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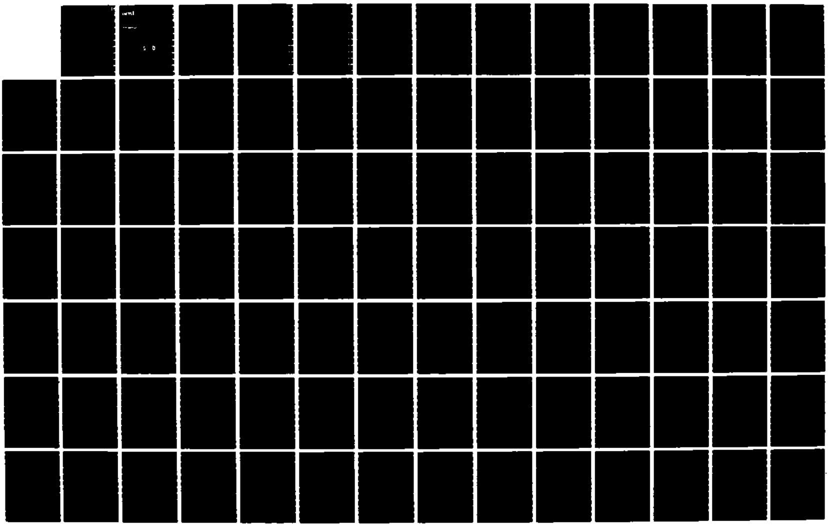

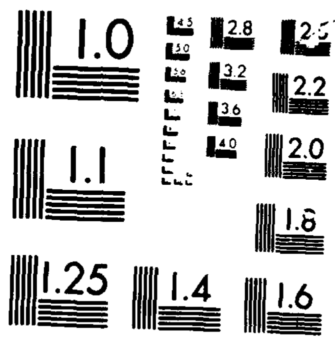

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DEVELOPMENT OF SIMPLIFIED METHODS AND DATA BASES FOR RADIATION SHIELDING CALCULATIONS FOR CONCRETE

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ABSTRACT

Two simplified methods have been developed which allow rapid and accurate calculations of the attenuation of neutrons and gamma rays through concrete shields. One method, called the BEST method, uses sensitivity coefficients to predict changes in the transmitted dose from a fission source that are due to changes in the composition of the shield. The other method uses transmission factors based on adjoint calculations to predict the transmitted dose from an arbitrary source incident on a given shield. The BEST method, utilizing an exponential model that is shown to be a significant improvement over the traditional linear model, has been successfully applied to slab shields of standard concrete and rebar concrete. It has also been tested for a special concrete that has been used in many shielding experiments at the ORNL Tower Shielding Facility, as well as for a deep-penetration sodium problem. A comprehensive data base of concrete sensitivity coefficients generated as part of this study is available for use in the BEST model. For problems in which the changes are energy independent, application of the model and data base can be accomplished with a desk calculator. Larger-scale calculations required for problems that are energy dependent are facilitated by employing a simple computer code, which is included, together with the data base and other calculational aids, in a data package that can be obtained from the ORNL Radiation Shielding Information Center (request DLC-102/CONSENT). The transmission factors used by the second method are a byproduct of the sensitivity calculations and are mathematically equivalent to the surface adjoint function ϕ^*, which gives the dose equivalent transmitted through a slab of thickness T due to one particle incident on the surface in the gth energy group and jth direction. A second data package available from RSIC (request DLC-101/ADVISE) contains the dose transmission factors and a computer code that can fold the transmission factors to represent sources with arbitrary neutron or gamma-ray energy and angle distributions.

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DEVELOPMENT OF SIMPLIFIED METHODS AND DATA BASES FOR RADIATION SHIELDING CALCULATIONS FOR CONCRETE

1. INTRODUCTION

The successful application of sophisticated computer codes based on the Boltzmann transport equation to the analysis of radiation shields is well known. In particular, three transport codes developed at Oak Ridge, the one-dimensional discrete ordinates code ANISN,[1] the two-dimensional discrete ordinates code DOT,[2] and the three-dimensional Monte Carlo code MORSE,[3] have been applied singly and in combination to model shields having extremely complex geometries and to calculate detailed radiation quantities for positions deep within the shields. Also, when applied to a problem in both the forward mode and the adjoint mode and linked with other special codes, such as SWANLAKE[4] or the FORSS[5] systems, these transport codes can yield information on the "sensitivity" of the calculated quantity of radiation to specific cross-section input data, thus indicating the relative importance of the various cross sections in that particular problem.

The disadvantages of using the large transport codes are, of course, that they incur high costs and they require a special expertise for implementation. Thus, they cannot be routinely applied to all shielding problems. Instead, simplified models with which rapid and inexpensive calculations can be performed, on occasion with no more than a desk calculator, are applied for relatively simple shielding problems. They are also sometimes used for iterative scoping calculations such as those needed to establish initial shield design parameters for reactor shield systems.

For a number of years, the simple linear model has been applied in shielding problems (and also in reactor problems) to predict a new response when changes have been made in the material composition of a shield. This model assumes that detailed transport calculations of the desired response have already been performed for the original shield and that the impact on that response by changes within the shield can be determined from sensitivity predictions based on first-order sensitivity theory. The required data base for the linear model calculations is a set of sensitivity coefficients P_Σ, also available from previous calculations. Using the notation of Oblow,[6] P_Σ can be expressed as

$$P_\Sigma = (\Sigma/R)(dR/d\Sigma), \tag{1}$$

where R is the integral system performance parameter (that is, the response of interest, such as dose rate), Σ is the data "field," and $dR/d\Sigma$ is the functional derivative in an unperturbed system.

If the change in the material composition is energy independent, e.g., a density change, then calculations with the linear model can indeed be performed on a desk calculator, providing the required set of total sensitivity coefficients is available. If, on the other hand, changes as a function of energy are needed, larger-scale calculations are necessary and they are usually performed on a computer. Calculations of this type have been facilitated by employing the SENTINEL code,[7] which uses as input the sensitivity coefficients and the fractional changes in the constituent cross sections, both as a function of energy.

It has been shown that in the case of reactor benchmark problems, calculations performed with the linear model via SENTINEL predict changes in the responses that are in complete agreement with those obtained with the more sophisticated transport methods.[8] But when similar calculations were attempted for benchmark shielding problems, large disparities in the responses occurred, and this raised questions as to whether predictions based on sensitivity theory were applicable to shielding problems. It thus became apparent that the development of a satisfactory predictive sensitivity model for shielding applications should be investigated.

This paper describes the results from a study in which methods for rapidly calculating the transport of radiation in shields of simplified geometry as a function of the shield composition, and also as a function of the radiation source, were investigated. Because concrete is the material most universally used in radiation shields, three common concrete compositions were selected for initial investigation. The study began with calculations of reference responses and sensitivity coefficients for specific thicknesses of two of these concretes, using a fission spectrum as the source. As explained below, the calculations were performed with the large transport codes linked with sensitivity codes, and the resulting data bases were then used as input in new models being developed as possible replacements for the linear model, as well as in the linear model itself. As a result of this work, we can offer a new simplified model that is a substantial improvement over the linear model for the materials studied.

Along with the model, we can also supply the data bases of the concrete sensitivity coefficients, which alone provide valuable information on the qualitative importance of the various material constituents. Finally, as a result of this study we can supply additional data bases of concrete "transmission factors." In essence, the transmission factors are the adjoint results, or, rather, a particular subset of the adjoint results, that are obtained for the sensitivity calculations. They can be used in a modified version of the FTF code[9] to determine for an arbitrary source the response for the concrete compositions and thicknesses covered in this study. It is anticipated that eventually the modified FTF code (which we have identified as FTF-II) will be linked with a modified version of the SENTINEL code (which we have identified as the SENATOR code) to allow a simultaneous calculation of the impact of changes in both the shield composition and the source.

2. DEVELOPMENT AND TESTING OF THE SIMPLIFIED PREDICTION MODELS

Selection of Reference Concrete Cases

Two different compositions of concrete were selected as reference cases for this study and are identified throughout the paper as (1) standard concrete and (2) rebar concrete. For the initial calculations the reference cases selected were 1- and 2-m-thick slab shields of each composition.

The compositions of the standard and rebar concretes are given in Table 1. The standard concrete was assumed to have the composition adopted by the American Nuclear Society as being most representative of commercial concrete.[10] Its water content was specified as 4.96 wt%.

Table 1. Slab Compositions Used in This Study

Element	Composition (atoms/cc × 10^{-24})			
	Standard Concrete	Rebar	Homogenized Rebar Concrete[a]	TSF Concrete
H	7.77 (-3)[b]		7.18 (-3)	8.88 (-3)
C	1.00 (-9)[c]	9.82 (-4)	7.46 (-5)	7.97 (-3)
O	4.39 (-2)		4.06 (-2)	4.20 (-2)
Na	1.05 (-3)		9.70 (-4)	2.73 (-5)
Mg	1.49 (-4)		1.38 (-4)	1.44 (-3)
Al	2.45 (-3)		2.26 (-3)	4.14 (-4)
Si	1.58 (-2)		1.46 (-2)	3.83 (-3)
S	5.64 (-5)		5.21 (-5)	1.015 (-4)
K	6.93 (-4)		6.40 (-4)	2.34 (-3)
Ca	2.92 (-3)		2.70 (-3)	1.00 (-2)
Mn		5.15 (-4)	3.91 (-5)	
Fe	3.13 (-4)	8.37 (-2)	6.65 (-3)	2.64 (-4)
Density (g/cc)	2.34	7.83	2.76	2.39

[a] Same as standard concrete at 0.924 volume fraction plus rebar at 0.076 volume fraction.
[b] Read 7.77 × 10^{-3}.
[c] Low concentration assigned to avoid distortion of answers.

The rebar concrete, included to represent a practical case, was assumed to have the same composition as the standard concrete but with steel-reinforcing bars traversing the slabs in both the vertical direction and a horizontal direction.[11] The steel content of the slabs was assumed to be 7.6 vol%. As will be pointed in the discussion below, for the one-dimensional calculations performed in the study, it was necessary to treat the rebar concrete as a homogenized medium.

A third concrete shown in Table 1, the TSF concrete, has a composition corresponding to the concrete slabs that have long been used in radiation shielding experiments at the Oak Ridge National Laboratory's Tower Shielding Facility.[12] Calculations were performed for this concrete to test whether sensitivity results for standard concrete could be applied to a concrete with completely different composition.

Transport and Sensitivity Calculations for Reference Cases

As noted above, the approach in developing the models was first to calculate the reference responses and the sensitivity coefficients for the 1- and 2-m-thick concrete cases. In each case a fission neutron source was assumed to be incident on one face of the slab and a detector to be present on the opposite (exit) face. The calculated response of interest was the the dose rate due to neutrons penetrating to the detector and due to the secondary gamma rays produced within the shield and reaching the detector. The fission source energy distribution and the corresponding neutron dose-rate response functions are given in Table 2, and the gamma-ray dose-rate response functions are given in Table 3.

Transport calculations performed in both the forward mode and the adjoint mode provided the reference responses (that is, the reference dose rates) for the concrete cases and also constituted the first step of the sensitivity calculations. The transport calculations were performed with the discrete ordinates code ANISN[1] using the DLC-41C/VITAMIN-C cross-section library[13] applied with P_3 cross-section expansion and S_{16} angular quadrature. The quantity calculated was the absorbed dose rate [(rem/h)/(particles/cm^2·s)]. The group boundaries of the VITAMIN-C library are included in Tables 2 and 3, and the angular quadrature is described in Table 4.

Care was taken in the mesh interval selection and source description to ensure agreement between the forward and adjoint results to within 0.01%. In all cases, the fission source was assumed to be normally incident and to be distributed within the first 0.2-cm-thick interval of the slab, while the detector was assumed to be positioned in the last 0.2-cm-thick interval. Three zones were used in the 1-m slabs and seven zones in the 2-m slabs, which allowed the spatial production of secondary gamma rays by various energy groups to be observed. In the case of the rebar slabs, the constituents of the steel-reinforcing bars and those of the concrete were homogenized throughout all zones. Descriptions of the zones for the various slabs are presented in Table 5.

The sensitivity coefficients were obtained with the JULIET module of the FORSS code system.[5] In all cases the sensitivities considered were the sensitivities of the total dose rate at the exit face of the slab to the total, absorption, and elastic-scattering cross sections.

For the standard concrete slabs, these sensitivities were calculated both for the individual constituents of the concrete and also for the total mix. In addition, the sensitivities were calculated for the cross sections corresponding to the water content of the slabs. The sensitivities for each constituent summed over energy and space are presented in Table 6.

For the rebar concrete, the sensitivities were calculated for the homogenized steel and for the homogenized rebar concrete. The rebar concrete sensitivity results are also shown in Table 6.

Development of the Prediction Models

Linear Model. Conventional use of P_Σ as a predictive tool results in the linear model. This model can be deduced by considering the following formulation:

$$\frac{dR}{d\Sigma} = F_1 \cdot P_{\Sigma^0} , \tag{2}$$

Table 2. Neutron Energy Group Structure, Fission Source Distribution, and Dose-Rate Response Functions

Group No.	Upper Energy Boundary (eV)[a]	Fission Source (neutrons/cm^2·s)	Dose-Rate Response Function $\left(\frac{\text{rem/hr}}{\text{neutrons/cm}^2\text{·s}}\right)$
1	1.7333(+7)[b]	1.5820(-6)	2.1801(-4)
2	1.6487(+7)	2.9711(-6)	2.1537(-4)
3	1.5683(+7)	5.3910(-6)	2.1277(-4)
4	1.4918(+7)	4.0593(-6)	2.1091(-4)
5	1.4550(+7)	5.3326(-6)	2.0963(-4)
6	1.4191(+7)	6.9481(-6)	2.0792(-4)
7	1.3840(+7)	8.9234(-6)	2.0320(-4)
8	1.3499(+7)	2.6076(-5)	1.9522(-4)
9	1.2840(+7)	4.1418(-5)	1.8539(-4)
10	1.2214(+7)	6.4118(-5)	1.7605(-4)
11	1.1618(+7)	9.6425(-5)	1.6719(-4)
12	1.1052(+7)	1.4172(-4)	1.5878(-4)
13	1.0513(+7)	2.0335(-4)	1.5078(-4)
14	1.0000(+7)	2.8492(-4)	1.4706(-4)
15	9.5123(+6)	3.9081(-4)	1.4706(-4)
16	9.0484(+6)	5.2525(-4)	1.4706(-4)
17	8.6071(+6)	6.9239(-4)	1.4706(-4)
18	8.1873(+6)	8.9599(-4)	1.4706(-4)
19	7.7880(+6)	1.1394(-3)	1.4706(-4)
20	7.4082(+6)	1.4254(-3)	1.4706(-4)
21	7.0469(+6)	1.7554(-3)	1.4757(-4)
22	6.7032(+6)	6.6615(-4)	1.4843(-4)
23	6.5924(+6)	1.4633(-3)	1.4911(-4)
24	6.3763(+6)	2.5480(-3)	1.5024(-4)
25	6.0653(+6)	3.0074(-3)	1.5160(-4)
26	5.7695(+6)	3.5059(-3)	1.5297(-4)
27	5.4881(+6)	4.0367(-3)	1.5435(-4)
28	5.2205(+6)	4.5976(-3)	1.5571(-4)
29	4.9659(+6)	5.1797(-3)	1.5463(-4)
30	4.7237(+6)	5.7764(-3)	1.5217(-4)
31	4.4933(+6)	1.3360(-2)	1.4849(-4)
32	4.0657(+6)	1.5723(-2)	1.4380(-4)
33	3.6788(+6)	1.7925(-2)	1.3925(-4)
34	3.3287(+6)	9.7042(-3)	1.3596(-4)
35	3.1664(+6)	1.0154(-2)	1.3379(-4)
36	3.0119(+6)	1.0547(-2)	1.3165(-4)
37	2.8653(+6)	1.0891(-2)	1.2955(-4)
38	2.7253(+6)	1.1188(-2)	1.2749(-4)
39	2.5924(+6)	1.1430(-2)	1.2554(-4)
40	2.4660(+6)	7.7260(-3)	1.2521(-4)
41	2.3852(+6)	1.9542(-3)	1.2536(-4)
42	2.3653(+6)	1.9453(-3)	1.2542(-4)
43	2.3457(+6)	3.9100(-3)	1.2551(-4)
44	2.3069(+6)	7.8493(-3)	1.2568(-4)
45	2.2313(+6)	1.1842(-2)	1.2598(-4)
46	2.1225(+6)	1.1877(-2)	1.2633(-4)
47	2.0190(+6)	1.1870(-2)	1.2668(-4)
48	1.9205(+6)	1.1813(-2)	1.2704(-4)
49	1.8268(+6)	1.1708(-2)	1.2739(-4)
50	1.7377(+6)	1.1560(-2)	1.2775(-4)
51	1.6530(+6)	1.1390(-2)	1.2811(-4)
52	1.5724(+6)	1.1187(-2)	1.2847(-4)
53	1.4957(+6)	1.0958(-2)	1.2883(-4)
54	1.4227(+6)	1.0677(-2)	1.2919(-4)
55	1.3534(+6)	1.0425(-2)	1.2955(-4)
56	1.2873(+6)	1.0097(-2)	1.2991(-4)

Table 2. Continued

Group No.	Upper Energy Boundary (eV)[a]	Fission Source (neutrons/cm²·s)	Dose-Rate Response Function ((rem/hr)/(neutrons/cm²·s))
57	1.2246(+6)	9.8104(-3)	1.3028(-4)
58	1.1648(+6)	9.4715(-3)	1.3064(-4)
59	1.1080(+6)	1.7934(-2)	1.3119(-4)
60	1.0026(+6)	7.0803(-3)	1.3024(-4)
61	9.6164(+5)	9.4953(-3)	1.2666(-4)
62	9.0718(+5)	7.7714(-3)	1.2286(-4)
63	8.6294(+5)	7.4322(-3)	1.1947(-4)
64	8.2085(+5)	7.0945(-3)	1.1616(-4)
65	7.8082(+5)	6.7639(-3)	1.1295(-4)
66	7.4274(+5)	6.4407(-3)	1.0983(-4)
67	7.0651(+5)	6.1215(-3)	1.0679(-4)
68	6.7206(+5)	5.8148(-3)	1.0384(-4)
69	6.3928(+5)	5.5152(-3)	1.0096(-4)
70	6.0810(+5)	5.2254(-3)	9.8171(-5)
71	5.7844(+5)	4.9450(-3)	9.5456(-5)
72	5.5023(+5)	4.6748(-3)	9.2816(-5)
73	5.2340(+5)	4.4173(-3)	9.0489(-5)
74	4.9787(+5)	8.0988(-3)	8.8284(-5)
75	4.5049(+5)	7.1895(-3)	8.0684(-5)
76	4.0762(+5)	3.2798(-3)	7.5347(-5)
77	3.8774(+5)	3.0834(-3)	7.2030(-5)
78	3.6883(+5)	5.6168(-3)	6.7391(-5)
79	3.3373(+5)	4.9457(-3)	6.1589(-5)
80	3.0197(+5)	5.3157(-4)	5.8498(-5)
81	2.9850(+5)	1.9870(-4)	5.8080(-5)
82	2.9720(+5)	4.0877(-4)	5.7730(-5)
83	2.9452(+5)	1.1032(-3)	5.6856(-5)
84	2.8725(+5)	2.1018(-3)	5.4982(-5)
85	2.7324(+5)	3.8097(-3)	5.1443(-5)
86	2.4724(+5)	1.7235(-3)	4.8036(-5)
87	2.3518(+5)	1.6115(-3)	4.5922(-5)
88	2.2371(+5)	1.5064(-3)	4.3900(-5)
89	2.1280(+5)	1.4079(-3)	4.1968(-5)
90	2.0242(+5)	1.3146(-3)	4.0120(-5)
91	1.9255(+5)	1.2278(-3)	3.8355(-5)
92	1.8316(+5)	1.1471(-3)	3.6666(-5)
93	1.7422(+5)	1.0688(-3)	3.5052(-5)
94	1.6573(+5)	9.9876(-4)	3.3509(-5)
95	1.5764(+5)	9.2971(-4)	3.2034(-5)
96	1.4996(+5)	8.6864(-4)	3.0624(-5)
97	1.4264(+5)	8.0827(-4)	2.9276(-5)
98	1.3569(+5)	7.5431(-4)	2.7987(-5)
99	1.2907(+5)	7.0315(-4)	2.6755(-5)
100	1.2277(+5)	6.5355(-4)	2.5577(-5)
101	1.1679(+5)	6.1010(-4)	2.4452(-5)
102	1.1109(+5)	1.3466(-3)	2.2644(-5)
103	9.8037(+4)	1.1256(-3)	2.0419(-5)
104	8.6517(+4)	3.7763(-4)	1.9052(-5)
105	8.2500(+4)	2.7677(-4)	1.8429(-5)
106	7.9500(+4)	6.7141(-4)	1.7488(-5)
107	7.2000(+4)	3.9844(-4)	1.6379(-5)
108	6.7379(+4)	8.8374(-4)	1.4904(-5)
109	5.6562(+4)	3.1485(-4)	1.3503(-5)
110	5.2475(+4)	4.5365(-4)	1.2488(-5)
111	4.6309(+4)	3.7751(-4)	1.1321(-5)
112	4.0868(+4)	4.2434(-4)	1.0069(-5)
113	3.4307(+4)	1.5090(-4)	9.1223(-6)
114	3.1828(+4)	1.9381(-4)	8.4838(-6)
115	2.8500(+4)	8.3946(-5)	7.9518(-6)
116	2.7000(+4)	5.1574(-5)	7.6770(-6)

Table 2. Continued

Group No.	Upper Energy Boundary (eV)[a]	Fission Source (neutrons/cm²·s)	Dose-Rate Response Function $\left(\frac{rem/hr}{neutrons/cm^2 \cdot s}\right)$
117	2.6058(+4)	6.8129(-5)	7.4241(-6)
118	2.4788(+4)	3.2200(-5)	7.2087(-6)
119	2.4176(+4)	3.1112(-5)	7.0687(-6)
120	2.3579(+4)	8.6574(-5)	6.7976(-6)
121	2.1875(+4)	1.2441(-4)	6.2864(-6)
122	1.9305(+4)	1.8920(-4)	5.4331(-6)
123	1.5034(+4)	1.3033(-4)	4.4656(-6)
124	1.1709(+4)	8.9803(-5)	3.7095(-6)
125	9.1188(+3)	6.1773(-5)	3.5538(-6)
126	7.1017(+3)	4.2529(-5)	3.5632(-6)
127	5.5308(+3)	2.9221(-5)	3.5772(-6)
128	4.3074(+3)	1.2970(-5)	3.5914(-6)
129	3.7074(+3)	7.1633(-6)	3.6017(-6)
130	3.3546(+3)	6.1492(-6)	3.6107(-6)
131	3.0354(+3)	5.3178(-6)	3.6204(-6)
132	2.7465(+3)	2.3474(-6)	3.6280(-6)
133	2.6126(+3)	2.1998(-6)	3.6332(-6)
134	2.4852(+3)	3.9329(-6)	3.6414(-6)
135	2.2487(+3)	3.3767(-6)	3.6528(-6)
136	2.0347(+3)	6.5221(-6)	3.6742(-6)
137	1.5846(+3)	4.5172(-6)	3.7073(-6)
138	1.2341(+3)	3.0870(-6)	3.7435(-6)
139	9.6112(+2)	2.1191(-6)	3.7823(-6)
140	7.4852(+2)	1.4612(-6)	3.8236(-6)
141	5.8295(+2)	9.9765(-7)	3.8670(-6)
142	4.5400(+2)	7.0190(-7)	3.9122(-6)
143	3.5358(+2)	4.8352(-7)	3.9590(-6)
144	2.7536(+2)	3.1670(-7)	4.0068(-6)
145	2.1445(+2)	2.1917(-7)	4.0554(-6)
146	1.6702(+2)	1.5554(-7)	4.1044(-6)
147	1.3007(+2)	1.0970(-7)	4.1534(-6)
148	1.0130(+2)	6.5345(-8)	4.2020(-6)
149	7.8893(+1)	5.2620(-8)	4.2497(-6)
150	6.1442(+1)	3.6783(-8)	4.2961(-6)
151	4.7851(+1)	2.4986(-8)	4.3406(-6)
152	3.7267(+1)	3.9523(-8)	4.3824(-6)
153	2.9203(+1)	0.0	4.4220(-6)
154	2.2603(+1)	0.0	4.4587(-6)
155	1.7603(+1)	0.0	4.4911(-6)
156	1.3710(+1)	0.0	4.5192(-6)
157	1.0677(+1)	0.0	4.5424(-6)
158	8.3153(+0)	0.0	4.5602(-6)
159	6.4760(+0)	0.0	4.5722(-6)
160	5.0435(+0)	0.0	4.5778(-6)
161	3.9279(+0)	0.0	4.5766(-6)
162	3.0590(+0)	0.0	4.5680(-6)
163	2.3724(+0)	0.0	4.5518(-6)
164	1.8554(+0)	0.0	4.5278(-6)
165	1.4450(+0)	0.0	4.4953(-6)
166	1.1254(+0)	0.0	4.4542(-6)
167	8.7642(-1)	0.0	4.4044(-6)
168	6.8256(-1)	0.0	4.3457(-6)
169	5.3158(-1)	0.0	4.2781(-6)
170	4.1399(-1)	0.0	3.9586(-6)
171	1.0000(-1)[c]	0.0	3.6748(-6)
	1.0000(-5)		

[a]Energy structure used in DLC-41C/VITAMIN-C cross-section library.
[b]Read: 1.7333×10^7 eV.
[c]Lower limit is 1.0000(-5) eV.

Table 3. Gamma-Ray Energy Group Structure and Dose-Rate Response Functions

Group No.	Upper Energy Boundary (eV)[a]	Dose-Rate Response Function $\left(\frac{\text{rem/hr}}{\text{photons/cm}^2\cdot\text{s}}\right)$
1	1.4000(+7)[b]	1.1776(-5)
2	1.2000(+7)	1.0264(-5)
3	1.0000(+7)	8.7716(-6)
4	8.0000(+6)	7.8468(-6)
5	7.5000(+6)	7.4783(-6)
6	7.0000(+6)	7.1104(-6)
7	6.5000(+6)	6.7426(-6)
8	6.0000(+6)	6.3749(-6)
9	5.5000(+6)	6.0069(-6)
10	5.0000(+6)	5.6001(-6)
11	4.5000(+6)	5.2272(-6)
12	4.0000(+6)	4.8324(-6)
13	3.5000(+6)	4.4117(-6)
14	3.0000(+6)	3.9596(-6)
15	2.5000(+6)	3.4686(-6)
16	2.0000(+6)	3.0192(-6)
17	1.6600(+6)	2.7312(-6)
18	1.5000(+6)	2.5301(-6)
19	1.3300(+6)	2.2051(-6)
20	1.0000(+6)	1.8326(-6)
21	8.0000(+5)	1.6038(-6)
22	7.0000(+5)	1.4417(-6)
23	6.0000(+5)	1.2815(-6)
24	5.1200(+5)	1.2019(-6)
25	5.1000(+5)	1.1281(-6)
26	4.5000(+5)	1.0321(-6)
27	4.0000(+5)	8.7594(-7)
28	3.0000(+5)	6.3061(-7)
29	2.0000(+5)	4.3908(-7)
30	1.5000(+5)	3.2767(-7)
31	1.0000(+5)	2.6817(-7)
32	7.5000(+4)	2.5932(-7)
33	6.0000(+4)	2.8439(-7)
34	4.5000(+4)	4.1154(-7)
35	3.0000(+4)	8.2669(-7)
36	2.0000(+4)[c]	2.1439(-6)

[a]Energy structure used in DLC-41C/VITAMIN-C cross-section library.
[b]Read: 1.4000×10^7 eV.
[c]Lower limit is 1.0000(+4) eV.

Table 4. Description of Angular Quadrature

Angle	cos μ	Weight
1	-1.00000 (0)	0
2	-9.89400 (-1)*	1.35765 (-2)
3	-9.44573 (-1)	3.11270 (-2)
4	-8.65630 (-1)	4.75785 (-2)
5	-7.55404 (-1)	6.23145 (-2)
6	-6.17876 (-1)	7.47979 (-2)
7	-4.58017 (-1)	8.45785 (-2)
8	-2.81603 (-1)	9.13014 (-2)
9	-9.50124 (-1)	9.47254 (-2)
10	9.50124 (-1)	9.47254 (-2)
11	2.81603 (-1)	9.13014 (-2)
12	4.58017 (-1)	8.45785 (-2)
13	6.17876 (-1)	7.47979 (-2)
14	7.55404 (-1)	6.23145 (-2)
15	8.65630 (-1)	4.75785 (-2)
16	9.44573 (-1)	3.11270 (-2)
17	9.89400 (-1)	1.35754 (-2)

*Read: -9.89400×10^{-1}.

where

$$F_1 = \frac{R^0}{\Sigma^0},$$

and the superscript zero refers to quantities evaluated in the unperturbed system. The solution can be expressed as

$$R = R^0\left[1 + P_{\Sigma^0}\left(\frac{\Sigma}{\Sigma^0} - 1\right)\right]. \tag{3}$$

In a more general form, in which the subscript g denotes the energy group and subscript i denotes a material constituent of the shield, the expression becomes

$$R_L = R_0\left[1 + \sum_g \sum_i P_{\Sigma^0_{gi}}\left(\frac{\Sigma_{gi}}{\Sigma^0_{gi}} - 1\right)\right]; \tag{4}$$

that is, it gives the predicted response, R_L, based on the linear model.

Table 5. Description of Zones Used in Concrete Slab Calculations[a]

Slab Thickness (m)	Number of Zones	Total Number of Intervals	Intervals in Each Zone[b]
0.05	1	25	Zone 1 — 25
0.50	3	58	Zone 1 — 5
			Zone 2 — 48
			Zone 3 — 5
1.0	3	108	Zone 1 — 5
			Zone 2 — 98
			Zone 3 — 5
1.5	5	158	Zone 1 — 5
			Zone 2 — 49
			Zone 3 — 50
			Zone 4 — 49
			Zone 5 — 5
2.0	7	208	Zone 1 — 5
			Zone 2 — 49
			Zone 3 — 50
			Zone 4 — 50
			Zone 5 — 25
			Zone 6 — 24
			Zone 7 — 5

[a]Note: The zone descriptions given for the 0.05-, 0.5-, and 1.5-m slabs apply to later calculations described in Section 3.

[b]For the 0.05-m slab, all the interval thicknesses were 0.2 cm. For the other slabs, all the interval thicknesses were 1 cm except the first and the last zones, which were 0.2 cm thick. (These were the source and detector zones.)

Expression (4) is the one generally used to assess the effect of changes in a response due to changes in nuclear data. For example, the SENTINEL computer code[7] of the ORNL FORSS sensitivity and uncertainty analysis system[5] uses the equation, requiring as input the fractional change in cross sections as a function of energy and constituent and the corresponding relative sensitivity coefficient $P_{\underset{\sim}{\Sigma}^0_g}$.

For the case in which the variation to be considered is not a function of the energy group, Eq. (4) reduces to

Table 6. Total Macroscopic Cross-Section Sensitivities Used as Reference Base for the Prediction Models

Constituent	P_Σ, Relative Sensitivity	
	1-m slab	2-m slab
Standard Concrete Slabs (4.96 wt% Water)		
Water	-2.00043	-2.81860
H	-1.7334	-2.32544
C	-9.63386-08	-1.50955-07
O	-3.0218	-5.57983
Na	-0.14651	-0.276091
Mg	-0.017964	-0.0332595
Al	-0.30203	-0.566342
Si	-1.9073	-3.79948
S	-0.007529	-0.0159036
K	-0.13386	-0.300728
Ca	-0.47229	-1.00945
Fe	-0.068398	-0.0987944
Rebar Concrete Slabs (7.6 vol% Steel)		
Concrete	-7.48073	-12.9769
Steel	-1.29088	-2.84410

$$R_L = R^0\left[1 + \sum_i P_{\Sigma_i^0}\left(\frac{N_i}{N_i^0} - 1\right)\right], \tag{5}$$

where

$$P_{\Sigma_i^0} = \sum_g P_{\Sigma_{ig}^0}$$

is the total relative sensitivity for constituent i, and N_i and N_i^0 are, for example, the perturbed and unperturbed number densities, respectively, for constituent i.

Exponential Model. The unsatisfactory results obtained with our initial efforts to apply the linear model to benchmark shielding problems led us to search for an improved prediction method. Beginning with the formulation

$$\frac{dR}{d\Sigma} = F_\Sigma \cdot P_{\Sigma^0}, \tag{6}$$

where

$$F_2 = \frac{R}{\Sigma^0},$$

we obtained an exponential model solution (R_E) analogous to Eq. (5):

$$R_E = R^0 \prod_i \left\{ \exp\left[\left(\frac{N_i}{N_i^0} - 1 \right) P_{\Sigma_i^0} \right] \right\}, \tag{7}$$

which can also be expressed as

$$R_E = R^0 \left\{ \exp\left[\sum_i P_{\Sigma_i^0} \left(\frac{N_i}{N_i^0} - 1 \right) \right] \right\}. \tag{8}$$

Power Model. One additional model was developed which was based on the formulation

$$\frac{dR}{d\Sigma} = F_3 \cdot P_{\Sigma^0}, \tag{9}$$

where

$$F_3 = \frac{R}{\Sigma}.$$

From this, we obtained a power model solution (R_P) for changes in the response function that are independent of the energy group. This solution is given by:

$$R_P = R^0 \prod_i \left(\frac{N_i}{N_i^0} \right)^{P_{\Sigma_i^0}}. \tag{10}$$

Application of Models to Reference Concrete Cases

As noted above, the linear, exponential and power models were used to calculate changes in the tissue dose rates emerging from 1- and 2-m-thick concrete slabs that were due to changes in the following properties of the slabs: (1) water content, (2) rebar content, and (3) concrete composition. The source was the fission neutron source described in Table 2, and the problems calculated are described below.

Problem 1 — Variation of Water Content. In this problem the cross-section change for water is not a function of energy, and thus it can be expressed as:

$$\frac{\Sigma_{wg}}{\Sigma_{wg}^0} = \frac{\sigma_{wg} f_w}{\sigma_{wg} f_w^0} = \frac{f_w}{f_w^0}, \tag{11}$$

where f_w and f_w^0 are the weight fractions of water for the modified and standard cases, respectively.

