1.35810E-12
12	2.47830E-13	2.29780E-13	6.96400E-13
13	3.72060E-13	3.49730E-13	1.02270E-12
14	3.10700E-11	2.05010E-11	4.02800E-11
15	2.90780E-11	1.90790E-11	2.55540E-11
16	2.92260E-11	1.89200E-11	1.79780E-11
17	2.97020E-11	1.89720E-11	1.33660E-11
18	3.05700E-11	1.92770E-11	1.00660E-11
19	3.17770E-11	1.97910E-11	7.97160E-12
20	3.33180E-11	2.05090E-11	6.37210E-12
21	3.52310E-11	2.14470E-11	5.27640E-12
22	3.75770E-11	2.26360E-11	4.46000E-12
23	4.04410E-11	2.41270E-11	3.89460E-12
24	4.42600E-11	2.61600E-11	3.52160E-12
25	4.94010E-11	2.89530E-11	3.32310E-12
26	5.56950E-11	3.23870E-11	3.23220E-12
27	6.50900E-11	3.75800E-11	3.32740E-12
28	7.95030E-11	4.56050E-11	3.60700E-12
29	1.00490E-10	5.74050E-11	4.15420E-12
30	1.85070E-12	1.47710E-12	1.17520E-13

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	8.05530E-13	4.19560E-12	3.70370E-13	2.91510E-13	5.47010E-13	8.59230E-13	1.00280E-12	1.10880E-12
2	4.22350E-13	2.09620E-12	2.20070E-13	1.30360E-13	2.66650E-13	4.05700E-13	4.79230E-13	5.50780E-13
3	2.54840E-13	1.22750E-12	1.46230E-13	7.22960E-14	1.49200E-13	2.21180E-13	2.63920E-13	3.11850E-13
4	1.69050E-13	7.95870E-13	1.03870E-13	4.53560E-14	9.07180E-14	1.31240E-13	1.57680E-13	1.89990E-13
5	1.18800E-13	5.47550E-13	7.70790E-14	3.03750E-14	6.01100E-14	8.22460E-14	9.91740E-14	1.24610E-13
6	8.68500E-14	3.91620E-13	5.71120E-14	2.11180E-14	3.76100E-14	5.45710E-14	6.60050E-14	7.71450E-14
7	6.39380E-14	2.82190E-13	4.38780E-14	1.50800E-14	2.56600E-14	3.46940E-14	4.19160E-14	5.19040E-14
8	4.85010E-14	2.09430E-13	3.36400E-14	1.08770E-14	1.78360E-14	2.36550E-14	2.85260E-14	3.49300E-14
9	3.70270E-14	1.56290E-13	2.60930E-14	8.02960E-15	1.27660E-14	1.62970E-14	1.95320E-14	2.43280E-14
10	2.85800E-14	1.18030E-13	2.03130E-14	5.97170E-15	9.18000E-15	1.15260E-14	1.37500E-14	1.68570E-14
11	2.22560E-14	8.98820E-14	1.59250E-14	4.50520E-15	6.71770E-15	8.18080E-15	9.68480E-15	1.19580E-14
12	1.76290E-14	6.96730E-14	1.26480E-14	3.46720E-15	5.02070E-15	5.99500E-15	7.05280E-15	8.60860E-15
13	1.52390E-16	3.95960E-16	2.07350E-16	1.13170E-15	1.61870E-15	1.90270E-15	1.95460E-15	3.52220E-15
14	2.69260E-15	1.19850E-14	1.17310E-14	5.01740E-14	8.28540E-14	1.12810E-13	1.61510E-13	2.56390E-13
15	3.21180E-15	1.42420E-14	1.38080E-14	5.96840E-14	9.82360E-14	1.33340E-13	1.90190E-13	2.99250E-13
16	3.82580E-15	1.69220E-14	1.62950E-14	7.10070E-14	1.16550E-13	1.57750E-13	2.24370E-13	3.50950E-13
17	4.55930E-15	2.01300E-14	1.92800E-14	8.45750E-14	1.38480E-13	1.86910E-13	2.65220E-13	4.12730E-13
18	5.44200E-15	2.39920E-14	2.28760E-14	1.00920E-13	1.64860E-13	2.21920E-13	3.14190E-13	4.86610E-13
19	6.50930E-15	2.86660E-14	2.72240E-14	1.20690E-13	1.96720E-13	2.64120E-13	3.73140E-13	5.75230E-13
20	7.80840E-15	3.43490E-14	3.25150E-14	1.44760E-13	2.35420E-13	3.15280E-13	4.44520E-13	6.82150E-13
21	9.39820E-15	4.13110E-14	3.89880E-14	1.74220E-13	2.82710E-13	3.77680E-13	5.31450E-13	8.11890E-13
22	1.13570E-14	4.98850E-14	4.69630E-14	2.10510E-13	3.40870E-13	4.54280E-13	6.38020E-13	9.70429E-13
23	1.37910E-14	6.05430E-14	5.68770E-14	2.55610E-13	4.13020E-13	5.49170E-13	7.69890E-13	1.16600E-12
24	1.68480E-14	7.39280E-14	6.93320E-14	3.12250E-13	5.03450E-13	6.67910E-13	9.34750E-13	1.40980E-12
25	2.07330E-14	9.09480E-14	8.51860E-14	3.84280E-13	6.18240E-13	8.18470E-13	1.14360E-12	1.71800E-12
26	2.57490E-14	1.12940E-13	1.05700E-13	4.77330E-13	7.66280E-13	1.01240E-12	1.41270E-12	2.11420E-12
27	3.23590E-14	1.41960E-13	1.32870E-13	6.00120E-13	9.61350E-13	1.26790E-12	1.76720E-12	2.63560E-12
28	4.12570E-14	1.81120E-13	1.69730E-13	7.65750E-13	1.22420E-12	1.61240E-12	2.24610E-12	3.34070E-12
29	5.39970E-14	2.37530E-13	2.23470E-13	1.00440E-12	1.60300E-12	2.11080E-12	2.94340E-12	4.37370E-12
30	4.38900E-15	1.12310E-14	5.62000E-15	3.25440E-14	4.48760E-14	5.08180E-14	5.06540E-14	8.48400E-14
31	3.86170E-13	1.47210E-12	4.64440E-13	9.88020E-13	1.34870E-12	1.58680E-12	2.07600E-12	2.47770E-12
32	3.11840E-13	1.16650E-12	3.94210E-13	7.78520E-13	1.02340E-12	1.17760E-12	1.51620E-12	1.80090E-12
33	2.56640E-13	9.40860E-13	3.34650E-13	6.15680E-13	7.91910E-13	8.92140E-13	1.13330E-12	1.34220E-12
34	2.12850E-13	7.64090E-13	2.84290E-13	4.93150E-13	6.12980E-13	6.75810E-13	8.45940E-13	9.95390E-13
35	1.78360E-13	6.26990E-13	2.42510E-13	3.96490E-13	4.79950E-13	5.18690E-13	6.41000E-13	7.50210E-13
36	1.51120E-13	5.19980E-13	2.08040E-13	3.21770E-13	3.77860E-13	4.00260E-13	4.88020E-13	5.66890E-13
37	1.29770E-13	4.37110E-13	1.79970E-13	2.63310E-13	3.00920E-13	3.12990E-13	3.77070E-13	4.35040E-13
38	1.13370E-13	3.73770E-13	1.57500E-13	2.18130E-13	2.42410E-13	2.47580E-13	2.94680E-13	3.37200E-13
39	1.01240E-13	3.26760E-13	1.40260E-13	1.83930E-13	1.99100E-13	1.99990E-13	2.35420E-13	2.67290E-13
40	9.30400E-14	2.93950E-13	1.28670E-13	1.60610E-13	1.69310E-13	1.67240E-13	1.94560E-13	2.18840E-13
41	8.90180E-14	2.75330E-13	1.27190E-13	1.55430E-13	1.59750E-13	1.55310E-13	1.78600E-13	1.98760E-13
42	8.95280E-14	2.70630E-13	1.38400E-13	1.71210E-13	1.70470E-13	1.61450E-13	1.81180E-13	1.97470E-13

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,γ) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	1.33600E-12	1.61450E-12	1.88120E-12	1.89750E-12	1.55730E-12	1.23580E-12	6.92270E-12	2.22360E-13
2	6.79900E-13	7.68420E-13	8.83960E-13	9.14260E-13	7.95780E-13	6.41980E-13	3.88970E-12	1.21050E-13
3	3.91170E-13	4.22130E-13	4.79960E-13	5.02490E-13	4.50840E-13	3.67820E-13	2.31520E-12	7.21610E-14
4	2.40800E-13	2.51350E-13	2.82400E-13	2.96770E-13	2.70410E-13	2.22010E-13	1.42670E-12	4.45730E-14
5	1.58820E-13	1.57330E-13	1.74530E-13	1.83260E-13	1.68290E-13	1.41570E-13	9.18700E-13	2.86940E-14
6	9.86470E-14	1.03140E-13	1.13260E-13	1.18640E-13	1.09310E-13	8.59910E-14	5.60090E-13	1.74210E-14
7	6.63770E-14	6.48530E-14	7.00460E-14	7.30420E-14	6.73720E-14	5.60530E-14	3.65470E-13	1.13720E-14
8	4.45840E-14	4.29390E-14	4.66210E-14	4.83790E-14	4.45950E-14	3.64960E-14	2.37970E-13	7.37060E-15
9	3.10130E-14	2.94700E-14	3.09160E-14	3.18210E-14	2.92020E-14	2.38850E-14	1.55190E-13	4.79080E-15
10	2.14100E-14	2.00550E-14	2.12390E-14	2.17600E-14	1.99560E-14	1.63060E-14	1.06020E-13	3.25370E-15
11	1.51360E-14	1.40310E-14	1.44760E-14	1.47600E-14	1.35290E-14	1.10680E-14	7.22330E-14	2.26880E-15
12	1.08330E-14	9.99990E-15	1.05110E-14	1.08720E-14	1.02090E-14	8.78180E-15	5.98100E-14	1.90670E-15
13	4.51260E-15	5.24260E-15	6.47310E-15	5.99020E-15	6.37130E-15	6.91890E-15	2.43490E-14	3.90270E-14
14	3.53940E-13	4.78140E-13	5.99440E-13	7.28580E-13	8.93900E-13	1.12450E-12	2.84910E-12	3.47120E-12
15	4.11150E-13	5.56610E-13	7.07910E-13	8.73600E-13	1.08930E-12	1.40690E-12	3.61350E-12	4.41890E-12
16	4.80290E-13	6.51940E-13	8.35950E-13	1.04260E-12	1.31440E-12	1.72980E-12	4.49630E-12	5.53920E-12
17	5.62740E-13	7.65820E-13	9.87950E-13	1.24310E-12	1.58090E-12	2.11310E-12	5.55140E-12	6.89110E-12
18	6.61060E-13	9.01780E-13	1.16940E-12	1.48250E-12	1.89980E-12	2.57350E-12	6.82640E-12	8.53250E-12
19	7.78620E-13	1.06460E-12	1.38660E-12	1.77000E-12	2.28320E-12	3.12960E-12	8.37330E-12	1.05300E-11
20	9.20160E-13	1.26060E-12	1.64850E-12	2.11720E-12	2.74670E-12	3.80440E-12	1.02570E-11	1.29660E-11
21	1.09150E-12	1.49810E-12	1.96600E-12	2.53840E-12	3.30960E-12	4.62570E-12	1.25560E-11	1.59410E-11
22	1.30040E-12	1.78790E-12	2.35330E-12	3.05300E-12	3.99660E-12	5.62940E-12	1.53690E-11	1.95790E-11
23	1.55770E-12	2.14470E-12	2.83010E-12	3.68570E-12	4.84060E-12	6.86270E-12	1.88260E-11	2.40390E-11
24	1.87800E-12	2.58900E-12	3.42280E-12	4.47170E-12	5.88560E-12	8.38640E-12	2.30910E-11	2.95230E-11
25	2.28250E-12	3.14950E-12	4.16910E-12	5.45890E-12	7.19160E-12	1.02820E-11	2.83830E-11	3.62900E-11
26	2.80230E-12	3.86900E-12	5.12370E-12	6.71510E-12	8.84380E-12	1.26620E-11	3.49940E-11	4.46770E-11
27	3.48660E-12	4.81460E-12	6.37150E-12	8.34580E-12	1.09660E-11	1.56860E-11	4.33360E-11	5.51400E-11
28	4.41310E-12	6.09140E-12	8.04250E-12	1.05030E-11	1.37290E-11	1.95440E-11	5.38750E-11	6.81470E-11
29	5.77720E-12	7.96530E-12	1.04580E-11	1.35430E-11	1.75060E-11	2.46080E-11	6.75340E-11	8.44510E-11
30	1.03410E-13	1.22660E-13	1.59520E-13	1.57500E-13	1.76390E-13	2.15800E-13	8.19990E-13	1.31880E-12
31	2.95410E-12	2.75680E-12	2.93770E-12	3.22360E-12	3.20340E-12	3.09470E-12	2.29630E-11	7.89870E-13
32	2.14860E-12	1.93150E-12	2.02300E-12	2.12650E-12	2.01890E-12	1.89850E-12	1.33750E-11	4.46180E-13
33	1.60060E-12	1.42170E-12	1.42600E-12	1.46470E-12	1.39080E-12	1.19120E-12	8.60050E-12	2.81730E-13
34	1.18510E-12	1.03350E-12	1.04280E-12	1.05610E-12	9.63030E-13	8.11700E-13	5.49950E-12	1.74460E-13
35	8.91390E-13	7.71550E-13	7.55330E-13	7.53500E-13	6.96390E-13	5.75050E-13	3.78130E-12	1.20040E-13
36	6.71570E-13	5.73720E-13	5.64080E-13	5.58370E-13	5.00570E-13	4.06720E-13	2.69110E-12	8.19640E-14
37	5.13800E-13	4.36280E-13	4.19760E-13	4.10970E-13	3.73470E-13	3.01150E-13	1.91800E-12	5.94550E-14
38	3.96720E-13	3.33440E-13	3.21460E-13	3.13150E-13	2.77870E-13	2.21500E-13	1.43580E-12	4.28980E-14
39	3.13160E-13	2.61740E-13	2.48340E-13	2.39890E-13	2.15440E-13	1.71230E-13	1.07220E-12	3.28010E-14
40	2.54990E-13	2.11210E-13	2.00360E-13	1.92770E-13	1.69850E-13	1.33800E-13	8.55030E-13	2.52200E-14
41	2.29880E-13	1.89050E-13	1.77020E-13	1.69010E-13	1.50280E-13	1.18240E-13	7.31690E-13	2.20450E-14
42	2.23970E-13	1.81290E-13	1.68880E-13	1.59860E-13	1.39000E-13	1.08230E-13	6.74960E-13	1.99700E-14

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-REVINET-LIH) (N,γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	6.45370E-14	1.43520E-13	2.30750E-12	4.33180E-12	9.27090E-12	1.22930E-11	1.44480E-11	2.42120E-11
2	3.44290E-14	8.60710E-14	1.55970E-12	3.02420E-12	6.76300E-12	8.96940E-12	1.04140E-11	1.67400E-11
3	1.94830E-14	5.00110E-14	9.01860E-13	1.82190E-12	4.19830E-12	5.72880E-12	6.76810E-12	1.10740E-11
4	1.12010E-14	2.88750E-14	5.33950E-13	1.06900E-12	2.50350E-12	3.43090E-12	4.00950E-12	6.50380E-12
5	6.71540E-15	1.72880E-14	3.19340E-13	6.45760E-13	1.47240E-12	2.01370E-12	2.42500E-12	3.96230E-12
6	3.80550E-15	9.75090E-15	1.85660E-13	3.75940E-13	8.75090E-13	1.19460E-12	1.41100E-12	2.34810E-12
7	2.33640E-15	5.99120E-15	1.11490E-13	2.25520E-13	5.26800E-13	7.27430E-13	8.64090E-13	1.42570E-12
8	1.39750E-15	3.54320E-15	6.76260E-14	1.35920E-13	3.15590E-13	4.32130E-13	5.12390E-13	8.35070E-13
9	8.77710E-16	2.25040E-15	4.25150E-14	8.53670E-14	1.97990E-13	2.71930E-13	3.22660E-13	5.31520E-13
10	5.42170E-16	1.36840E-15	2.58150E-14	5.16920E-14	1.19410E-13	1.62850E-13	1.92280E-13	3.12640E-13
11	3.66060E-16	9.49630E-16	1.80260E-14	3.60150E-14	8.26950E-14	1.12670E-13	1.33260E-13	2.16940E-13
12	3.01840E-16	7.28560E-16	1.36810E-14	2.55580E-14	5.48980E-14	7.00430E-14	7.76790E-14	1.22320E-13
13	2.17930E-13	3.78040E-13	2.31440E-13	6.00460E-14	1.08990E-13	1.25090E-13	1.19230E-13	1.70900E-13
14	1.14810E-11	1.47950E-11	2.30120E-11	7.86330E-11	1.92730E-10	1.62680E-10	2.15490E-10	1.59320E-10
15	1.47720E-11	1.78640E-11	2.73530E-11	7.19610E-11	1.16820E-10	1.04220E-10	2.40670E-11	5.76470E-11
16	1.86650E-11	2.15280E-11	3.22910E-11	7.09740E-11	7.38060E-11	7.05210E-11	3.56430E-12	2.28090E-11
17	2.34120E-11	2.60080E-11	3.84560E-11	6.93360E-11	4.83860E-11	4.40390E-11	9.95350E-13	9.48660E-12
18	2.92290E-11	3.14610E-11	4.58420E-11	6.98090E-11	3.37570E-11	2.98190E-11	5.21550E-13	4.07750E-12
19	3.63580E-11	3.80940E-11	5.47700E-11	7.08510E-11	2.32950E-11	2.01490E-11	3.35600E-13	1.79560E-12
20	4.51050E-11	4.61690E-11	6.55600E-11	7.39980E-11	1.87990E-11	1.40140E-11	2.32700E-13	8.11080E-13
21	5.58300E-11	5.60130E-11	7.86440E-11	7.90520E-11	1.60700E-11	1.03180E-11	1.69060E-13	3.95910E-13
22	6.89900E-11	6.80310E-11	9.45510E-11	8.75270E-11	1.61500E-11	8.52170E-12	1.48890E-13	2.52130E-13
23	8.51560E-11	8.27590E-11	1.13980E-10	1.00840E-10	1.84970E-11	9.52520E-12	1.41670E-13	3.68360E-13
24	1.05050E-10	1.00880E-10	1.37870E-10	1.22090E-10	2.55370E-11	1.53820E-11	2.65850E-13	1.10150E-12
25	1.29590E-10	1.23330E-10	1.67440E-10	1.56920E-10	4.43400E-11	3.22400E-11	5.49640E-13	3.97110E-12
26	1.59980E-10	1.51390E-10	2.04470E-10	2.14460E-10	9.20400E-11	7.68800E-11	1.65730E-12	1.54390E-11
27	1.97830E-10	1.86990E-10	2.51650E-10	3.16790E-10	2.27850E-10	1.96120E-10	9.71520E-12	6.24940E-11
28	2.45000E-10	2.32840E-10	3.12750E-10	4.96740E-10	6.04420E-10	5.17420E-10	1.13550E-10	2.67170E-10
29	3.05110E-10	2.96820E-10	3.99600E-10	8.86100E-10	1.90570E-09	1.54310E-09	1.78200E-09	1.26040E-09
30	8.35380E-12	1.08820E-11	5.78310E-12	1.01650E-12	1.62640E-12	1.69400E-12	1.48790E-12	2.00940E-12
31	7.45980E-15	1.52730E-14	2.25200E-13	3.55550E-13	6.72930E-13	7.88110E-13	8.26180E-13	1.23890E-12
32	3.74280E-15	9.92560E-15	1.60500E-13	3.15160E-13	6.73210E-13	8.65590E-13	9.87120E-13	1.56450E-12
33	2.16320E-15	5.56710E-15	9.36470E-14	1.87220E-13	4.36140E-13	5.91480E-13	6.89780E-13	1.11940E-12
34	1.29460E-15	3.40250E-15	5.62250E-14	1.14950E-13	2.66040E-13	3.66700E-13	4.37590E-13	7.16240E-13
35	8.38070E-16	2.08900E-15	3.43460E-14	6.89580E-14	1.61240E-13	2.21000E-13	2.61110E-13	4.27870E-13
36	5.28410E-16	1.37740E-15	2.24100E-14	4.50720E-14	1.03400E-13	1.41700E-13	1.67210E-13	2.72920E-13
37	3.75630E-16	9.33830E-16	1.51510E-14	2.97070E-14	6.82690E-14	9.26000E-14	1.11030E-13	1.82170E-13
38	2.64860E-16	6.59930E-16	1.05410E-14	2.11250E-14	4.79760E-14	6.52280E-14	7.54510E-14	1.22250E-13
39	1.95530E-16	4.85200E-16	7.79020E-15	1.50340E-14	3.41630E-14	4.59710E-14	5.45020E-14	8.91980E-14
40	1.50650E-16	3.76690E-16	6.03790E-15	1.18610E-14	2.65710E-14	3.58290E-14	4.20910E-14	6.82630E-14
41	1.24000E-16	3.00730E-16	4.80760E-15	9.30730E-15	2.09680E-14	2.79670E-14	3.25890E-14	5.26110E-14
42	9.43430E-17	2.30580E-16	3.58830E-15	6.67850E-15	1.44820E-14	1.90990E-14	2.20570E-14	3.55820E-14