Using Eq. (11), the prediction models become

$$R_L = R^0 \left[1 + P_{\Sigma_w^0} \left(\frac{f_w}{f_w^0} - 1 \right) \right], \tag{12}$$

$$R_E = R^0 \left\{ \exp \left[P_{\Sigma_w^0} \left(\frac{f_w}{f_w^0} - 1 \right) \right] \right\}, \tag{13}$$

and

$$R_P = R^0 \left(\frac{f_w}{f_w^0} \right)^{P_{\Sigma_w^0}}, \tag{14}$$

where $P_{\Sigma_w^0}$ is the sensitivity due to water for the standard concrete reference results (see Table 6). Values of f_w varied from about 2 wt% to 8 wt%.

The dose rates for the various water contents calculated with each model are compared with the exact dose rate obtained from an ANISN calculation in Table 7. The results show that for this problem both the exponential model and the power model outperform the linear model, the exponential model being best for the 1-m slab and the power model being best for the 2-m slab. All three models agree for the unperturbed case (f_w = 4.97%). In general, as the water content varies, the power model gives responses that are higher than the ANISN responses while the linear and exponential models give responses that are lower than the ANISN responses.

For the 1-m slab, the exponential model results are within 13% of the ANISN results over the range of water content investigated. For a water content of about 3 to 8%, the power model results are within 20% of the ANISN results, but for a 2% water content they differ by 53%. The linear model results are within 23% of the ANISN results for a water content of 3 to 6%, but they differ by 42% for a water content of 2% and predict a negative answer for a water content of 8%.

For the 2-m slab, the exponential model results are within 21% of the ANISN results for a water content from 3 to 7 wt%. The power model results agree within 9% for a water content from 3 to 8 wt%. The linear model does not work very well and predicts a negative answer for a water content greater than about 6.5 wt%.

Table 7. Comparison of Predicted Responses for Various Water Contents of Standard Concrete Slabs (Fission Source)

Water Content (wt%)	Predicted Responses [(rem/h)/(neutrons/cm²·s)] Exact (ANISN)	Linear Model	% Dev.[a]	Exp. Model	% Dev.	Power Model	% Dev.
			1-m-thick slab				
1.97	2.538(-7)[b]	1.460(-7)	-42.5	2.217(-7)	-12.7	3.891(-7)	+53.3
2.96	1.560(-7)	1.196(-7)	-23.4	1.486(-7)	-4.8	1.812(-7)	+16.1
3.97	9.891(-8)	9.258(-8)	-6.4	9.871(-8)	-0.2	1.028(-7)	+3.9
4.96[c]	6.604(-8)	6.604(-8)	0.0	6.604(-8)	0.0	6.604(-8)	0.0
6.06	4.245(-8)	3.689(-8)	-13.1	4.247(-8)	0.0	4.410(-8)	+3.9
7.14	2.860(-8)	8.138(-9)	-71.5	2.748(-8)	-3.9	3.314(-8)	+9.7
8.24	1.960(-8)	-2.123(-8)	-208.3	1.762(-8)	-10.1	2.310(-8)	+17.8
			2-m-thick slab				
1.97	3.620(-10)	9.895(-11)	-72.7	2.016(-10)	-44.3	4.300(-10)	+18.7
2.96	1.453(-10)	7.834(-11)	-46.1	1.147(-10)	-21.1	1.500(-10)	+3.1
3.97	6.805(-11)	5.728(-11)	-15.8	6.445(-11)	-5.3	6.807(-11)	0.0
4.96[c]	3.654(-11)	3.654(-11)	0.0	3.654(-11)	0.0	3.654(-11)	0.0
6.06	2.078(-11)	1.384(-11)	-33.4	1.963(-11)	-5.5	2.065	-0.6
7.14	1.304(-11)	-8.586(-12)	-165.8	1.063(-11)	-18.5	1.270(-11)	-2.6
8.24	8.702(-12)	-3.149(-11)	-461.9	5.679(-12)	-34.7	8.189(-12)	-5.9

[a] Percent deviation from exact value.
[b] Read: 2.538×10^{-5}.
[c] Reference standard concrete has 4.96 wt% water.

Problem 2 — Variation of Rebar Content. For this problem it was assumed that the concrete and steel could be homogenized and that equivalent number densities based on the volume fractions of steel and concrete could be used. Again, the cross-section changes considered (for steel and concrete) are not functions of energy. Thus, the ratio for the concrete cross sections can be written as

$$\frac{\bar{\Sigma}_{cg}}{\bar{\Sigma}^0_{cg}} = \frac{\sigma_{cg}\bar{N}_c}{\sigma_{cg}\bar{N}^0_c} = \frac{\bar{N}_c v_c}{\bar{N}_c v^0_c} = \frac{v_c}{v^0_c}\,, \tag{15}$$

where v_c and v^0_c are the volume fractions of concrete in the modified and original slabs, respectively, and $\bar{\Sigma}$ and $\bar{N}$ represent equivalent quantities because of the assumption of homogenization of the slabs. In a similar expression for steel, v_s and v^0_s are, respectively, the modified and original volume fractions of steel in the slabs.

Using Eq. (15), the prediction models in this case become

$$R_L = R^0\left[1 + P_{\Sigma_c^0}\left(\frac{v_c}{v_c^0} - 1\right) + P_{\Sigma_s^0}\left(\frac{v_s}{v_s^0} - 1\right)\right], \tag{16}$$

$$R_E = R^0\left\{\exp\left[P_{\Sigma_c^0}\left(\frac{v_c}{v_c^0} - 1\right) + P_{\Sigma_s^0}\left(\frac{v_s}{v_s^0} - 1\right)\right]\right\}, \tag{17}$$

and

$$R_P = R^0\left(\frac{v_c}{v_c^0}\right)^{P_{\Sigma_c^0}}\left(\frac{v_s}{v_s^0}\right)^{P_{\Sigma_s^0}}, \tag{18}$$

where v_c and v_s are the volume fractions of concrete and steel, respectively, in the modified rebar slabs and v_c^0 and v_s^0 are the corresponding volume fractions in the reference rebar slabs (0.924 and 0.076, respectively). $P_{\Sigma_c^0}$ and $P_{\Sigma_s^0}$ are the sensitivities due to concrete and steel for the reference rebar concrete results (see Table 6).

The responses calculated with each model for the rebar slabs are compared with the ANISN-calculated responses in Table 8. For this problem, the exponential model is clearly superior.

For the 1-m slab, the exponential model results agree within 9% with the ANISN results for the entire range of rebar content considered (4 to 20 vol%). The power model does reasonably well for a rebar content of 4 to 10 vol%, but seems to diverge for higher rebar volume percentages. The linear model similarly does well for the 4 to 10 vol% range but then moves toward a negative prediction at higher rebar volume percentages.

For the 2-m slab, the exponential model results differ no more that 13% from the ANISN results over the entire rebar content range considered. In the case of the power model, a rebar content variation of only a few percent causes the results to diverge radically from the ANISN results, and the linear model predicts negative answers for a rebar content above about 11 vol%.

Problem 3 — Variation of Concrete Composition. In this problem we attempted to predict the dose rate response for slabs of concrete having a nonstandard composition (identified as TSF concrete[12] in Table 1). This problem tests the possibility of using the models for a concrete composition in which all the constituent elements are in different concentrations than those in the standard concrete used as a reference. Here again the cross-section change (for each element) is not a function of energy and is simply represented by the ratio of number densities of each constituent, as indicated, for example, by Eqs. (5), (8), and (10). That is, the N_i's are the atom densities of the constituent elements in the TSF concrete, and the N_i^0's are the atom densities of the corresponding constituent elements in the standard concrete. The sensitivities $P_{\Sigma_i^0}$ for each element are given in Table 6.

Table 8. Comparison of Predicted Responses for Various Steel Contents of Rebar Concrete Slabs (Fission Source)

Steel Content (vol%)	Predicted Responses [(rem/h)/(neutrons/cm²·s)] Exact (ANISN)	Linear Model	% Dev.[a]	Exp. Model	% Dev.	Power Model	% Dev.
			1-m-thick slab				
4.0	4.455(-8)[b]	4.241(-8)	-4.8	4.425(-8)	-0.7	5.528(-8)	+3.41
7.6[c]	3.213(-8)	3.213(-8)	0.0	3.213(-8)	0.0	3.213(-8)	0.0
8.0	3.100(-8)	3.099(-8)	0.0	3.100(-8)	0.0	3.106(-8)	+0.2
9.0	2.841(-8)	2.813(-8)	-1.0	2.837(-8)	-0.1	2.895(-8)	+1.9
10.0	2.607(-8)	2.528(-8)	-3.0	2.600(-8)	-0.4	2.745(-8)	+5.3
16.0	1.593(-8)	8.139(-9)	-48.9	1.523(-9)	-4.4	2.507(-9)	+57.4
20.0	1.174(-8)	-3.286(-9)	-128.0	1.067(-8)	-9.1	2.708(-9)	+130.6
			2-m-thick slab				
4.0	1.656(-11)	1.323(-11)	-20.1	1.667(-11)	+0.7	2.716(-11)	+64.0
7.6[c]	7.186(-12)	7.186(-12)	0.0	7.186(-12)	0.0	7.186(-12)	0.0
20.0	4.547(-13)	-1.365(-11)	-3100.9	3.959(-13)	-12.9	2.975(-12)	+554.2

[a]Percent deviation from exact value.
[b]Read: 4.455×10^{-6}.
[c]Reference rebar concrete has 7.6 vol% steel.

The results obtained for this case with all three models are presented in Table 9, along with the results calculated with the ANISN code. It is apparent that only the exponential model yields acceptable results, the power model predicting answers that are much too large and the linear model giving negative answers for the 2-m slab.

Detailed Comparison of Results. Some detailed comparisons of exact (ANISN-calculated) results and those predicted by the models for the reference cases and also for the TSF concrete case are presented in Appendix A.

Application of Exponential (BEST) Model to Problem of Neutron Transport in Sodium

Because the exponential model worked well for shielding problems dominated by attenuation, it was selected as the model to be recommended as a predictive tool and was designated as the BEST model (for *B*asic *E*xponential *S*hielding *T*rend).

In order to investigate a wider applicability of the exponential (BEST) model, we applied it to a very special problem in reactor shielding. It was pointed out by Goldstein[14] that in some cases the mechanisms of radiation transport are such that the response is a markedly nonlinear function of modification in the cross sections. He cited as an example the famous 297-keV minimum in the sodium cross section. With Huang, he studied the problem[15] and, by the direct substitution method, calculated changes in the response as the

Table 9. Comparison of Predicted Responses for TSF Concrete (Fission Source)

Concrete	Predicted Responses [(rem/h)/(neutrons/cm^2·s)]						
	Exact (ANISN)	Linear	% Dev.[a]	Exp.	% Dev.	Power	% Dev.
			1-m-thick slab				
TSF	3.588(-8)[b]	2.235(-8)	-37.7	3.408(-8)	-5.0	1.193(-6)	+3225.1
			2-m-thick slab				
TSF	1.377(-11)	-4.606(-12)	-133.5	1.185(-11)	-13.9	1.038(-8)	+75280.5

[a]Deviation from exact value for TSF concrete.
[b]Read: 3.588×10^{-8}.

minimum in the sodium cross section was deepened or "filled up." The result was anticipated to be representative of the class of problems in which extreme forms of nonlinearity are encountered. They found that even for a quite modest change in the microscopic cross section σ — of the order of 5 to 10% — the correct values of the sensitivity profile differed by 20 to 50% from the prediction of linear perturbation theory.

E. Greenspan et al.[16] examined a similar problem, investigating higher order effects in cross-section sensitivity analysis for neutron transport through 260 cm of sodium. The problem consisted of a neutron source in the energy region just above 297 keV, the energy of the major cross-section minimum in sodium, with the response of interest being the neutron fluence at an energy just below that of the minimum. They developed a second-order sensitivity theory (SOST) and compared results obtained with that theory with results obtained with first-order sensitivity theory (FOST) (that is, the linear model). They also recalculated the problem with the perturbed cross-section set (an exact transport calculation). The variation studied was that of the cross section in the 297-keV minimum region, allowing the perturbed-to-initial-value ratio (σ/σ_0) to vary from 0.5 to 1.5.

In applying the exponential model to the same problem, we used the sensitivity coefficient which they had calculated for use in their linear (FOST) model. The approach was as follows.

Greenspan et al.[16] define their sensitivity coefficient as

$$\frac{\delta R/R}{\delta\alpha/\alpha} = \frac{1}{R}\left[S_1\alpha + S_2\alpha^2\right] = \frac{\alpha}{R} S_1\left[1 + \alpha\frac{S_2}{S_1}\right], \tag{19}$$

where R is the response, S_1 is the first-order sensitivity (FOST), S_2 is the second-order sensitivity, and α is related to the cross-section perturbation as indicated below. The use of Eq. (19) constitutes their second-order sensitivity theory (SOST).

Note that if we ignore the S_2 term and use the assumption in our exponential model, we get

$$(dR/R)/d\alpha = S_1/R_0\,, \tag{20}$$

$$R_E = R_0 \exp(S_1/R_0)(\alpha - \alpha_0)\,, \tag{21}$$

where S_1 is an "absolute" sensitivity, whereas our P_Σ is a "relative" sensitivity.

In order to compare results, a determination of the ratio S_1/R_0 and the relationship between α and the cross section is required. Using the notation in ref. 16, the following can be deduced:

$$\sigma/\sigma_0 = 1.333\alpha + 1\,, \tag{22}$$

where σ represents the perturbed cross section at the energy of the minimum and σ_0 the unperturbed cross section at that point. Note that when $\alpha = \alpha_0 = 0$, $\sigma/\sigma_0 = 1$; that is, no perturbation occurs.

From ref. 16, we find that FOST gives

$$R/R_0 \approx 3.1 \text{ for } \sigma/\sigma_0 = 0.5\,. \tag{23}$$

Using Eq. (22), we solve for the corresponding

$$\alpha = -0.5/1.333 = -0.375\,. \tag{24}$$

If we express FOST as

$$R - R_0 = S_1\alpha \tag{25}$$

or as

$$(R/R_0) - 1 = (S_1/R_0)\alpha\,, \tag{26}$$

we can use Eqs. (23), (24), and (26) to find

$$S_1/R_0 = 2.1/-0.375 = -5.6\,. \tag{27}$$

Therefore, the exponential model can be written as

$$R_E/R_0 = \exp\{-5.6\alpha\}, \quad (28)$$

with

$$\alpha = [(\sigma/\sigma_0 - 1)]/1.333. \quad (29)$$

Note that in deriving Eq. (28) we have not assumed a particular value for S_1 but have deduced the ratio S_1/R_0 based on the results shown in ref. 16 for FOST.

Comparisons of the exponential model and results obtained by using the first-order coefficient quoted in ref. 16 are compared with FOST, SOST, and exact results in Fig. 1. It is seen that the exponential (BEST) model provides predictions closer to the exact results than does SOST for the entire range of cross-section variation considered. The SOST results began to diverge for σ/σ_0 larger than 1.2, where no divergence is noticed in the BEST predictions. Thus, even for this extreme perturbation, the BEST model gives good results.

Examination of BEST Model Assumption

The apparent success of the BEST model as a predictive tool prompted an examination of the assumption behind its development. The physical implication of this assumption suggests that

$$P_{\Sigma_g}/\Sigma_g = \text{constant}, \quad (30)$$

which implies that the ratio

$$\frac{P_{\Sigma_g^0}/\Sigma_g^0}{P_{\Sigma_g}/\Sigma_g} \approx 1, \quad (31)$$

where $(P_{\Sigma_g^0}, \Sigma_g^0)$ and (P_{Σ_g}, Σ_g) are the sensitivities and the cross sections for the unperturbed and perturbed cases, respectively. That Eqs. (30) and (31) are representative of the situations studied is the assumption on which the BEST model is based.

To examine the validity of this assumption, we computed the ratio implied in Eq. (31) for the 1-m-thick standard concrete slab, assuming a water content of 3 and 4.96 wt% for the unperturbed and perturbed cases, respectively. For this case, the water cross-section change is not a function of energy and the ratio implied by Eq. (31) can be expressed in terms of the total sensitivity (summed over all energy groups) and percent water content f_w. The ratio was found to be

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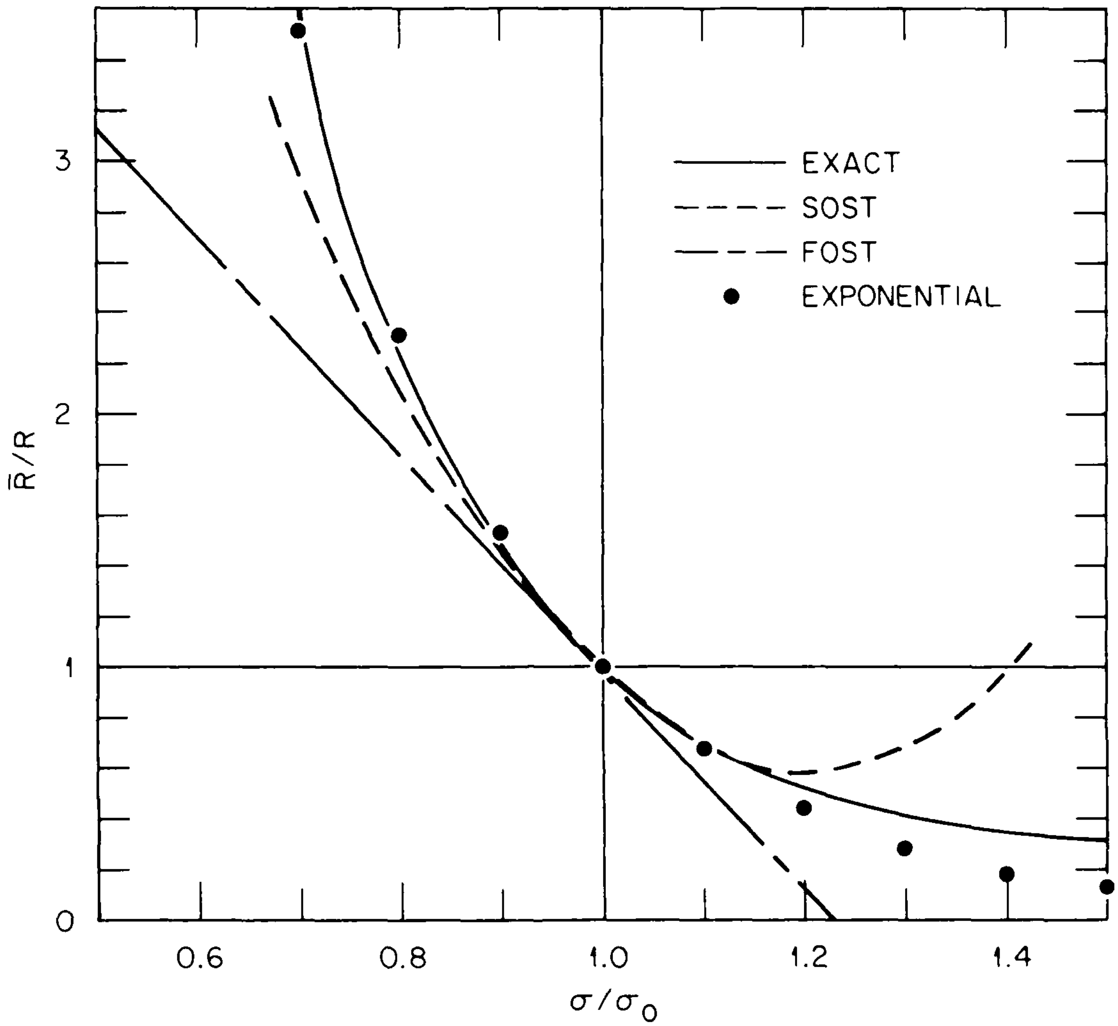

Fig. 1. Comparison of Relative Detector Responses for Deep-Penetration Sodium Problem. Note: This figure has been taken from Ref. 16 and our exponential results have been added to it.

$$\frac{P_{\Sigma_w^0}/\Sigma_w^0}{P_{\Sigma_w}/\Sigma_w} = \frac{P_{\Sigma_w^0}/f_w^0}{P_{\Sigma_w}/f_w} = 0.87\,, \tag{32}$$

where f_w and f_w^0 are the weight fractions of water for the perturbed and unperturbed cases, respectively.

As was expected, the numerical value of Eq. (32) is close to the ideal value of unity. This is to be contrasted with corresponding values inherent in the assumptions of the linear and power models:

$$\frac{R_{\Sigma_w^0} \cdot P_{\Sigma_w^0}/f_w^0}{R_{\Sigma_w} \cdot P_{\Sigma_w}/f_w} = 0.36\,, \qquad \text{(Linear)}$$

and

$$\frac{P_{\Sigma_w^0}}{P_{\Sigma_w}} = 1.45\,. \qquad \text{(Power)}$$

In order to examine this case on an energy group basis, the sensitivities for the 4.96 wt% water case were arranged in descending order (highest sensitivity first) along with the corresponding group ratios suggested in Eq. (30) (see Table 10). The comparison shows that the groups with comparatively higher sensitivities have ratios of approximately 1. For additional insight, we took the cumulative sum of the sensitivities and divided these numbers by the sum of the sensitivities to calculate the cumulative sensitivity fraction. It can be seen that 60% of the total sensitivity is confined to the 20 groups shown in Table 10. Further investigation reveals that 80% of the total sensitivity lies within 48 groups. In this range, the worst ratio differed from unity by 45%, whereas for the cases which contributed a total of 10% of the total sensitivity (a total of 120 groups), the typical ratio deviated from unity by more than 50%.

The interpretation of the foregoing results is that the assumption inherent in the BEST model, that is, the assumption that P_{Σ_g}/Σ_g is constant, is indeed a good approximation for the cases considered. We thus assumed that the BEST model could legitimately be offered as a useful predictive tool. Our next steps were to codify the BEST model (and the power model, as well) and to expand its data base in preparation for its release to the shielding community (see Section 3).

3. DEVELOPMENT OF PREDICTION MODEL USER DATA PACKAGE FOR CONCRETE SLABS

Generalization of Models

As noted above, the original version of the SENTINEL code[7] employs the linear model to compute the percentage or fractional change in a response (for example, a dose rate) for a given system (for example, a shield configuration) due to specified percentage or fractional changes in the group cross sections for the materials included in the system. Following the success of the newly developed exponential and power models, especially the exponential (BEST) model, it was considered important to expand SENTINEL to allow the user a choice of prediction model. Generalization of all three models into a common expression for implementation into the code was accomplished as described below.

With

$$P_{\Sigma_i^0} = \left(\frac{\Sigma_i}{R} \cdot \frac{\partial R}{\partial \Sigma_i} \right)_0 \quad \text{at } R_0 = R(\Sigma_i^0) \qquad (33)$$

Table 10. Energy Group Ratios $(P_{\Sigma_g^0}/\Sigma_g^0)/(P_{\Sigma_t}/\Sigma_g)$ and Cumulative Sensitivity Fractions for 1-m-thick Standard Concrete Slab (4.96 wt% Water)

Energy Group Number	Total Cross-Section Sensitivity	$(P_{\Sigma_g^0}/\Sigma_g^0)/(P_{\Sigma_t}/\Sigma_g)$	Cumulative Sensitivity (%)
171	-2.0640(-1)*	0.94439	10.25
40	-1.1240(-1)	0.93204	15.83
43	-1.0006(-2)	0.95297	20.80
42	-7.6071(-2)	0.97860	24.57
38	-6.5481(-2)	0.93626	27.83
39	-6.5258(-2)	0.95813	31.07
37	-6.3043(-2)	0.95813	34.20
36	-6.2511(-2)	0.98215	37.30
44	-6.2224(-2)	0.89067	40.40
41	-4.8928(-2)	0.96248	42.82
45	-4.7718(-2)	0.86494	45.19
27	-4.5505(-2)	1.2875	47.45
31	-4.4816(-2)	1.0939	49.68
35	-4.1647(-2)	0.98019	51.75
46	-3.4215(-2)	0.85448	53.48
49	-3.2943(-2)	0.82396	55.08
30	-3.1036(-2)	1.1606	56.62
29	-2.9622(-2)	1.1942	58.09
32	-2.7558(-2)	1.0198	59.46
170	-2.6924(-2)	0.72088	60.80

*Read: -2.0640×10^{-1}.

defined as the relative sensitivity, our linear model is

$$R = R_0 + \sum_i \frac{\partial R}{\partial \Sigma_i} \Delta\Sigma_i , \tag{34}$$

where we assume $\partial R/\partial \Sigma_i$ is constant over a reasonable range of Σ_i values.

Now let us assume that n_R and n_i exist for which the following relation is valid over a range of interest:

$$\frac{\partial R}{\partial \Sigma_i} = R^{n_R} \Sigma_i^{n_i} . \tag{35}$$

This can be expressed as

$$\frac{\partial R}{\partial \Sigma_i} = \left(\frac{R}{R_0}\right)^{n_R} \left(\frac{\Sigma_i}{\Sigma_i^0}\right)^{n_i} \frac{R_0}{\Sigma_i^0} P_{\Sigma_i^0} . \tag{36}$$

We have

$$dR = \sum_i \frac{\partial R}{\partial \Sigma_i} d\Sigma_i$$

or

$$\delta R = \sum_i \left(\frac{R}{R_0}\right)^{n_R} \left(\frac{\Sigma_i}{\Sigma_i^0}\right)^{n_i} \left(\frac{R^0}{\Sigma_i^0}\right) P_{\Sigma_i^0} \delta\Sigma_i . \tag{37}$$

Note that we are assuming that each derivative depends only on the dependent variable R in a uniform way and on the particular individual independent variable:

$$\frac{dR}{R^{n_R}} = \sum_i \left(\frac{1}{R_0}\right)^{n_R - 1} \left(\frac{1}{\Sigma_0}\right)^{n_i + 1} P_{\Sigma_i^0} \Sigma_i^{n_i} d\Sigma_i . \tag{38}$$

We have

$$\int_{R_0}^{R} R^{-n_R} dR = \begin{cases} \left(R^{-n_R+1} - R_0{}^{-n_R+1}\right) \Big/ (1 - n_R) & \text{if } n_R \neq 1 , \\ \ln(R/R_0) & \text{if } n_R = 1 . \end{cases} \tag{39}$$

Similarly,

$$\int_{\Sigma_i^0}^{\Sigma_i} \Sigma_i^{n_i} d\Sigma_i = \begin{cases} \left[(\Sigma_i)^{n_i+1} - \left(\Sigma_i^0\right)^{n_i+1}\right] \Big/ (n_i + 1) & \text{if } n_i \neq -1 , \\ \ln\left(\Sigma_i/\Sigma_i^0\right) & \text{if } n_i = -1 . \end{cases} \tag{40}$$

If n_R and $-n_i$ are not equal to unity, the result is

$$R^{-n_R+1} = R_0{}^{-n_R+1} \left\{ 1 + (1 - n_R) \frac{\sum_i \left[\left(\Sigma_i/\Sigma_i^0\right)^{n_i+1} - 1\right]}{1 + n_i} P_{\Sigma_i^0} \right\} \tag{41}$$

or

$$R = R_0 \left\{ 1 + (1 - n_R) \sum_i P_{\Sigma_i^0} \frac{\left[\left(\Sigma_i / \Sigma_i^0 \right)^{n_i + 1} - 1 \right]}{1 + n_i} \right\}^{1/(1 - n_R)} \tag{42}$$

Now if $n_R = 1$,

$$R = R_0 \exp \left\{ \sum_i P_{\Sigma_i^0} \frac{\left[\left(\Sigma_i / \Sigma_i^0 \right)^{n_i + 1} - 1 \right]}{1 + n_i} \right\} . \tag{43}$$

If $n_i = -1$,

$$\frac{\left[\left(\Sigma_i / \Sigma_i^0 \right)^{n_i + 1} - 1 \right]}{1 + n_i} \text{ is replaced by } \ln \left(\Sigma_i / \Sigma_i^0 \right) . \tag{44}$$

We can express

$$R / R_0 = 1 + \Delta R / R_0 , \tag{45}$$

and

$$\Sigma_i / \Sigma_i^0 = 1 + \Delta \Sigma_i / \Sigma_i^0 ; \tag{46}$$

therefore we can write the equations in terms of ΔR and $\Delta \Sigma$ as

$$\Delta R / R_0 = \left\{ 1 + (1 - n_R) \sum_i P_{\Sigma_i^0} \frac{\left[\left(\Delta \Sigma_i / \Sigma_i^0 + 1 \right)^{n_i + 1} - 1 \right]}{1 + n_i} \right\}^{1/(1 - n_R)} - 1 . \tag{47}$$

Comparing these relations with expressions found earlier, we see that the following special cases are identified:

Linear Model	if $n_R = n_i = 0$.
Power Model	if $n_R = 1; n_i = -1$.
Exponential Model	if $n_R = 1; n_i = 0$.

Implementation of Models into SENTINEL Code

The scheme for implementing the above generalized form into the SENTINEL code is now described.

Given n_R, the n_i's, and the $\Delta\Sigma_i/\Sigma_i^0$'s, we define

$$f_i^{n_i} \equiv \begin{cases} \left\{\left[1 + \left(\Delta\Sigma_i/\Sigma_i^0\right)\right]^{n_i+1} - 1\right\} \Big/ (1 + n_i) & \text{if } n_i \neq -1, \\ \ln\left[1 + \left(\Delta\Sigma_i/\Sigma_i^0\right)\right] & \text{if } n_i = -1. \end{cases} \tag{48}$$

Define

$$F = \sum_i P_{\Sigma_i^0} f_i^{n_i} \tag{49}$$

and

$$G(F) \equiv \begin{cases} \left[1 + \left(1 - n_R\right)F\right]^{1/(1-n_R)} & \text{if } n_R \neq 1, \\ \exp(F) & \text{if } n_R = 1; \end{cases} \tag{50}$$

then

$$\Delta R/R_0 = G(F) - 1. \tag{51}$$

With the above scheme implemented in SENTINEL, we renamed our modified code the SENATOR code (for *S*ENTINEL *E*xtended to *N*ew *A*pproaches *TO* *R*esponse prediction). A comprehensive description of the code is included in the user's manual, which is part of a new RSIC data package called CONSENT (see below). Like SENTINEL, SENATOR works with cross sections and sensitivities as a function of energy groups. The group sensitivities should be in SENPRO format. Two independent input options are implemented in SENATOR. Users with no inventory of cross sections in the ANISN format may find option 1 more attractive, while those with ANISN cross sections available may find option 2 useful. Although some data are common to both options, for clarity, separate and completely detailed input descriptions are provided in the input for both options.

The code has been automated such that problems can be executed in any of the three modes — linear, power and exponential — simply by changing two model indices. The free-form FIDO input system is supplied for user convenience.

Expansion of Concrete Sensitivity Coefficient Data Base

As described in Section 2, as a reference base for the development of the simplified models, calculations were performed with the FORSS sensitivity system[5] to obtain the sensitivities of the total dose rates calculated for the 1- and 2-m-thick reference concrete slabs to changes in the cross sections used in the ANISN transport calculations. These sensitivities, summed over energy, were presented in Table 6.

In view of the success of the model development, it was decided to expand the sensitivity data base so that it would apply to a wider range of concrete problems. Thus additional sensitivity calculations were performed for 0.05-, 0.5-, and 1.5-m-thicknesses of both the standard and the rebar concrete slabs. For the standard concrete case, energy-dependent sensitivities of the total dose rate to changes in the total, absorption, and elastic-scattering cross sections of the various concrete constituents were provided. Further, the sensitivities were calculated for the individual zones in the slabs, as well as for the total slab. (The slab zones are shown in Table 5 in Section 2.) For the rebar concrete slabs, energy-dependent sensitivities for concrete, steel, and rebar concrete were provided.

The resulting sensitivity profiles are available in the standard SENPRO format[7] for all the slabs, including the 1- and 2-m-thick slabs. For standard concrete, 415 sensitivity profiles are available, and for rebar concrete, 207 profiles are available. They may be obtained from the ORNL Radiation Shielding Information Center (see below).

Tables of the sensitivity profiles summed over energy are presented in Appendix B for both the standard concrete and the rebar concrete. As was noted in Section 2, when a problem is not energy dependent, these sensitivities can be used with the models for desk-type calculations. If, however, energy-dependent problems are being solved, the calculations must be performed with a computer, in which case the SENPRO-formatted data are most convenient.

In addition to being directly useful in the models, the sensitivity profiles themselves yield valuable information on which neutron interactions are important contributors to the penetrating dose rates. This is discussed more fully in Section 4.

Description of User Data Package (CONSENT)

In order to facilitate use of the models for concrete shielding problems, a data package identified as DLC-102/CONSENT has been assembled for release from the ORNL Radiation Shielding Information Center. The package includes the sensitivity profiles and the SENATOR code. It also includes a program called SENDIN which can be used to convert the SENPRO files from the binary form to the BCD form and vice versa.

In addition, the data package includes a small computer program called COMPOSE. This program was written to facilitate problems such as Problem 3 described in Section 2. In Problem 3, it was necessary to consider the sensitivities of each individual element in the concrete, and with COMPOSE the problem can be handled easily on a small computer.

Requests for the data package DLC-102/CONSENT should be addressed to: Radiation Shielding Information Center, Oak Ridge National Laboratory, Post Office Box X, Oak Ridge, Tennessee, USA, 37831.

4. DEVELOPMENT OF TRANSMISSION FUNCTION DATA PACKAGE FOR CONCRETE SLABS AND A VARIABLE SOURCE

Data Base of Concrete Dose Transmission Factors

As was noted in the introduction to this report, in addition to the data base of sensitivity coefficients described in Section 3 and included in the RSIC data package CONSENT, this study yielded a data base of "dose transmission factors" for concrete. The transmission factors are of the type proposed by Roussin and Schmidt[17] and expanded upon by Engström and Lefvert.[9]

These dose transmission factors provide a relatively simple means for calculating the dose rate at the exit face of a concrete slab due to an arbitrary source incident on the opposite face of the slab. Like the sensitivity coefficients, the transmission factors are obtained from detailed calculations for specific concrete slab cases, and they are limited in application to those cases. As would be expected, the cases for which we offer transmission factors are the same cases for which we offer sensitivity coefficients.

In essence, the transmission factors are a byproduct of the sensitivity calculations that can be used independently by the shielding community. As noted in Ref. 17, methods for utilizing adjoint transport calculations to obtain solutions to certain classes of source-detector problems were originally outlined by Hansen and Sandmeier.[18] Roussin and Schmidt applied these methods to the case of an infinite concrete slab with finite thickness and showed mathematically that the surface adjoint function ϕ^* can be interpreted as a transmission factor τ which gives the dose equivalent transmitted through a slab of thickness T due to one particle incident on the surface in the gth energy group and jth direction. With this interpretation, transmission factors can be used for computing a "detector reading," such as dose equivalent, for an arbitrary source, with the equation

$$R(T) = \sum_g \sum_j S_{gj} w_j \tau_{gj}(T), \qquad (52)$$

where $S_{gj} w_j$ is the number of gth energy group particles entering the slab with a direction in the cosine interval j, and w_j is the weight (solid angle) associated with the jth cosine.