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,Y) REACTIONS

INT.	GRP. 25	GRP. 26	GRP. 27
1	2.38790E-11	2.46030E-11	1.04340E-10
2	1.53670E-11	1.48870E-11	4.88240E-11
3	1.02270E-11	9.55950E-12	3.04290E-11
4	5.95350E-12	5.64610E-12	1.80430E-11
5	3.69170E-12	3.46000E-12	1.10370E-11
6	2.16250E-12	2.06700E-12	6.48750E-12
7	1.33110E-12	1.27840E-12	4.01790E-12
8	7.65650E-13	7.19340E-13	2.30400E-12
9	4.89410E-13	4.72370E-13	1.50990E-12
10	2.92430E-13	2.68750E-13	8.31980E-13
11	1.98490E-13	1.89750E-13	6.16490E-13
12	1.13140E-13	1.04910E-13	3.17300E-13
13	1.93070E-13	1.81390E-13	5.28430E-13
14	1.56460E-11	1.02970E-11	2.01750E-11
15	1.46390E-11	9.56990E-12	1.27350E-11
16	1.47120E-11	9.48330E-12	8.91240E-12
17	1.49780E-11	9.51760E-12	6.59120E-12
18	1.54880E-11	9.70580E-12	4.94250E-12
19	1.62450E-11	1.00440E-11	3.90930E-12
20	1.73040E-11	1.05630E-11	3.15040E-12
21	1.87670E-11	1.13210E-11	2.68690E-12
22	2.08090E-11	1.24220E-11	2.45450E-12
23	2.37230E-11	1.40420E-11	2.54320E-12
24	2.79980E-11	1.64800E-11	3.13050E-12
25	3.44640E-11	2.02450E-11	4.76430E-12
26	4.45690E-11	2.62410E-11	8.54790E-12
27	6.10000E-11	3.61630E-11	1.80620E-11
28	8.86620E-11	5.31130E-11	4.17170E-11
29	1.40840E-10	8.60530E-11	1.12630E-10
30	2.52690E-12	2.20530E-12	4.51400E-12
31	1.15030E-12	1.06920E-12	3.24960E-12
32	1.38120E-12	1.29920E-12	4.20660E-12
33	1.04790E-12	9.85220E-13	2.99090E-12
34	6.50670E-13	6.18550E-13	1.96900E-12
35	4.00830E-13	3.75730E-13	1.16400E-12
36	2.49150E-13	2.37860E-13	7.54820E-13
37	1.67970E-13	1.56850E-13	4.90390E-13
38	1.12610E-13	1.07500E-13	3.45710E-13
39	8.23730E-14	7.75570E-14	2.34880E-13
40	6.20330E-14	5.85850E-14	1.85470E-13
41	4.88800E-14	4.58800E-14	1.48900E-13
42	3.20310E-14	3.01680E-14	8.88300E-14

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,γ)(N,N',γ) REACTIONS

INT.	GRP. 1	GRP. 2	GRP. 3	GRP. 4	GRP. 5	GRP. 6	GRP. 7	GRP. 8
1	8.05530E-13	4.19560E-12	3.70370E-13	2.91510E-13	5.47010E-13	8.59230E-13	1.00280E-12	1.10880E-12
2	4.22350E-13	2.09620E-12	2.20070E-13	1.30360E-13	2.66650E-13	4.05700E-13	4.79230E-13	5.50780E-13
3	2.54840E-13	1.22750E-12	1.46230E-13	7.22960E-14	1.49200E-13	2.21180E-13	2.63920E-13	3.11850E-13
4	1.69050E-13	7.95870E-13	1.03870E-13	4.53560E-14	9.07180E-14	1.31240E-13	1.57680E-13	1.89990E-13
5	1.18800E-13	5.47550E-13	7.70790E-14	3.03750E-14	6.01100E-14	8.22460E-14	9.91740E-14	1.24610E-13
6	8.68500E-14	3.91620E-13	5.71120E-14	2.11180E-14	3.76100E-14	5.45710E-14	6.60050E-14	7.71450E-14
7	6.39380E-14	2.82190E-13	4.38780E-14	1.50800E-14	2.56600E-14	3.46940E-14	4.19160E-14	5.19040E-14
8	4.85010E-14	2.09430E-13	3.36400E-14	1.08770E-14	1.78360E-14	2.36550E-14	2.85260E-14	3.49300E-14
9	3.70270E-14	1.56290E-13	2.60930E-14	8.02960E-15	1.27650E-14	1.62970E-14	1.95320E-14	2.43280E-14
10	2.85800E-14	1.18030E-13	2.03130E-14	5.97170E-15	9.18000E-15	1.15260E-14	1.37500E-14	1.68570E-14
11	2.22560E-14	8.98820E-14	1.59250E-14	4.50520E-15	6.71770E-15	8.18080E-15	9.68480E-15	1.19580E-14
12	1.76290E-14	6.96730E-14	1.26480E-14	3.46720E-15	5.02070E-15	5.99500E-15	7.05280E-15	8.60860E-15
13	1.56020E-13	4.73190E-13	3.96580E-13	1.44580E-12	1.69510E-12	1.55870E-12	1.44000E-12	1.23560E-12
14	2.96940E-13	1.38780E-12	1.43150E-12	6.38260E-12	8.92030E-12	7.78540E-12	6.74730E-12	6.13730E-12
15	3.59680E-13	1.66970E-12	1.70240E-12	7.65890E-12	1.06880E-11	9.34790E-12	8.13160E-12	7.39240E-12
16	4.35370E-13	2.00980E-12	2.03070E-12	9.19480E-12	1.28190E-11	1.12370E-11	9.82150E-12	8.94900E-12
17	5.27660E-13	2.42340E-12	2.42950E-12	1.10550E-11	1.54000E-11	1.35330E-11	1.18890E-11	1.08660E-11
18	6.41010E-13	2.92970E-12	2.91610E-12	1.33190E-11	1.85430E-11	1.63360E-11	1.44290E-11	1.32320E-11
19	7.81080E-13	3.55270E-12	3.51250E-12	1.60880E-11	2.23850E-11	1.97740E-11	1.75600E-11	1.61590E-11
20	9.55240E-13	4.32320E-12	4.24750E-12	1.94940E-11	2.71080E-11	2.40110E-11	2.14400E-11	1.97960E-11
21	1.17330E-12	5.28380E-12	5.15920E-12	2.37090E-11	3.29480E-11	2.92660E-11	2.62760E-11	2.43450E-11
22	1.44810E-12	6.48860E-12	6.29790E-12	2.89590E-11	4.02150E-11	3.58240E-11	3.23410E-11	3.00690E-11
23	1.79780E-12	8.01340E-12	7.73290E-12	3.55540E-11	4.93340E-11	4.40750E-11	4.00100E-11	3.73300E-11
24	2.24730E-12	9.96290E-12	9.55980E-12	4.39180E-11	6.08800E-11	5.45510E-11	4.97940E-11	4.66240E-11
25	2.83210E-12	1.24860E-11	1.19150E-11	5.46540E-11	7.56750E-11	6.80090E-11	6.24240E-11	5.86630E-11
26	3.60420E-12	1.58010E-11	1.49980E-11	6.86310E-11	9.48950E-11	8.55330E-11	7.89460E-11	7.44710E-11
27	4.64500E-12	2.02450E-11	1.91200E-11	8.71830E-11	1.20350E-10	1.08810E-10	1.01010E-10	9.56760E-11
28	6.07240E-12	2.63170E-11	2.47500E-11	1.12270E-10	1.54680E-10	1.40300E-10	1.31040E-10	1.24710E-10
29	8.14580E-12	3.51170E-11	3.29460E-11	1.48170E-10	2.03660E-10	1.85440E-10	1.74540E-10	1.67270E-10
30	4.08720E-12	1.21030E-11	9.58510E-12	3.68810E-11	4.10110E-11	3.70620E-11	3.45490E-11	2.91460E-11
31	3.86170E-13	1.47210E-12	4.64440E-13	9.88020E-13	1.34870E-12	1.58680E-12	2.07600E-12	2.47770E-12
32	3.11840E-13	1.16650E-12	3.94210E-13	7.78520E-13	1.02340E-12	1.17760E-12	1.51620E-12	1.80090E-12
33	2.56640E-13	9.40860E-13	3.34650E-13	6.15680E-13	7.91910E-13	8.92140E-13	1.13330E-12	1.34220E-12
34	2.12850E-13	7.64090E-13	2.84290E-13	4.93150E-13	6.12980E-13	6.75810E-13	8.45940E-13	9.95390E-13
35	1.78360E-13	6.26990E-13	2.42510E-13	3.96490E-13	4.79950E-13	5.18690E-13	6.41000E-13	7.50210E-13
36	1.51120E-13	5.19980E-13	2.08040E-13	3.21770E-13	3.77860E-13	4.00260E-13	4.88020E-13	5.66890E-13
37	1.29770E-13	4.37110E-13	1.79970E-13	2.63310E-13	3.00920E-13	3.12990E-13	3.77070E-13	4.35040E-13
38	1.13370E-13	3.73770E-13	1.57500E-13	2.18130E-13	2.42410E-13	2.47580E-13	2.94680E-13	3.37200E-13
39	1.01240E-13	3.26760E-13	1.40260E-13	1.83930E-13	1.99100E-13	1.99990E-13	2.35420E-13	2.67290E-13
40	9.30400E-14	2.93950E-13	1.28670E-13	1.60610E-13	1.69310E-13	1.67240E-13	1.94560E-13	2.18840E-13
41	8.90180E-14	2.75330E-13	1.27190E-13	1.55430E-13	1.59750E-13	1.55310E-13	1.78600E-13	1.98760E-13
42	8.95280E-14	2.70630E-13	1.38400E-13	1.71210E-13	1.70470E-13	1.61450E-13	1.81180E-13	1.97470E-13

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N, γ) (N,N',γ) REACTIONS

INT.	GRP. 9	GRP. 10	GRP. 11	GRP. 12	GRP. 13	GRP. 14	GRP. 15	GRP. 16
1	1.33600E-12	1.61450E-12	1.88120E-12	1.89750E-12	1.55730E-12	1.23580E-12	5.92270E-12	2.22360E-13
2	6.79900E-13	7.68420E-13	8.83960E-13	9.14260E-13	7.95780E-13	6.41980E-13	3.88970E-12	1.21050E-13
3	3.91170E-13	4.22130E-13	4.79960E-13	5.02490E-13	4.50840E-13	3.67820E-13	2.31520E-12	7.21610E-14
4	2.40800E-13	2.51350E-13	2.82400E-13	2.96770E-13	2.70410E-13	2.22010E-13	1.42670E-12	4.45730E-14
5	1.58820E-13	1.57330E-13	1.74530E-13	1.83260E-13	1.68290E-13	1.41570E-13	9.18700E-13	2.86940E-14
6	9.86470E-14	1.03140E-13	1.13260E-13	1.18640E-13	1.09310E-13	8.59910E-14	5.60090E-13	1.74210E-14
7	6.63770E-14	6.48530E-14	7.00460E-14	7.30420E-14	6.73720E-14	5.60530E-14	3.65470E-13	1.13720E-14
8	4.45840E-14	4.29390E-14	4.66210E-14	4.83790E-14	4.45950E-14	3.64960E-14	2.37970E-13	7.37060E-15
9	3.10130E-14	2.94700E-14	3.09160E-14	3.18210E-14	2.92020E-14	2.38850E-14	1.55190E-13	4.79080E-15
10	2.14100E-14	2.00550E-14	2.12390E-14	2.17600E-14	1.99560E-14	1.63060E-14	1.06020E-13	3.25370E-15
11	1.51360E-14	1.40310E-14	1.44760E-14	1.47600E-14	1.35290E-14	1.10680E-14	7.22330E-14	2.26880E-15
12	1.08330E-14	9.99990E-15	1.05110E-14	1.08720E-14	1.02090E-14	8.78180E-15	5.98100E-14	1.90670E-15
13	6.49680E-13	1.97220E-13	1.86520E-13	1.93780E-13	1.41500E-13	8.91100E-15	2.43500E-14	3.90270E-14
14	5.68390E-12	4.40020E-12	3.12060E-12	1.95470E-12	1.27170E-12	1.31750E-12	2.98580E-12	3.47430E-12
15	6.84650E-12	5.33710E-12	3.84440E-12	2.43660E-12	1.58940E-12	1.67080E-12	3.80430E-12	4.42430E-12
16	8.29610E-12	6.51650E-12	4.73980E-12	3.02740E-12	1.97030E-12	2.08500E-12	4.75810E-12	5.54870E-12
17	1.00860E-11	7.98300E-12	5.85290E-12	3.76220E-12	2.43890E-12	2.58820E-12	5.90870E-12	6.90750E-12
18	1.22980E-11	9.80850E-12	7.24450E-12	4.68330E-12	3.02180E-12	3.20800E-12	7.31380E-12	8.56100E-12
19	1.50410E-11	1.20890E-11	8.99140E-12	5.84450E-12	3.75200E-12	3.97700E-12	9.03940E-12	1.05790E-11
20	1.84580E-11	1.49480E-11	1.11950E-11	7.31640E-12	4.67280E-12	4.93760E-12	1.11710E-11	1.30520E-11
21	2.27440E-11	1.85580E-11	1.39950E-11	9.19390E-12	5.84270E-12	6.14570E-12	1.38190E-11	1.60920E-11
22	2.81530E-11	2.31470E-11	1.75730E-11	1.16070E-11	7.34040E-12	7.67690E-12	1.71300E-11	1.98450E-11
23	3.50370E-11	2.90260E-11	2.21840E-11	1.47290E-11	9.27660E-12	9.63830E-12	2.13140E-11	2.45140E-11
24	4.38800E-11	3.66310E-11	2.81790E-11	1.88140E-11	1.18090E-11	1.21820E-11	2.66680E-11	3.03770E-11
25	5.53820E-11	4.65870E-11	3.60720E-11	2.42240E-11	1.51730E-11	1.55370E-11	3.36470E-11	3.78480E-11
26	7.05510E-11	5.98060E-11	4.66000E-11	3.14840E-11	1.97240E-11	2.00600E-11	4.29740E-11	4.75700E-11
27	9.10120E-11	7.77670E-11	6.09690E-11	4.14700E-11	2.60630E-11	2.63620E-11	5.59100E-11	6.06280E-11
28	1.19190E-10	1.02680E-10	8.09530E-11	5.54680E-11	3.51440E-11	3.54450E-11	7.46410E-11	7.88410E-11
29	1.60950E-10	1.39950E-10	1.10870E-10	7.65480E-11	4.91940E-11	4.95470E-11	1.04070E-10	1.06030E-10
30	1.59110E-11	9.52520E-12	1.04600E-11	1.17920E-11	9.82990E-12	1.32640E-12	8.20700E-13	1.31880E-12
31	2.95410E-12	2.75680E-12	2.93770E-12	3.22360E-12	3.20340E-12	3.09470E-12	2.29630E-11	7.89870E-13
32	2.14860E-12	1.93150E-12	2.02300E-12	2.12650E-12	2.01890E-12	1.89850E-12	1.33750E-11	4.46180E-13
33	1.60060E-12	1.42170E-12	1.42600E-12	1.46470E-12	1.39080E-12	1.19120E-12	8.60050E-12	2.81730E-13
34	1.18510E-12	1.03350E-12	1.04280E-12	1.05610E-12	9.63030E-13	8.11700E-13	5.49950E-12	1.74460E-13
35	8.91390E-13	7.71550E-13	7.55330E-13	7.53500E-13	6.96390E-13	5.75050E-13	3.78130E-12	1.20040E-13
36	6.71570E-13	5.73720E-13	5.64080E-13	5.58370E-13	5.00570E-13	4.06720E-13	2.69110E-12	8.19640E-14
37	5.13800E-13	4.36280E-13	4.19760E-13	4.10970E-13	3.73470E-13	3.01150E-13	1.91800E-12	5.94550E-14
38	3.96720E-13	3.33440E-13	3.21460E-13	3.13150E-13	2.77870E-13	2.21500E-13	1.43580E-12	4.28980E-14
39	3.13160E-13	2.61740E-13	2.48340E-13	2.39890E-13	2.15440E-13	1.71230E-13	1.07220E-12	3.28010E-14
40	2.54990E-13	2.11210E-13	2.00360E-13	1.92770E-13	1.69850E-13	1.33800E-13	8.55030E-13	2.52200E-14
41	2.29880E-13	1.89050E-13	1.77020E-13	1.69010E-13	1.50280E-13	1.18240E-13	7.31690E-13	2.20450E-14
42	2.23970E-13	1.81290E-13	1.68880E-13	1.59860E-13	1.39000E-13	1.08230E-13	6.74960E-13	1.99700E-14