As described in Section 2, the adjoint calculations that yielded values of $\tau_{gj}(T)$ were performed with the ANISN transport code[1] using the DLC/VITAMIN-C cross-section library[13] applied with P_3 cross-section expansion and S_{16} angular quadrature. The VITAMIN-C library was originally developed for use in calculations for breeder reactors and for calculations of interest to the fusion reactor program, but the library has found widespread application in the shielding community. It is a well-documented state-of-the-art data base, and thus the dose transmission factors obtained from calculations based on the library are themselves state-of-the-art transmission factors.

Dose transmission factors have been calculated for both neutrons and gamma rays incident on standard and rebar concrete slabs having thicknesses of 0.05, 0.5, 1.0, 1.5, and 2.0 m. For incident neutrons, the transmission factors are given for both the transmitted neutron dose and the transmitted total dose due to neutrons incident in VITAMIN-C's 171 neutron energy groups. For incident gamma rays, the transmission factors are given for gamma-ray dose due to gamma rays incident in VITAMIN-C's 36 gamma-ray groups. In all cases, eight angles of incidence are included. The tabulated values are presented in Appendix C for both the standard and the rebar concrete slabs.

The FTF-II Code

The transmission factors reported by Roussin and Schmidt[17] (in 1971) were given for 22 neutron groups and 18 gamma-ray groups and covered concrete slab thicknesses up to 2 m. The transmission factors reported by Engström and Lefvert[9] (in 1977) were for the same energy group structure, but they were based on updated cross sections and covered additional slab thicknesses. Along with the publication of their results, Engström and Lefvert released a small computer program which could read the transmission factors and fold them into an arbitrary neutron or gamma-ray source distribution. Called FTF (for a program to *F*old the *T*ransmission *F*actors), the code could also interpolate the calculated dose logarithmically between the two slab thicknesses adjacent to the given thickness, as well as extrapolate the dose by using the transmission data for the thickest slabs.

In our work we have modified the FTF code so that it can fold the transmission factors from all the energy groups in which we report them. The modified code is identified as FTF-II. The code predicts results that agree within 0.01% with those obtained with ANISN forward calculations. In a test case, we used FTF-II to calculate the dose due to a fusion-fission source, and the results were identical with ANISN results.

Description of User Data Package (ADVISE)

The dose transmission factors and the FTF-II code are available from the Radiation Shielding Information Center in data package ADVISE (for *A*djoint *D*ata generated from *V*ITAMIN-C for *I*nvestigating *S*ource *E*ffects). The data package may be requested by its identification number DLC-101/ADVISE from: Radiation Shielding Information Center, Oak Ridge National Laboratory, Post Office Box X, Oak Ridge, Tennessee, U.S.A., 37831.

5. RESULTS AND DISCUSSION

The results from this study can be summarized in the following three paragraphs:

(1) A simplified exponential prediction model for shielding calculations has been developed which is a significant improvement over the traditional linear model for using sensitivity coefficients to predict changes in a calculated response due to changes in the shield composition. In addition, a second model, called the power model, has been developed which also outperforms the linear model for some cases. Detailed results for reference concrete cases are given in Appendix A.

(2) A comprehensive sensitivity coefficient data base as a function of energy has been developed for the case of a fission source normally incident on standard concrete and rebar concrete slabs having thicknesses of 0.05, 0.5, 1.0, 1.5, and 2.0 m (see Appendix B). In addition to being available for use with the calculational models, this data base gives insight into the dominant processes governing neutron and secondary gamma-ray transport in concrete (see discussion below).

(3) An extensive data base of dose transmission factors for concrete slabs has been calculated (see Appendix C). These transmission factors can be used to predict responses due to arbitrary sources (in energy and angle) incident on the slabs to which the data base applies.

All three of the simplified prediction models [we have identified the exponential (BEST) model as the preferred model] can be applied to energy-independent problems using the energy-integrated sensitivity coefficients included in Appendix B of this report. Such an application can be done with a desk-type calculator; however, a small computer program called COMPOSE is available to facilitate the calculation of problems involving changes in a number of shield constituents. For energy-dependent calculations, another code called the SENATOR code, which is a modified version of the SENTINEL code, may be used, along with the energy-dependent sensitivity coefficient data base. The SENATOR code, the data base, the COMPOSE program, and other calculational tools are available from the ORNL Radiation Shielding Information Center as data package DLC-102/CONSENT.

The dose transmission factors are also available from RSIC. They are included, along with an implementation code identified as FTF-II (a modified version of the FTF code), in data package DLC-101/ADVISE.

Adequacy of Simplified Models

When the simplified models and sensitivity coefficients from Appendix B were applied to standard concrete slabs in which the water content was varied, both the exponential (BEST) model and the power model outperformed the linear model, the exponential model being best for a 1-m slab and the power model being best for a 2-m slab. For the 1-m slab, the BEST model results were within 13% of exact results calculated with the ANISN transport code over the entire range of water content considered (2 to 8 wt%).

When the models and sensitivity coefficients from Appendix B were applied to rebar concrete slabs, the BEST model was clearly superior for all cases. For the 1-m slab, the BEST model results agreed with the ANISN results within 9% for the entire range of rebar considered (4 to 20 vol%). For the 2-m slab, they agreed within 13%.

For a case in which all the concrete constituents were changed (from standard concrete to TSF concrete), only the BEST model yielded acceptable results, agreeing with the ANISN results within 5% for the 1-m slab and within 14% for the 2-m slab.

The validity of the BEST model was further established by applying it to a deep-penetration sodium problem, for which it again gave results that were in good agreement with discrete ordinates results.

The assumption inherent in the BEST model is that $P_{\Sigma g}/\Sigma_g$ is constant. An examination of this assumption for a 1-m standard slab indicated that the assumption is reasonably valid, and thus explains the success of the model. The model is therefore recommended for use as a predictive tool for concrete shield calculations dominated by attenuation.

Qualitative Features of Concrete Sensitivity Coefficients

An examination of the sensitivity coefficients given in Appendix B for the reference slabs of standard concrete (4.96 wt% water) shows that the contribution of the neutron dose to the total dose decreases with increasing slab thickness. For a 0.05-m slab, the neutron contribution is 100%, while for the 1-m slab it decreases to 90% and for the 2-m slab to 60%. It is also interesting to note that 86% of the total sensitivity of the last interval of the 2-m slab (at the exit face) is due to secondary gamma rays produced within that interval.

The constitutents oxygen, silicon and hydrogen contribute 38%, 24%, and 22%, respectively, to the total cross-section sensitivity for the 1-m standard concrete slab, and they contribute 39%, 27%, and 17%, respectively, for the 2-m slab. This means that these three elements account for 83% and 85%, respectively, of the sensitivity of the total dose, with the remaining elements making negligible contributions. Sulfur, for example, contributes only 0.09% of the total cross-section sensitivity, and the sensitivity profiles for sulfur show no significant qualitative features. This indicates that by considering the qualitative and quantitative importance of the various concrete constituents, the calculations for concrete shields could be simplified.

The sensitivity coefficients in Appendix B also show that water accounts for 25% and 20% of the total sensitivity in the 1-m and 2-m standard concrete slabs, respectively.

Finally, the sensitivity coefficients in Appendix B indicate that elastic scattering is the dominant process for the transport of neutrons; however, the importance of the process lessens with increasing slab thickness. For the 0.05-m slab, for example, the sensitivity of the total dose to elastic scattering is 92%, decreasing to 82% for the 0.5-m slab and to 61% and 47% for the 1.5-m and 2-m slabs, respectively. In the last (exit) interval of the 2-m slab, elastic scattering accounts for only 12% of the sensitivity, with absorption (and the concomitant gamma-ray production) being the dominant process.

A similar examination of the sensitivity coefficients given in Appendix B for the reference rebar slabs (7.6 vol% steel) shows that the reinforcing steel rods account for 15% of the total sensitivity in the 1-m rebar slab and 18% in the 2-m rebar slab. The sensitivity of the total dose to the total cross section for the 1-m rebar slab is 56% of that for the 2-m rebar slab. In the 2-m rebar case, the secondary gamma-ray sensitivity increases to 42% of the total sensitivity, compared to only 10% in the 1-m rebar case.

Additional insight into the transport process could be gained by examination of the sensitivity coefficients for other cases included in Appendix B. The resulting information not only would lead to a better understanding of the deep penetration of neutrons in concrete, but also should be an aid in the design of actual shields.

Applicability of Dose Transmission Factors

With the data base of dose transmission factors resulting from this study, transmission factors are now available for both standard concrete slabs and rebar concrete slabs and they are based on the latest VITAMIN-C cross sections. Thus for these cases, the transmission of neutrons and gamma rays through the slabs for any arbitrary source can be calculated without having to use discrete ordinates codes, and the results will be the same as the exact results that would be obtained with the discrete ordinates method. With the interpolation techniques available, the transmission factors may also be used to predict doses for other slab thicknesses, with agreement estimated to be within 10% of the exact results.

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Appendix A

DETAILED RESULTS OF MODEL PREDICTIONS FOR STANDARD, REBAR, AND TSF CONCRETE CASES

Some detailed comparisons of exact (ANISN-calculated) results and those predicted by the models for the reference concrete slab cases and a fission source are shown in this appendix, together with illustrative results obtained for TSF concrete. The results are presented in tabular form and indicate the contribution of each individual element or constituent of the slab to the final result for the perturbed case. For the linear model, the contributions are "additive" terms [see Eq. (5) in the text] that add or subtract from the initial response, R_0. For the exponential and power models, the individual contributions take the form of multiplicative factors [see Eqs. (7) and (10) in the text] which modify the initial response, R_0. If a constituent does not change in the perturbation, its factor will be zero in the linear model and unity in the exponential and power models.

Consider, for example, the results shown in Tables A-1a and A-2a for the cases of the 1- and 2-m-thick standard concrete slabs. Here we examine the effect of changing the water content of the slabs from the reference value of 4.96% to some other percentage. This involves changes in the number densities of H and 0, with all other elements remaining the same. Thus only the entries opposite H and 0 change. In the case of the linear model, the additive factors for the other materials are zero while in the cases of the exponential and power models the multiplicative factors are unity. A comparison of the total calculated responses for these cases are given in Tables A-1b and A-2b.

Similar results for the steel-reinforced (rebar) cases are shown in Tables A-3a, A-3b, A-4a, and A-4b. For these cases we consider the collective effects of the steel components and the concrete components, rather than each individual element.

Finally, two cases are provided (in Tables A-5a and A-5b) which use the standard concrete sensitivities to predict the result for a completely different concrete, the so-called TSF concrete. For these cases, each element is present in a different concentration in the TSF concrete and the standard concrete. Hence, additive or multiplicative factors contributing to the predicted results are found for each element.

The results presented in this appendix were produced using a simple computer code, COMPOSE, which is available from the Radiation Shielding Information Center as part of the DLC-102/CONSENT data library package (see Section 5).

Table A-1a. Calculational Parameters for 1-m-thick Standard Concrete Slab Reference Cases — Variable Water Content

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
		Slab Containing 1.97 wt% Water			
H	0.77700E-02[a]	0.30790E-02	0.10465E 01	0.28477E 01	0.49756E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.41510E-01	0.16451E 00	0.11788E 01	0.11843E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
		Slab Containing 2.96 wt% Water			
H	0.77700E-02	0.46325E-02	0.69994E 00	0.20136E 01	0.24509E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.42289E-01	0.11086E 00	0.11172E 01	0.11196E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
		Slab Containing 3.97 wt% Water			
H	0.77700E-02	0.62182E-02	0.34619E 00	0.14137E 01	0.14714E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.43090E-01	0.55755E-01	0.10573E 01	0.10579E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
		Slab Containing 4.96 wt% Water[b]			
H	0.77700E-02	0.77700E-02	0.0	0.10000E 01	0.10000E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.43900E-01	0.0	0.10000E 01	0.10000E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01

Table A-1a. Continued

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
			Slab Containing 6.06 wt% Water		
H	0.77700E-02	0.94903E-02	-0.38378E 00	0.68128E 00	0.70703E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.44738E-01	-0.57682E-01	0.94395E 00	0.94446E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
			Slab Containing 7.14 wt% Water		
H	0.77700E-02	0.11179E-01	-0.76051E 00	0.46743E 00	0.53230E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.45589E-01	-0.11627E 00	0.89024E 00	0.89218E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
			Slab Containing 8.24 wt% Water		
H	0.77700E-02	0.12904E-01	-0.11453E 01	0.31812E 00	0.41507E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.46459E-01	-0.17612E 00	0.83852E 00	0.84267E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01

[a]Read: 0.77700×10^{-2}.
[b]Unperturbed case.

Table A-1b. Calculated Responses for 1-m-thick Standard Concrete Slab Reference Cases — Variable Water Content

Note: Initial response for unperturbed 1-m-thick slab containing 4.96 wt% water was:

0.66038E-07 (rem/hr)/(neutrons/cm²·s)

Water Content (wt%)	Model	Calculated Response (rem/hr / neutrons/cm²·s)	% Deviation from Exact
1.97	Exact	0.25382E-06[a]	
	Linear	0.14601E-06	-42.5
	Exponential	0.22168E-06	-12.7
	Power	0.38914E-06	+53.3
2.96	Exact	0.15603E-06	
	Linear	0.11958E-06	-23.4
	Exponential	0.14856E-06	-4.8
	Power	0.18121E-06	+16.1
3.97	Exact	0.98909E-07	
	Linear	0.92581E-07	-6.4
	Exponential	0.98708E-07	-0.2
	Power	0.10279E-06	+3.9
4.96[b]	Exact	0.66038E-07	
	Linear	0.66038E-07	0.0
	Exponential	0.66038E-07	0.0
	Power	0.66038E-07	0.0
6.06	Exact	0.42452E-07	
	Linear	0.36885E-07	-13.1
	Exponential	0.42469E-07	0.0
	Power	0.44098E-07	+3.9
7.14	Exact	0.28598E-07	
	Linear	0.81375E-08	-71.5
	Exponential	0.27480E-07	-3.9
	Power	0.31362E-07	+9.7
8.24	Exact	0.19604E-07	
	Linear	-0.21228E-07	-208.3
	Exponential	0.17615E-07	-10.1
	Power	0.23098E-07	+17.8

[a]Read: 0.25382×10^{-6}.
[b]Unperturbed case.

Table A-2a. Calculational Parameters for 2-m-thick Standard Concrete Slab Reference Cases — Variable Water Content

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
			Slab Containing 1.97 wt% Water		
H	0.77700E-02[a]	0.30790E-02	0.14039E 01	0.40712E 01	0.86070E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.41510E-01	0.30378E 00	0.13550E 01	0.13666E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
			Slab Containing 2.96 wt% Water		
H	0.77700E-02	0.46325E-02	0.93900E 00	0.25574E 01	0.33289E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.42289E-01	0.20470E 00	0.12272E 01	0.12319E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
			Slab Containing 3.97 wt% Water		
H	0.77700E-02	0.62182E-02	0.46443E 00	0.15911E 01	0.16788E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.43090E-01	0.10295E 00	0.11084E 01	0.11095E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
			Slab Containing 4.96 wt% Water[b]		
H	0.77700E-02	0.77700E-02	0.0	0.10000E 01	0.10000E 01
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.43900E-01	0.0	0.10000E 01	0.10000E 01
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01

Table A-2a. Continued

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
		Slab Containing 6.06 wt% Water			
H	0.77700E-02	0.94903E-02	-0.51486E 00	0.59759E 00	0.62808E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.44738E-01	-0.10651E 00	0.89896E 00	0.89987E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
		Slab Containing 7.14 wt% Water			
H	0.77700E-02	0.11179E-01	-0.10203E 01	0.36050E 00	0.42916E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.45589E-01	-0.21469E 00	0.80679E 00	0.81005E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01
		Slab Containing 8.24 wt% Water			
H	0.77700E-02	0.12904E-01	-0.15365E 01	0.21513E 00	0.30740E 00
C	0.10000E-08	0.10000E-08	0.0	0.10000E 01	0.10000E 01
O	0.43900E-01	0.46459E-01	-0.32520E 00	0.72238E 00	0.72900E 00
Na	0.10500E-02	0.10500E-02	0.0	0.10000E 01	0.10000E 01
Mg	0.14900E-03	0.14900E-03	0.0	0.10000E 01	0.10000E 01
Al	0.24500E-02	0.24500E-02	0.0	0.10000E 01	0.10000E 01
Si	0.15800E-01	0.15800E-01	0.0	0.10000E 01	0.10000E 01
S	0.56400E-04	0.56400E-04	0.0	0.10000E 01	0.10000E 01
K	0.69300E-03	0.69300E-03	0.0	0.10000E 01	0.10000E 01
Ca	0.29200E-02	0.29200E-02	0.0	0.10000E 01	0.10000E 01
Fe	0.31300E-03	0.31300E-03	0.0	0.10000E 01	0.10000E 01

[a]Read: 0.77700×10^{-2}.
[b]Unperturbed case.

Table A-2b. Calculated Responses for 2-m-thick Standard Concrete Slab Reference Cases — Variable Water Content

Note: Initial response for unperturbed 2-m-thick slab containing 4.96 wt% water was:

0.36543E-10 (rem/hr)/(neutrons/cm²·s)

Water Content (wt%)	Model	Calculated Response (rem/hr / neutrons/cm²·s)	% Deviation from Exact
1.97	Exact	0.36198E-09[a]	
	Linear	0.98948E-10	-72.7
	Exponential	0.20158E-09	-44.3
	Power	0.42984E-09	+18.7
2.96	Exact	0.14533E-09	
	Linear	0.78337E-10	-46.1
	Exponential	0.11468E-09	-21.1
	Power	0.14986E-09	+3.1
3.97	Exact	0.68053E-10	
	Linear	0.57277E-10	-15.8
	Exponential	0.64449E-10	-5.3
	Power	0.68066E-10	0.0
4.96[b]	Exact	0.36543E-10	
	Linear	0.36543E-10	0.0
	Exponential	0.36543E-10	0.0
	Power	0.36543E-10	0.0
6.06	Exact	0.20782E-10	
	Linear	0.13836E-10	-33.4
	Exponential	0.19631E-10	-5.5
	Power	0.20654E-10	-0.6
7.14	Exact	0.13041E-10	
	Linear	-0.85856E-11	-165.8
	Exponential	0.10628E-10	-18.5
	Power	0.12704E-10	-2.6
8.24	Exact	0.87023E-11	
	Linear	-0.31490E-10	-461.9
	Exponential	0.56789E-11	-34.7
	Power	0.81890E-11	-5.9

[a] Read: 0.36198×10^{-9}.
[b] Unperturbed case.

Table A-3a. Calculational Parameters for 1-m-thick Steel-Reinforced (Rebar) Concrete Slab Reference Cases — Variable Steel Content

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
Slab Containing 4.0 vol% Steel					
STEEL	0.76000E-01[a]	0.40000E-01	0.61147E 00	0.18431E 01	0.22900E 01
CONCRETE	0.92400E 00	0.96000E 00	-0.29145E 00	0.74718E 00	0.75132E 00
Slab Containing 7.6 vol% Steel[b]					
STEEL	0.76000E-01	0.76000E-01	0.0	0.10000E 01	0.10000E 01
CONCRETE	0.92400E 00	0.92400E 00	0.0	0.10000E 01	0.10000E 01
Slab Containing 8.0 vol% Steel					
STEEL	0.76000E-01	0.80000E-01	-0.67941E-01	0.93432E 00	0.93593E 00
CONCRETE	0.92400E 00	0.92000E 00	0.32384E-01	0.10329E 01	0.10330E 01
Slab Containing 9.0 vol% Steel					
STEEL	0.76000E-01	0.90000E-01	-0.23779E 00	0.78837E 00	0.80392E 00
CONCRETE	0.92400E 00	0.91000E 00	0.11334E 00	0.11200E 01	0.11210E 01
Slab Containing 10.0 vol% Steel					
STEEL	0.76000E-01	0.10000E 00	-0.40765E 00	0.66521E 00	0.70169E 00
CONCRETE	0.92400E 00	0.90000E 00	0.19430E 00	0.12145E 01	0.12176E 01
Slab Containing 16.0 vol% Steel					
STEEL	0.76000E-01	0.16000E 00	-0.14268E 01	0.24009E 00	0.38252E 00
CONCRETE	0.92400E 00	0.84000E 00	0.68007E 00	0.19740E 01	0.20401E 01
Slab Containing 20.0 vol% Steel					
STEEL	0.76000E-01	0.20000E 00	-0.21062E 01	0.12170E 00	0.28678E 00
CONCRETE	0.92400E 00	0.80000E 00	0.10039E 01	0.27289E 01	0.29387E 01

[a]Read: 0.76000×10^{-1}
[b]Unperturbed case.

Table A-3b. Calculated Responses for 1-m-thick Steel-Reinforced (Rebar) Concrete Slab Reference Cases — Variable Steel Content

Note: Initial response for unperturbed 1-m-thick slab containing 7.6 vol% steel was:

0.32130E-07 (rem/hr)/(neutrons/cm²·s)

Steel Content (vol%)	Model	Calculated Response (rem/hr / neutrons/cm²·s)	% Deviation from Exact
4.0	Exact	0.44550E-07[a]	
	Linear	0.42412E-07	-4.8
	Exponential	0.44248E-07	-0.7
	Power	0.55281E-07	+24.1
7.6[b]	Exact	0.32130E-07	
	Linear	0.32130E-07	0.0
	Exponential	0.32130E-07	0.0
	Power	0.32130E-07	0.0
8.0	Exact	0.31000E-07	
	Linear	0.30988E-07	0.0
	Exponential	0.31008E-07	0.0
	Power	0.31063E-07	+0.2
9.0	Exact	0.28410E-07	
	Linear	0.28131E-07	-1.0
	Exponential	0.28370E-07	-0.1
	Power	0.28955E-07	+1.9
10.0	Exact	0.26070E-07	
	Linear	0.25275E-07	-3.0
	Exponential	0.25957E-07	-0.4
	Power	0.27451E-07	+5.3
16.0	Exact	0.15932E-07	
	Linear	0.81387E-08	-48.9
	Exponential	0.15227E-07	-4.4
	Power	0.25073E-07	+57.4
20.0	Exact	0.11740E-07	
	Linear	-0.32858E-08	-128.0
	Exponential	0.10671E-07	-9.1
	Power	0.27078E-07	+130.6

[a] Read: 0.44550×10^{-7}.
[b] Unperturbed case.

Table A-4a. Calculational Parameters for 2-m-thick Steel-Reinforced (Rebar) Concrete Slab Reference Cases — Variable Steel Content

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
Slab Containing 4.0 vol% Steel					
STEEL	0.76000E-01[a]	0.40000E-01	0.13472E 01	0.38467E 01	0.62059E 01
CONCRETE	0.92400E 00	0.96000E 00	-0.50559E 00	0.60315E 00	0.60897E 00
Slab Containing 7.6 vol% Steel[b]					
STEEL	0.76000E-01	0.76000E-01	0.0	0.10000E 01	0.10000E 01
CONCRETE	0.92400E 00	0.92400E 00	0.0	0.10000E 01	0.10000E 01
Slab Containing 20.0 vol% Steel					
STEEL	0.76000E-01	0.20000E 00	-0.46404E 01	0.96541E-02	0.63806E-01
CONCRETE	0.92400E 00	0.80000E 00	0.17415E 01	0.57058E 01	0.64881E 01

[a]Read: 0.76000×10^{-1}.
[b]Unperturbed case.

Table A-4b. Calculated Responses for 2-m-thick Steel-Reinforced (Rebar) Concrete Slab Reference Cases — Variable Steel Content

Note: Initial response for unperturbed 2-m-thick slab containing 7.6 vol% steel was:

0.71864E-11 (rem/hr)/(neutrons/cm^2·s)

Steel Content (vol%)	Model	Calculated Response (rem/hr / neutrons/cm^2·s)	% Deviation from Exact
4.0	Exact	0.16561E-10[a]	
	Linear	0.13235E-10	-20.1
	Exponential	0.16673E-10	+0.7
	Power	0.27159E-10	+64.0
7.6[b]	Exact	0.71864E-11	
	Linear	0.71864E-11	0.0
	Exponential	0.71864E-11	0.0
	Power	0.71864E-11	0.0
20.0	Exact	0.45473E-12	
	Linear	-0.13646E-10	-3100.9
	Exponential	0.39586E-12	-12.9
	Power	0.29750E-11	+554.2

[a]Read: 0.16561×10^{-10}.
[b]Unperturbed case.

Table A-5a. Calculational Parameters for 1- and 2-m-thick TSF Concrete Slab

Constituent	Density (atoms/b·cm) Initial	Density (atoms/b·cm) Final	Linear Model Additive Factor	Exponential Model Multiplicative Factor	Power Model Multiplicative Factor
		1-m-thick TSF Concrete Slab			
H	0.77700E-02[a]	0.88800E-02	-0.24763E 00	0.78065E 00	0.79337E 00
C	0.10000E-08	0.79700E-02	-0.76782E 00	0.46402E 00	0.10000E 01
O	0.43900E-01	0.42000E-01	0.13078E 00	0.11397E 01	0.11430E 01
Na	0.10500E-02	0.27300E-04	0.14270E 00	0.11534E 01	0.17070E 01
Mg	0.14900E-03	0.14400E-02	-0.15565E 00	0.85586E 00	0.96007E 00
Al	0.24500E-02	0.41400E-03	0.25099E 00	0.12853E 01	0.17109E 01
Si	0.15800E-01	0.38400E-02	0.14438E 01	0.42366E 01	0.14849E 02
S	0.56400E-04	0.10200E-03	-0.60873E-02	0.99393E 00	0.99555E 00
K	0.69300E-03	0.23400E-02	-0.31813E 00	0.72750E 00	0.84968E 00
Ca	0.29200E-02	0.10000E-01	-0.11451E 01	0.31818E 00	0.55912E 00
Fe	0.31300E-03	0.26400E-03	0.10708E-01	0.10108E 01	0.10117E 01
		2-m-thick TSF Concrete Slab			
H	0.77700E-02	0.88800E-02	-0.33220E 00	0.71734E 00	0.73307E 00
C	0.10000E-08	0.79700E-02	-0.12031E 01	0.30026E 00	0.10000E 01
O	0.43900E-01	0.42000E-01	0.24150E 00	0.12732E 01	0.12800E 01
Na	0.10500E-02	0.27300E-04	0.26891E 00	0.13085E 01	0.27391E 01
Mg	0.14900E-03	0.14400E-02	-0.28817E 00	0.74963E 00	0.92733E 00
Al	0.24500E-02	0.41400E-03	0.47064E 00	0.16010E 01	0.27372E 01
Si	0.15800E-01	0.38400E-02	0.28761E 01	0.17744E 02	0.21583E 03
S	0.56400E-04	0.10200E-03	-0.12858E-01	0.98722E 00	0.99062E 00
K	0.69300E-03	0.23400E-02	-0.71472E 00	0.48933E 00	0.69354E 00
Ca	0.29200E-02	0.10000E-01	-0.24476E 01	0.86504E-01	0.28862E 00
Fe	0.31300E-03	0.26400E-03	0.15466E-01	0.10156E 01	0.10170E 01

[a]Read: 0.77700×10^{-2}.

Table A-5b. Calculated Responses for 1- and 2-m-thick TSF Concrete Slab

Note: Initial response for unperturbed 1-m-thick standard concrete slab (4.96 wt% water) was:

0.66038E-07 (rem/hr)/(neutrons/cm^2·s)

Initial response for unperturbed 2-m-thick standard concrete slab (4.96 wt% water) was:

0.36543E-10 (rem/hr)/(neutrons/cm^2·s)

Slab Thickness (m)	Model	Calculated Response (rem/hr / neutrons/cm^2·s)	% Deviation from Exact
1	Exact	0.35880E-07[a]	
	Linear	0.22353E-07	-37.7
	Exponential	0.34080E-07	-5.0
	Power	0.11931E-05	+3225.1
2	Exact	0.13765E-10	
	Linear	-0.46064E-11	-133.5
	Exponential	0.11851E-10	-13.9
	Power	0.10376E-07	+75280.5

[a]Read: 0.35880×10^{-7}.

Appendix B

SENSITIVITY COEFFICIENTS FOR STANDARD AND REBAR CONCRETE

One purpose of this study was to determine whether sensitivity coefficients could be successfully used to assess the impact of cross-section changes in deep-penetration shielding problems. The results shown in Section 3, particularly using the exponential (BEST) model, for the 1- and 2-m-thick standard and rebar concrete slabs gave confidence that such sensitivity coefficients would be useful. For that reason, additional slab thicknesses of 0.05-, 0.5-, and 1.5-m were analyzed for both concrete compositions and the results combined with those of the original studies. The complete energy- and spatial-dependent sensitivities are tabulated in SENPRO format in the data package DLC-102/CONSENT, which is available from the Radiation Shielding Information Center. Results which have been summed over energy groups are tabulated in Tables B-1 and B-2 for standard concrete and rebar concrete, respectively.

Table B-1. Relative Sensitivities of Total Dose Penetrating Standard Concrete Slab to Changes in Constituent Cross Sections as a Function of Zone in Slab (Normally Incident Fission Source)

Note: See Table 5 in text for descriptions of zones 1 7.
Entry of "Slab" under col. 2 means all zones.

Case	Zone	Constituent	Cross Section[a]	P_Σ Sensitivity[b] All Groups	P_Σ Sensitivity[b] Neutron Groups	P_Σ Sensitivity[b] Gamma-Ray Groups
0.05-m-thick Standard Concrete Slab (4.96 wt% H_2O)						
1	SLAB	CONCRETE	MACRO SIGT	-2.1327E-01[c]	-2.1297E-01	-3.0008E-04
2	SLAB	CONCRETE	MACRO SIGA	-7.2333E-03	-7.2301E-03	-3.2392E-06
3	SLAB	CONCRETE	MACRO SIGE	-1.9724E-01	-1.9724E-01	0.0
4	SLAB	WATER	MACRO SIGT	-7.8306E-02	-7.8291E-02	-1.6213E-05
5	SLAB	WATER	MACRO SIGA	-2.2723E-04	-2.2722E-04	-1.9224E-08
6	SLAB	WATER	MACRO SIGE	-7.8057E-02	-7.8057E-02	0.0
7	SLAB	HYDROGEN	MACRO SIGT	-6.8571E-02	-6.8568E-02	-3.2137E-06
8	SLAB	OXYGEN	MACRO SIGT	-1.1015E-01	-1.1000E-01	-1.4708E-04
9	SLAB	SODIUM	MACRO SIGT	-1.9210E-03	-1.9161E-03	-4.8764E-06
10	SLAB	MAGNESIUM	MACRO SIGT	-2.2529E-04	-2.2453E-04	-7.5744E-07
11	SLAB	ALUMINIUM	MACRO SIGT	-2.6559E-03	-2.6423E-03	-1.3552E-05
12	SLAB	SILICA	MACRO SIGT	-2.1238E-02	-2.1143E-02	-9.4494E-05
13	SLAB	SULFUR	MACRO SIGT	-5.7898E-05	-5.7508E-05	-3.8990E-07
14	SLAB	POTASSIUM	MACRO SIGT	-1.1135E-03	-1.1077E-03	-5.8041E-06
15	SLAB	CALCIUM	MACRO SIGT	-6.4899E-03	-6.4639E-03	-2.6029E-05
16	SLAB	IRON	MACRO SIGT	-8.4660E-04	-8.4272E-04	-3.8801E-06
17	SLAB	CARBON	MACRO SIGT	-2.3146E-09	-2.3121E-09	-2.5024E-12
0.5-m-thick Standard Concrete Slab (4.96 wt% H_2O)						
18	ZN 1	CONCRETE	MACRO SIGT	-5.2203E-02	-5.2201E-02	-1.9737E-06
19	ZN 2	CONCRETE	MACRO SIGT	-3.8346E 00	-3.7231E 00	-1.1146E-01
20	ZN 3	CONCRETE	MACRO SIGT	-4.0192E-02	-3.2573E-02	-7.6189E-03
21	SLAB	CONCRETE	MACRO SIGT	-3.9270E 00	-3.8079E 00	-1.1908E-01
22	ZN 1	CONCRETE	MACRO SIGA	-2.2592E-03	-2.2592E-03	-6.5608E-10
23	ZN 2	CONCRETE	MACRO SIGA	-2.4241E-01	-2.4177E-01	-6.4258E-04
24	ZN 3	CONCRETE	MACRO SIGA	-3.1562E-03	-2.9432E-03	-2.1307E-04
25	SLAB	CONCRETE	MACRO SIGA	-2.4783E-01	-2.4697E-01	-8.5566E-04
26	ZN 1	CONCRETE	MACRO SIGE	-4.2778E-02	-4.2778E-02	0.0
27	ZN 2	CONCRETE	MACRO SIGE	-3.1419E 00	-3.1419E 00	0.0
28	ZN 3	CONCRETE	MACRO SIGE	-3.0954E-02	-3.0954E-02	0.0
29	SLAB	CONCRETE	MACRO SIGE	-3.2156E 00	-3.2156E 00	0.0
30	ZN 1	WATER	MACRO SIGT	-9.8735E-03	-9.8735E-03	-1.0332E-07
31	ZN 2	WATER	MACRO SIGT	-1.0207E 00	-1.0148E 00	-5.8759E-03
32	ZN 3	WATER	MACRO SIGT	-1.7447E-02	-1.7049E-02	-3.9863E-04
33	SLAB	WATER	MACRO SIGT	-1.0480E 00	-1.0417E 00	-6.2747E-03
34	ZN 1	WATER	MACRO SIGA	-7.8151E-05	-7.8151E-05	-3.4929E-12
35	ZN 2	WATER	MACRO SIGA	-3.1885E-02	-3.1882E-02	-3.7796E-06
36	ZN 3	WATER	MACRO SIGA	-3.8215E-04	-3.8087E-04	-1.2869E-06
37	SLAB	WATER	MACRO SIGA	-3.2346E-02	-3.2341E-02	-5.0665E-06
38	ZN 1	WATER	MACRO SIGE	-9.7717E-03	-9.7717E-03	0.0
39	ZN 2	WATER	MACRO SIGE	-9.8840E-01	-9.8840E-01	0.0
40	ZN 3	WATER	MACRO SIGE	-1.6915E-02	-1.6915E-02	0.0
41	SLAB	WATER	MACRO SIGE	-1.0151E 00	-1.0151E 00	0.0
42	ZN 1	HYDROGEN	MACRO SIGT	-7.8200E-03	-7.8200E-03	-1.9502E-08
43	ZN 2	HYDROGEN	MACRO SIGT	-8.7913E-01	-8.7801E-01	-1.1252E-03
44	ZN 3	HYDROGEN	MACRO SIGT	-1.5923E-02	-1.5846E-02	-7.7304E-05
45	SLAB	HYDROGEN	MACRO SIGT	-9.0287E-01	-9.0167E-01	-1.2026E-03

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1–7.
Entry of "Slab" under col. 2 means all zones.

				P_{Σ}, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
46	ZN 1	OXYGEN	MACRO SIGT	-2.3235E-02	-2.3234E-02	-9.4835E-07
47	ZN 2	OXYGEN	MACRO SIGT	-1.6015E 00	-1.5478E 00	-5.3752E-02
48	ZN 3	OXYGEN	MACRO SIGT	-1.7240E-02	-1.3604E-02	-3.6356E-03
49	SLAB	OXYGEN	MACRO SIGT	-1.6420E 00	-1.5846E 00	-5.7388E-02
50	ZN 1	SODIUM	MACRO SIGT	-8.8530E-04	-8.8527E-04	-3.2130E-08
51	ZN 2	SODIUM	MACRO SIGT	-6.4378E-02	-6.2568E-02	-1.8110E-03
52	ZN 3	SODIUM	MACRO SIGT	-2.2136E-04	-9.8910E-05	-1.2245E-04
53	SLAB	SODIUM	MACRO SIGT	-6.5484E-02	-6.3552E-02	-1.9335E-03
54	ZN 1	MAGNESIUM	MACRO SIGT	-1.2159E-04	-1.2159E-04	-5.0225E-09
55	ZN 2	MAGNESIUM	MACRO SIGT	-8.4174E-03	-8.1348E-03	-2.8269E-04
56	ZN 3	MAGNESIUM	MACRO SIGT	-5.3469E-05	-3.4331E-05	-1.9138E-05
57	SLAB	MAGNESIUM	MACRO SIGT	-8.5925E-03	-8.2908E-03	-3.0183E-04
58	ZN 1	ALUMINIUM	MACRO SIGT	-2.1644E-03	-2.1643E-03	-9.0333E-08
59	ZN 2	ALUMINIUM	MACRO SIGT	-1.3807E-01	-1.3299E-01	-5.0802E-03
60	ZN 3	ALUMINIUM	MACRO SIGT	-6.2155E-04	-2.7638E-04	-3.4517E-04
61	SLAB	ALUMINIUM	MACRO SIGT	-1.4085E-01	-1.3543E-01	-5.4255E-03
62	ZN 1	SILICA	MACRO SIGT	-1.3609E-02	-1.3609E-02	-6.3341E-07
63	ZN 2	SILICA	MACRO SIGT	-8.6225E-01	-8.2667E-01	-3.5582E-02
64	ZN 3	SILICA	MACRO SIGT	-4.6864E-03	-2.2632E-03	-2.4232E-03
65	SLAB	SILICA	MACRO SIGT	-8.8055E-01	-8.4254E-01	-3.8006E-02
66	ZN 1	SULFUR	MACRO SIGT	-5.2561E-05	-5.2558E-05	-2.6334E-09
67	ZN 2	SULFUR	MACRO SIGT	-3.2341E-03	-3.0862E-03	-1.4788E-04
68	ZN 3	SULFUR	MACRO SIGT	-1.6296E-05	-6.1071E-06	-1.0189E-05
69	SLAB	SULFUR	MACRO SIGT	-3.3029E-03	-3.1448E-03	-1.5807E-04
70	ZN 1	POTASSIUM	MACRO SIGT	-7.1338E-04	-7.1334E-04	-3.9510E-08
71	ZN 2	POTASSIUM	MACRO SIGT	-4.8787E-02	-4.6566E-02	-2.2209E-03
72	ZN 3	POTASSIUM	MACRO SIGT	-1.1322E-04	4.3266E-05	-1.5648E-04
73	SLAB	POTASSIUM	MACRO SIGT	-4.9614E-02	-4.7236E-02	-2.3775E-03
74	ZN 1	CALCIUM	MACRO SIGT	-3.2379E-03	-3.2377E-03	-1.7685E-07
75	ZN 2	CALCIUM	MACRO SIGT	-2.0140E-01	-1.9143E-01	-9.9682E-03
76	ZN 3	CALCIUM	MACRO SIGT	-1.2641E-03	-5.5078E-04	-7.1329E-04
77	SLAB	CALCIUM	MACRO SIGT	-2.0590E-01	-1.9522E-01	-1.0682E-02
78	ZN 1	IRON	MACRO SIGT	-3.6233E-04	-3.6230E-04	-2.5989E-08
79	ZN 2	IRON	MACRO SIGT	-2.7386E-02	-2.5898E-02	-1.4886E-03
80	ZN 3	IRON	MACRO SIGT	-5.1979E-05	6.4136E-05	-1.1611E-04
81	SLAB	IRON	MACRO SIGT	-2.7801E-02	-2.6196E-02	-1.6047E-03
82	ZN 1	CARBON	MACRO SIGT	-6.7308E-10	-6.7307E-10	-1.5876E-14
83	ZN 2	CARBON	MACRO SIGT	-4.7941E-08	-4.7037E-08	-9.0391E-10
84	ZN 3	CARBON	MACRO SIGT	-3.1266E-10	-2.5134E-10	-6.1320E-11
85	SLAB	CARBON	MACRO SIGT	-4.8926E-08	-4.7961E-08	-9.6525E-10
1.0-m-thick Standard Concrete Slab (4.97 wt% H_2O)						
86	ZN 1	CONCRETE	MACRO SIGT	-5.1284E-02	-5.1282E-02	-1.6067E-06
87	ZN 2	CONCRETE	MACRO SIGT	-7.7182E 00	-6.9021E 00	-8.1618E-01
88	ZN 3	CONCRETE	MACRO SIGT	-4.1647E-02	-2.0028E-02	-2.1620E-02
89	SLAB	CONCRETE	MACRO SIGT	-7.8112E 00	-6.9734E 00	-8.3780E-01
90	ZN 1	CONCRETE	MACRO SIGA	-2.7548E-03	-2.7548E-03	-2.6773E-10
91	ZN 2	CONCRETE	MACRO SIGA	-7.7072E-01	-7.6818E-01	-2.5392E-03
92	ZN 3	CONCRETE	MACRO SIGA	-3.7730E-03	-2.9941E-03	-7.7894E-04
93	SLAB	CONCRETE	MACRO SIGA	-7.7725E-01	-7.7393E-01	-3.3182E-03

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1–7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
94	ZN 1	CONCRETE	MACRO SIGE	-4.0619E-02	-4.0619E-02	0.0
95	ZN 2	CONCRETE	MACRO SIGE	-5.5900E 00	-5.5900E 00	0.0
96	ZN 3	CONCRETE	MACRO SIGE	-1.9680E-02	-1.9680E-02	0.0
97	SLAB	CONCRETE	MACRO SIGE	-5.6503E 00	-5.6503E 00	0.0
98	ZN 1	WATER	MACRO SIGT	-9.3387E-03	-9.3387E-03	-7.8451E-08
99	ZN 2	WATER	MACRO SIGT	-1.9923E 00	-1.9497E 00	-4.2685E-02
100	ZN 3	WATER	MACRO SIGT	-1.2049E-02	-1.0918E-02	-1.1315E-03
101	SLAB	WATER	MACRO SIGT	-2.0137E 00	-1.9699E 00	-4.3816E-02
102	ZN 1	WATER	MACRO SIGA	-9.3299E-05	-9.3299E-05	-1.4230E-12
103	ZN 2	WATER	MACRO SIGA	-1.3451E-01	-1.3449E-01	-1.4876E-05
104	ZN 3	WATER	MACRO SIGA	-5.2039E-04	-5.1569E-04	-4.7030E-06
105	SLAB	WATER	MACRO SIGA	-1.3512E-01	-1.3510E-01	-1.9579E-05
106	ZN 1	WATER	MACRO SIGE	-9.2068E-03	-9.2068E-03	0.0
107	ZN 2	WATER	MACRO SIGE	-1.8314E 00	-1.8314E 00	0.0
108	ZN 3	WATER	MACRO SIGE	-1.0763E-02	-1.0763E-02	0.0
109	SLAB	WATER	MACRO SIGE	-1.8513E 00	-1.8513E 00	0.0
110	ZN 1	HYDROGEN	MACRO SIGT	-7.3230E-03	-7.3230E-03	-1.3396E-08
111	ZN 2	HYDROGEN	MACRO SIGT	-1.7158E 00	-1.7078E 00	-8.0443E-03
112	ZN 3	HYDROGEN	MACRO SIGT	-1.0221E-02	-1.0000E-02	-2.2055E-04
113	SLAB	HYDROGEN	MACRO SIGT	-1.7334E 00	-1.7251E 00	-8.2649E-03
114	ZN 1	OXYGEN	MACRO SIGT	-2.2171E-02	-2.2171E-02	-7.3493E-07
115	ZN 2	OXYGEN	MACRO SIGT	-2.9798E 00	-2.5886E 00	-3.9125E-01
116	ZN 3	OXYGEN	MACRO SIGT	-1.9804E-02	-9.5154E-03	-1.0289E-02
117	SLAB	OXYGEN	MACRO SIGT	-3.0218E 00	-2.6203E 00	-4.0154E-01
118	ZN 1	SODIUM	MACRO SIGT	-8.9164E-04	-8.9162E-04	-2.5986E-08
119	ZN 2	SODIUM	MACRO SIGT	-1.4532E-01	-1.3206E-01	-1.3266E-02
120	ZN 3	SODIUM	MACRO SIGT	-2.9448E-04	5.1636E-05	-3.4612E-04
121	SLAB	SODIUM	MACRO SIGT	-1.4651E-01	-1.3290E-01	-1.3612E-02
122	ZN 1	MAGNESIUM	MACRO SIGT	-1.2162E-04	-1.2161E-04	-4.1164E-09
123	ZN 2	MAGNESIUM	MACRO SIGT	-1.7769E-02	-1.5695E-02	-2.0746E-03
124	ZN 3	MAGNESIUM	MACRO SIGT	-7.2607E-05	-1.8503E-05	-5.4105E-05
125	SLAB	MAGNESIUM	MACRO SIGT	-1.7964E-02	-1.5835E-02	-2.1287E-03
126	ZN 1	ALUMINIUM	MACRO SIGT	-2.2016E-03	-2.2015E-03	-7.4992E-08
127	ZN 2	ALUMINIUM	MACRO SIGT	-2.9880E-01	-2.6146E-01	-3.7341E-02
128	ZN 3	ALUMINIUM	MACRO SIGT	-1.0270E-03	-5.0175E-05	-9.7683E-04
129	SLAB	ALUMINIUM	MACRO SIGT	-3.0203E-01	-2.6371E-01	-3.8317E-02
130	ZN 1	SILICA	MACRO SIGT	-1.4001E-02	-1.4001E-02	-5.3241E-07
131	ZN 2	SILICA	MACRO SIGT	-1.8856E 00	-1.6237E 00	-2.6197E-01
132	ZN 3	SILICA	MACRO SIGT	-7.6587E-03	-7.9729E-04	-6.8614E-03
133	SLAB	SILICA	MACRO SIGT	-1.9073E 00	-1.6385E 00	-2.6883E-01
134	ZN 1	SULFUR	MACRO SIGT	-5.4816E-05	-5.4814E-05	-2.2663E-09
135	ZN 2	SULFUR	MACRO SIGT	-7.4474E-03	-6.3561E-03	-1.0913E-03
136	ZN 3	SULFUR	MACRO SIGT	-2.6847E-05	2.1068E-06	-2.8954E-05
137	SLAB	SULFUR	MACRO SIGT	-7.5290E-03	-6.4088E-03	-1.1203E-03
138	ZN 1	POTASSIUM	MACRO SIGT	-7.5253E-04	-7.5250E-04	-3.5132E-08
139	ZN 2	POTASSIUM	MACRO SIGT	-1.3284E-01	-1.1641E-01	-1.6432E-02
140	ZN 3	POTASSIUM	MACRO SIGT	-2.6316E-04	1.8473E-04	-4.4789E-04
141	SLAB	POTASSIUM	MACRO SIGT	-1.3386E-01	-1.1698E-01	-1.6880E-02

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1–7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
142	ZN 1	CALCIUM	MACRO SIGT	-3.3961E-03	-3.3959E-03	-1.5887E-07
143	ZN 2	CALCIUM	MACRO SIGT	-4.6680E-01	-3.9308E-01	-7.3727E-02
144	ZN 3	CALCIUM	MACRO SIGT	-2.0959E-03	-4.3629E-05	-2.0523E-03
145	SLAB	CALCIUM	MACRO SIGT	-4.7229E-01	-3.9652E-01	-7.5779E-02
146	ZN 1	IRON	MACRO SIGT	-3.6981E-04	-3.6979E-04	-2.4653E-08
147	ZN 2	IRON	MACRO SIGT	-6.7845E-02	-5.6863E-02	-1.0982E-02
148	ZN 3	IRON	MACRO SIGT	-1.8406E-04	1.5920E-04	-3.4326E-04
149	SLAB	IRON	MACRO SIGT	-6.8398E-02	-5.7073E-02	-1.1326E-02
150	ZN 1	CARBON	MACRO SIGT	-6.5647E-10	-6.5646E-10	-1.1925E-14
151	ZN 2	CARBON	MACRO SIGT	-9.5372E-08	-8.8824E-08	-6.5483E-09
152	ZN 3	CARBON	MACRO SIGT	-3.1011E-10	-1.3627E-10	-1.7384E-10
153	SLAB	CARBON	MACRO SIGT	-9.6338E-08	-8.9616E-08	-6.7221E-09
1-m-thick Standard Concrete Slab (3.0 wt% H_2O)[d]						
154	3ZN 1	CONCRETE	MACRO SIGT	-4.5350E-02	-4.5349E-02	-6.8214E-07
155	3ZN 2	CONCRETE	MACRO SIGT	-6.9267E 00	-6.4056E 00	-5.2109E-01
156	3ZN 3	CONCRETE	MACRO SIGT	-3.2551E-02	-1.4185E-02	-1.8366E-02
157	3SLAB	CONCRETE	MACRO SIGT	-7.0046E 00	-6.4651E 00	-5.3946E-01
158	3ZN 1	CONCRETE	MACRO SIGA	-2.3859E-03	-2.3859E-03	-1.1250E-10
159	3ZN 2	CONCRETE	MACRO SIGA	-6.6212E-01	-6.6017E-01	-1.9469E-03
160	3ZN 3	CONCRETE	MACRO SIGA	-3.7583E-03	-3.1595E-03	-5.9883E-04
161	3SLAB	CONCRETE	MACRO SIGA	-6.6826E-01	-6.6572E-01	-2.5458E-03
162	3ZN 1	CONCRETE	MACRO SIGE	-3.5564E-02	-3.5564E-02	0.0
163	3ZN 2	CONCRETE	MACRO SIGE	-5.1938E 00	-5.1938E 00	0.0
164	3ZN 3	CONCRETE	MACRO SIGE	-1.4617E-02	-1.4617E-02	0.0
165	3SLAB	CONCRETE	MACRO SIGE	-5.2440E 00	-5.2440E 00	0.0
166	3ZN 1	WATER	MACRO SIGT	-5.5950E-03	-5.5950E-03	-2.0375E-08
167	3ZN 2	WATER	MACRO SIGT	-1.3625E 00	-1.3460E 00	-1.6525E-02
168	3ZN 3	WATER	MACRO SIGT	-7.3297E-03	-6.7477E-03	-5.8215E-04
169	3SLAB	WATER	MACRO SIGT	-1.3755E 00	-1.3584E 00	-1.7107E-02
170	3ZN 1	WATER	MACRO SIGA	-4.7903E-05	-4.7903E-05	-3.5491E-13
171	3ZN 2	WATER	MACRO SIGA	-7.5955E-02	-7.5949E-02	-6.7827E-06
172	3ZN 3	WATER	MACRO SIGA	-3.9931E-04	-3.9716E-04	-2.1476E-06
173	3SLAB	WATER	MACRO SIGA	-7.6402E-02	-7.6394E-02	-8.9303E-06
174	3ZN 1	WATER	MACRO SIGE	-5.5298E-03	-5.5298E-03	0.0
175	3ZN 2	WATER	MACRO SIGE	-1.2793E 00	-1.2793E 00	0.0
176	3ZN 3	WATER	MACRO SIGE	-6.6342E-03	-6.6342E-03	0.0
177	3SLAB	WATER	MACRO SIGE	-1.2914E 00	-1.2914E 00	0.0
1.5-m-thick Standard Concrete Slab (4.96 wt% H_2O)						
178	ZN 1	CONCRETE	MACRO SIGT	-4.7842E-02	-4.7840E-02	-2.0128E-06
179	ZN 2	CONCRETE	MACRO SIGT	-3.6945E 00	-3.5394E 00	-1.5509E-01
180	ZN 3	CONCRETE	MACRO SIGT	-3.7696E 00	-2.9261E 00	-8.4355E-01
181	ZN 4	CONCRETE	MACRO SIGT	-3.6935E 00	-2.1474E 00	-1.5462E 00
182	ZN 5	CONCRETE	MACRO SIGT	-4.4608E-02	-1.2405E-02	-3.2204E-02
183	SLAB	CONCRETE	MACRO SIGT	-1.1250E 01	-8.6733E 00	-2.5770E 00
184	ZN 1	CONCRETE	MACRO SIGA	-2.8275E-03	-2.8275E-03	-3.4448E-10
185	ZN 2	CONCRETE	MACRO SIGA	-3.9219E-01	-3.9218E-01	-1.4043E-05
186	ZN 3	CONCRETE	MACRO SIGA	-5.0105E-01	-5.0096E-01	-9.6502E-05
187	ZN 4	CONCRETE	MACRO SIGA	-3.5377E-01	-3.4946E-01	-4.3065E-03
188	ZN 5	CONCRETE	MACRO SIGA	-3.3989E-03	-2.0861E-03	-1.3129E-03
189	SLAB	CONCRETE	MACRO SIGA	-1.2532E 00	-1.2475E 00	-5.7299E-03

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1-7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
190	ZN 1	CONCRETE	MACRO SIGE	-3.7369E-02	-3.7369E-02	0.0
191	ZN 2	CONCRETE	MACRO SIGE	-2.7884E 00	-2.7884E 00	0.0
192	ZN 3	CONCRETE	MACRO SIGE	-2.2969E 00	-2.2969E 00	0.0
193	ZN 4	CONCRETE	MACRO SIGE	-1.7734E 00	-1.7734E 00	0.0
194	ZN 5	CONCRETE	MACRO SIGE	-1.2397E-02	-1.2397E-02	0.0
195	SLAB	CONCRETE	MACRO SIGE	-6.9086E 00	-6.9086E 00	0.0
196	ZN 1	WATER	MACRO SIGT	-8.3476E-03	-8.3476E-03	-9.1618E-08
197	ZN 2	WATER	MACRO SIGT	-9.0824E-01	-9.0039E-01	-7.8494E-03
198	ZN 3	WATER	MACRO SIGT	-9.3072E-01	-8.8763E-01	-4.3089E-02
199	ZN 4	WATER	MACRO SIGT	-7.7864E-01	-6.9798E-01	-8.0661E-02
200	ZN 5	WATER	MACRO SIGT	-8.5526E-03	-6.8674E-03	-1.6853E-03
201	SLAB	WATER	MACRO SIGT	-2.6344E 00	-2.5012E 00	-1.3328E-01
202	ZN 1	WATER	MACRO SIGA	-9.6561E-05	-9.6561E-05	-1.8414E-12
203	ZN 2	WATER	MACRO SIGA	-5.9084E-02	-5.9084E-02	-7.4933E-08
204	ZN 3	WATER	MACRO SIGA	-1.0094E-01	-1.0094E-01	-5.1277E-07
205	ZN 4	WATER	MACRO SIGA	-7.5164E-02	-7.5140E-02	-2.5202E-05
206	ZN 5	WATER	MACRO SIGA	-3.8752E-04	-3.7961E-04	-7.9212E-06
207	SLAB	WATER	MACRO SIGA	-2.3568E-01	-2.3564E-01	-3.3711E-05
208	ZN 1	WATER	MACRO SIGE	-8.2075E-03	-8.2075E-03	0.0
209	ZN 2	WATER	MACRO SIGE	-8.4000E-01	-8.4000E-01	0.0
210	ZN 3	WATER	MACRO SIGE	-7.9144E-01	-7.9144E-01	0.0
211	ZN 4	WATER	MACRO SIGE	-6.3569E-01	-6.3569E-01	0.0
212	ZN 5	WATER	MACRO SIGE	-6.7568E-03	-6.7568E-03	0.0
213	SLAB	WATER	MACRO SIGE	-2.2820E 00	-2.2820E 00	0.0
214	ZN 1	HYDROGEN	MACRO SIGT	-6.5238E-03	-6.5238E-03	-1.3966E-08
215	ZN 2	HYDROGEN	MACRO SIGT	-7.8231E-01	-7.8089E-01	-1.4161E-03
216	ZN 3	HYDROGEN	MACRO SIGT	-8.1070E-01	-8.0282E-01	-7.8731E-03
217	ZN 4	HYDROGEN	MACRO SIGT	-6.4642E-01	-6.3123E-01	-1.5197E-02
218	ZN 5	HYDROGEN	MACRO SIGT	-6.6426E-03	-6.3116E-03	-3.3103E-04
219	SLAB	HYDROGEN	MACRO SIGT	-2.2525E 00	-2.2277E 00	-2.4817E-02
220	ZN 1	OXYGEN	MACRO SIGT	-2.0636E-02	-2.0635E-02	-8.7858E-07
221	ZN 2	OXYGEN	MACRO SIGT	-1.4248E 00	-1.3521E 00	-7.2789E-02
222	ZN 3	OXYGEN	MACRO SIGT	-1.3582E 00	-9.5975E-01	-3.9844E-01
223	ZN 4	OXYGEN	MACRO SIGT	-1.4960E 00	-7.5534E-01	-7.4069E-01
224	ZN 5	OXYGEN	MACRO SIGT	-2.1610E-02	-6.2875E-03	-1.5323E-02
225	SLAB	OXYGEN	MACRO SIGT	-4.3213E 00	-3.0941E 00	-1.2272E 00
226	ZN 1	SODIUM	MACRO SIGT	-8.1897E-04	-8.1894E-04	-3.2360E-08
227	ZN 2	SODIUM	MACRO SIGT	-7.3081E-02	-7.0565E-02	-2.5171E-03
228	ZN 3	SODIUM	MACRO SIGT	-7.9223E-02	-6.5523E-02	-1.3702E-02
229	ZN 4	SODIUM	MACRO SIGT	-6.7369E-02	-4.2237E-02	-2.5133E-02
230	ZN 5	SODIUM	MACRO SIGT	-4.4821E-04	6.6281E-05	-5.1449E-04
231	SLAB	SODIUM	MACRO SIGT	-2.2094E-01	-1.7908E-01	-4.1866E-02
232	ZN 1	MAGNESIUM	MACRO SIGT	-1.1261E-04	-1.1261E-04	-5.1881E-09
233	ZN 2	MAGNESIUM	MACRO SIGT	-8.7569E-03	-8.3609E-03	-3.9600E-04
234	ZN 3	MAGNESIUM	MACRO SIGT	-8.9311E-03	-6.7792E-03	-2.1519E-03
235	ZN 4	MAGNESIUM	MACRO SIGT	-8.4739E-03	-4.5427E-03	-3.9312E-03
236	ZN 5	MAGNESIUM	MACRO SIGT	-9.0459E-05	-1.0062E-05	-8.0398E-05
237	SLAB	MAGNESIUM	MACRO SIGT	-2.6365E-02	-1.9806E-02	-6.5595E-03
238	ZN 1	ALUMINIUM	MACRO SIGT	-2.0835E-03	-2.0834E-03	-9.5593E-08
239	ZN 2	ALUMINIUM	MACRO SIGT	-1.4603E-01	-1.3886E-01	-7.1670E-03
240	ZN 3	ALUMINIUM	MACRO SIGT	-1.5305E-01	-1.1417E-01	-3.8881E-02
241	ZN 4	ALUMINIUM	MACRO SIGT	-1.4760E-01	-7.6827E-02	-7.0769E-02
242	ZN 5	ALUMINIUM	MACRO SIGT	-1.4308E-03	2.1010E-05	-1.4519E-03
243	SLAB	ALUMINIUM	MACRO SIGT	-4.5019E-01	-3.3192E-01	-1.1827E-01

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1-7.
Entry of "Slab" under col. 2 means all zones.

				P_{Σ}, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
244	ZN 1	SILICA	MACRO SIGT	-1.3335E-02	-1.3335E-02	-6.8596E-07
245	ZN 2	SILICA	MACRO SIGT	-9.3850E-01	-8.8794E-01	-5.0560E-02
246	ZN 3	SILICA	MACRO SIGT	-9.8314E-01	-7.0930E-01	-2.7384E-01
247	ZN 4	SILICA	MACRO SIGT	-9.5875E-01	-4.6216E-01	-4.9659E-01
248	ZN 5	SILICA	MACRO SIGT	-1.0447E-02	-2.4943E-04	-1.0197E-02
249	SLAB	SILICA	MACRO SIGT	-2.9041E 00	-2.0729E 00	-8.3119E-01
250	ZN 1	SULFUR	MACRO SIGT	-5.2135E-05	-5.2132E-05	-2.9780E-09
251	ZN 2	SULFUR	MACRO SIGT	-3.8062E-03	-3.5935E-03	-2.1265E-04
252	ZN 3	SULFUR	MACRO SIGT	-4.0869E-03	-2.9387E-03	-1.1482E-03
253	ZN 4	SULFUR	MACRO SIGT	-3.8383E-03	-1.7691E-03	-2.0692E-03
254	ZN 5	SULFUR	MACRO SIGT	-3.9811E-05	3.2822E-06	-4.3093E-05
255	SLAB	SULFUR	MACRO SIGT	-1.1823E-02	-8.3500E-03	-3.4732E-03
256	ZN 1	POTASSIUM	MACRO SIGT	-7.1681E-04	-7.1677E-04	-4.7378E-08
257	ZN 2	POTASSIUM	MACRO SIGT	-6.4846E-02	-6.1604E-02	-3.2426E-03
258	ZN 3	POTASSIUM	MACRO SIGT	-8.3133E-02	-6.5700E-02	-1.7434E-02
259	ZN 4	POTASSIUM	MACRO SIGT	-7.2889E-02	-4.1725E-02	-3.1165E-02
260	ZN 5	POTASSIUM	MACRO SIGT	-5.1108E-04	1.5768E-04	-6.6876E-04
261	SLAB	POTASSIUM	MACRO SIGT	-2.2209E-01	-1.6958E-01	-5.2510E-02
262	ZN 1	CALCIUM	MACRO SIGT	-3.2357E-03	-3.2355E-03	-2.1593E-07
263	ZN 2	CALCIUM	MACRO SIGT	-2.3178E-01	-2.1719E-01	-1.4588E-02
264	ZN 3	CALCIUM	MACRO SIGT	-2.5599E-01	-1.7766E-01	-7.8329E-02
265	ZN 4	CALCIUM	MACRO SIGT	-2.5093E-01	-1.1111E-01	-1.3982E-01
266	ZN 5	CALCIUM	MACRO SIGT	-2.9952E-03	7.7650E-05	-3.0729E-03
267	SLAB	CALCIUM	MACRO SIGT	-7.4493E-01	-5.0912E-01	-2.3581E-01
268	ZN 1	IRON	MACRO SIGT	-3.2710E-04	-3.2707E-04	-3.4861E-08
269	ZN 2	IRON	MACRO SIGT	-2.0561E-02	-1.8358E-02	-2.2028E-03
270	ZN 3	IRON	MACRO SIGT	-3.3250E-02	-2.1506E-02	-1.1744E-02
271	ZN 4	IRON	MACRO SIGT	-4.1265E-02	-2.0445E-02	-2.0820E-02
272	ZN 5	IRON	MACRO SIGT	-3.9300E-04	1.2830E-04	-5.2130E-04
273	SLAB	IRON	MACRO SIGT	-9.5796E-02	-6.0509E-02	-3.5288E-02
274	ZN 1	CARBON	MACRO SIGT	-6.0460E-10	-6.0459E-10	-1.3806E-14
275	ZN 2	CARBON	MACRO SIGT	-4.7049E-08	-4.5849E-08	-1.2008E-09
276	ZN 3	CARBON	MACRO SIGT	-4.4736E-08	-3.8136E-08	-6.5997E-09
277	ZN 4	CARBON	MACRO SIGT	-3.9155E-08	-2.6765E-08	-1.2390E-08
278	ZN 5	CARBON	MACRO SIGT	-3.3489E-10	-7.5493E-11	-2.5939E-10
279	SLAB	CARBON	MACRO SIGT	-1.3188E-07	-1.1143E-07	-2.0450E-08
2.0-m-thick Standard Concrete Slab (4.96 wt% H_2O)						
280	ZN 1	CONCRETE	MACRO SIGT	-4.2410E-02	-4.2407E-02	-2.9540E-06
281	ZN 2	CONCRETE	MACRO SIGT	-3.4444E 00	-3.2102E 00	-2.3419E-01
282	ZN 3	CONCRETE	MACRO SIGT	-3.5146E 00	-2.3436E 00	-1.1710E 00
283	ZN 4	CONCRETE	MACRO SIGT	-3.5142E 00	-1.6289E 00	-1.8852E 00
284	ZN 5	CONCRETE	MACRO SIGT	-1.7569E 00	-6.4521E-01	-1.1117E 00
285	ZN 6	CONCRETE	MACRO SIGT	-1.6865E 00	-5.1493E-01	-1.1715E 00
286	ZN 7	CONCRETE	MACRO SIGT	-4.6362E-02	-6.5295E-03	-3.9833E-02
287	SLAB	CONCRETE	MACRO SIGT	-1.4005E 01	-8.3919E 00	-5.6135E 00
288	ZN 1	CONCRETE	MACRO SIGA	-2.5582E-03	-2.5582E-03	-4.9599E-10
289	ZN 2	CONCRETE	MACRO SIGA	-4.6074E-01	-4.6072E-01	-1.8496E-05
290	ZN 3	CONCRETE	MACRO SIGA	-5.4204E-01	-5.4194E-01	-1.0166E-04
291	ZN 4	CONCRETE	MACRO SIGA	-3.2139E-01	-3.2118E-01	-2.0370E-04
292	ZN 5	CONCRETE	MACRO SIGA	-1.1566E-01	-1.1543E-01	-2.3451E-04
293	ZN 6	CONCRETE	MACRO SIGA	-8.3284E-02	-7.7924E-02	-5.3606E-03
294	ZN 7	CONCRETE	MACRO SIGA	-2.8281E-03	-1.1095E-03	-1.7186E-03
295	SLAB	CONCRETE	MACRO SIGA	-1.5285E 00	-1.5209E 00	-7.6376E-03

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1–7.
Entry of "Slab" under col. 2 means all zones.