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 17	GRP. 18	GRP. 19	GRP. 20	GRP. 21	GRP. 22	GRP. 23	GRP. 24
1	6.45370E-14	1.43520E-13	2.30750E-12	4.33180E-12	9.27090E-12	1.22930E-11	1.44480E-11	2.42120E-11
2	3.44290E-14	8.60710E-14	1.55970E-12	3.02420E-12	6.76300E-12	8.96940E-12	1.04140E-11	1.67400E-11
3	1.94830E-14	5.00110E-14	9.01860E-13	1.82190E-12	4.19830E-12	5.72880E-12	6.76810E-12	1.10740E-11
4	1.12010E-14	2.88750E-14	5.33950E-13	1.06900E-12	2.50350E-12	3.43090E-12	4.00950E-12	6.50380E-12
5	6.71540E-15	1.72880E-14	3.19340E-13	6.45760E-13	1.47240E-12	2.01370E-12	2.42500E-12	3.96230E-12
6	3.80550E-15	9.75090E-15	1.85660E-13	3.75940E-13	8.75090E-13	1.19460E-12	1.41100E-12	2.34810E-12
7	2.33640E-15	5.99120E-15	1.11490E-13	2.25520E-13	5.26800E-13	7.27430E-13	8.64090E-13	1.42570E-12
8	1.39750E-15	3.54320E-15	6.76260E-14	1.35920E-13	3.15590E-13	4.32130E-13	5.12390E-13	8.35070E-13
9	8.77710E-16	2.25040E-15	4.25150E-14	8.53670E-14	1.97990E-13	2.71930E-13	3.22660E-13	5.31520E-13
10	5.42170E-16	1.36840E-15	2.58150E-14	5.16920E-14	1.19410E-13	1.62850E-13	1.92280E-13	3.12640E-13
11	3.66060E-16	9.49630E-16	1.80260E-14	3.60150E-14	8.26950E-14	1.12670E-13	1.33260E-13	2.16940E-13
12	3.01840E-16	7.28560E-16	1.36810E-14	2.55580E-14	5.48980E-14	7.00430E-14	7.76790E-14	1.22320E-13
13	2.17930E-13	3.78040E-13	2.31440E-13	6.00460E-14	1.08990E-13	1.25090E-13	1.19230E-13	1.70900E-13
14	1.14850E-11	1.47950E-11	2.30120E-11	7.86330E-11	1.92730E-10	1.62680E-10	2.15490E-10	1.59320E-10
15	1.47790E-11	1.78640E-11	2.73530E-11	7.19610E-11	1.16820E-10	1.04220E-10	2.40670E-11	5.76470E-11
16	1.86770E-11	2.15280E-11	3.22910E-11	7.09740E-11	7.38060E-11	7.05210E-11	3.56430E-12	2.28090E-11
17	2.34330E-11	2.60080E-11	3.84560E-11	6.93360E-11	4.83860E-11	4.40390E-11	9.95350E-13	9.48660E-12
18	2.92660E-11	3.14610E-11	4.58420E-11	6.98090E-11	3.37570E-11	2.98190E-11	5.21550E-13	4.07750E-12
19	3.64230E-11	3.80940E-11	5.47700E-11	7.08510E-11	2.32950E-11	2.01490E-11	3.35600E-13	1.79560E-12
20	4.52190E-11	4.61690E-11	6.55600E-11	7.39980E-11	1.87990E-11	1.40140E-11	2.32700E-13	8.11080E-13
21	5.60310E-11	5.60130E-11	7.86440E-11	7.90520E-11	1.60700E-11	1.03180E-11	1.69060E-13	3.95910E-13
22	6.93470E-11	6.80310E-11	9.45510E-11	8.75270E-11	1.61500E-11	8.52170E-12	1.48890E-13	2.52130E-13
23	8.57960E-11	8.27590E-11	1.13980E-10	1.00840E-10	1.84970E-11	9.52520E-12	1.41670E-13	3.68360E-13
24	1.06210E-10	1.00880E-10	1.37870E-10	1.22090E-10	2.55370E-11	1.53820E-11	2.65850E-13	1.10150E-12
25	1.31710E-10	1.23330E-10	1.67440E-10	1.56920E-10	4.43400E-11	3.22400E-11	5.49640E-13	3.97110E-12
26	1.63930E-10	1.51390E-10	2.04470E-10	2.14460E-10	9.20400E-11	7.68800E-11	1.65730E-12	1.54390E-11
27	2.05360E-10	1.86990E-10	2.51650E-10	3.16790E-10	2.27850E-10	1.96120E-10	9.71520E-12	6.24940E-11
28	2.59720E-10	2.32840E-10	3.12750E-10	4.96740E-10	6.04420E-10	5.17420E-10	1.13550E-10	2.67170E-10
29	3.35020E-10	2.96820E-10	3.99600E-10	8.86100E-10	1.90570E-09	1.54310E-09	1.78200E-09	1.26040E-09
30	8.35380E-12	1.08820E-11	5.78310E-12	1.01650E-12	1.62640E-12	1.69400E-12	1.48790E-12	2.00940E-12
31	7.45980E-15	1.52730E-14	2.25200E-13	3.55550E-13	6.72930E-13	7.88110E-13	8.26180E-13	1.23890E-12
32	3.74280E-15	9.92560E-15	1.60500E-13	3.15160E-13	6.73210E-13	8.65590E-13	9.87120E-13	1.56450E-12
33	2.16320E-15	5.56710E-15	9.36470E-14	1.87220E-13	4.36140E-13	5.91480E-13	6.89780E-13	1.11940E-12
34	1.29460E-15	3.40250E-15	5.62250E-14	1.14950E-13	2.66040E-13	3.66700E-13	4.37590E-13	7.16240E-13
35	8.38070E-16	2.08900E-15	3.43460E-14	6.89580E-14	1.61240E-13	2.21000E-13	2.61110E-13	4.27870E-13
36	5.28410E-16	1.37740E-15	2.24100E-14	4.50720E-14	1.03400E-13	1.41700E-13	1.67210E-13	2.72920E-13
37	3.75630E-16	9.33830E-16	1.51510E-14	2.97070E-14	6.82690E-14	9.26000E-14	1.11030E-13	1.82170E-13
38	2.64860E-16	6.59930E-16	1.05410E-14	2.11250E-14	4.79760E-14	6.52280E-14	7.54510E-14	1.22250E-13
39	1.95530E-16	4.85200E-16	7.79020E-15	1.50340E-14	3.41630E-14	4.59710E-14	5.45020E-14	8.91980E-14
40	1.50650E-16	3.76690E-16	6.03790E-15	1.18610E-14	2.65710E-14	3.58290E-14	4.20910E-14	6.82630E-14
41	1.24000E-16	3.00730E-16	4.80760E-15	9.30730E-15	2.09680E-14	2.79670E-14	3.25890E-14	5.26110E-14
42	9.43430E-17	2.30580E-16	3.58830E-15	6.67850E-15	1.44820E-14	1.90990E-14	2.20570E-14	3.55820E-14

NEUTRON CONTRIBUTION TO GAMMA DOSE

CONFIGURATION 4 (LIH-HEVIMET-LIH) (N,γ) (N,N',γ) REACTIONS

INT.	GRP. 25	GRP. 26	GRP. 27
1	2.38790E-11	2.46030E-11	1.04340E-10
2	1.53670E-11	1.48870E-11	4.88240E-11
3	1.02270E-11	9.55950E-12	3.04290E-11
4	5.95350E-12	5.64610E-12	1.80430E-11
5	3.69170E-12	3.46000E-12	1.10370E-11
6	2.16250E-12	2.06700E-12	6.48750E-12
7	1.33110E-12	1.27840E-12	4.01790E-12
8	7.65650E-13	7.19340E-13	2.30400E-12
9	4.89410E-13	4.72370E-13	1.50990E-12
10	2.92430E-13	2.68750E-13	8.31980E-13
11	1.98490E-13	1.89750E-13	6.16490E-13
12	1.13140E-13	1.04910E-13	3.17300E-13
13	1.93070E-13	1.81390E-13	5.28430E-13
14	1.56460E-11	1.02970E-11	2.01750E-11
15	1.46390E-11	9.56990E-12	1.27350E-11
16	1.47120E-11	9.48330E-12	8.91240E-12
17	1.49780E-11	9.51760E-12	6.59120E-12
18	1.54880E-11	9.70580E-12	4.94250E-12
19	1.62450E-11	1.00440E-11	3.90930E-12
20	1.73040E-11	1.05630E-11	3.15040E-12
21	1.87670E-11	1.13210E-11	2.68690E-12
22	2.08090E-11	1.24220E-11	2.45450E-12
23	2.37230E-11	1.40420E-11	2.54320E-12
24	2.79980E-11	1.64800E-11	3.13050E-12
25	3.44640E-11	2.02450E-11	4.76430E-12
26	4.45690E-11	2.62410E-11	8.54790E-12
27	6.10000E-11	3.61630E-11	1.80620E-11
28	8.86620E-11	5.31130E-11	4.17170E-11
29	1.40840E-10	8.60530E-11	1.12630E-10
30	2.52690E-12	2.20530E-12	4.51400E-12
31	1.15030E-12	1.06920E-12	3.24960E-12
32	1.38120E-12	1.29920E-12	4.20660E-12
33	1.04790E-12	9.85220E-13	2.99090E-12
34	6.50670E-13	6.18550E-13	1.96900E-12
35	4.00830E-13	3.75730E-13	1.16400E-12
36	2.49150E-13	2.37860E-13	7.54820E-13
37	1.67970E-13	1.56850E-13	4.90390E-13
38	1.12610E-13	1.07500E-13	3.45710E-13
39	8.23730E-14	7.75570E-14	2.34880E-13
40	6.20330E-14	5.85850E-14	1.85470E-13
41	4.88800E-14	4.58800E-14	1.48900E-13
42	3.20310E-14	3.01680E-14	8.88300E-14

APPENDIX B. GRAPHS OF DOSE CONTRIBUTIONS

This appendix presents in graphical form the results of the calculations for all energy intervals and selected spacial intervals in the Hevimet for all four configurations. Two figures are given for each configuration; the first one presents the contributions to the gamma-ray dose by neutron capture reactions (n,γ) and the second one the contributions to the gamma-ray dose by all neutron reactions $(n,\gamma + n,n'\gamma)$. The reader is referred to Table 1 for the energy group structure.

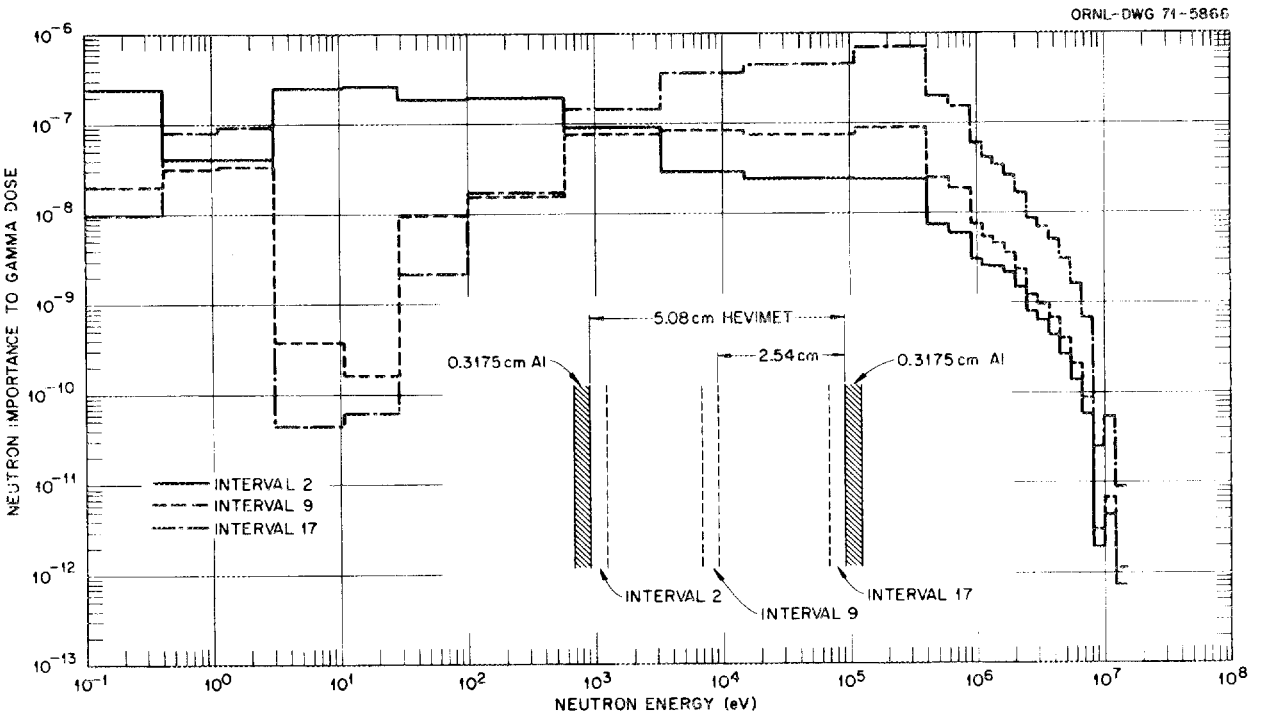

Fig. B1. Spacial and Energy Dependence of Neutron Capture Reactions Contributing to Exit Gamma-Ray Dose in Configuration 1.

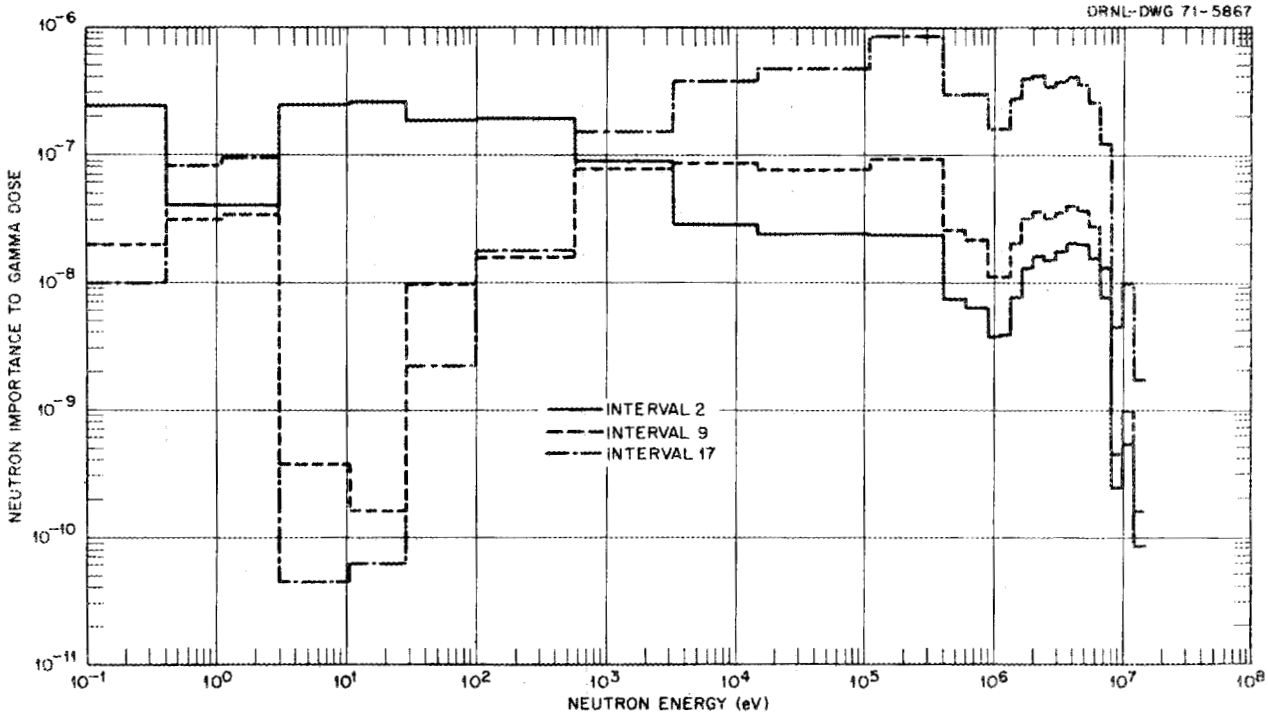

Fig. B2. Spacial and Energy Dependence of All Neutron Reactions (Captures Plus Inelastic Scatterings) Contributing to Exit Gamma-Ray Dose in Configuration 1.