				P_{Σ}, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
296	ZN 1	CONCRETE	MACRO SIGE	-3.3152E-02	-3.3152E-02	0.0
297	ZN 2	CONCRETE	MACRO SIGE	-2.5504E 00	-2.5504E 00	0.0
298	ZN 3	CONCRETE	MACRO SIGE	-1.8228E 00	-1.8228E 00	0.0
299	ZN 4	CONCRETE	MACRO SIGE	-1.2817E 00	-1.2817E 00	0.0
300	ZN 5	CONCRETE	MACRO SIGE	-5.1735E-01	-5.1735E-01	0.0
301	ZN 6	CONCRETE	MACRO SIGE	-4.4477E-01	-4.4477E-01	0.0
302	ZN 7	CONCRETE	MACRO SIGE	-6.5804E-03	-6.5804E-03	0.0
303	SLAB	CONCRETE	MACRO SIGE	-6.6568E 00	-6.6568E 00	0.0
304	ZN 1	WATER	MACRO SIGT	-7.0918E-03	-7.0917E-03	-1.2946E-07
305	ZN 2	WATER	MACRO SIGT	-8.7999E-01	-8.6824E-01	-1.1755E-02
306	ZN 3	WATER	MACRO SIGT	-8.1311E-01	-7.5399E-01	-5.9114E-02
307	ZN 4	WATER	MACRO SIGT	-6.1247E-01	-5.1640E-01	-9.6064E-02
308	ZN 5	WATER	MACRO SIGT	-2.6336E-01	-2.0607E-01	-5.7289E-02
309	ZN 6	WATER	MACRO SIGT	-2.3688E-01	-1.7546E-01	-6.1418E-02
310	ZN 7	WATER	MACRO SIGT	-5.7543E-03	-3.6651E-03	-2.0893E-03
311	SLAB	WATER	MACRO SIGT	-2.8186E 00	-2.5309E 00	-2.8773E-01
312	ZN 1	WATER	MACRO SIGA	-9.1547E-05	-9.1547E-05	-2.6583E-12
313	ZN 2	WATER	MACRO SIGA	-8.1420E-02	-8.1420E-02	-9.9014E-08
314	ZN 3	WATER	MACRO SIGA	-1.1541E-01	-1.1541E-01	-5.4300E-07
315	ZN 4	WATER	MACRO SIGA	-6.8569E-02	-6.8569E-02	-1.0833E-06
316	ZN 5	WATER	MACRO SIGA	-2.5207E-02	-2.5206E-02	-1.2552E-06
317	ZN 6	WATER	MACRO SIGA	-1.7217E-02	-1.7186E-02	-3.1468E-05
318	ZN 7	WATER	MACRO SIGA	-2.1834E-04	-2.0798E-04	-1.0364E-05
319	SLAB	WATER	MACRO SIGA	-3.0814E-01	-3.0809E-01	-4.4812E-05
320	ZN 1	WATER	MACRO SIGE	-6.9623E-03	-6.9623E-03	0.0
321	ZN 2	WATER	MACRO SIGE	-7.8508E-01	-7.8508E-01	0.0
322	ZN 3	WATER	MACRO SIGE	-6.3927E-01	-6.3927E-01	0.0
323	ZN 4	WATER	MACRO SIGE	-4.5129E-01	-4.5129E-01	0.0
324	ZN 5	WATER	MACRO SIGE	-1.8397E-01	-1.8397E-01	0.0
325	ZN 6	WATER	MACRO SIGE	-1.6245E-01	-1.6245E-01	0.0
326	ZN 7	WATER	MACRO SIGE	-3.6054E-03	-3.6054E-03	0.0
327	SLAB	WATER	MACRO SIGE	-2.2326E 00	-2.2326E 00	0.0
328	ZN 1	HYDROGEN	MACRO SIGT	-5.4548E-03	-5.4548E-03	-1.8338E-08
329	ZN 2	HYDROGEN	MACRO SIGT	-7.6083E-01	-7.5874E-01	-2.0961E-03
330	ZN 3	HYDROGEN	MACRO SIGT	-6.9686E-01	-6.8624E-01	-1.0626E-02
331	ZN 4	HYDROGEN	MACRO SIGT	-4.9005E-01	-4.7256E-01	-1.7494E-02
332	ZN 5	HYDROGEN	MACRO SIGT	-1.9880E-01	-1.8821E-01	-1.0594E-02
333	ZN 6	HYDROGEN	MACRO SIGT	-1.6971E-01	-1.5804E-01	-1.1665E-02
334	ZN 7	HYDROGEN	MACRO SIGT	-3.7749E-03	-3.3625E-03	-4.1244E-04
335	SLAB	HYDROGEN	MACRO SIGT	-2.3254E 00	-2.2726E 00	-5.2887E-02
336	ZN 1	OXYGEN	MACRO SIGT	-1.8522E-02	-1.8520E-02	-1.2573E-06
337	ZN 2	OXYGEN	MACRO SIGT	-1.3482E 00	-1.2389E 00	-1.0929E-01
338	ZN 3	OXYGEN	MACRO SIGT	-1.3153E 00	-7.6667E-01	-5.4862E-01
339	ZN 4	OXYGEN	MACRO SIGT	-1.3851E 00	-4.9608E-01	-8.8898E-01
340	ZN 5	OXYGEN	MACRO SIGT	-7.3042E-01	-2.0209E-01	-5.2833E-01
341	ZN 6	OXYGEN	MACRO SIGT	-7.5999E-01	-1.9706E-01	-5.6292E-01
342	ZN 7	OXYGEN	MACRO SIGT	-2.2396E-02	-3.4235E-03	-1.8973E-02
343	SLAB	OXYGEN	MACRO SIGT	-5.5798E 00	-2.9227E 00	-2.6571E 00
344	ZN 1	SODIUM	MACRO SIGT	-6.9090E-04	-6.9085E-04	-4.7348E-08
345	ZN 2	SODIUM	MACRO SIGT	-7.0061E-02	-6.6264E-02	-3.7981E-03
346	ZN 3	SODIUM	MACRO SIGT	-7.5071E-02	-5.6071E-02	-1.9001E-02
347	ZN 4	SODIUM	MACRO SIGT	-6.9304E-02	-3.8689E-02	-3.0615E-02
348	ZN 5	SODIUM	MACRO SIGT	-3.2589E-02	-1.4518E-02	-1.8071E-02
349	ZN 6	SODIUM	MACRO SIGT	-2.7785E-02	-8.7485E-03	-1.9036E-02
350	ZN 7	SODIUM	MACRO SIGT	-5.9229E-04	4.3509E-05	-6.3580E-04
351	SLAB	SODIUM	MACRO SIGT	-2.7609E-01	-1.8493E-01	-9.1156E-02

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1-7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	All Groups	Neutron Groups	Gamma-Ray Groups
352	ZN 1	MAGNESIUM	MACRO SIGT	-9.7610E-05	-9.7603E-05	-7.6386E-09
353	ZN 2	MAGNESIUM	MACRO SIGT	-7.926[illegible]-03	-7.3280E-03	-5.9846E-04
354	ZN 3	MAGNESIUM	MACRO SIGT	-8.2802E-03	-5.2894E-03	-2.9908E-03
355	ZN 4	MAGNESIUM	MACRO SIGT	-8.5818E-03	-3.7714E-03	-4.8105E-03
356	ZN 5	MAGNESIUM	MACRO SIGT	-4.2882E-03	-1.4547E-03	-2.8334E-03
357	ZN 6	MAGNESIUM	MACRO SIGT	-3.9808E-03	-1.0061E-03	-2.9747E-03
358	ZN 7	MAGNESIUM	MACRO SIGT	-1.0407E-04	-4.7652E-06	-9.9308E-05
359	SLAB	MAGNESIUM	MACRO SIGT	-3.3259E-02	-1.8952E-02	-1.4307E-02
360	ZN 1	ALUMINIUM	MACRO SIGT	-1.8560E-03	-1.8559E-03	-1.4156E-07
361	ZN 2	ALUMINIUM	MACRO SIGT	-1.2669E-01	-1.1585E-01	-1.0847E-02
362	ZN 3	ALUMINIUM	MACRO SIGT	-1.3695E-01	-8.2795E-02	-5.4153E-02
363	ZN 4	ALUMINIUM	MACRO SIGT	-1.5223E-01	-6.5275E-02	-8.6954E-02
364	ZN 5	ALUMINIUM	MACRO SIGT	-7.6844E-02	-2.5733E-02	-5.1112E-02
365	ZN 6	ALUMINIUM	MACRO SIGT	-7.0001E-02	-1.6493E-02	-5.3509E-02
366	ZN 7	ALUMINIUM	MACRO SIGT	-1.7638E-03	2.9136E-05	-1.7930E-03
367	SLAB	ALUMINIUM	MACRO SIGT	-5.6634E-01	-3.0797E-01	-2.5837E-01
368	ZN 1	SILICA	MACRO SIGT	-1.1968E-02	-1.1967E-02	-1.0213E-06
369	ZN 2	SILICA	MACRO SIGT	-8.4600E-01	-7.6937E-01	-7.6630E-02
370	ZN 3	SILICA	MACRO SIGT	-9.3118E-01	-5.4899E-01	-3.8220E-01
371	ZN 4	SILICA	MACRO SIGT	-1.0118E 00	-3.9906E-01	-6.1270E-01
372	ZN 5	SILICA	MACRO SIGT	-5.1186E-01	-1.5244E-01	-3.5943E-01
373	ZN 6	SILICA	MACRO SIGT	-4.7412E-01	-9.8964E-02	-3.7516E-01
374	ZN 7	SILICA	MACRO SIGT	-1.2642E-02	-5.2684E-05	-1.2589E-02
375	SLAB	SILICA	MACRO SIGT	-3.7995E 00	-1.9808E 00	-1.8187E 00
376	ZN 1	SULFUR	MACRO SIGT	-4.6554E-05	-4.6550E-05	-4.4769E-09
377	ZN 2	SULFUR	MACRO SIGT	-3.5542E-03	-3.2310E-03	-3.2317E-04
378	ZN 3	SULFUR	MACRO SIGT	-3.9939E-03	-2.3851E-03	-1.6089E-03
379	ZN 4	SULFUR	MACRO SIGT	-4.2375E-03	-1.6663E-03	-2.5712E-03
380	ZN 5	SULFUR	MACRO SIGT	-2.1198E-03	-6.1720E-04	-1.5026E-03
381	ZN 6	SULFUR	MACRO SIGT	-1.9010E-03	-3.3941E-04	-1.5616E-03
382	ZN 7	SULFUR	MACRO SIGT	-5.0903E-05	2.3051E-06	-5.3209E-05
383	SLAB	SULFUR	MACRO SIGT	-1.5904E-02	-8.2831E-03	-7.6205E-03
384	ZN 1	POTASSIUM	MACRO SIGT	-6.3565E-04	-6.3558E-04	-7.2104E-08
385	ZN 2	POTASSIUM	MACRO SIGT	-6.6210E-02	-6.1264E-02	-4.9461E-03
386	ZN 3	POTASSIUM	MACRO SIGT	-8.4308E-02	-5.9747E-02	-2.4561E-02
387	ZN 4	POTASSIUM	MACRO SIGT	-7.9507E-02	-4.0424E-02	-3.9083E-02
388	ZN 5	POTASSIUM	MACRO SIGT	-3.7927E-02	-1.5207E-02	-2.2720E-02
389	ZN 6	POTASSIUM	MACRO SIGT	-3.1408E-02	-7.9123E-03	-2.3496E-02
390	ZN 7	POTASSIUM	MACRO SIGT	-7.3409E-04	9.2362E-05	-8.2645E-04
391	SLAB	POTASSIUM	MACRO SIGT	-3.0073E-01	-1.8509E-01	-1.1563E-01
392	ZN 1	CALCIUM	MACRO SIGT	-2.8928E-03	-2.8925E-03	-3.2980E-07
393	ZN 2	CALCIUM	MACRO SIGT	-2.1184E-01	-1.8956E-01	-2.2278E-02
394	ZN 3	CALCIUM	MACRO SIGT	-2.4797E-01	-1.3743E-01	-1.1054E-01
395	ZN 4	CALCIUM	MACRO SIGT	-2.7552E-01	-9.9858E-02	-1.7566E-01
396	ZN 5	CALCIUM	MACRO SIGT	-1.3987E-01	-3.7919E-02	-1.0195E-01
397	ZN 6	CALCIUM	MACRO SIGT	-1.2762E-01	-2.2160E-02	-1.0546E-01
398	ZN 7	CALCIUM	MACRO SIGT	-3.7283E-03	7.3729E-05	-3.8020E-03
399	SLAB	CALCIUM	MACRO SIGT	-1.0094E 00	-4.8975E-01	-5.1969E-01
400	ZN 1	IRON	MACRO SIGT	-2.4624E-04	-2.4619E-04	-5.4201E-08
401	ZN 2	IRON	MACRO SIGT	-3.0648E-03	3.1995E-04	-3.3847E-03
402	ZN 3	IRON	MACRO SIGT	-1.4788E-02	1.9360E-03	-1.6724E-02
403	ZN 4	IRON	MACRO SIGT	-3.7971E-02	-1.1584E-02	-2.6388E-02
404	ZN 5	IRON	MACRO SIGT	-2.2203E-02	-7.0200E-03	-1.5183E-02
405	ZN 6	IRON	MACRO SIGT	-1.9945E-02	-4.1946E-03	-1.5751E-02
406	ZN 7	IRON	MACRO SIGT	-5.7597E-04	7.3006E-05	-6.4897E-04
407	SLAB	IRON	MACRO SIGT	-9.8794E-02	-2.0716E-02	-7.8078E-02

Table B-1. Continued

Note: See Table 5 in text for descriptions of zones 1–7.
Entry of "Slab" under col. 2 means all zones.

Case	Zone	Constituent	Cross Section[a]	P_Σ, Sensitivity[b] All Groups	Neutron Groups	Gamma-Ray Groups
408	ZN 1	CARBON	MACRO SIGT	-5.3057E-10	-5.3055E-10	-1.9396E-14
409	ZN 2	CARBON	MACRO SIGT	-4.2494E-08	-4.0697E-08	-1.7963E-09
410	ZN 3	CARBON	MACRO SIGT	-3.8728E-08	-2.9688E-08	-9.0400E-09
411	ZN 4	CARBON	MACRO SIGT	-3.6056E-08	-2.1347E-08	-1.4709E-08
412	ZN 5	CARBON	MACRO SIGT	-1.7174E-08	-8.3889E-09	-8.7848E-09
413	ZN 6	CARBON	MACRO SIGT	-1.5618E-08	-6.1772E-09	-9.4408E-09
414	ZN 7	CARBON	MACRO SIGT	-3.5809E-10	-3.6382E-11	-3.2170E-10
415	SLAB	CARBON	MACRO SIGT	-1.5095E-07	-1.0686E-07	-4.4093E-08

[a]SIGT = total cross section; SIGA = absorption cross section; SIGE = elastic-scattering cross section.

[b]P_Σ = relative change in response due to relative change in cross section.

[c]Read: -2.1327×10^{-1}.

[d]For this one case, the water content of the standard slab was assumed to be 3 wt% rather than the 4.97 wt% specified for the standard concrete slab.

Table B-2. Relative Sensitivities of Dose Penetrating Steel-Reinforced (Rebar) Concrete Slab to Changes in Constituent Cross Sections as a Function of Zone in Slab (Normally Incident Fission Source)

Note: See Table 5 in text for descriptions of zones 1—7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	Total Dose	Neutron Dose	Gamma-Ray Dose
			0.05-m-thick Rebar Concrete Slab			
1	SLAB	REBRCONC	MACRO SIGT	-2.1515E-01	-2.1463E-01	-5.2833E-04
2	SLAB	REBRCONC	MACRO SIGA	-6.8806E-03	-6.8678E-03	-1.2796E-05
3	SLAB	REBRCONC	MACRO SIGE	-1.9137E-01	-1.9137E-01	0.0
4	SLAB	CONC	MACRO SIGT	-1.9818E-01	-1.9777E-01	-4.1248E-04
5	SLAB	CONC	MACRO SIGA	-6.5171E-03	-6.5137E-03	-3.4919E-06
6	SLAB	CONC	MACRO SIGE	-1.8362E-01	-1.8362E-01	0.0
7	SLAB	STEEL	MACRO SIGT	-1.6969E-02	-1.6853E-02	-1.1583E-04
8	SLAB	STEEL	MACRO SIGA	-3.6339E-04	-3.5409E-04	-9.3031E-06
9	SLAB	STEEL	MACRO SIGE	-7.7496E-03	-7.7496E-03	0.0
10	ZN 1	REBRCONC	MACRO SIGT	-5.8754E-02	-5.8752E-02	-2.3397E-06
11	ZN 2	REBRCONC	MACRO SIGT	-4.2570E 00	-4.1191E 00	-1.3790E-01
12	ZN 3	REBRCONC	MACRO SIGT	-4.7664E-02	-3.7874E-02	-9.7895E-03
13	SLAB	REBRCONC	MACRO SIGT	-4.3634E 00	-4.2157E 00	-1.4769E-01
14	ZN 1	REBRCONC	MACRO SIGA	-2.1184E-03	-2.1184E-03	-1.4577E-09
15	ZN 2	REBRCONC	MACRO SIGA	-2.2943E-01	-2.2848E-01	-9.5289E-04
16	ZN 3	REBRCONC	MACRO SIGA	-3.3749E-03	-3.0196E-03	-3.5537E-04
17	SLAB	REBRCONC	MACRO SIGA	-2.3493E-01	-2.3362E-01	-1.3083E-03
18	ZN 1	REBRCONC	MACRO SIGE	-4.5448E-02	-4.5448E-02	0.0
19	ZN 2	REBRCONC	MACRO SIGE	-3.3283E 00	-3.3283E 00	0.0
20	ZN 3	REBRCONC	MACRO SIGE	-3.6121E-02	-3.6121E-02	0.0
21	SLAB	REBRCONC	MACRO SIGE	-3.4098E 00	-3.4098E 00	0.0
22	ZN 1	CONC	MACRO SIGT	-5.0869E-02	-5.0868E-02	-1.7842E-06
23	ZN 2	CONC	MACRO SIGT	-3.7185E 00	-3.6127E 00	-1.0588E-01
24	ZN 3	CONC	MACRO SIGT	-4.4965E-02	-3.7513E-02	-7.4526E-03
25	SLAB	CONC	MACRO SIGT	-3.8144E 00	-3.7011E 00	-1.1334E-01
26	ZN 1	CONC	MACRO SIGA	-2.0270E-03	-2.0270E-03	-3.8202E-10
27	ZN 2	CONC	MACRO SIGA	-1.5300E-01	-1.5274E-01	-2.5873E-04
28	ZN 3	CONC	MACRO SIGA	-1.9851E-03	-1.8873E-03	-9.7828E-05
29	SLAB	CONC	MACRO SIGA	-1.5701E-01	-1.5665E-01	-3.5656E-04
30	ZN 1	CONC	MACRO SIGE	-4.2250E-02	-4.2250E-02	0.0
31	ZN 2	CONC	MACRO SIGE	-3.1174E 00	-3.1174E 00	0.0
32	ZN 3	CONC	MACRO SIGE	-3.5724E-02	-3.5724E-02	0.0
33	SLAB	CONC	MACRO SIGE	-3.1953E 00	-3.1953E 00	0.0
34	ZN 1	STEEL	MACRO SIGT	-7.8836E-03	-7.8831E-03	-5.5542E-07
35	ZN 2	STEEL	MACRO SIGT	-5.3833E-01	-5.0632E-01	-3.2011E-02
36	ZN 3	STEEL	MACRO SIGT	-2.6978E-03	-3.6129E-04	-2.3366E-03
37	SLAB	STEEL	MACRO SIGT	-5.4891E-01	-5.1457E-01	-3.4348E-02
38	ZN 1	STEEL	MACRO SIGA	-9.1354E-05	-9.1353E-05	-1.0755E-09
39	ZN 2	STEEL	MACRO SIGA	-7.6422E-02	-7.5729E-02	-6.9405E-04
40	ZN 3	STEEL	MACRO SIGA	-1.3897E-03	-1.1322E-03	-2.5751E-04
41	SLAB	STEEL	MACRO SIGA	-7.7903E-02	-7.6952E-02	-9.5156E-04
42	ZN 1	STEEL	MACRO SIGE	-3.1973E-03	-3.1973E-03	0.0
43	ZN 2	STEEL	MACRO SIGE	-2.1088E-01	-2.1088E-01	0.0
44	ZN 3	STEEL	MACRO SIGE	-3.9731E-04	-3.9731E-04	0.0
45	SLAB	STEEL	MACRO SIGE	-2.1447E-01	-2.1447E-01	0.0

Table B-2. Continued

Note: See Table 5 in text for descriptions of zones 1—7.
Entry of "Slab" under col. 2 means all zones.

Case	Zone	Constituent	Cross Section[a]	P_Σ, Sensitivity[b] Total Dose	Neutron Dose	Gamma-Ray Dose
1.0-m-thick Rebar Concrete Slab						
46	ZN 1	REBRCONC	MACRO SIGT	-5.8688E-02	-5.8686E-02	-1.9906E-06
47	ZN 2	REBRCONC	MACRO SIGT	-8.6618E 00	-7.7276E 00	-9.3420E-01
48	ZN 3	REBRCONC	MACRO SIGT	-5.1314E-02	-2.8258E-02	-2.3056E-02
49	SLAB	REBRCONC	MACRO SIGT	-8.7718E 00	-7.8146E 00	-9.5726E-01
50	ZN 1	REBRCONC	MACRO SIGA	-2.7215E-03	-2.7215E-03	-7.6774E-10
51	ZN 2	REBRCONC	MACRO SIGA	-6.2888E-01	-6.2573E-01	-3.1533E-03
52	ZN 3	REBRCONC	MACRO SIGA	-3.8383E-03	-2.7803E-03	-1.0580E-03
53	SLAB	REBRCONC	MACRO SIGA	-6.3544E-01	-6.3123E-01	-4.2113E-03
54	ZN 1	REBRCONC	MACRO SIGE	-4.3451E-02	-4.3451E-02	0.0
55	ZN 2	REBRCONC	MACRO SIGE	-6.0119E 00	-6.0119E 00	0.0
56	ZN 3	REBRCONC	MACRO SIGE	-2.7498E-02	-2.7498E-02	0.0
57	SLAB	REBRCONC	MACRO SIGE	-6.0829E 00	-6.0829E 00	0.0
58	ZN 1	CONC	MACRO SIGT	-5.0367E-02	-5.0366E-02	-1.4564E-06
59	ZN 2	CONC	MACRO SIGT	-7.3842E 00	-6.6708E 00	-7.1344E-01
60	ZN 3	CONC	MACRO SIGT	-4.6125E-02	-2.8592E-02	-1.7533E-02
61	SLAB	CONC	MACRO SIGT	-7.4807E 00	-6.7498E 00	-7.3097E-01
62	ZN 1	CONC	MACRO SIGA	-2.6014E-03	-2.6014E-03	-2.0328E-10
63	ZN 2	CONC	MACRO SIGA	-3.7921E-01	-3.7836E-01	-8.5391E-04
64	ZN 3	CONC	MACRO SIGA	-1.8383E-03	-1.5473E-03	-2.9105E-04
65	SLAB	CONC	MACRO SIGA	-3.8365E-01	-3.8251E-01	-1.1450E-03
66	ZN 1	CONC	MACRO SIGE	-4.0160E-02	-4.0160E-02	0.0
67	ZN 2	CONC	MACRO SIGE	-5.5715E 00	-5.5715E 00	0.0
68	ZN 3	CONC	MACRO SIGE	-2.7415E-02	-2.7415E-02	0.0
69	SLAB	CONC	MACRO SIGE	-5.6390E 00	-5.6390E 00	0.0
70	ZN 1	STEEL	MACRO SIGT	-8.3191E-03	-8.3186E-03	-5.3411E-07
71	ZN 2	STEEL	MACRO SIGT	-1.2774E 00	-1.0566E 00	-2.2073E-01
72	ZN 3	STEEL	MACRO SIGT	-5.1877E-03	3.3441E-04	-5.5221E-03
73	SLAB	STEEL	MACRO SIGT	-1.2909E 00	-1.0646E 00	-2.2625E-01
74	ZN 1	STEEL	MACRO SIGA	-1.2014E-04	-1.2013E-04	-5.6438E-10
75	ZN 2	STEEL	MACRO SIGA	-2.4963E-01	-2.4733E-01	-2.2991E-03
76	ZN 3	STEEL	MACRO SIGA	-1.9997E-03	-1.2329E-03	-7.6679E-04
77	SLAB	STEEL	MACRO SIGA	-2.5175E-01	-2.4869E-01	-3.0659E-03
78	ZN 1	STEEL	MACRO SIGE	-3.2910E-03	-3.2910E-03	0.0
79	ZN 2	STEEL	MACRO SIGE	-4.4039E-01	-4.4039E-01	0.0
80	ZN 3	STEEL	MACRO SIGE	-8.3276E-05	-8.3276E-05	0.0
81	SLAB	STEEL	MACRO SIGE	-4.4376E-01	-4.4376E-01	0.0
1.5-m-thick Rebar Concrete Slab						
82	ZN 1	REBRCONC	MACRO SIGT	-5.4718E-02	-5.4715E-02	-2.8559E-06
83	ZN 2	REBRCONC	MACRO SIGT	-4.1376E 00	-3.9132E 00	-2.2436E-01
84	ZN 3	REBRCONC	MACRO SIGT	-4.2212E 00	-3.1508E 00	-1.0703E 00
85	ZN 4	REBRCONC	MACRO SIGT	-4.1360E 00	-2.4145E 00	-1.7215E 00
86	ZN 5	REBRCONC	MACRO SIGT	-5.3603E-02	-1.8985E-02	-3.4618E-02
87	SLAB	REBRCONC	MACRO SIGT	-1.2603E 01	-9.5524E 00	-3.0508E 00
88	ZN 1	REBRCONC	MACRO SIGA	-2.8386E-03	-2.8386E-03	-1.0962E-09
89	ZN 2	REBRCONC	MACRO SIGA	-3.8150E-01	-3.8145E-01	-4.8537E-05
90	ZN 3	REBRCONC	MACRO SIGA	-3.7177E-01	-3.7149E-01	-2.7891E-04
91	ZN 4	REBRCONC	MACRO SIGA	-2.3820E-01	-2.3281E-01	-5.3897E-03

Table B-2. Continued

Note: See Table 5 in text for descriptions of zones 1—7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	Total Dose	Neutron Dose	Gamma-Ray Dose
92	ZN 5	REBRCONC	MACRO SIGA	-3.6741E-03	-1.8673E-03	-1.8068E-03
93	SLAB	REBRCONC	MACRO SIGA	-9.9798E-01	-9.9046E-01	-7.5240E-03
94	ZN 1	REBRCONC	MACRO SIGE	-3.9837E-02	-3.9837E-02	0.0
95	ZN 2	REBRCONC	MACRO SIGE	-2.9010E 00	-2.9010E 00	0.0
96	ZN 3	REBRCONC	MACRO SIGE	-2.4017E 00	-2.4017E 00	0.0
97	ZN 4	REBRCONC	MACRO SIGE	-1.9802E 00	-1.9802E 00	0.0
98	ZN 5	REBRCONC	MACRO SIGE	-1.8608E-02	-1.8608E-02	0.0
99	SLAB	REBR CONC	MACRO SIGE	-7.3415E 00	-7.3415E 00	0.0
100	ZN 1	CONC	MACRO SIGT	-4.7066E-02	-4.7064E-02	-2.0383E-06
101	ZN 2	CONC	MACRO SIGT	-3.5366E 00	-3.3677E 00	-1.6891E-01
102	ZN 3	CONC	MACRO SIGT	-3.5056E 00	-2.6965E 00	-8.0916E-01
103	ZN 4	CONC	MACRO SIGT	-3.4147E 00	-2.0983E 00	-1.3164E 00
104	ZN 5	CONC	MACRO SIGT	-4.5665E-02	-1.9319E-02	-2.6346E-02
105	SLAB	CONC	MACRO SIGT	-1.0550E 01	-8.2290E 00	-2.3208E 00
106	ZN 1	CONC	MACRO SIGA	-2.7006E-03	-2.7006E-03	-2.9133E-10
107	ZN 2	CONC	MACRO SIGA	-2.4252E-01	-2.4251E-01	-1.2888E-05
108	ZN 3	CONC	MACRO SIGA	-1.9893E-01	-1.9885E-01	-7.3791E-05
109	ZN 4	CONC	MACRO SIGA	-1.1623E-01	-1.1477E-01	-1.4585E-03
110	ZN 5	CONC	MACRO SIGA	-1.5036E-03	-1.0069E-03	-4.9677E-04
111	SLAB	CONC	MACRO SIGA	-5.6188E-01	-5.5984E-01	-2.0419E-03
112	ZN 1	CONC	MACRO SIGE	-3.6959E-02	-3.6959E-02	0.0
113	ZN 2	CONC	MACRO SIGE	-2.6749E 00	-2.6749E 00	0.0
114	ZN 3	CONC	MACRO SIGE	-2.2009E 00	-2.2009E 00	0.0
115	ZN 4	CONC	MACRO SIGE	-1.8358E 00	-1.8358E 00	0.0
116	ZN 5	CONC	MACRO SIGE	-1.8597E-02	-1.8597E-02	0.0
117	SLAB	CONC	MACRO SIGE	-6.7671E 00	-6.7671E 00	0.0
118	ZN 1	STEEL	MACRO SIGT	-7.6500E-03	-7.6492E-03	-8.1753E-07
119	ZN 2	STEEL	MACRO SIGT	-6.0091E-01	-5.4547E-01	-5.5443E-02
120	ZN 3	STEEL	MACRO SIGT	-7.1542E-01	-4.5427E-01	-2.6115E-01
121	ZN 4	STEEL	MACRO SIGT	-7.2113E-01	-3.1615E-01	-4.0498E-01
122	ZN 5	STEEL	MACRO SIGT	-7.9372E-03	3.3384E-04	-8.2711E-03
123	SLAB	STEEL	MACRO SIGT	-2.0530E 00	-1.3232E 00	-7.2984E-01
124	ZN 1	STEEL	MACRO SIGA	-1.3792E-04	-1.3792E-04	-8.0475E-10
125	ZN 2	STEEL	MACRO SIGA	-1.3896E-01	-1.3893E-01	-3.5643E-05
126	ZN 3	STEEL	MACRO SIGA	-1.7281E-01	-1.7261E-01	-2.0508E-04
127	ZN 4	STEEL	MACRO SIGA	-1.2195E-01	-1.1802E-01	-3.9307E-03
128	ZN 5	STEEL	MACRO SIGA	-2.1701E-03	-8.6029E-04	-1.3098E-03
129	SLAB	STEEL	MACRO SIGA	-4.3603E-01	-4.3055E-01	-5.4812E-03
130	ZN 1	STEEL	MACRO SIGE	-2.8778E-03	-2.8778E-03	0.0
131	ZN 2	STEEL	MACRO SIGE	-2.2614E-01	-2.2614E-01	0.0
132	ZN 3	STEEL	MACRO SIGE	-2.0081E-01	-2.0081E-01	0.0
133	ZN 4	STEEL	MACRO SIGE	-1.4442E-01	-1.4442E-01	0.0
134	ZN 5	STEEL	MACRO SIGE	-1.1272E-05	-1.1272E-05	0.0
135	SLAB	STEEL	MACRO SIGE	-5.7426E-01	-5.7426E-01	0.0
2.0-m-thick Rebar Concrete Slab						
136	ZN 1	REBRCONC	MACRO SIGT	-5.3000E-02	-5.2995E-02	-4.4348E-06
137	ZN 2	REBRCONC	MACRO SIGT	-4.1628E 00	-3.8087E 00	-3.5406E-01
138	ZN 3	REBRCONC	MACRO SIGT	-4.2335E 00	-2.6201E 00	-1.6134E 00
139	ZN 4	REBRCONC	MACRO SIGT	-4.2251E 00	-1.8311E 00	-2.3940E 00
140	ZN 5	REBRCONC	MACRO SIGT	-2.1117E 00	-7.5693E-01	-1.3548E 00
141	ZN 6	REBRCONC	MACRO SIGT	-2.0285E 00	-6.3604E-01	-1.3925E 00
142	ZN 7	REBRCONC	MACRO SIGT	-5.8500E-02	-1.1034E-02	-4.7466E-02
143	SLAB	REBRCONC	MACRO SIGT	-1.6873E 01	-9.7171E 00	-7.1562E 00

Table B-2. Continued

Note: See Table 5 in text for descriptions of zones 1—7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	Total Dose	Neutron Dose	Gamma-Ray Dose
144	ZN 1	REBRCONC	MACRO SIGA	-2.7704E-03	-2.7704E-03	-1.5790E-09
145	ZN 2	REBRCONC	MACRO SIGA	-4.7523E-01	-4.7516E-01	-6.6970E-05
146	ZN 3	REBRCONC	MACRO SIGA	-4.5358E-01	-4.5325E-01	-3.3002E-04
147	ZN 4	REBRCONC	MACRO SIGA	-2.1833E-01	-2.1774E-01	-5.9047E-04
148	ZN 5	REBRCONC	MACRO SIGA	-7.1331E-02	-7.0789E-02	-5.4233E-04
149	ZN 6	REBRCONC	MACRO SIGA	-6.4637E-02	-5.7599E-02	-7.0382E-03
150	ZN 7	REBRCONC	MACRO SIGA	-3.5777E-03	-1.0240E-03	-2.5537E-03
151	SLAB	REBRCONC	MACRO SIGA	-1.2894E 00	-1.2783E 00	-1.1122E-02
152	ZN 1	REBRCONC	MACRO SIGE	-3.9000E-02	-3.9000E-02	0.0
153	ZN 2	REBRCONC	MACRO SIGE	-2.8986E 00	-2.8986E 00	0.0
154	ZN 3	REBRCONC	MACRO SIGE	-1.9986E 00	-1.9986E 00	0.0
155	ZN 4	REBRCONC	MACRO SIGE	-1.4236E 00	-1.4236E 00	0.0
156	ZN 5	REBRCONC	MACRO SIGE	-6.0963E-01	-6.0963E-01	0.0
157	ZN 6	REBRCONC	MACRO SIGE	-5.4593E-01	-5.4593E-01	0.0
158	ZN 7	REBRCONC	MACRO SIGE	-1.0849E-02	-1.0849E-02	0.0
159	SLAB	REBRCONC	MACRO SIGE	-7.5263E 00	-7.5263E 00	0.0
160	ZN 1	CONC	MACRO SIGT	-4.2939E-02	-4.2936E-02	-2.9731E-06
161	ZN 2	CONC	MACRO SIGT	-3.3484E 00	-3.0975E 00	-2.5086E-01
162	ZN 3	CONC	MACRO SIGT	-3.2606E 00	-2.1151E 00	-1.1456E 00
163	ZN 4	CONC	MACRO SIGT	-3.1706E 00	-1.4634E 00	-1.7072E 00
164	ZN 5	CONC	MACRO SIGT	-1.5781E 00	-6.0643E-01	-9.7164E-01
165	ZN 6	CONC	MACRO SIGT	-1.5316E 00	-5.2398E-01	-1.0076E 00
166	ZN 7	CONC	MACRO SIGT	-4.4466E-02	-1.0395E-02	-3.4071E-02
167	SLAB	CONC	MACRO SIGT	-1.2977E 01	-7.8599E 00	-5.1170E 00
168	ZN 1	CONC	MACRO SIGA	-2.4296E-03	-2.4296E-03	-4.1233E-10
169	ZN 2	CONC	MACRO SIGA	-2.5310E-01	-2.5309E-01	-1.7480E-05
170	ZN 3	CONC	MACRO SIGA	-2.0979E-01	-2.0970E-01	-8.6017E-05
171	ZN 4	CONC	MACRO SIGA	-1.0693E-01	-1.0677E-01	-1.5334E-04
172	ZN 5	CONC	MACRO SIGA	-3.4211E-02	-3.4071E-02	-1.4018E-04
173	ZN 6	CONC	MACRO SIGA	-2.7426E-02	-2.5555E-02	-1.8712E-03
174	ZN 7	CONC	MACRO SIGA	-1.2065E-03	-5.1821E-04	-6.8831E-04
175	SLAB	CONC	MACRO SIGA	-6.3510E-01	-6.3214E-01	-2.9565E-03
176	ZN 1	CONC	MACRO SIGE	-3.3926E-02	-3.3926E-02	0.0
177	ZN 2	CONC	MACRO SIGE	-2.4876E 00	-2.4876E 00	0.0
178	ZN 3	CONC	MACRO SIGE	-1.6972E 00	-1.6972E 00	0.0
179	ZN 4	CONC	MACRO SIGE	-1.2089E 00	-1.2089E 00	0.0
180	ZN 5	CONC	MACRO SIGE	-5.2106E-01	-5.2106E-01	0.0
181	ZN 6	CONC	MACRO SIGE	-4.7377E-01	-4.7377E-01	0.0
182	ZN 7	CONC	MACRO SIGE	-1.0035E-02	-1.0035E-02	0.0
183	SLAB	CONC	MACRO SIGE	-6.4325E 00	-6.4325E 00	0.0
184	ZN 1	STEEL	MACRO SIGT	-6.5702E-03	-6.5690E-03	-1.2228E-06
185	ZN 2	STEEL	MACRO SIGT	-5.4219E-01	-4.5921E-01	-8.2974E-02
186	ZN 3	STEEL	MACRO SIGT	-7.0844E-01	-3.3294E-01	-3.7550E-01
187	ZN 4	STEEL	MACRO SIGT	-7.9772E-01	-2.4865E-01	-5.4906E-01
188	ZN 5	STEEL	MACRO SIGT	-4.0590E-01	-1.0117E-01	-3.0473E-01
189	ZN 6	STEEL	MACRO SIGT	-3.7290E-01	-6.9416E-02	-3.0349E-01
190	ZN 7	STEEL	MACRO SIGT	-1.0435E-02	2.1154E-04	-1.0646E-02
191	SLAB	STEEL	MACRO SIGT	-2.8441E 00	-1.2177E 00	-1.6264E 00
192	ZN 1	STEEL	MACRO SIGA	-1.4278E-04	-1.4278E-04	-1.1369E-09
193	ZN 2	STEEL	MACRO SIGA	-2.0208E-01	-2.0203E-01	-4.8228E-05
194	ZN 3	STEEL	MACRO SIGA	-2.2737E-01	-2.2713E-01	-2.3780E-04
195	ZN 4	STEEL	MACRO SIGA	-1.0299E-01	-1.0257E-01	-4.2607E-04
196	ZN 5	STEEL	MACRO SIGA	-3.4434E-02	-3.4042E-02	-3.9205E-04
197	ZN 6	STEEL	MACRO SIGA	-3.5082E-02	-3.0051E-02	-5.0315E-03
198	ZN 7	STEEL	MACRO SIGA	-2.2803E-03	-4.6494E-04	-1.8154E-03
199	SLAB	STEEL	MACRO SIGA	-6.0438E-01	-5.9643E-01	-7.9510E-03

Table B-2. Continued

Note: See Table 5 in text for descriptions of zones 1—7.
Entry of "Slab" under col. 2 means all zones.

				P_Σ, Sensitivity[b]		
Case	Zone	Constituent	Cross Section[a]	Total Dose	Neutron Dose	Gamma-Ray Dose
200	ZN 1	STEEL	MACRO SIGE	-2.3082E-03	-2.3082E-03	0.0
201	ZN 2	STEEL	MACRO SIGE	-2.0822E-01	-2.0822E-01	0.0
202	ZN 3	STEEL	MACRO SIGE	-1.6309E-01	-1.6309E-01	0.0
203	ZN 4	STEEL	MACRO SIGE	-1.1619E-01	-1.1619E-01	0.0
204	ZN 5	STEEL	MACRO SIGE	-4.6081E-02	-4.6081E-02	0.0
205	ZN 6	STEEL	MACRO SIGE	-3.3519E-02	-3.3519E-02	0.0
206	ZN 7	STEEL	MACRO SIGE	7.4138E-06	7.4138E-06	0.0
207	SLAB	STEEL	MACRO SIGE	-5.6940E-01	-5.6940E-01	0.0

[a]SIGT = total cross section; SIGA = absorption cross section; SIGE = elastic-scattering cross section.

[b]P_Σ = relative change in response due to relative change in cross section.

[c]Read: -2.1515×10^{-1}.

Appendix C

DOSE TRANSMISSION FACTORS FOR STANDARD AND REBAR CONCRETE

A byproduct of the sensitivity calculations is the adjoint results for the given slab thickness and response function. The surface adjoint result can be considered as a "transmission function," τ_{gj}, which can be folded with an angular- and energy-dependent source of interest to calculate the dose transmitted for that given source, slab, and response combination (see Section 4). The dose transmitted through a slab of thickness T can be calculated from [see Eq. (52)]

$$R(T) = \sum_g \sum_j S_{gj} w_j \tau_{gj}(T) ,$$

where $S_{gj} w_j$ is the number of gth energy group source particles entering the slab (the current) with a direction in the cosine interval j, and w_j is the weight (solid angle) associated with the jth cosine. The dose transmission factors for standard concrete slabs are given in Tables C-1 through C-5.

As an example of the use of the dose transmission factors, assume that it is desired to calculate the dose transmitted through a 150-cm-thick slab given an approximately normally incident 14-MeV neutron source of strength 1 neutron/cm^2·s. For this case, the source can be represented as

$$S_{gj} w_j = S_{61} W_1 = 1 ,$$

and R(150) can be found as

$$R(150) = S_{61} \cdot W_1 \tau_{61} = 1 \times (7.23 \times 10^{-9})$$

or

$$R(150) = 7.23 \times 10^{-9} (\mathrm{rem/hr})/(\mathrm{neutron/cm^2} - s) ,$$

where τ_{61} is the entry in Table C-1d for angle 1 (column COS1) and energy group 6.

A similar set of dose transmission factors for rebar slabs can be found in Tables C-6 through C-10.

For convenience, the data and a computer code FTF-II (see Section 4) have been packaged as DLC-101/ADVISE, which is available from the Radiation Shielding Information Center. The package can be used to automate the folding procedures indicated in the above equation.

Table C-1a. Neutron Dose Rate Transmission Factors for 0.05-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	2.01-04	2.12-04	2.30-04	2.54-04	2.80-04	2.99-04	2.77-04	1.37-04
2	1.649+7	1.97-04	2.07-04	2.25-04	2.48-04	2.73-04	2.91-04	2.68-04	1.31-04
3	1.568+7	1.92-04	2.02-04	2.20-04	2.43-04	2.67-04	2.82-04	2.55-04	1.25-04
4	1.492+7	1.90-04	2.00-04	2.17-04	2.39-04	2.63-04	2.78-04	2.52-04	1.23-04
5	1.455+7	1.88-04	1.98-04	2.14-04	2.36-04	2.59-04	2.74-04	2.50-04	1.21-04
6	1.419+7	1.86-04	1.96-04	2.12-04	2.33-04	2.56-04	2.71-04	2.47-04	1.19-04
7	1.384+7	1.83-04	1.92-04	2.07-04	2.28-04	2.50-04	2.65-04	2.41-04	1.16-04
8	1.350+7	1.77-04	1.86-04	2.01-04	2.21-04	2.42-04	2.57-04	2.36-04	1.14-04
9	1.284+7	1.69-04	1.77-04	1.92-04	2.11-04	2.31-04	2.46-04	2.25-04	1.11-04
10	1.221+7	1.59-04	1.67-04	1.80-04	1.96-04	2.14-04	2.26-04	2.04-04	1.01-04
11	1.162+7	1.52-04	1.59-04	1.71-04	1.87-04	2.04-04	2.15-04	1.95-04	9.85-05
12	1.105+7	1.45-04	1.53-04	1.65-04	1.82-04	2.02-04	2.18-04	2.08-04	1.04-04
13	1.051+7	1.39-04	1.45-04	1.57-04	1.72-04	1.90-04	2.04-04	1.93-04	9.66-05
14	1.000+7	1.39-04	1.45-04	1.56-04	1.72-04	1.90-04	2.06-04	1.97-04	1.01-04
15	9.512+6	1.40-04	1.46-04	1.57-04	1.73-04	1.91-04	2.08-04	2.01-04	1.02-04
16	9.048+6	1.40-04	1.46-04	1.57-04	1.72-04	1.89-04	2.03-04	1.93-04	9.89-05
17	8.607+6	1.40-04	1.46-04	1.57-04	1.72-04	1.89-04	2.04-04	1.94-04	1.01-04
18	8.187+6	1.41-04	1.47-04	1.58-04	1.73-04	1.91-04	2.07-04	1.99-04	1.03-04
19	7.788+6	1.42-04	1.48-04	1.59-04	1.74-04	1.92-04	2.05-04	1.94-04	1.01-04
20	7.408+6	1.42-04	1.48-04	1.59-04	1.73-04	1.90-04	2.02-04	1.89-04	1.01-04
21	7.047+6	1.42-04	1.49-04	1.60-04	1.76-04	1.95-04	2.13-04	2.08-04	1.10-04
22	6.703+6	1.44-04	1.51-04	1.63-04	1.80-04	2.00-04	2.18-04	2.14-04	1.14-04
23	6.592+6	1.45-04	1.52-04	1.64-04	1.81-04	2.03-04	2.25-04	2.26-04	1.20-04
24	6.376+6	1.49-04	1.56-04	1.69-04	1.86-04	2.07-04	2.26-04	2.21-04	1.20-04
25	6.065+6	1.50-04	1.57-04	1.69-04	1.96-04	2.05-04	2.19-04	2.06-04	1.13-04
26	5.770+6	1.60-04	1.67-04	1.77-04	1.91-04	2.07-04	2.17-04	1.98-04	1.12-04
27	5.488+6	1.56-04	1.63-04	1.76-04	1.93-04	2.13-04	2.32-04	2.25-04	1.21-04
28	5.221+6	1.50-04	1.57-04	1.68-04	1.82-04	1.96-04	2.03-04	1.79-04	1.01-04
29	4.966+6	1.55-04	1.61-04	1.73-04	1.88-04	2.04-04	2.14-04	1.94-04	1.07-04
30	4.724+6	1.51-04	1.58-04	1.69-04	1.84-04	2.00-04	2.09-04	1.89-04	1.05-04
31	4.493+6	1.51-04	1.56-04	1.65-04	1.77-04	1.88-04	1.91-04	1.66-04	9.60-05
32	4.066+6	1.49-04	1.53-04	1.61-04	1.71-04	1.78-04	1.75-04	1.46-04	9.16-05
33	3.679+6	1.44-04	1.48-04	1.54-04	1.61-04	1.65-04	1.59-04	1.31-04	8.76-05
34	3.329+6	1.34-04	1.38-04	1.46-04	1.55-04	1.63-04	1.60-04	1.34-04	8.85-05
35	3.166+6	1.38-04	1.43-04	1.52-04	1.63-04	1.75-04	1.80-04	1.60-04	9.42-05
36	3.012+6	1.39-04	1.44-04	1.52-04	1.64-04	1.76-04	1.85-04	1.71-04	9.62-05
37	2.865+6	1.39-04	1.43-04	1.51-04	1.61-04	1.73-04	1.80-04	1.64-04	9.36-05
38	2.725+6	1.38-04	1.42-04	1.50-04	1.59-04	1.70-04	1.76-04	1.60-04	9.18-05
39	2.592+6	1.40-04	1.44-04	1.50-04	1.58-04	1.67-04	1.71-04	1.52-04	8.97-05
40	2.466+6	1.38-04	1.42-04	1.50-04	1.60-04	1.74-04	1.86-04	1.79-04	9.75-05
41	2.385+6	1.35-04	1.40-04	1.48-04	1.61-04	1.78-04	1.96-04	1.97-04	1.06-04
42	2.365+6	1.32-04	1.37-04	1.46-04	1.60-04	1.79-04	2.01-04	2.10-04	1.15-04
43	2.346+6	1.29-04	1.34-04	1.43-04	1.57-04	1.74-04	1.93-04	1.96-04	1.04-04
44	2.307+6	1.29-04	1.33-04	1.41-04	1.51-04	1.63-04	1.72-04	1.59-04	8.68-05
45	2.231+6	1.30-04	1.34-04	1.40-04	1.49-04	1.58-04	1.62-04	1.44-04	8.19-05
46	2.123+6	1.31-04	1.35-04	1.41-04	1.48-04	1.56-04	1.57-04	1.36-04	7.92-05
47	2.019+6	1.35-04	1.38-04	1.42-04	1.48-04	1.52-04	1.48-04	1.23-04	7.63-05
48	1.921+6	1.33-04	1.35-04	1.38-04	1.40-04	1.40-04	1.32-04	1.06-04	7.32-05
49	1.827+6	1.30-04	1.33-04	1.38-04	1.46-04	1.53-04	1.55-04	1.34-04	7.67-05
50	1.738+6	1.25-04	1.28-04	1.33-04	1.39-04	1.44-04	1.41-04	1.17-04	7.19-05
51	1.653+6	1.24-04	1.26-04	1.29-04	1.33-04	1.34-04	1.27-04	1.03-04	6.85-05
52	1.572+6	1.26-04	1.29-04	1.33-04	1.39-04	1.43-04	1.39-04	1.16-04	6.96-05
53	1.496+6	1.26-04	1.29-04	1.33-04	1.37-04	1.40-04	1.35-04	1.10-04	6.75-05
54	1.423+6	1.29-04	1.31-04	1.34-04	1.38-04	1.39-04	1.31-04	1.04-04	6.51-05
55	1.353+6	1.34-04	1.34-04	1.33-04	1.31-04	1.23-04	1.08-04	8.39-05	6.03-05
56	1.287+6	1.24-04	1.26-04	1.28-04	1.29-04	1.28-04	1.18-04	9.11-05	5.78-05
57	1.225+6	1.20-04	1.22-04	1.24-04	1.26-04	1.25-04	1.16-04	8.97-05	5.53-05

Table C-1a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.11-04	1.13-04	1.16-04	1.18-04	1.17-04	1.08-04	8.29-05	5.18-05
59	1.108+6	9.49-05	9.57-05	9.63-05	9.55-05	9.09-05	7.98-05	6.21-05	4.64-05
60	1.003+6	9.07-05	9.02-05	8.88-05	8.55-05	7.90-05	6.86-05	5.64-05	4.57-05
61	9.616+5	1.04-04	1.04-04	1.04-04	1.02-04	9.61-05	8.42-05	6.54-05	4.88-05
62	9.072+5	1.06-04	1.07-04	1.08-04	1.09-04	1.06-04	9.59-05	7.33-05	4.92-05
63	8.629+5	1.05-04	1.06-04	1.06-04	1.06-04	1.02-04	9.10-05	6.93-05	4.76-05
64	8.209+5	1.01-04	1.01-04	1.01-04	1.00-04	9.62-05	8.56-05	6.53-05	4.57-05
65	7.808+5	9.80-05	9.90-05	1.00-04	1.01-04	9.93-05	9.10-05	6.95-05	4.42-05
66	7.427+5	9.54-05	9.62-05	9.75-05	9.82-05	9.66-05	8.85-05	6.73-05	4.21-05
67	7.065+5	9.27-05	9.34-05	9.43-05	9.47-05	9.26-05	8.41-05	6.35-05	4.00-05
68	6.721+5	8.99-05	9.05-05	9.11-05	9.11-05	8.84-05	7.96-05	5.96-05	3.79-05
69	6.393+5	8.70-05	8.75-05	8.80-05	8.77-05	8.47-05	7.57-05	5.61-05	3.56-05
70	6.081+5	8.42-05	8.45-05	8.45-05	8.35-05	7.97-05	7.00-05	5.13-05	3.30-05
71	5.784+5	7.75-05	7.71-05	7.61-05	7.37-05	6.84-05	5.83-05	4.30-05	3.00-05
72	5.502+5	7.68-05	7.68-05	7.64-05	7.49-05	7.05-05	6.07-05	4.34-05	2.74-05
73	5.234+5	7.25-05	7.23-05	7.16-05	6.94-05	6.43-05	5.40-05	3.80-05	2.42-05
74	4.979+5	5.68-05	5.57-05	5.34-05	4.94-05	4.32-05	3.51-05	2.67-05	1.94-05
75	4.505+5	3.79-05	3.70-05	3.53-05	3.26-05	2.90-05	2.48-05	2.09-05	1.73-05
76	4.076+5	4.19-05	4.16-05	4.08-05	3.90-05	3.54-05	2.96-05	2.26-05	1.74-05
77	3.877+5	4.26-05	4.25-05	4.21-05	4.07-05	3.75-05	3.16-05	2.33-05	1.71-05
78	3.688+5	4.17 05	4.17-05	4.13-05	4.02-05	3.73-05	3.15-05	2.28-05	1.62-05
79	3.337+5	3.90-05	3.90-05	3.87-05	3.76-05	3.50-05	2.96-05	2.12-05	1.47-05
80	3.020+5	3.69-05	3.69-05	3.65-05	3.54-05	3.28-05	2.76-05	1.99-05	1.38-05
81	2.985+5	3.67-05	3.66-05	3.63-05	3.52-05	3.27-05	2.75-05	1.97-05	1.37-05
82	2.972+5	3.65-05	3.64-05	3.60-05	3.50-05	3.24-05	2.73-05	1.96-05	1.36-05
83	2.945+5	3.58-05	3.57-05	3.53-05	3.42-05	3.16-05	2.66-05	1.91-05	1.34-05
84	2.873+5	3.48-05	3.47-05	3.43-05	3.32-05	3.06-05	2.57-05	1.85-05	1.29-05
85	2.732+5	3.23-05	3.21-05	3.16-05	3.04-05	2.79-05	2.33-05	1.68-05	1.18-05
86	2.472+5	2.96-05	2.94-05	2.88-05	2.76-05	2.51-05	2.08-05	1.51-05	1.08-05
87	2.352+5	2.80-05	2.77-05	2.72-05	2.59-05	2.36-05	1.95-05	1.42-05	1.02-05
88	2.237+5	2.54-05	2.51-05	2.45-05	2.32-05	2.09-05	1.73-05	1.30-05	9.74-06
89	2.128+5	2.35-05	2.32-05	2.26-05	2.14-05	1.92-05	1.59-05	1.23-05	9.44-06
90	2.024+5	2.18-05	2.16-05	2.10-05	1.98-05	1.78-05	1.49-05	1.17-05	9.29-06
91	1.926+5	2.15-05	2.13-05	2.07-05	1.96-05	1.77-05	1.48-05	1.17-05	9.24-06
92	1.832+5	2.24-05	2.23-05	2.19-05	2.10-05	1.92-05	1.61-05	1.21-05	9.09-06
93	1.742+5	2.27-05	2.26-05	2.24-05	2.17-05	2.01-05	1.70-05	1.23-05	8.79-06
94	1.657+5	2.24-05	2.24-05	2.23-05	2.19-05	2.05-05	1.75-05	1.25-05	8.39-06
95	1.576+5	2.14-05	2.15-05	2.15-05	2.11-05	1.98-05	1.70-05	1.21-05	8.02-06
96	1.500+5	2.04-05	2.04-05	2.04-05	1.99-05	1.87-05	1.59-05	1.13-05	7.66-06
97	1.426+5	1.93-05	1.93-05	1.92-05	1.87-05	1.74-05	1.47-05	1.06-05	7.33-06
98	1.357+5	1.90-05	1.91-05	1.91-05	1.87-05	1.77-05	1.51-05	1.07-05	6.97-06
99	1.291+5	1.83-05	1.83-05	1.83-05	1.80-05	1.70-05	1.46-05	1.03-05	6.64-06
100	1.228+5	1.72-05	1.73-05	1.72-05	1.68-05	1.57-05	1.34-05	9.48-06	6.32-06
101	1.168+5	1.66-05	1.66-05	1.66-05	1.62-05	1.52-05	1.30-05	9.15-06	6.02-06
102	1.111+5	1.53-05	1.53-05	1.52-05	1.48-05	1.38-05	1.17-05	8.30-06	5.56-06
103	9.804+4	1.33-05	1.32-05	1.31-05	1.26-05	1.16-05	9.73-06	7.05-06	5.00-06
104	8.652+4	1.22-05	1.22-05	1.20-05	1.15-05	1.05-05	8.80-06	6.47-06	4.69-06
105	8.250+4	1.21-05	1.21-05	1.19-05	1.15-05	1.06-05	8.92-06	6.45-06	4.55-06
106	7.950+4	1.16-05	1.16-05	1.15-05	1.11-05	1.03-05	8.63-06	6.22-06	4.34-06
107	7.200+4	1.09-05	1.08-05	1.07-05	1.04-05	9.58-06	8.05-06	5.82-06	4.09-06
108	6.738+4	1.00-05	9.98-06	9.86-06	9.54-06	8.81-06	7.41-06	5.38-06	3.79-06
109	5.656+4	8.99-06	8.95-06	8.83-06	8.52-06	7.84-06	6.58-06	4.82-06	3.45-06
110	5.248+4	8.48-06	8.45-06	8.35-06	8.07-06	7.44-06	6.26-06	4.58-06	3.25-06
111	4.631+4	7.74-06	7.71-06	7.61-06	7.34-06	6.77-06	5.70-06	4.19-06	2.99-06
112	4.087+4	6.78-06	6.73-06	6.61-06	6.33-06	5.79-06	4.88-06	3.71-06	2.77-06
113	3.431+4	6.33-06	6.29-06	6.18-06	5.95-06	5.46-06	4.63-06	3.53-06	2.64-06
114	3.183+4	6.12-06	6.10-06	6.02-06	5.82-06	5.38-06	4.59-06	3.48-06	2.56-06

Table C-1a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	5.78-06	5.75-06	5.67-06	5.48-06	5.06-06	4.32-06	3.32-06	2.47-06
116	2.700+4	5.73-06	5.71-06	5.65-06	5.47-06	5.09-06	4.36-06	3.32-06	2.44-06
117	2.606+4	5.61-06	5.59-06	5.53-06	5.37-06	5.00-06	4.29-06	3.28-06	2.41-06
118	2.479+4	5.49-06	5.48-06	5.42-06	5.26-06	4.90-06	4.22-06	3.23-06	2.37-06
119	2.418+4	5.42-06	5.40-06	5.35-06	5.19-06	4.84-06	4.17-06	3.20-06	2.35-06
120	2.358+4	5.27-06	5.25-06	5.20-06	5.04-06	4.70-06	4.06-06	3.13-06	2.31-06
121	2.188+4	5.01-06	5.00-06	4.95-06	4.81-06	4.49-06	3.89-06	3.03-06	2.25-06
122	1.931+4	4.65-06	4.64-06	4.59-06	4.47-06	4.20-06	3.67-06	2.90-06	2.18-06
123	1.503+4	4.24-06	4.23-06	4.20-06	4.10-06	3.87-06	3.42-06	2.75-06	2.09-06
124	1.171+4	3.98-06	3.97-06	3.94-06	3.86-06	3.65-06	3.26-06	2.67-06	2.05-06
125	9.119+3	3.95-06	3.94-06	3.91-06	3.82-06	3.62-06	3.24-06	2.66-06	2.05-06
126	7.102+3	3.96-06	3.95-06	3.92-06	3.82-06	3.61-06	3.23-06	2.65-06	2.05-06
127	5.531+3	3.99-06	3.98-06	3.94-06	3.84-06	3.62-06	3.23-06	2.66-06	2.05-06
128	4.307+3	4.01-06	3.99-06	3.94-06	3.82-06	3.59-06	3.19-06	2.62-06	2.03-06
129	3.707+3	3.93-06	3.89-06	3.82-06	3.67-06	3.42-06	3.02-06	2.50-06	1.95-06
130	3.355+3	3.74-06	3.70-06	3.61-06	3.46-06	3.20-06	2.83-06	2.38-06	1.90-06
131	3.035+3	3.26-06	3.21-06	3.11-06	2.96-06	2.75-06	2.48-06	2.19-06	1.86-06
132	2.747+3	3.56-06	3.52-06	3.42-06	3.27-06	3.03-06	2.72-06	2.35-06	1.97-06
133	2.613+3	3.84-06	3.81-06	3.73-06	3.59-06	3.35-06	2.98-06	2.52-06	2.05-06
134	2.485+3	4.02-06	3.99-06	3.94-06	3.81-06	3.58-06	3.19-06	2.66-06	2.11-06
135	2.249+3	4.11-06	4.09-06	4.05-06	3.94-06	3.71-06	3.31-06	2.74-06	2.14-06
136	2.035+3	4.16-06	4.15-06	4.11-06	4.01-06	3.79-06	3.38-06	2.79-06	2.17-06
137	1.585+3	4.21-06	4.20-06	4.16-06	4.06-06	3.84-06	3.43-06	2.83-06	2.19-06
138	1.234+3	4.25-06	4.24-06	4.20-06	4.09-06	3.87-06	3.46-06	2.85-06	2.21-06
139	9.611+2	4.29-06	4.28-06	4.24-06	4.14-06	3.91-06	3.49-06	2.87-06	2.23-06
140	7.485+2	4.33-06	4.32-06	4.28-06	4.17-06	3.94-06	3.52-06	2.90-06	2.24-06
141	5.829+2	4.37-06	4.35-06	4.31-06	4.20-06	3.97-06	3.54-06	2.91-06	2.26-06
142	4.540+2	4.40-06	4.39-06	4.35-06	4.24-06	4.00-06	3.57-06	2.93-06	2.27-06
143	3.536+2	4.44-06	4.43-06	4.38-06	4.27-06	4.03-06	3.59-06	2.95-06	2.28-06
144	2.754+2	4.47-06	4.46-06	4.41-06	4.30-06	4.06-06	3.62-06	2.97-06	2.29-06
145	2.144+2	4.51-06	4.49-06	4.45-06	4.33-06	4.09-06	3.64-06	2.98-06	2.30-06
146	1.670+2	4.54-06	4.52-06	4.47-06	4.36-06	4.11-06	3.66-06	2.99-06	2.31-06
147	1.301+2	4.57-06	4.55-06	4.50-06	4.38-06	4.13-06	3.67-06	3.00-06	2.32-06
148	1.013+2	4.59-06	4.57-06	4.53-06	4.41-06	4.15-06	3.69-06	3.01-06	2.32-06
149	7.889+1	4.61-06	4.60-06	4.55-06	4.42-06	4.17-06	3.70-06	3.02-06	2.32-06
150	6.144+1	4.63-06	4.61-06	4.56-06	4.44-06	4.18-06	3.70-06	3.02-06	2.32-06
151	4.785+1	4.65-06	4.63-06	4.58-06	4.45-06	4.19-06	3.71-06	3.02-06	2.32-06
152	3.727+1	4.66-06	4.64-06	4.58-06	4.46-06	4.19-06	3.71-06	3.02-06	2.32-06
153	2.920+1	4.66-06	4.64-06	4.59-06	4.46-06	4.19-06	3.71-06	3.01-06	2.31-06
154	2.260+1	4.66-06	4.65-06	4.59-06	4.46-06	4.19-06	3.70-06	3.00-06	2.30-06
155	1.760+1	4.66-06	4.64-06	4.58-06	4.45-06	4.18-06	3.69-06	2.99-06	2.29-06
156	1.371+1	4.65-06	4.63-06	4.57-06	4.44-06	4.17-06	3.67-06	2.97-06	2.27-06
157	1.068+1	4.64-06	4.62-06	4.56-06	4.42-06	4.15-06	3.65-06	2.95-06	2.25-06
158	8.315+0	4.61-06	4.59-06	4.54-06	4.40-06	4.12-06	3.62-06	2.92-06	2.23-06
159	6.476+0	4.59-06	4.57-06	4.51-06	4.37-06	4.09-06	3.59-06	2.89-06	2.21-06
160	5.043+0	4.55-06	4.53-06	4.47-06	4.34-06	4.06-06	3.56-06	2.86-06	2.18-06
161	3.928+0	4.51-06	4.49-06	4.43-06	4.30-06	4.02-06	3.52-06	2.83-06	2.15-06
162	3.059+0	4.47-06	4.45-06	4.39-06	4.25-06	3.97-06	3.48-06	2.79-06	2.12-06
163	2.372+0	4.41-06	4.39-06	4.34-06	4.20-06	3.92-06	3.43-06	2.75-06	2.09-06
164	1.855+0	4.36-06	4.34-06	4.28-06	4.14-06	3.87-06	3.38-06	2.70-06	2.05-06
165	1.445+0	4.29-06	4.27-06	4.22-06	4.08-06	3.81-06	3.33-06	2.66-06	2.01-06
166	1.125+0	4.22-06	4.20-06	4.15-06	4.02-06	3.75-06	3.27-06	2.61-06	1.97-06
167	8.764-1	4.14-06	4.12-06	4.07-06	3.94-06	3.68-06	3.21-06	2.56-06	1.93-06
168	6.826-1	4.06-06	4.04-06	3.99-06	3.86-06	3.60-06	3.14-06	2.50-06	1.88-06
169	5.316-1	3.97-06	3.95-06	3.90-06	3.77-06	3.52-06	3.06-06	2.43-06	1.82-06
170	4.140-1	3.66-06	3.63-06	3.57-06	3.44-06	3.20-06	2.79-06	2.25-06	1.72-06
171	1.000-1	2.92-06	2.87-06	2.78-06	2.62-06	2.39-06	2.08-06	1.73-06	1.38-06
	1.000-5								

Table C-1b. Total Dose Rate Transmission Factors for 0.05-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	2.02-04	2.13-04	2.31-04	2.55-04	2.82-04	3.01-04	2.79-04	1.39-04
2	1.649+7	1.98-04	2.08-04	2.26-04	2.49-04	2.74-04	2.93-04	2.70-04	1.34-04
3	1.568+7	1.93-04	2.04-04	2.21-04	2.44-04	2.69-04	2.84-04	2.58-04	1.28-04
4	1.492+7	1.91-04	2.02-04	2.19-04	2.41-04	2.65-04	2.80-04	2.55-04	1.26-04
5	1.455+7	1.90-04	1.99-04	2.16-04	2.38-04	2.61-04	2.77-04	2.53-04	1.23-04
6	1.419+7	1.88-04	1.97-04	2.13-04	2.35-04	2.58-04	2.73-04	2.50-04	1.21-04
7	1.384+7	1.84-04	1.93-04	2.09-04	2.30-04	2.52-04	2.67-04	2.44-04	1.19-04
8	1.350+7	1.78-04	1.87-04	2.02-04	2.22-04	2.44-04	2.60-04	2.38-04	1.17-04
9	1.284+7	1.70-04	1.79-04	1.93-04	2.12-04	2.33-04	2.48-04	2.28-04	1.13-04
10	1.221+7	1.61-04	1.68-04	1.81-04	1.98-04	2.16-04	2.28-04	2.07-04	1.04-04
11	1.162+7	1.53-04	1.60-04	1.73-04	1.89-04	2.06-04	2.18-04	1.98-04	1.01-04
12	1.105+7	1.47-04	1.54-04	1.67-04	1.84-04	2.04-04	2.21-04	2.11-04	1.06-04
13	1.051+7	1.40-04	1.47-04	1.58-04	1.74-04	1.92-04	2.06-04	1.95-04	9.91-05
14	1.000+7	1.40-04	1.46-04	1.58-04	1.73-04	1.92-04	2.08-04	2.00-04	1.03-04
15	9.512+6	1.41-04	1.47-04	1.59-04	1.74-04	1.93-04	2.10-04	2.03-04	1.05-04
16	9.048+6	1.41-04	1.48-04	1.58-04	1.73-04	1.90-04	2.05-04	1.95-04	1.01-04
17	8.607+6	1.41-04	1.47-04	1.58-04	1.73-04	1.90-04	2.05-04	1.96-04	1.03-04
18	8.187+6	1.41-04	1.48-04	1.59-04	1.74-04	1.92-04	2.08-04	2.01-04	1.04-04
19	7.788+6	1.43-04	1.49-04	1.60-04	1.75-04	1.93-04	2.07-04	1.96-04	1.02-04
20	7.408+6	1.43-04	1.49-04	1.59-04	1.74-04	1.90-04	2.03-04	1.90-04	1.02-04
21	7.047+6	1.43-04	1.49-04	1.61-04	1.77-04	1.96-04	2.14-04	2.09-04	1.11-04
22	6.703+6	1.45-04	1.51-04	1.63-04	1.80-04	2.00-04	2.19-04	2.15-04	1.15-04
23	6.592+6	1.45-04	1.52-04	1.64-04	1.82-04	2.03-04	2.25-04	2.27-04	1.21-04
24	6.376+6	1.49-04	1.56-04	1.69-04	1.86-04	2.07-04	2.27-04	2.22-04	1.21-04
25	6.065+6	1.51-04	1.58-04	1.70-04	1.86-04	2.05-04	2.20-04	2.07-04	1.14-04
26	5.770+6	1.61-04	1.67-04	1.78-04	1.92-04	2.07-04	2.17-04	1.99-04	1.12-04
27	5.488+6	1.57-04	1.64-04	1.76-04	1.93-04	2.14-04	2.32-04	2.26-04	1.22-04
28	5.221+6	1.51-04	1.57-04	1.68-04	1.82-04	1.97-04	2.03 04	1.80-04	1.02-04
29	4.966+6	1.55-04	1.62-04	1.73-04	1.88-04	2.04-04	2.14-04	1.95-04	1.08-04
30	4.724+6	1.51-04	1.58-04	1.69-04	1.84-04	2.00-04	2.10-04	1.90-04	1.05-04
31	4.493+6	1.51-04	1.56-04	1.66-04	1.77-04	1.88-04	1.92-04	1.66-04	9.65-05
32	4.066+6	1.49-04	1.54-04	1.62-04	1.71-04	1.78-04	1.75-04	1.46-04	9.19-05
33	3.679+6	1.44-04	1.48-04	1.54-04	1.61-04	1.65-04	1.59-04	1.31-04	8.79-05
34	3.329+6	1.34-04	1.39-04	1.46-04	1.56-04	1.63-04	1.60-04	1.35-04	8.88-05
35	3.166+6	1.38-04	1.43-04	1.52-04	1.64-04	1.75-04	1.80-04	1.60-04	9.45-05
36	3.012+6	1.39-04	1.44-04	1.52-04	1.64-04	1.77-04	1.85-04	1.71-04	9.65-05
37	2.865+6	1.39-04	1.43-04	1.51-04	1.62-04	1.73-04	1.80-04	1.64-04	9.38-05
38	2.725+6	1.39-04	1.43-04	1.50-04	1.59-04	1.70-04	1.76-04	1.60-04	9.20-05
39	2.592+6	1.40-04	1.44-04	1.50-04	1.58-04	1.67-04	1.71-04	1.53-04	8.99-05
40	2.466+6	1.38-04	1.42-04	1.50-04	1.61-04	1.74-04	1.86-04	1.79-04	9.77-05
41	2.385+6	1.35-04	1.40-04	1.49-04	1.62-04	1.78-04	1.96-04	1.97-04	1.07-04
42	2.365+6	1.32-04	1.37-04	1.46-04	1.61-04	1.79-04	2.01-04	2.10-04	1.15-04
43	2.346+6	1.29-04	1.34-04	1.44-04	1.57-04	1.74-04	1.93-04	1.96-04	1.04-04
44	2.307+6	1.29-04	1.34-04	1.41-04	1.51-04	1.63-04	1.72-04	1.59-04	8.69-05
45	2.231+6	1.30-04	1.34-04	1.41-04	1.49-04	1.58-04	1.62-04	1.44-04	8.21-05
46	2.123+6	1.31-04	1.35-04	1.41-04	1.48-04	1.56-04	1.57-04	1.36-04	7.93-05
47	2.019+6	1.35-04	1.38-04	1.43-04	1.48-04	1.52-04	1.48-04	1.24-04	7.63-05
48	1.921+6	1.33-04	1.35-04	1.38-04	1.40-04	1.40-04	1.32-04	1.06-04	7.32-05
49	1.827+6	1.30-04	1.33-04	1.39-04	1.46-04	1.53-04	1.55-04	1.34-04	7.67-05
50	1.738+6	1.25-04	1.28-04	1.33-04	1.39-04	1.44-04	1.41-04	1.17-04	7.20-05
51	1.653+6	1.24-04	1.26-04	1.29-04	1.33-04	1.34-04	1.27-04	1.03-04	6.85-05
52	1.572+6	1.26-04	1.29-04	1.33-04	1.39-04	1.43-04	1.40-04	1.16-04	6.96-05
53	1.496+6	1.26-04	1.29-04	1.33-04	1.37-04	1.40-04	1.35-04	1.10-04	6.75-05
54	1.423+6	1.29-04	1.31-04	1.35-04	1.38-04	1.39-04	1.31-04	1.04-04	6.51-05
55	1.353+6	1.34-04	1.34-04	1.33-04	1.31-04	1.23-04	1.08-04	8.40-05	6.03-05
56	1.287+6	1.24-04	1.26-04	1.28-04	1.29-04	1.28-04	1.18-04	9.12-05	5.78-05
57	1.225+6	1.20-04	1.22-04	1.24-04	1.26-04	1.25-04	1.16-04	8.98-05	5.54-05