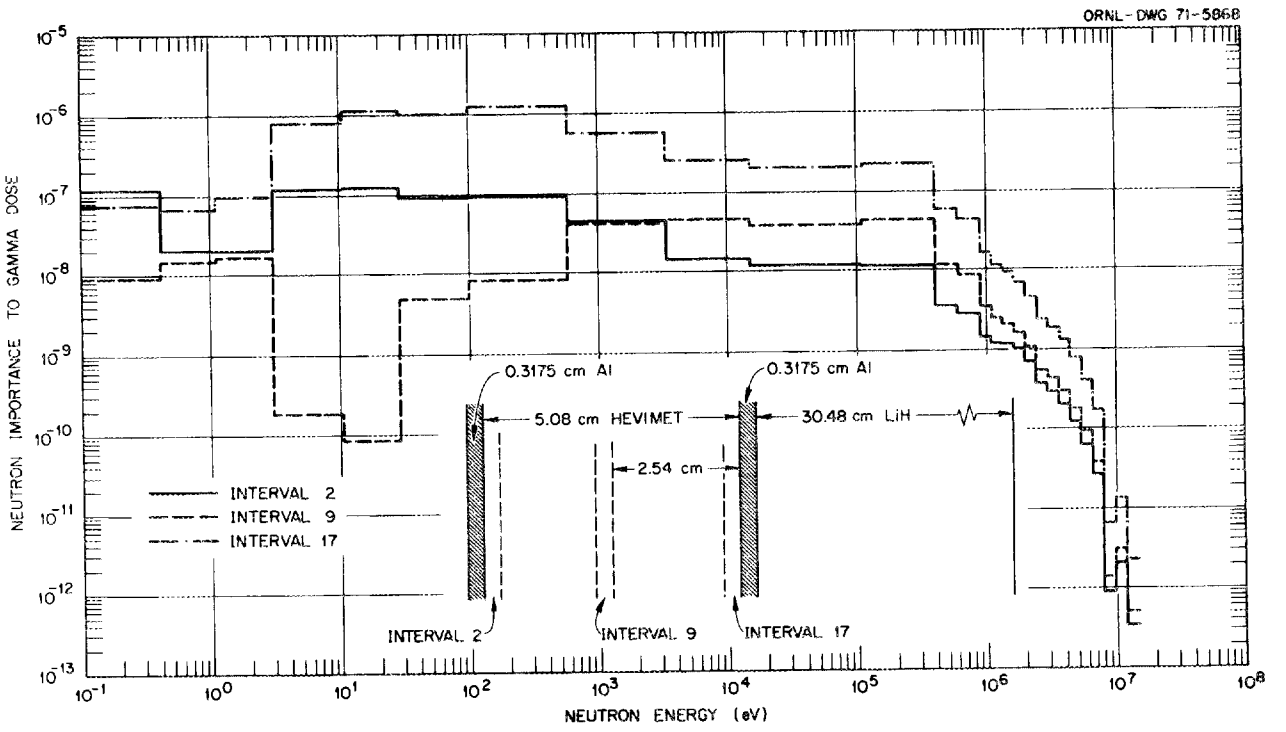

Fig. B3. Spacial and Energy Dependence of Neutron Capture Reactions Contributing to Exit Gamma-Ray Dose in Configuration 2.

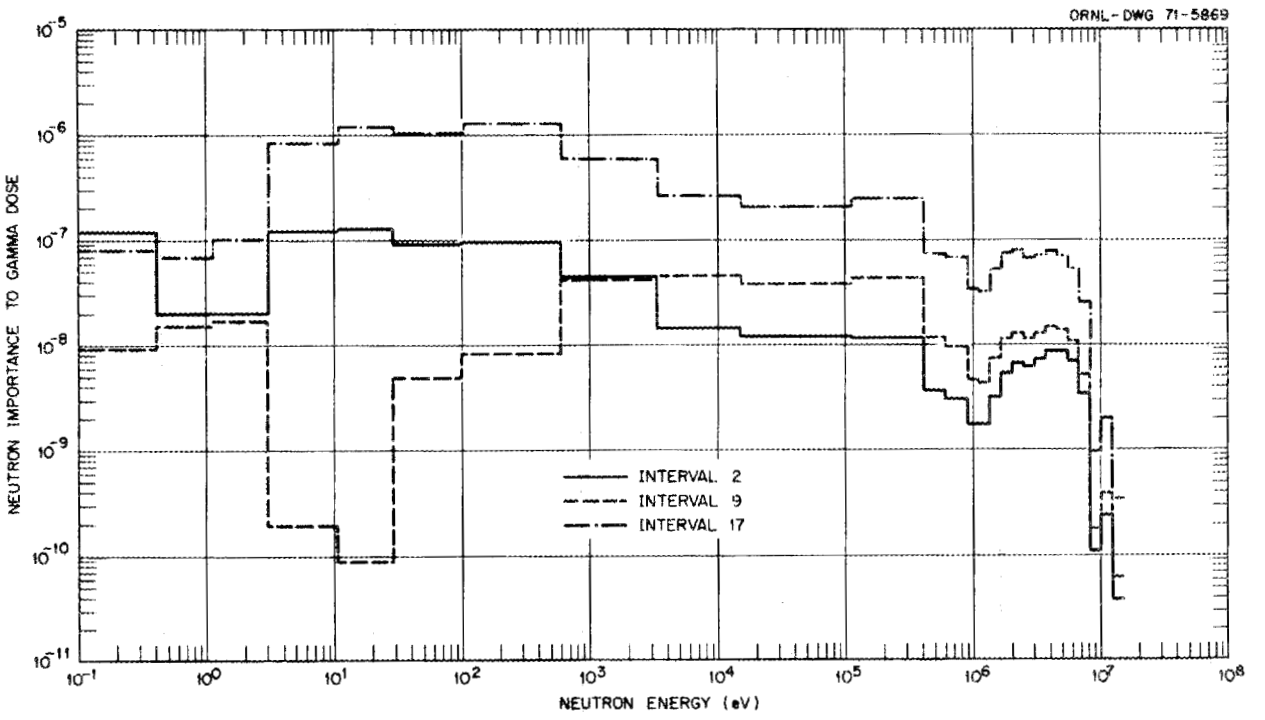

Fig. B4. Spacial and Energy Dependence of All Neutron Reactions (Captures Plus Inelastic Scatterings) Contributing to Exit Gamma-Ray Dose in Configuration 2.

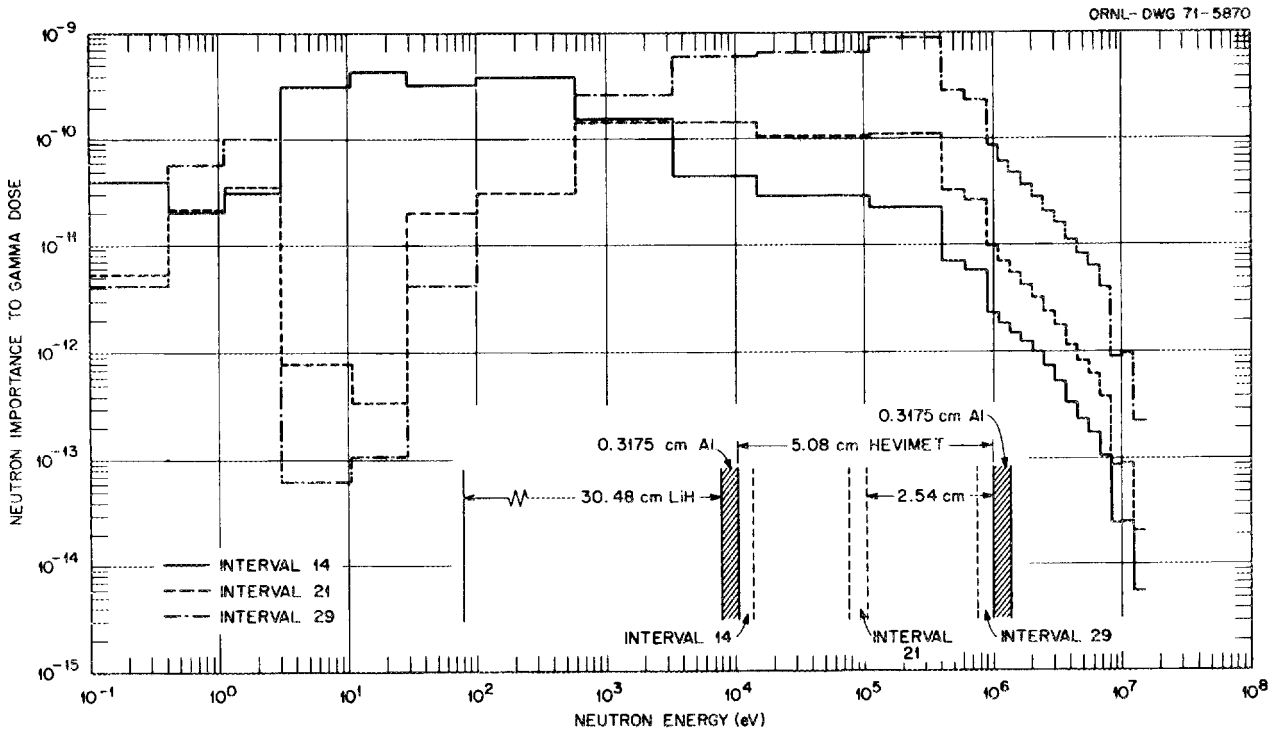

Fig. B5. Spacial and Energy Dependence of Neutron Capture Reactions Contributing to Exit Gamma-Ray Dose in Configuration 3.