Table C-1b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.11-04	1.13-04	1.16-04	1.18-04	1.17-04	1.08-04	8.29-05	5.18-05
59	1.108+6	9.49-05	9.57-05	9.63-05	9.55-05	9.09-05	7.98-05	6.21-05	4.64-05
60	1.003+6	9.07-05	9.02-05	8.88-05	8.55-05	7.90-05	6.86-05	5.64-05	4.57-05
61	9.616+5	1.04-04	1.04-04	1.04-04	1.02-04	9.61-05	8.42-05	6.54-05	4.88-05
62	9.072+5	1.06-04	1.07-04	1.08-04	1.09-04	1.06-04	9.59-05	7.33-05	4.92-05
63	8.629+5	1.05-04	1.06-04	1.06-04	1.06-04	1.02-04	9.10-05	6.93-05	4.76-05
64	8.209+5	1.01-04	1.01-04	1.01-04	1.00-04	9.62-05	8.56-05	6.53-05	4.57-05
65	7.808+5	9.81-05	9.90-05	1.00-04	1.01-04	9.93-05	9.10-05	6.95-05	4.42-05
66	7.427+5	9.54-05	9.63-05	9.75-05	9.82-05	9.66-05	8.85-05	6.73-05	4.21-05
67	7.065+5	9.27-05	9.34-05	9.43-05	9.47-05	9.26-05	8.41-05	6.35-05	4.00-05
68	6.721+5	8.99-05	9.05-05	9.11-05	9.11-05	8.84-05	7.96-05	5.96-05	3.79-05
69	6.393+5	8.70-05	8.75-05	8.80-05	8.77-05	8.47-05	7.57-05	5.61-05	3.56-05
70	6.081+5	8.42-05	8.45-05	8.45-05	8.35-05	7.97-05	7.00-05	5.13-05	3.30-05
71	5.784+5	7.75-05	7.71-05	7.61-05	7.37-05	6.85-05	5.83-05	4.30-05	3.00-05
72	5.502+5	7.68-05	7.68-05	7.64-05	7.49-05	7.05-05	6.07-05	4.34-05	2.74-05
73	5.234+5	7.25-05	7.23-05	7.16-05	6.94-05	6.43-05	5.40-05	3.80-05	2.42-05
74	4.979+5	5.68-05	5.57-05	5.34-05	4.94-05	4.32-05	3.51-05	2.67-05	1.94-05
75	4.505+5	3.79-05	3.70-05	3.53-05	3.26-05	2.90-05	2.48-05	2.09-05	1.73-05
76	4.076+5	4.19-05	4.16-05	4.08-05	3.90-05	3.54-05	2.96-05	2.26-05	1.74-05
77	3.877+5	4.26-05	4.25-05	4.21-05	4.07-05	3.75-05	3.16-05	2.33-05	1.71-05
78	3.688+5	4.17-05	4.17-05	4.13-05	4.02-05	3.73-05	3.15-05	2.28-05	1.62-05
79	3.337+5	3.90-05	3.90-05	3.87-05	3.76-05	3.50-05	2.96-05	2.12-05	1.47-05
80	3.020+5	3.69-05	3.69-05	3.65-05	3.54-05	3.28-05	2.76-05	1.99-05	1.39-05
81	2.985+5	3.67-05	3.67-05	3.63-05	3.52-05	3.27-05	2.75-05	1.97-05	1.37-05
82	2.972+5	3.65-05	3.64-05	3.60-05	3.50-05	3.24-05	2.73-05	1.96-05	1.36-05
83	2.945+5	3.58-05	3.57-05	3.53-05	3.42-05	3.16-05	2.66-05	1.91-05	1.34-05
84	2.873+5	3.48-05	3.47-05	3.43-05	3.32-05	3.07-05	2.57-05	1.85-05	1.29-05
85	2.732+5	3.23-05	3.21-05	3.16-05	3.05-05	2.79-05	2.33-05	1.68-05	1.19-05
86	2.472+5	2.96-05	2.94-05	2.88-05	2.76-05	2.51-05	2.08-05	1.51-05	1.08-05
87	2.352+5	2.80-05	2.77-05	2.72-05	2.60-05	2.36-05	1.95-05	1.42-05	1.02-05
88	2.237+5	2.54-05	2.52-05	2.45-05	2.32-05	2.09-05	1.73-05	1.30-05	9.75-06
89	2.128+5	2.35-05	2.32-05	2.26-05	2.14-05	1.92-05	1.60-05	1.23-05	9.44-06
90	2.024+5	2.19-05	2.16-05	2.10-05	1.98-05	1.78-05	1.49-05	1.17-05	9.30-06
91	1.926+5	2.15-05	2.13-05	2.07-05	1.96-05	1.77-05	1.49-05	1.17-05	9.24-06
92	1.832+5	2.24-05	2.23-05	2.19-05	2.10-05	1.92-05	1.61-05	1.21-05	9.10-06
93	1.742+5	2.27-05	2.26-05	2.24-05	2.17-05	2.01-05	1.70-05	1.24-05	8.79-06
94	1.657+5	2.24-05	2.24-05	2.23-05	2.19-05	2.06-05	1.75-05	1.25-05	8.40-06
95	1.576+5	2.15-05	2.15-05	2.15-05	2.11-05	1.99-05	1.70-05	1.21-05	8.02-06
96	1.500+5	2.04-05	2.04-05	2.04-05	1.99-05	1.87-05	1.59-05	1.14-05	7.67-06
97	1.426+5	1.93-05	1.93-05	1.92-05	1.87-05	1.74-05	1.47-05	1.06-05	7.34-06
98	1.357+5	1.90-05	1.91-05	1.91-05	1.87-05	1.77-05	1.51-05	1.07-05	6.98-06
99	1.291+5	1.83-05	1.83-05	1.83-05	1.80-05	1.70-05	1.46-05	1.03-05	6.65-06
100	1.228+5	1.72-05	1.73-05	1.72-05	1.68-05	1.57-05	1.34-05	9.49-06	6.33-06
101	1.168+5	1.66-05	1.67-05	1.66-05	1.62-05	1.52-05	1.30-05	9.16-06	6.02-06
102	1.111+5	1.53-05	1.53-05	1.52-05	1.48-05	1.38-05	1.17-05	8.31-06	5.57-06
103	9.804+4	1.33-05	1.32-05	1.31-05	1.26-05	1.16-05	9.74-06	7.06-06	5.01-06
104	8.652+4	1.22-05	1.22-05	1.20-05	1.15-05	1.05-05	8.81-06	6.48-06	4.70-06
105	8.250+4	1.21-05	1.21-05	1.19-05	1.15-05	1.06-05	8.93-06	6.47-06	4.56-06
106	7.950+4	1.16-05	1.16-05	1.15-05	1.11-05	1.03-05	8.64-06	6.23-06	4.35-06
107	7.200+4	1.09-05	1.08-05	1.07-05	1.04-05	9.59-06	8.06-06	5.84-06	4.10-06
108	6.738+4	1.00-05	9.99-06	9.88-06	9.55-06	8.82-06	7.42-06	5.39-06	3.80-06
109	5.656+4	9.00-06	8.97-06	8.85-06	8.54-06	7.86-06	6.60-06	4.84-06	3.46-06
110	5.248+4	8.50-06	8.47-06	8.36-06	8.08-06	7.45-06	6.27-06	4.59-06	3.26-06
111	4.631+4	7.75-06	7.72-06	7.62-06	7.36-06	6.79-06	5.72-06	4.21-06	3.01-06
112	4.087+4	6.80-06	6.75-06	6.63-06	6.35-06	5.81-06	4.90-06	3.73-06	2.79-06
113	3.431+4	6.34-06	6.31-06	6.20-06	5.97-06	5.49-06	4.65-06	3.55-06	2.66-06
114	3.183+4	6.14-06	6.11-06	6.04-06	5.84-06	5.40-06	4.61-06	3.50-06	2.57-06

Table C-1b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	5.80-06	5.77-06	5.69-06	5.49-06	5.08-06	4.34-06	3.34-06	2.49-06
116	2.700+4	5.74-06	5.73-06	5.66-06	5.49-06	5.11-06	4.38-06	3.34-06	2.46-06
117	2.606+4	5.62-06	5.61-06	5.55-06	5.39-06	5.02-06	4.31-06	3.30-06	2.42-06
118	2.479+4	5.51-06	5.50-06	5.44-06	5.28-06	4.92-06	4.24-06	3.25-06	2.39-06
119	2.418+4	5.44-06	5.42-06	5.37-06	5.21-06	4.86-06	4.19-06	3.22-06	2.37-06
120	2.358+4	5.29-06	5.27-06	5.22-06	5.07-06	4.73-06	4.08-06	3.15-06	2.33-06
121	2.188+4	5.03-06	5.01-06	4.96-06	4.83-06	4.51-06	3.91-06	3.05-06	2.27-06
122	1.931+4	4.66-06	4.65-06	4.61-06	4.49-06	4.21-06	3.68-06	2.91-06	2.19-06
123	1.503+4	4.26-06	4.25-06	4.21-06	4.11-06	3.88-06	3.43-06	2.76-06	2.10-06
124	1.171+4	4.00-06	3.99-06	3.96-06	3.87-06	3.67-06	3.28-06	2.68-06	2.06-06
125	9.119+3	3.97-06	3.96-06	3.93-06	3.84-06	3.64-06	3.25-06	2.68-06	2.06-06
126	7.102+3	3.98-06	3.97-06	3.94-06	3.84-06	3.64-06	3.25-06	2.67-06	2.07-06
127	5.531+3	4.01-06	4.00-06	3.96-06	3.86-06	3.65-06	3.25-06	2.68-06	2.07-06
128	4.307+3	4.04-06	4.02-06	3.96-06	3.85-06	3.62-06	3.22-06	2.65-06	2.05-06
129	3.707+3	3.98-06	3.94-06	3.87-06	3.72-06	3.47-06	3.07-06	2.54-06	1.99-06
130	3.355+3	3.77-06	3.73-06	3.64-06	3.48-06	3.23-06	2.86-06	2.41-06	1.92-06
131	3.035+3	3.29-06	3.24-06	3.14-06	2.99-06	2.77-06	2.51-06	2.21-06	1.88-06
132	2.747+3	3.59-06	3.54-06	3.45-06	3.29-06	3.06-06	2.74-06	2.38-06	1.99-06
133	2.613+3	3.87-06	3.83-06	3.76-06	3.62-06	3.37-06	3.00-06	2.55-06	2.06-06
134	2.485+3	4.04-06	4.01-06	3.96-06	3.84-06	3.60-06	3.21-06	2.68-06	2.12-06
135	2.249+3	4.13-06	4.11-06	4.07-06	3.96-06	3.74-06	3.34-06	2.76-06	2.16-06
136	2.035+3	4.19-06	4.17-06	4.13-06	4.03-06	3.81-06	3.41-06	2.81-06	2.19-06
137	1.585+3	4.24-06	4.22-06	4.19-06	4.09-06	3.87-06	3.46-06	2.85-06	2.21-06
138	1.234+3	4.28-06	4.27-06	4.23-06	4.13-06	3.91-06	3.49-06	2.88-06	2.23-06
139	9.611+2	4.32-06	4.31-06	4.27-06	4.16-06	3.94-06	3.52-06	2.90-06	2.25-06
140	7.485+2	4.36-06	4.35-06	4.31-06	4.20-06	3.98-06	3.55-06	2.93-06	2.27-06
141	5.829+2	4.40-06	4.39-06	4.34-06	4.24-06	4.01-06	3.58-06	2.95-06	2.28-06
142	4.540+2	4.44-06	4.43-06	4.38-06	4.28-06	4.04-06	3.61-06	2.97-06	2.30-06
143	3.536+2	4.48-06	4.46-06	4.42-06	4.31-06	4.08-06	3.64-06	2.99-06	2.32-06
144	2.754+2	4.52-06	4.50-06	4.46-06	4.35-06	4.11-06	3.66-06	3.01-06	2.33-06
145	2.144+2	4.55-06	4.54-06	4.49-06	4.38-06	4.14-06	3.69-06	3.03-06	2.34-06
146	1.670+2	4.59-06	4.57-06	4.53-06	4.41-06	4.17-06	3.71-06	3.05-06	2.36-06
147	1.301+2	4.62-06	4.61-06	4.56-06	4.44-06	4.19-06	3.73-06	3.06-06	2.37-06
148	1.013+2	4.65-06	4.64-06	4.59-06	4.47-06	4.22-06	3.75-06	3.08-06	2.38-06
149	7.889+1	4.68-06	4.66-06	4.61-06	4.49-06	4.24-06	3.77-06	3.09-06	2.38-06
150	6.144+1	4.70-06	4.69-06	4.64-06	4.52-06	4.26-06	3.78-06	3.10-06	2.39-06
151	4.785+1	4.73-06	4.71-06	4.66-06	4.54-06	4.28-06	3.80-06	3.10-06	2.39-06
152	3.727+1	4.74-06	4.73-06	4.67-06	4.55-06	4.29-06	3.80-06	3.11-06	2.39-06
153	2.920+1	4.76-06	4.74-06	4.69-06	4.56-06	4.30-06	3.81-06	3.11-06	2.39-06
154	2.260+1	4.77-06	4.75-06	4.70-06	4.57-06	4.30-06	3.81-06	3.11-06	2.39-06
155	1.760+1	4.77-06	4.76-06	4.70-06	4.57-06	4.30-06	3.81-06	3.10-06	2.39-06
156	1.371+1	4.77-06	4.76-06	4.70-06	4.57-06	4.30-06	3.81-06	3.10-06	2.38-06
157	1.068+1	4.77-06	4.75-06	4.70-06	4.57-06	4.29-06	3.80-06	3.09-06	2.37-06
158	8.315+0	4.76-06	4.74-06	4.69-06	4.56-06	4.28-06	3.79-06	3.08-06	2.36-06
159	6.476+0	4.75-06	4.73-06	4.67-06	4.54-06	4.27-06	3.77-06	3.06-06	2.35-06
160	5.043+0	4.73-06	4.71-06	4.65-06	4.52-06	4.25-06	3.75-06	3.04-06	2.34-06
161	3.928+0	4.70-06	4.68-06	4.63-06	4.50-06	4.23-06	3.73-06	3.03-06	2.32-06
162	3.059+0	4.67-06	4.66-06	4.60-06	4.47-06	4.20-06	3.71-06	3.01-06	2.30-06
163	2.372+0	4.64-06	4.62-06	4.57-06	4.44-06	4.17-06	3.68-06	2.98-06	2.28-06
164	1.855+0	4.60-06	4.58-06	4.53-06	4.41-06	4.14-06	3.65-06	2.96-06	2.26-06
165	1.445+0	4.55-06	4.54-06	4.49-06	4.37-06	4.10-06	3.62-06	2.93-06	2.24-06
166	1.125+0	4.50-06	4.49-06	4.44-06	4.32-06	4.06-06	3.59-06	2.91-06	2.22-06
167	8.764-1	4.45-06	4.44-06	4.39-06	4.27-06	4.02-06	3.55-06	2.88-06	2.20-06
168	6.826-1	4.39-06	4.38-06	4.34-06	4.22-06	3.97-06	3.51-06	2.85-06	2.17-06
169	5.316-1	4.34-06	4.32-06	4.28-06	4.17-06	3.92-06	3.46-06	2.81-06	2.13-06
170	4.140-1	4.07-06	4.06-06	4.01-06	3.89-06	3.65-06	3.23-06	2.66-06	2.07-06
171	1.000-1	3.60-06	3.55-06	3.46-06	3.31-06	3.06-06	2.72-06	2.31-06	1.87-06
	1.000-5								

Table C-1c. Gamma-ray Dose Rate Transmission Factors for 0.05-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gi}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	9.94-06	1.04-05	1.14-05	1.28-05	1.49-05	1.79-05	2.13-05	1.40-05
2	1.200+7	8.68-06	9.14-06	9.98-06	1.13-05	1.31-05	1.56-05	1.85-05	1.18-05
3	1.000+7	7.45-06	7.85-06	8.58-06	9.70-06	1.13-05	1.34-05	1.57-05	9.67-06
4	8.000+6	6.68-06	7.04-06	7.71-06	8.72-06	1.01-05	1.20-05	1.39-05	8.31-06
5	7.500+6	6.37-06	6.72-06	7.36-06	8.32-06	9.66-06	1.14-05	1.31-05	7.72-06
6	7.000+6	6.06-06	6.40-06	7.01-06	7.92-06	9.19-06	1.08-05	1.24-05	7.11-06
7	6.500+6	5.75-06	6.07-06	6.65-06	7.52-06	8.71-06	1.02-05	1.16-05	6.49-06
8	6.000+6	5.44-06	5.75-06	6.30-06	7.11-06	8.22-06	9.61-06	1.08-05	5.87-06
9	5.500+6	5.13-06	5.42-06	5.94-06	6.70-06	7.72-06	8.98-06	9.95-06	5.25-06
10	5.000+6	4.79-06	5.06-06	5.54-06	6.25-06	7.19-06	8.31-06	9.08-06	4.64-06
11	4.500+6	4.48-06	4.73-06	5.18-06	5.83-06	6.68-06	7.67-06	8.25-06	4.07-06
12	4.000+6	4.15-06	4.38-06	4.79-06	5.38-06	6.14-06	6.99-06	7.37-06	3.51-06
13	3.500+6	3.81-06	4.01-06	4.38-06	4.90-06	5.56-06	6.26-06	6.45-06	2.97-06
14	3.000+6	3.44-06	3.62-06	3.94-06	4.39-06	4.95-06	5.50-06	5.50-06	2.46-06
15	2.500+6	3.06-06	3.21-06	3.48-06	3.85-06	4.29-06	4.68-06	4.51-06	2.00-06
16	2.000+6	2.72-06	2.85-06	3.07-06	3.36-06	3.70-06	3.95-06	3.67-06	1.65-06
17	1.660+6	2.52-06	2.63-06	2.82-06	3.06-06	3.33-06	3.50-06	3.17-06	1.47-06
18	1.500+6	2.39-06	2.49-06	2.65-06	2.86-06	3.08-06	3.20-06	2.85-06	1.36-06
19	1.330+6	2.20-06	2.28-06	2.40-06	2.56-06	2.71-06	2.76-06	2.38-06	1.21-06
20	1.000+6	2.04-06	2.08-06	2.15-06	2.24-06	2.31-06	2.28-06	1.91-06	1.05-06
21	8.000+5	1.99-06	2.01-06	2.04-06	2.08-06	2.10-06	2.03-06	1.67-06	9.66-07
22	7.000+5	2.00-06	2.00-06	2.01-06	2.01-06	2.00-06	1.90-06	1.54-06	9.11-07
23	6.000+5	2.05-06	2.04-06	2.03-06	2.00-06	1.96-06	1.82-06	1.45-06	8.56-07
24	5.120+5	2.10-06	2.09-06	2.07-06	2.03-06	1.97-06	1.81-06	1.42-06	8.26-07
25	5.100+5	2.13-06	2.13-06	2.11-06	2.08-06	2.01-06	1.84-06	1.41-06	8.00-07
26	4.500+5	2.20-06	2.22-06	2.25-06	2.26-06	2.20-06	1.97-06	1.42-06	7.29-07
27	4.000+5	4.00-06	4.04-06	4.07-06	4.00-06	3.69-06	2.90-06	1.47-06	4.32-07
28	3.000+5	1.69-07	1.71-07	1.74-07	1.77-07	1.78-07	1.70-07	1.44-07	1.04-07
29	2.000+5	2.80-07	2.80-07	2.76-07	2.67-07	2.44-07	2.00-07	1.35-07	8.66-08
30	1.500+5	1.83-07	1.80-07	1.75-07	1.65-07	1.46-07	1.14-07	7.56-08	5.00-08
31	1.000+5	9.62-08	9.36-08	8.81-08	7.88-08	6.44-08	4.54-08	2.77-08	1.82-08
32	7.500+4	4.75-08	4.51-08	4.04-08	3.34-08	2.41-08	1.45-08	7.98-09	5.10-09
33	6.000+4	1.51-08	1.37-08	1.12-08	8.05-09	4.82-09	2.49-09	1.46-09	1.00-09
34	4.500+4	3.62-10	2.77-10	1.65-10	7.48-11	2.99-11	1.57-11	1.03-11	7.40-12
35	3.000+4	7.58-17	2.44-17	3.81-18	1.12-18	5.96-19	3.60-19	2.40-19	3.83-20
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-2a. Neutron Dose Rate Transmission Factors for 0.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.69-05	1.55-05	1.32-05	1.05-05	7.71-06	5.42-06	3.69-06	2.40-06
2	1.649+7	1.59-05	1.46-05	1.25-05	9.87-06	7.30-06	5.16-06	3.54-06	2.32-06
3	1.568+7	1.52-05	1.40-05	1.19-05	9.49-06	7.06-06	5.02-06	3.45-06	2.25-06
4	1.492+7	1.49-05	1.36-05	1.17-05	9.27-06	6.91-06	4.92-06	3.40-06	2.23-06
5	1.455+7	1.45-05	1.33-05	1.14-05	9.03-06	6.73-06	4.80-06	3.32-06	2.19-06
6	1.419+7	1.42-05	1.30-05	1.11-05	8.86-06	6.61-06	4.73-06	3.29-06	2.18-06
7	1.384+7	1.39-05	1.28-05	1.09-05	8.72-06	6.53-06	4.68-06	3.26-06	2.17-06
8	1.350+7	1.38-05	1.27-05	1.09-05	8.69-06	6.50-06	4.65-06	3.24-06	2.15-06
9	1.284+7	1.32-05	1.22-05	1.04-05	8.34-06	6.25-06	4.49-06	3.13-06	2.08-06
10	1.221+7	1.10-05	1.01-05	8.74-06	7.05-06	5.39-06	3.97-06	2.86-06	1.97-06
11	1.162+7	1.04-05	9.56-06	8.27-06	6.71-06	5.17-06	3.85-06	2.80-06	1.96-06
12	1.105+7	1.21-05	1.12-05	9.62-06	7.67-06	5.71-06	4.08-06	2.86-06	1.94-06
13	1.051+7	1.09-05	1.01-05	8.68-06	6.96-06	5.25-06	3.81-06	2.72-06	1.88-06
14	1.000+7	1.18-05	1.09-05	9.39-06	7.52-06	5.64-06	4.06-06	2.87-06	1.96-06
15	9.512+6	1.22-05	1.13-05	9.72-06	7.76-06	5.77-06	4.11-06	2.88-06	1.95-06
16	9.048+6	1.10-05	1.02-05	8.78-06	7.08-06	5.36-06	3.92-06	2.82-06	1.97-06
17	8.607+6	1.08-05	9.99-06	8.63-06	6.96-06	5.28-06	3.88-06	2.81-06	1.98-06
18	8.187+6	1.17-05	1.08-05	9.38-06	7.57-06	5.74-06	4.21-06	3.05-06	2.15-06
19	7.788+6	1.11-05	1.03-05	8.96-06	7.34-06	5.71-06	4.32-06	3.24-06	2.35-06
20	7.408+6	1.09-05	1.01-05	8.91-06	7.41-06	5.89-06	4.56-06	3.49-06	2.59-06
21	7.047+6	1.37-05	1.27-05	1.11-05	8.99-06	6.87-06	5.04-06	3.64-06	2.56-06
22	6.703+6	1.49-05	1.39-05	1.21-05	9.82-06	7.46-06	5.42-06	3.86-06	2.66-06
23	6.592+6	1.65-05	1.53-05	1.33-05	1.07-05	7.95-06	5.59-06	3.85-06	2.57-06
24	6.376+6	1.55-05	1.44-05	1.25-05	1.01-05	7.68-06	5.57-06	3.95-06	2.69-06
25	6.065+6	1.32-05	1.23-05	1.07-05	8.76-06	6.78-06	5.05-06	3.67-06	2.55-06
26	5.770+6	1.28-05	1.19-05	1.04-05	8.61-06	6.78-06	5.13-06	3.76-06	2.62-06
27	5.488+6	1.54-05	1.42-05	1.23-05	9.85-06	7.36-06	5.23-06	3.61-06	2.38-06
28	5.221+6	9.17-06	8.53-06	7.50-06	6.25-06	4.98-06	3.85-06	2.90-06	2.08-06
29	4.966+6	1.14-05	1.05-05	9.14-06	7.46-06	5.77-06	4.28-06	3.07-06	2.09-06
30	4.724+6	1.05-05	9.69-06	8.39-06	6.82-06	5.24-06	3.87-06	2.77-06	1.88-06
31	4.493+6	7.98-06	7.41-06	6.48-06	5.37-06	4.25-06	3.24-06	2.38-06	1.64-06
32	4.066+6	5.62-06	5.27-06	4.71-06	4.02-06	3.31-06	2.65-06	2.04-06	1.48-06
33	3.679+6	4.36-06	4.13-06	3.77-06	3.33-06	2.85-06	2.39-06	1.95-06	1.51-06
34	3.329+6	4.76-06	4.49-06	4.06-06	3.53-06	2.98-06	2.46-06	1.98-06	1.53-06
35	3.166+6	7.04-06	6.53-06	5.72-06	4.75-06	3.78-06	2.92-06	2.21-06	1.61-06
36	3.012+6	8.05-06	7.43-06	6.42-06	5.20-06	4.01-06	3.00-06	2.21-06	1.58-06
37	2.865+6	7.27-06	6.71-06	5.82-06	4.75-06	3.70-06	2.81-06	2.10-06	1.53-06
38	2.725+6	6.74-06	6.23-06	5.41-06	4.44-06	3.48-06	2.67-06	2.01-06	1.48-06
39	2.592+6	6.40-06	5.93-06	5.18-06	4.29-06	3.40-06	2.61-06	1.96-06	1.41-06
40	2.466+6	9.41-06	8.60-06	7.26-06	5.64-06	4.05-06	2.75-06	1.81-06	1.15-06
41	2.385+6	1.19-05	1.08-05	9.04-06	6.83-06	4.60-06	2.82-06	1.66-06	9.44-07
42	2.365+6	1.33-05	1.21-05	1.01-05	7.55-06	4.90-06	2.79-06	1.51-06	8.10-07
43	2.346+6	9.90-06	8.97-06	7.41-06	5.47-06	3.54-06	2.06-06	1.18-06	6.65-07
44	2.307+6	4.92-06	4.44-06	3.67-06	2.77-06	1.94-06	1.31-06	8.65-07	5.60-07
45	2.231+6	3.41-06	3.08-06	2.56-06	1.97-06	1.43-06	1.01-06	6.96-07	4.70-07
46	2.123+6	2.66-06	2.40-06	2.00-06	1.55-06	1.14-06	8.14-07	5.74-07	3.93-07
47	2.019+6	1.78-06	1.62-06	1.38-06	1.12-06	8.66-07	6.55-07	4.86-07	3.46-07
48	1.921+6	1.16-06	1.08-06	9.59-07	8.18-07	6.73-07	5.38-07	4.17-07	3.09-07
49	1.827+6	1.92-06	1.72-06	1.40-06	1.06-06	7.58-07	5.33-07	3.73-07	2.55-07
50	1.738+6	1.12-06	1.01-06	8.50-07	6.75-07	5.19-07	3.93-07	2.94-07	2.13-07
51	1.653+6	7.66-07	7.08-07	6.19-07	5.19-07	4.21-07	3.35-07	2.60-07	1.94-07
52	1.572+6	1.04-06	9.37-07	7.80-07	6.11-07	4.61-07	3.41-07	2.49-07	1.75-07
53	1.496+6	8.46-07	7.64-07	6.41-07	5.07-07	3.88-07	2.92-07	2.15-07	1.52-07
54	1.423+6	6.62-07	6.04-07	5.15-07	4.19-07	3.29-07	2.54-07	1.90-07	1.36-07
55	1.353+6	3.98-07	3.78-07	3.45-07	3.03-07	2.58-07	2.12-07	1.67-07	1.24-07
56	1.287+6	4.83-07	4.45-07	3.88-07	3.23-07	2.60-07	2.04-07	1.54-07	1.09-07
57	1.225+6	4.50-07	4.13-07	3.57-07	2.94-07	2.35-07	1.83-07	1.38-07	9.68-08

Table C-2a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	3.46-07	3.20-07	2.80-07	2.36-07	1.93-07	1.54-07	1.19-07	8.57-08
59	1.108+6	1.88-07	1.80-07	1.68-07	1.52-07	1.35-07	1.17-07	9.84-08	7.87-08
60	1.003+6	1.61-07	1.56-07	1.48-07	1.38-07	1.25-07	1.12-07	9.70-08	8.11-08
61	9.616+5	2.20-07	2.11-07	1.96-07	1.77-07	1.56-07	1.34-07	1.12-07	8.94-08
62	9.072+5	2.86-07	2.68-07	2.41-07	2.10-07	1.78-07	1.47-07	1.19-07	9.11-08
63	8.629+5	2.63-07	2.48-07	2.26-07	1.99-07	1.71-07	1.43-07	1.16-07	8.93-08
64	8.209+5	2.42-07	2.30-07	2.10-07	1.87-07	1.62-07	1.37-07	1.12-07	8.73-08
65	7.808+5	2.88-07	2.68-07	2.38-07	2.04-07	1.71-07	1.40-07	1.11-07	8.41-08
66	7.427+5	2.82-07	2.62-07	2.32-07	1.98-07	1.65-07	1.35-07	1.06-07	7.97-08
67	7.065+5	2.62-07	2.44-07	2.18-07	1.87-07	1.57-07	1.28-07	1.01-07	7.53-08
68	6.721+5	2.42-07	2.27-07	2.03-07	1.76-07	1.48-07	1.21-07	9.56-08	7.11-08
69	6.393+5	2.27-07	2.13-07	1.92-07	1.67-07	1.41-07	1.15-07	9.06-08	6.69-08
70	6.081+5	2.04-07	1.93-07	1.75-07	1.54-07	1.31-07	1.08-07	8.52-08	6.28-08
71	5.784+5	1.63-07	1.56-07	1.45-07	1.30-07	1.13-07	9.52-08	7.69-08	5.83-08
72	5.502+5	1.82-07	1.73-07	1.58-07	1.39-07	1.19-07	9.72-08	7.57-08	5.44-08
73	5.234+5	1.60-07	1.53-07	1.41-07	1.26-07	1.08-07	8.90-08	6.95-08	4.97-08
74	4.979+5	1.07-07	1.04-07	9.80-08	9.00-08	8.02-08	6.90-08	5.68-08	4.34-08
75	4.505+5	7.62-08	7.45-08	7.16-08	6.75-08	6.25-08	5.66-08	4.99-08	4.22-08
76	4.076+5	9.66-08	9.37-08	8.88-08	8.23-08	7.45-08	6.58-08	5.64-08	4.61-08
77	3.877+5	1.07-07	1.04-07	9.76-08	8.96-08	8.02-08	6.99-08	5.90-08	4.73-08
78	3.688+5	1.14-07	1.10-07	1.03-07	9.43-08	8.38-08	7.24-08	6.04-08	4.78-08
79	3.337+5	1.18-07	1.13-07	1.06-07	9.64-08	8.53-08	7.33-08	6.07-08	4.75-08
80	3.020+5	1.16-07	1.12-07	1.05-07	9.54-08	8.44-08	7.26-08	6.01-08	4.70-08
81	2.985+5	1.17-07	1.12-07	1.05-07	9.56-08	8.46-08	7.26-08	6.01-08	4.70-08
82	2.972+5	1.16-07	1.12-07	1.05-07	9.54-08	8.44-08	7.25-08	6.00-08	4.69-08
83	2.945+5	1.15-07	1.11-07	1.04-07	9.46-08	8.38-08	7.20-08	5.97-08	4.67-08
84	2.873+5	1.15-07	1.11-07	1.04-07	9.47-08	8.38-08	7.19-08	5.95-08	4.63-08
85	2.732+5	1.12-07	1.08-07	1.01-07	9.24-08	8.18-08	7.03-08	5.82-08	4.53-08
86	2.472+5	1.08-07	1.04-07	9.77-08	8.92-08	7.93-08	6.83-08	5.66-08	4.41-08
87	2.352+5	1.06-07	1.02-07	9.58-08	8.76-08	7.78-08	6.71-08	5.57-08	4.35-08
88	2.237+5	9.67-08	9.37-08	8.85-08	8.15-08	7.31-08	6.38-08	5.37-08	4.28-08
89	2.128+5	9.17-08	8.90-08	8.44-08	7.81-08	7.06-08	6.21-08	5.29-08	4.29-08
90	2.024+5	8.75-08	8.51-08	8.10-08	7.54-08	6.87-08	6.11-08	5.28-08	4.37-08
91	1.926+5	9.02-08	8.77-08	8.34-08	7.76-08	7.07-08	6.29-08	5.44-08	4.52-08
92	1.832+5	1.03-07	9.98-08	9.41-08	8.67-08	7.78-08	6.81-08	5.78-08	4.68-08
93	1.742+5	1.15-07	1.11-07	1.04-07	9.46-08	8.38-08	7.21-08	6.01-08	4.75-08
94	1.657+5	1.26-07	1.20-07	1.12-07	1.01-07	8.83-08	7.50-08	6.15-08	4.76-08
95	1.576+5	1.26-07	1.21-07	1.12-07	1.01-07	8.85-08	7.50-08	6.13-08	4.74-08
96	1.500+5	1.23-07	1.18-07	1.09-07	9.88-08	8.67-08	7.38-08	6.06-08	4.70-08
97	1.426+5	1.18-07	1.13-07	1.06-07	9.59-08	8.44-08	7.21-08	5.95-08	4.66-08
98	1.357+5	1.28-07	1.23-07	1.14-07	1.02-07	8.86-08	7.47-08	6.06-08	4.64-08
99	1.291+5	1.29-07	1.23-07	1.14-07	1.02-07	8.86-08	7.45-08	6.02-08	4.58-08
100	1.228+5	1.22-07	1.17-07	1.08-07	9.76-08	8.52-08	7.21-08	5.87-08	4.50-08
101	1.168+5	1.23-07	1.18-07	1.09-07	9.83-08	8.55-08	7.20-08	5.83-08	4.44-08
102	1.111+5	1.18-07	1.13-07	1.05-07	9.43-08	8.23-08	6.95-08	5.64-08	4.31-08
103	9.804+4	1.05-07	1.01-07	9.44-08	8.58-08	7.57-08	6.48-08	5.35-08	4.17-08
104	8.652+4	1.01-07	9.69-08	9.08-08	8.28-08	7.34-08	6.32-08	5.25-08	4.14-08
105	8.250+4	1.06-07	1.02-07	9.50-08	8.61-08	7.58-08	6.47-08	5.33-08	4.14-08
106	7.950+4	1.07-07	1.03-07	9.59-08	8.67-08	7.62-08	6.48-08	5.31-08	4.11-08
107	7.200+4	1.05-07	1.01-07	9.44-08	8.55-08	7.51-08	6.40-08	5.24-08	4.05-08
108	6.738+4	1.04-07	9.97-08	9.29-08	8.41-08	7.39-08	6.29-08	5.15-08	3.98-08
109	5.656+4	9.96-08	9.59-08	8.95-08	8.12-08	7.15-08	6.10-08	5.02-08	3.89-08
110	5.248+4	1.01-07	9.67-08	9.02-08	8.16-08	7.16-08	6.09-08	4.98-08	3.83-08
111	4.631+4	9.81-08	9.43-08	8.80-08	7.96-08	6.99-08	5.94-08	4.85-08	3.72-08
112	4.087+4	8.85-08	8.54-08	8.01-08	7.31-08	6.48-08	5.57-08	4.62-08	3.63-08
113	3.431+4	8.96-08	8.63-08	8.09-08	7.37-08	6.52-08	5.60-08	4.63-08	3.62-08
114	3.183+4	9.30-08	8.95-08	8.36-08	7.58-08	6.67-08	5.69-08	4.67-08	3.61-08