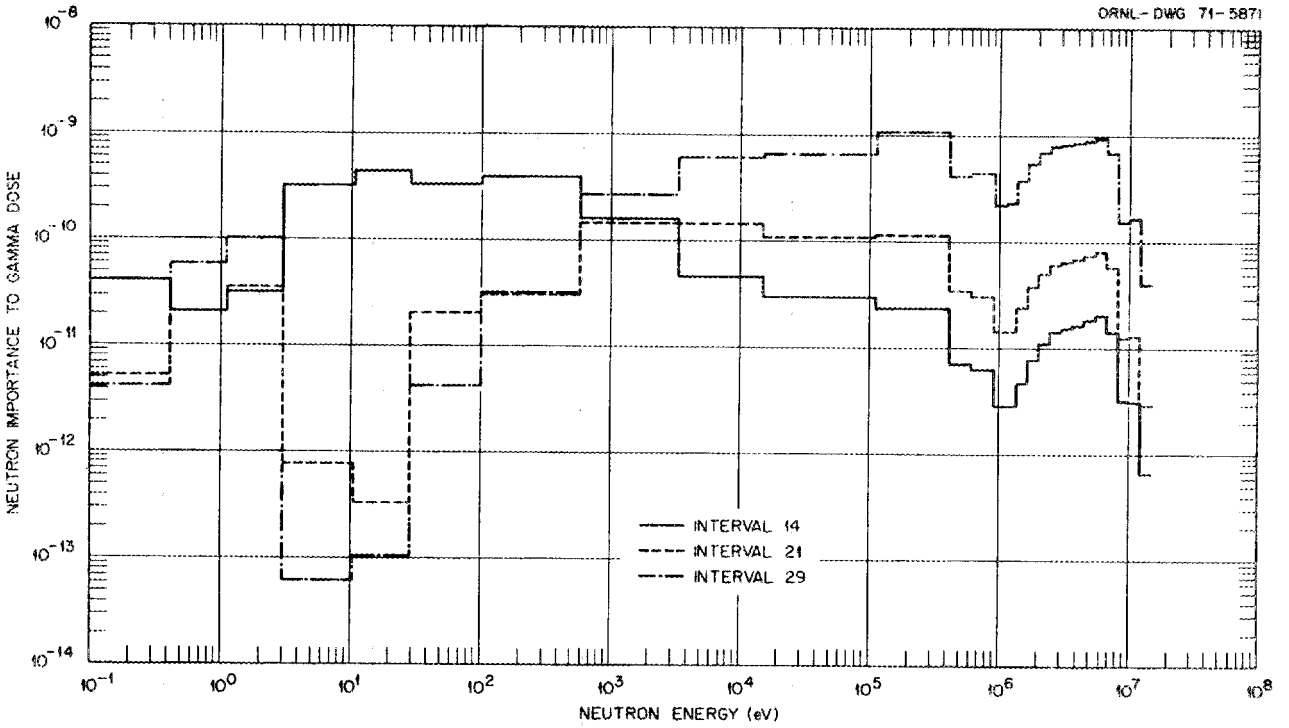

Fig. B6. Spacial and Energy Dependence of All Neutron Reactions (Captures Plus Inelastic Scatterings) Contributing to Exit Gamma-Ray Dose in Configuration 3.

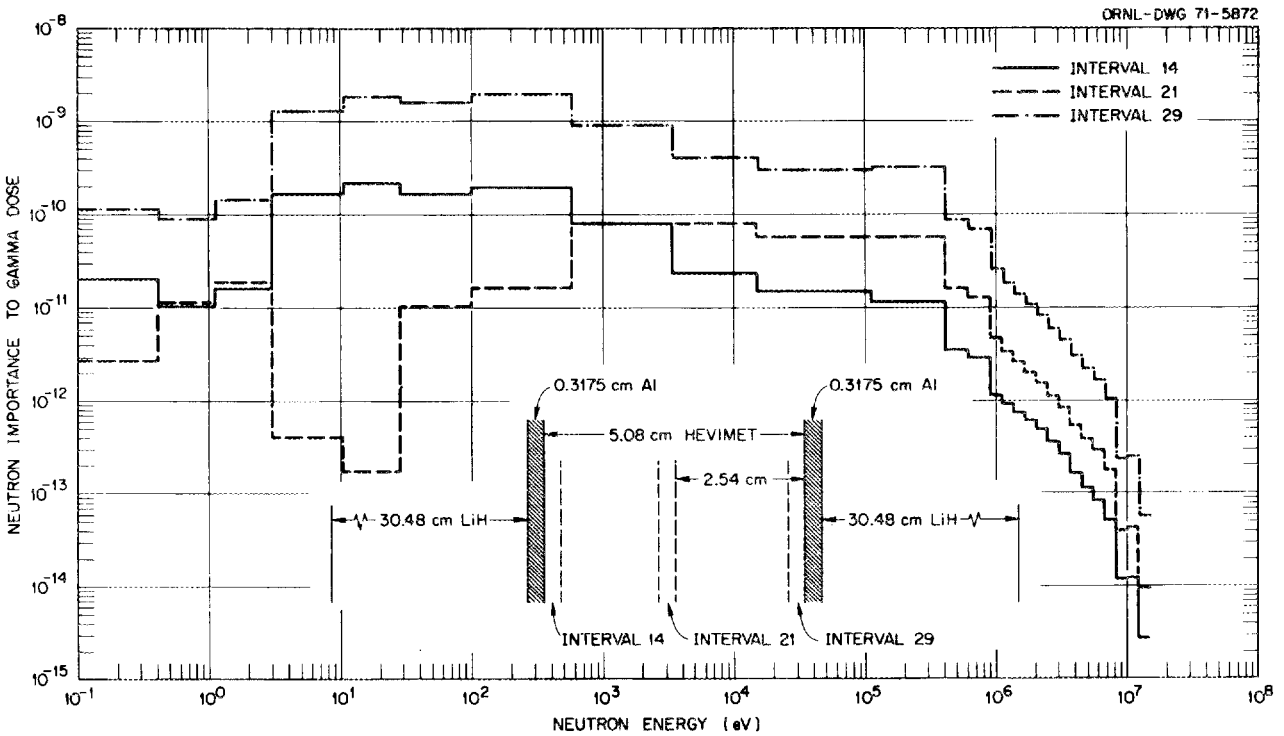

Fig. B7. Spacial and Energy Dependence of Neutron Capture Reactions Contributing to Exit Gamma-Ray Dose in Configuration 4.

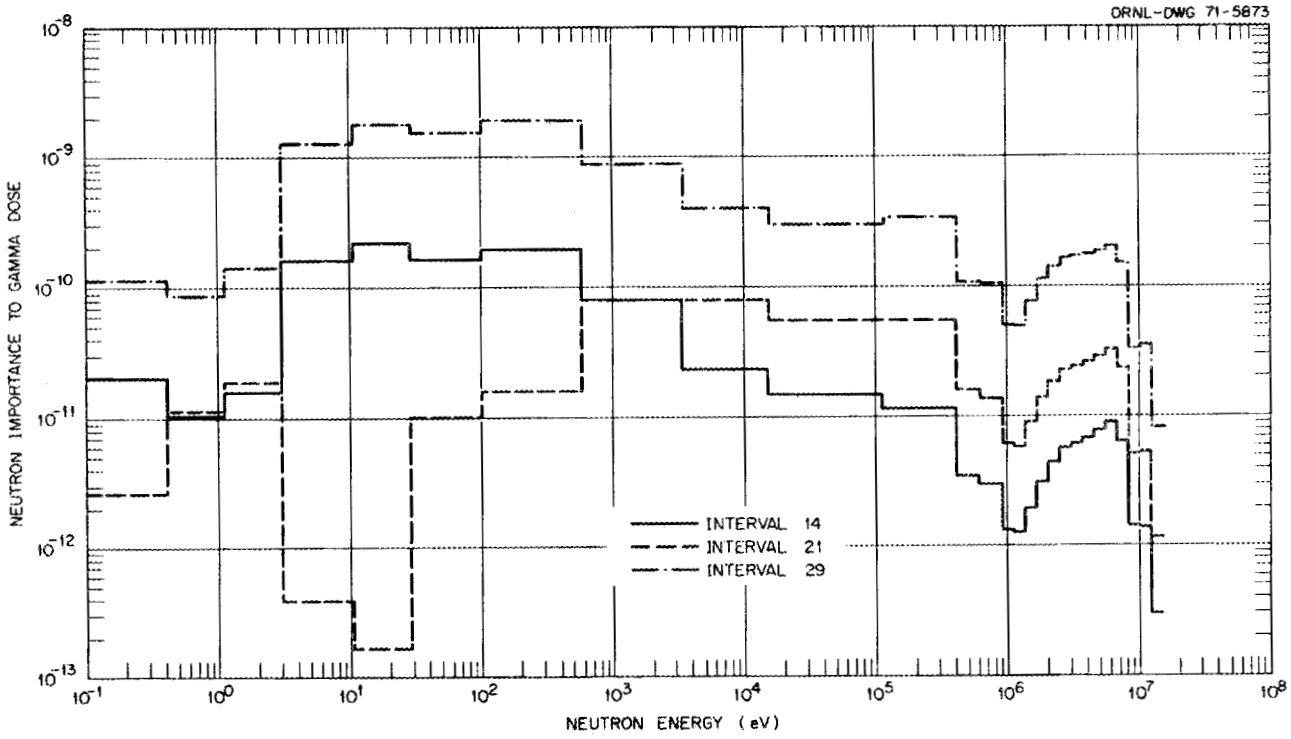

Fig. B8. Spacial and Energy Dependence of All Neutron Reactions (Captures Plus Inelastic Scatterings) Contributing to Exit Gamma-Ray Dose in Configuration 4.

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