Table C-2a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	9.02-08	8.69-08	8.13-08	7.38-08	6.52-08	5.58-08	4.60-08	3.58-08
116	2.700+4	9.36-08	9.00-08	8.40-08	7.60-08	6.67-08	5.67-08	4.64-08	3.58-08
117	2.606+4	9.37-08	9.01-08	8.39-08	7.59-08	6.66-08	5.66-08	4.62-08	3.55-08
118	2.479+4	9.33-08	8.97-08	8.36-08	7.56-08	6.63-08	5.63-08	4.60-08	3.53-08
119	2.418+4	9.29-08	8.93-08	8.33-08	7.53-08	6.60-08	5.61-08	4.58-08	3.52-08
120	2.358+4	9.17-08	8.82-08	8.22-08	7.44-08	6.53-08	5.55-08	4.54-08	3.49-08
121	2.188+4	9.03-08	8.68-08	8.10-08	7.33-08	6.44-08	5.47-08	4.47-08	3.44-08
122	1.931+4	8.79-08	8.45-08	7.89-08	7.14-08	6.28-08	5.34-08	4.37-08	3.36-08
123	1.503+4	8.42-08	8.10-08	7.57-08	6.86-08	6.03-08	5.14-08	4.21-08	3.24-08
124	1.171+4	7.98-08	7.69-08	7.19-08	6.53-08	5.76-08	4.92-08	4.04-08	3.13-08
125	9.119+3	7.71-08	7.43-08	6.95-08	6.32-08	5.58-08	4.77-08	3.92-08	3.03-08
126	7.102+3	7.40-08	7.14-08	6.69-08	6.09-08	5.38-08	4.61-08	3.80-08	2.94-08
127	5.531+3	7.17-08	6.91-08	6.48-08	5.90-08	5.22-08	4.47-08	3.68-08	2.86-08
128	4.307+3	6.85-08	6.61-08	6.20-08	5.65-08	5.00-08	4.29-08	3.53-08	2.73-08
129	3.707+3	6.24-08	6.03-08	5.68-08	5.21-08	4.64-08	4.00-08	3.32-08	2.59-08
130	3.355+3	5.60-08	5.43-08	5.14-08	4.74-08	4.27-08	3.73-08	3.14-08	2.49-08
131	3.035+3	4.45-08	4.35-08	4.18-08	3.93-08	3.64-08	3.29-08	2.90-08	2.47-08
132	2.747+3	5.07-08	4.95-08	4.72-08	4.41-08	4.04-08	3.61-08	3.14-08	2.62-08
133	2.613+3	5.87-08	5.69-08	5.39-08	4.98-08	4.49-08	3.94-08	3.34-08	2.71-08
134	2.485+3	6.47-08	6.26-08	5.89-08	5.40-08	4.81-08	4.17-08	3.48-08	2.76-08
135	2.249+3	6.80-08	6.56-08	6.15-08	5.61-08	4.97-08	4.28-08	3.54-08	2.77-08
136	2.035+3	6.89-08	6.64-08	6.22-08	5.66-08	5.00-08	4.28-08	3.53-08	2.75-08
137	1.585+3	6.80-08	6.55-08	6.13-08	5.57-08	4.92-08	4.21-08	3.47-08	2.69-08
138	1.234+3	6.65-08	6.41-08	5.99-08	5.45-08	4.81-08	4.11-08	3.39-08	2.63-08
139	9.611+2	6.52-08	6.28-08	5.87-08	5.34-08	4.71-08	4.03-08	3.31-08	2.57-08
140	7.485+2	6.37-08	6.13-08	5.73-08	5.21-08	4.60-08	3.93-08	3.24-08	2.51-08
141	5.829+2	6.21-08	5.99-08	5.60-08	5.09-08	4.49-08	3.84-08	3.16-08	2.45-08
142	4.540+2	6.07-08	5.85-08	5.47-08	4.97-08	4.38-08	3.75-08	3.08-08	2.39-08
143	3.536+2	5.93-08	5.71-08	5.34-08	4.85-08	4.28-08	3.66-08	3.01-08	2.34-08
144	2.754+2	5.79-08	5.57-08	5.21-08	4.73-08	4.18-08	3.57-08	2.94-08	2.28-08
145	2.144+2	5.65-08	5.44-08	5.09-08	4.62-08	4.08-08	3.48-08	2.87-08	2.22-08
146	1.670+2	5.52-08	5.31-08	4.97-08	4.51-08	3.98-08	3.40-08	2.80-08	2.17-08
147	1.301+2	5.39-08	5.19-08	4.85-08	4.40-08	3.88-08	3.32-08	2.73-08	2.12-08
148	1.013+2	5.26-08	5.06-08	4.73-08	4.30-08	3.79-08	3.24-08	2.66-08	2.07-08
149	7.889+1	5.13-08	4.94-08	4.62-08	4.19-08	3.70-08	3.16-08	2.60-08	2.01-08
150	6.144+1	5.01-08	4.82-08	4.51-08	4.09-08	3.60-08	3.08-08	2.53-08	1.96-08
151	4.785+1	4.89-08	4.71-08	4.40-08	3.99-08	3.52-08	3.00-08	2.47-08	1.91-08
152	3.727+1	4.77-08	4.59-08	4.29-08	3.89-08	3.43-08	2.93-08	2.41-08	1.87-08
153	2.920+1	4.66-08	4.48-08	4.19-08	3.80-08	3.35-08	2.86-08	2.35-08	1.82-08
154	2.260+1	4.54-08	4.37-08	4.08-08	3.70-08	3.26-08	2.78-08	2.29-08	1.77-08
155	1.760+1	4.43-08	4.26-08	3.98-08	3.61-08	3.18-08	2.71-08	2.23-08	1.72-08
156	1.371+1	4.32-08	4.16-08	3.88-08	3.52-08	3.10-08	2.64-08	2.17-08	1.68-08
157	1.068+1	4.21-08	4.05-08	3.78-08	3.43-08	3.02-08	2.57-08	2.11-08	1.63-08
158	8.315+0	4.10-08	3.95-08	3.69-08	3.34-08	2.94-08	2.50-08	2.05-08	1.59-08
159	6.476+0	4.00-08	3.85-08	3.59-08	3.25-08	2.86-08	2.44-08	2.00-08	1.55-08
160	5.043+0	3.90-08	3.75-08	3.50-08	3.17-08	2.79-08	2.37-08	1.94-08	1.50-08
161	3.928+0	3.79-08	3.65-08	3.41-08	3.08-08	2.71-08	2.31-08	1.89-08	1.46-08
162	3.059+0	3.70-08	3.56-08	3.32-08	3.00-08	2.64-08	2.24-08	1.84-08	1.42-08
163	2.372+0	3.60-08	3.46-08	3.23-08	2.92-08	2.56-08	2.18-08	1.78-08	1.37-08
164	1.855+0	3.50-08	3.37-08	3.14-08	2.84-08	2.49-08	2.12-08	1.73-08	1.33-08
165	1.445+0	3.41-08	3.27-08	3.05-08	2.76-08	2.42-08	2.05-08	1.68-08	1.29-08
166	1.125+0	3.31-08	3.18-08	2.96-08	2.68-08	2.35-08	1.99-08	1.62-08	1.25-08
167	8.764-1	3.21-08	3.08-08	2.87-08	2.60-08	2.28-08	1.93-08	1.57-08	1.20-08
168	6.826-1	3.10-08	2.98-08	2.78-08	2.51-08	2.20-08	1.86-08	1.52-08	1.16-08
169	5.316-1	3.00-08	2.88-08	2.68-08	2.42-08	2.12-08	1.79-08	1.45-08	1.10-08
170	4.140-1	2.61-08	2.52-08	2.36-08	2.15-08	1.90-08	1.62-08	1.33-08	1.03-08
171	1.000-1	1.61-08	1.56-08	1.48-08	1.36-08	1.23-08	1.07-08	9.00-09	7.19-09
	1.000-5								

Table C-2b. Total Dose Rate Transmission Factors for 0.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.75-05	1.61-05	1.38-05	1.09-05	8.13-06	5.76-06	3.96-06	2.58-06
2	1.649+7	1.65-05	1.52-05	1.30-05	1.03-05	7.71-06	5.49-06	3.80-06	2.51-06
3	1.568+7	1.58-05	1.45-05	1.25-05	9.95-06	7.46-06	5.35-06	3.70-06	2.43-06
4	1.492+7	1.54-05	1.42-05	1.22-05	9.73-06	7.30-06	5.25-06	3.65-06	2.41-06
5	1.455+7	1.50-05	1.38-05	1.19-05	9.48-06	7.12-06	5.12-06	3.57-06	2.37-06
6	1.419+7	1.47-05	1.36-05	1.16-05	9.31-06	7.00-06	5.04-06	3.53-06	2.36-06
7	1.384+7	1.44-05	1.33-05	1.14-05	9.16-06	6.91-06	5.00-06	3.51-06	2.35-06
8	1.350+7	1.44-05	1.33-05	1.14-05	9.13-06	6.88-06	4.96-06	3.48-06	2.32-06
9	1.284+7	1.38-05	1.27-05	1.09-05	8.77-06	6.62-06	4.79-06	3.37-06	2.26-06
10	1.221+7	1.15-05	1.06-05	9.17-06	7.45-06	5.73-06	4.25-06	3.08-06	2.13-06
11	1.162+7	1.08-05	1.00-05	8.70-06	7.10-06	5.50-06	4.12-06	3.02-06	2.12-06
12	1.105+7	1.27-05	1.17-05	1.01-05	8.08-06	6.06-06	4.36-06	3.09-06	2.11-06
13	1.051+7	1.14-05	1.05-05	9.11-06	7.35-06	5.58-06	4.09-06	2.94-06	2.04-06
14	1.000+7	1.23-05	1.14-05	9.83-06	7.92-06	5.98-06	4.34-06	3.09-06	2.12-06
15	9.512+6	1.27-05	1.18-05	1.02-05	8.15-06	6.11-06	4.39-06	3.10-06	2.11-06
16	9.048+6	1.14-05	1.06-05	9.19-06	7.44-06	5.68-06	4.19-06	3.03-06	2.12-06
17	8.607+6	1.12-05	1.04-05	9.03-06	7.31-06	5.59-06	4.14-06	3.02-06	2.13-06
18	8.187+6	1.21-05	1.12-05	9.76-06	7.92-06	6.05-06	4.46-06	3.25-06	2.30-06
19	7.788+6	1.15-05	1.07-05	9.32-06	7.67-06	6.00-06	4.56-06	3.43-06	2.49-06
20	7.408+6	1.12-05	1.05-05	9.23-06	7.70-06	6.15-06	4.79-06	3.67-06	2.72-06
21	7.047+6	1.40-05	1.30-05	1.14-05	9.31-06	7.15-06	5.28-06	3.83-06	2.69-06
22	6.703+6	1.53-05	1.42-05	1.24-05	1.01-05	7.74-06	5.66-06	4.04-06	2.79-06
23	6.592+6	1.69-05	1.57-05	1.37-05	1.10-05	8.24-06	5.83-06	4.04-06	2.71-06
24	6.376+6	1.59-05	1.47-05	1.29-05	1.05-05	7.98-06	5.82-06	4.14-06	2.84-06
25	6.065+6	1.36-05	1.26-05	1.10-05	9.07-06	7.06-06	5.29-06	3.86-06	2.69-06
26	5.770+6	1.31-05	1.22-05	1.08-05	8.93-06	7.06-06	5.38-06	3.96-06	2.76-06
27	5.488+6	1.58-05	1.46-05	1.27-05	1.02-05	7.66-06	5.49-06	3.81-06	2.53-06
28	5.221+6	9.49-06	8.84-06	7.79-06	6.52-06	5.23-06	4.07-06	3.07-06	2.21-06
29	4.966+6	1.17-05	1.09-05	9.48-06	7.77-06	6.04-06	4.52-06	3.26-06	2.23-06
30	4.724+6	1.08-05	1.00-05	8.72-06	7.12-06	5.52-06	4.11-06	2.96-06	2.01-06
31	4.493+6	8.32-06	7.74-06	6.80-06	5.66-06	4.51-06	3.46-06	2.56-06	1.77-06
32	4.066+6	5.94-06	5.58-06	5.00-06	4.29-06	3.56-06	2.86-06	2.21-06	1.61-06
33	3.679+6	4.64-06	4.41-06	4.04-06	3.57-06	3.08-06	2.59-06	2.11-06	1.64-06
34	3.329+6	5.05-06	4.78-06	4.33-06	3.78-06	3.21-06	2.66-06	2.15-06	1.66-06
35	3.166+6	7.39-06	6.87-06	6.04-06	5.05-06	4.05-06	3.16-06	2.40-06	1.75-06
36	3.012+6	8.42-06	7.79-06	6.76-06	5.52-06	4.30-06	3.24-06	2.41-06	1.72-06
37	2.865+6	7.63-06	7.07-06	6.16-06	5.07-06	3.99-06	3.06-06	2.30-06	1.68-06
38	2.725+6	7.11-06	6.59-06	5.75-06	4.76-06	3.77-06	2.91-06	2.21-06	1.62-06
39	2.592+6	6.77-06	6.29-06	5.52-06	4.61-06	3.68-06	2.86-06	2.16-06	1.56-06
40	2.466+6	9.82-06	9.00-06	7.65-06	6.00-06	4.37-06	3.02-06	2.03-06	1.30-06
41	2.385+6	1.23-05	1.12-05	9.45-06	7.21-06	4.94-06	3.11-06	1.88-06	1.09-06
42	2.365+6	1.37-05	1.25-05	1.05-05	7.95-06	5.26-06	3.09-06	1.74-06	9.60-07
43	2.346+6	1.03-05	9.38-06	7.81-06	5.84-06	3.87-06	2.34-06	1.39-06	8.07-07
44	2.307+6	5.28-06	4.79-06	4.00-06	3.08-06	2.22-06	1.54-06	1.05-06	6.92-07
45	2.231+6	3.75-06	3.41-06	2.88-06	2.26-06	1.69-06	1.22-06	8.72-07	5.97-07
46	2.123+6	2.98-06	2.71-06	2.30-06	1.83-06	1.39-06	1.03-06	7.44-07	5.17-07
47	2.019+6	2.09-06	1.92-06	1.67-06	1.38-06	1.10-06	8.55-07	6.48-07	4.67-07
48	1.921+6	1.42-06	1.34-06	1.21-06	1.05-06	8.80-07	7.18-07	5.66-07	4.24-07
49	1.827+6	2.23-06	2.02-06	1.69-06	1.33-06	9.96-07	7.36-07	5.36-07	3.74-07
50	1.738+6	1.39-06	1.28-06	1.11-06	9.15-07	7.33-07	5.77-07	4.45-07	3.27-07
51	1.653+6	1.02-06	9.56-07	8.55-07	7.37-07	6.18-07	5.05-07	4.01-07	3.03-07
52	1.572+6	1.33-06	1.22-06	1.05-06	8.55-07	6.78-07	5.27-07	4.00-07	2.87-07
53	1.496+6	1.13-06	1.04-06	9.01-07	7.47-07	6.02-07	4.74-07	3.63-07	2.62-07
54	1.423+6	9.42-07	8.75-07	7.72-07	6.55-07	5.40-07	4.33-07	3.35-07	2.43-07
55	1.353+6	6.46-07	6.18-07	5.72-07	5.13-07	4.45-07	3.73-07	3.00-07	2.25-07
56	1.287+6	7.46-07	7.00-07	6.28-07	5.44-07	4.56-07	3.71-07	2.88-07	2.08-07
57	1.225+6	7.08-07	6.63-07	5.93-07	5.12-07	4.28-07	3.47-07	2.69-07	1.93-07

Table C-2b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	5.80-07	5.47-07	4.96-07	4.34-07	3.70-07	3.06-07	2.42-07	1.77-07
59	1.108+6	3.62-07	3.50-07	3.31-07	3.05-07	2.75-07	2.41-07	2.05-07	1.65-07
60	1.003+6	3.21-07	3.13-07	2.99-07	2.80-07	2.57-07	2.31-07	2.02-07	1.69-07
61	9.616+5	4.22-07	4.07-07	3.83-07	3.52-07	3.15-07	2.75-07	2.32-07	1.86-07
62	9.072+5	5.21-07	4.97-07	4.58-07	4.11-07	3.59-07	3.05-07	2.50-07	1.93-07
63	8.629+5	4.96-07	4.75-07	4.42-07	3.99-07	3.50-07	2.99-07	2.46-07	1.91-07
64	8.209+5	4.69-07	4.51-07	4.21-07	3.82-07	3.38-07	2.90-07	2.41-07	1.89-07
65	7.808+5	5.36-07	5.09-07	4.67-07	4.15-07	3.60-07	3.03-07	2.46-07	1.88-07
66	7.427+5	5.33-07	5.06-07	4.63-07	4.11-07	3.56-07	2.98-07	2.41-07	1.82-07
67	7.065+5	5.13-07	4.88-07	4.48-07	3.99-07	3.46-07	2.90-07	2.34-07	1.76-07
68	6.721+5	4.91-07	4.68-07	4.31-07	3.86-07	3.35-07	2.81-07	2.26-07	1.70-07
69	6.393+5	4.75-07	4.54-07	4.19-07	3.75-07	3.26-07	2.74-07	2.19-07	1.64-07
70	6.081+5	4.47-07	4.28-07	3.98-07	3.58-07	3.12-07	2.62-07	2.10-07	1.57-07
71	5.784+5	3.79-07	3.66-07	3.43-07	3.13-07	2.76-07	2.36-07	1.93-07	1.47-07
72	5.502+5	4.19-07	4.02-07	3.74-07	3.36-07	2.93-07	2.44-07	1.93-07	1.41-07
73	5.234+5	3.83-07	3.69-07	3.44-07	3.11-07	2.72-07	2.28-07	1.81-07	1.30-07
74	4.979+5	2.73-07	2.65-07	2.51-07	2.32-07	2.08-07	1.81-07	1.49-07	1.15-07
75	4.505+5	1.99-07	1.95-07	1.87-07	1.77-07	1.64-07	1.49-07	1.32-07	1.12-07
76	4.076+5	2.47-07	2.41-07	2.30-07	2.14-07	1.96-07	1.74-07	1.50-07	1.23-07
77	3.877+5	2.72-07	2.64-07	2.51-07	2.32-07	2.10-07	1.85-07	1.57-07	1.26-07
78	3.688+5	2.89-07	2.80-07	2.65-07	2.45-07	2.20-07	1.92-07	1.62-07	1.29-07
79	3.337+5	2.99-07	2.90-07	2.74-07	2.52-07	2.26-07	1.96-07	1.64-07	1.29-07
80	3.020+5	2.97-07	2.88-07	2.72-07	2.51-07	2.25-07	1.95-07	1.63-07	1.28-07
81	2.985+5	2.98-07	2.89-07	2.73-07	2.52-07	2.25-07	1.96-07	1.63-07	1.28-07
82	2.972+5	2.98-07	2.88-07	2.73-07	2.51-07	2.25-07	1.95-07	1.63-07	1.28-07
83	2.945+5	2.96-07	2.86-07	2.71-07	2.50-07	2.24-07	1.94-07	1.63-07	1.28-07
84	2.873+5	2.97-07	2.88-07	2.72-07	2.51-07	2.25-07	1.95-07	1.63-07	1.27-07
85	2.732+5	2.92-07	2.83-07	2.67-07	2.46-07	2.21-07	1.92-07	1.60-07	1.25-07
86	2.472+5	2.84-07	2.75-07	2.60-07	2.40-07	2.16-07	1.88-07	1.57-07	1.23-07
87	2.352+5	2.79-07	2.71-07	2.57-07	2.37-07	2.13-07	1.85-07	1.55-07	1.22-07
88	2.237+5	2.59-07	2.52-07	2.39-07	2.22-07	2.01-07	1.77-07	1.50-07	1.20-07
89	2.128+5	2.48-07	2.41-07	2.30-07	2.14-07	1.95-07	1.73-07	1.48-07	1.20-07
90	2.024+5	2.38-07	2.32-07	2.22-07	2.08-07	1.90-07	1.70-07	1.48-07	1.22-07
91	1.926+5	2.45-07	2.39-07	2.28-07	2.14-07	1.96-07	1.75-07	1.52-07	1.27-07
92	1.832+5	2.77-07	2.69-07	2.56-07	2.38-07	2.15-07	1.90-07	1.62-07	1.32-07
93	1.742+5	3.05-07	2.96-07	2.80-07	2.58-07	2.32-07	2.02-07	1.69-07	1.35-07
94	1.657+5	3.29-07	3.18-07	3.00-07	2.75-07	2.44-07	2.11-07	1.75-07	1.36-07
95	1.576+5	3.32-07	3.21-07	3.02-07	2.76-07	2.46-07	2.12-07	1.75-07	1.36-07
96	1.500+5	3.26-07	3.15-07	2.97-07	2.72-07	2.42-07	2.09-07	1.74-07	1.36-07
97	1.426+5	3.17-07	3.06-07	2.89-07	2.66-07	2.37-07	2.05-07	1.71-07	1.35-07
98	1.357+5	3.40-07	3.28-07	3.08-07	2.81-07	2.49-07	2.14-07	1.76-07	1.35-07
99	1.291+5	3.43-07	3.31-07	3.11-07	2.83-07	2.51-07	2.14-07	1.76-07	1.34-07
100	1.228+5	3.29-07	3.18-07	2.99-07	2.74-07	2.43-07	2.09-07	1.72-07	1.33-07
101	1.168+5	3.34-07	3.22-07	3.03-07	2.76-07	2.45-07	2.09-07	1.72-07	1.32-07
102	1.111+5	3.23-07	3.12-07	2.93-07	2.68-07	2.38-07	2.04-07	1.68-07	1.29-07
103	9.804+4	2.96-07	2.86-07	2.70-07	2.49-07	2.22-07	1.93-07	1.60-07	1.26-07
104	8.652+4	2.86-07	2.78-07	2.63-07	2.42-07	2.17-07	1.89-07	1.58-07	1.25-07
105	8.250+4	3.00-07	2.90-07	2.74-07	2.52-07	2.25-07	1.94-07	1.61-07	1.26-07
106	7.950+4	3.04-07	2.94-07	2.77-07	2.54-07	2.27-07	1.95-07	1.62-07	1.26-07
107	7.200+4	3.02-07	2.92-07	2.75-07	2.52-07	2.25-07	1.94-07	1.61-07	1.25-07
108	6.738+4	2.99-07	2.90-07	2.73-07	2.51-07	2.23-07	1.93-07	1.59-07	1.24-07
109	5.656+4	2.92-07	2.83-07	2.67-07	2.45-07	2.18-07	1.89-07	1.57-07	1.22-07
110	5.248+4	2.96-07	2.86-07	2.70-07	2.47-07	2.20-07	1.90-07	1.57-07	1.21-07
111	4.631+4	2.92-07	2.82-07	2.66-07	2.44-07	2.17-07	1.87-07	1.54-07	1.19-07
112	4.087+4	2.69-07	2.61-07	2.46-07	2.27-07	2.04-07	1.77-07	1.48-07	1.17-07
113	3.431+4	2.73-07	2.65-07	2.50-07	2.30-07	2.06-07	1.79-07	1.49-07	1.18-07
114	3.183+4	2.83-07	2.74-07	2.59-07	2.37-07	2.12-07	1.83-07	1.52-07	1.18-07

Table C-2b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	2.77-07	2.68-07	2.53-07	2.33-07	2.08-07	1.80-07	1.50-07	1.17-07
116	2.700+4	2.86-07	2.77-07	2.61-07	2.40-07	2.13-07	1.84-07	1.52-07	1.18-07
117	2.606+4	2.87-07	2.78-07	2.62-07	2.40-07	2.14-07	1.84-07	1.52-07	1.17-07
118	2.479+4	2.87-07	2.77-07	2.61-07	2.40-07	2.13-07	1.83-07	1.51-07	1.17-07
119	2.418+4	2.86-07	2.77-07	2.61-07	2.39-07	2.13-07	1.83-07	1.51-07	1.17-07
120	2.358+4	2.84-07	2.74-07	2.59-07	2.37-07	2.11-07	1.82-07	1.50-07	1.16-07
121	2.188+4	2.81-07	2.72-07	2.56-07	2.35-07	2.09-07	1.80-07	1.49-07	1.15-07
122	1.931+4	2.77-07	2.68-07	2.52-07	2.32-07	2.06-07	1.78-07	1.47-07	1.14-07
123	1.503+4	2.70-07	2.61-07	2.46-07	2.26-07	2.01-07	1.74-07	1.44-07	1.11-07
124	1.171+4	2.60-07	2.52-07	2.38-07	2.19-07	1.95-07	1.69-07	1.40-07	1.09-07
125	9.119+3	2.55-07	2.47-07	2.34-07	2.15-07	1.92-07	1.66-07	1.38-07	1.07-07
126	7.102+3	2.49-07	2.41-07	2.28-07	2.10-07	1.88-07	1.63-07	1.35-07	1.05-07
127	5.531+3	2.45-07	2.37-07	2.24-07	2.06-07	1.85-07	1.60-07	1.33-07	1.04-07
128	4.307+3	2.37-07	2.30-07	2.18-07	2.00-07	1.79-07	1.55-07	1.29-07	1.00-07
129	3.707+3	2.20-07	2.14-07	2.03-07	1.87-07	1.68-07	1.47-07	1.22-07	9.59-08
130	3.355+3	2.00-07	1.94-07	1.85-07	1.72-07	1.56-07	1.37-07	1.16-07	9.25-08
131	3.035+3	1.62-07	1.58-07	1.52-07	1.44-07	1.34-07	1.21-07	1.07-07	9.12-08
132	2.747+3	1.83-07	1.79-07	1.71-07	1.61-07	1.48-07	1.33-07	1.16-07	9.70-08
133	2.613+3	2.09-07	2.04-07	1.94-07	1.80-07	1.64-07	1.45-07	1.24-07	1.01-07
134	2.485+3	2.29-07	2.22-07	2.11-07	1.95-07	1.76-07	1.54-07	1.29-07	1.03-07
135	2.249+3	2.40-07	2.33-07	2.20-07	2.03-07	1.82-07	1.58-07	1.32-07	1.04-07
136	2.035+3	2.44-07	2.37-07	2.24-07	2.06-07	1.84-07	1.60-07	1.33-07	1.04-07
137	1.585+3	2.44-07	2.36-07	2.23-07	2.05-07	1.84-07	1.59-07	1.32-07	1.03-07
138	1.234+3	2.42-07	2.34-07	2.21-07	2.03-07	1.82-07	1.57-07	1.31-07	1.02-07
139	9.611+2	2.40-07	2.32-07	2.19-07	2.02-07	1.80-07	1.56-07	1.30-07	1.01-07
140	7.485+2	2.37-07	2.30-07	2.17-07	1.99-07	1.78-07	1.54-07	1.28-07	1.00-07
141	5.829+2	2.35-07	2.27-07	2.15-07	1.97-07	1.76-07	1.53-07	1.27-07	9.91-08
142	4.540+2	2.32-07	2.25-07	2.12-07	1.95-07	1.74-07	1.51-07	1.25-07	9.80-08
143	3.536+2	2.30-07	2.23-07	2.10-07	1.93-07	1.73-07	1.49-07	1.24-07	9.70-08
144	2.754+2	2.27-07	2.20-07	2.08-07	1.91-07	1.71-07	1.48-07	1.23-07	9.59-08
145	2.144+2	2.25-07	2.18-07	2.06-07	1.89-07	1.69-07	1.46-07	1.21-07	9.49-08
146	1.670+2	2.23-07	2.16-07	2.04-07	1.87-07	1.67-07	1.45-07	1.20-07	9.39-08
147	1.301+2	2.20-07	2.13-07	2.01-07	1.85-07	1.65-07	1.43-07	1.19-07	9.28-08
148	1.013+2	2.18-07	2.11-07	1.99-07	1.83-07	1.64-07	1.41-07	1.18-07	9.18-08
149	7.889+1	2.16-07	2.09-07	1.97-07	1.81-07	1.62-07	1.40-07	1.16-07	9.08-08
150	6.144+1	2.13-07	2.07-07	1.95-07	1.79-07	1.60-07	1.38-07	1.15-07	8.98-08
151	4.785+1	2.11-07	2.04-07	1.93-07	1.77-07	1.58-07	1.37-07	1.14-07	8.88-08
152	3.727+1	2.09-07	2.02-07	1.91-07	1.75-07	1.56-07	1.35-07	1.12-07	8.77-08
153	2.920+1	2.07-07	2.00-07	1.89-07	1.73-07	1.55-07	1.34-07	1.11-07	8.67-08
154	2.260+1	2.04-07	1.98-07	1.87-07	1.71-07	1.53-07	1.32-07	1.10-07	8.57-08
155	1.760+1	2.02-07	1.96-07	1.84-07	1.69-07	1.51-07	1.31-07	1.08-07	8.46-08
156	1.371+1	2.00-07	1.93-07	1.82-07	1.68-07	1.50-07	1.29-07	1.07-07	8.36-08
157	1.068+1	1.97-07	1.91-07	1.80-07	1.66-07	1.48-07	1.28-07	1.06-07	8.25-08
158	8.315+0	1.95-07	1.89-07	1.78-07	1.64-07	1.46-07	1.26-07	1.05-07	8.15-08
159	6.476+0	1.93-07	1.87-07	1.76-07	1.62-07	1.44-07	1.24-07	1.03-07	8.04-08
160	5.043+0	1.91-07	1.84-07	1.74-07	1.60-07	1.42-07	1.23-07	1.02-07	7.93-08
161	3.928+0	1.88-07	1.82-07	1.72-07	1.58-07	1.41-07	1.21-07	1.00-07	7.82-08
162	3.059+0	1.86-07	1.80-07	1.70-07	1.56-07	1.39-07	1.20-07	9.91-08	7.70-08
163	2.372+0	1.84-07	1.78-07	1.67-07	1.54-07	1.37-07	1.18-07	9.76-08	7.58-08
164	1.855+0	1.81-07	1.75-07	1.65-07	1.52-07	1.35-07	1.16-07	9.62-08	7.46-08
165	1.445+0	1.79-07	1.73-07	1.63-07	1.49-07	1.33-07	1.15-07	9.47-08	7.34-08
166	1.125+0	1.76-07	1.70-07	1.61-07	1.47-07	1.31-07	1.13-07	9.31-08	7.21-08
167	8.764-1	1.73-07	1.68-07	1.58-07	1.45-07	1.29-07	1.11-07	9.15-08	7.07-08
168	6.826-1	1.70-07	1.65-07	1.55-07	1.42-07	1.27-07	1.09-07	8.97-08	6.93-08
169	5.316-1	1.67-07	1.62-07	1.52-07	1.40-07	1.24-07	1.07-07	8.76-08	6.72-08
170	4.140-1	1.50-07	1.46-07	1.38-07	1.27-07	1.14-07	9.86-08	8.20-08	6.41-08
171	1.000-1	1.08-07	1.05-07	1.00-07	9.36-08	8.51-08	7.52-08	6.41-08	5.18-08
	1.000-5								

Table C-2c. Gamma-ray Dose Rate Transmission Factors for 0.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	1.58-06	1.49-06	1.31-06	1.03-06	6.57-07	2.75-07	5.54-08	6.67-09
2	1.200+7	1.36-06	1.28-06	1.12-06	8.73-07	5.48-07	2.27-07	4.78-08	5.84-09
3	1.000+7	1.13-06	1.06-06	9.23-07	7.10-07	4.38-07	1.79-07	3.92-08	4.78-09
4	8.000+6	9.82-07	9.17-07	7.91-07	6.01-07	3.65-07	1.47-07	3.29-08	3.94-09
5	7.500+6	9.14-07	8.51-07	7.32-07	5.52-07	3.33-07	1.33-07	3.01-08	3.58-09
6	7.000+6	8.43-07	7.83-07	6.69-07	5.01-07	2.99-07	1.19-07	2.72-08	3.21-09
7	6.500+6	7.68-07	7.11-07	6.05-07	4.49-07	2.64-07	1.04-07	2.42-08	2.85-09
8	6.000+6	6.91-07	6.37-07	5.38-07	3.95-07	2.29-07	8.92-08	2.12-08	2.49-09
9	5.500+6	6.11-07	5.61-07	4.70-07	3.41-07	1.95-07	7.50-08	1.82-08	2.15-09
10	5.000+6	5.31-07	4.85-07	4.02-07	2.88-07	1.62-07	6.19-08	1.54-08	1.84-09
11	4.500+6	4.52-07	4.11-07	3.37-07	2.38-07	1.31-07	4.98-08	1.27-08	1.56-09
12	4.000+6	3.73-07	3.36-07	2.73-07	1.89-07	1.02-07	3.86-08	1.02-08	1.31-09
13	3.500+6	2.93-07	2.62-07	2.10-07	1.42-07	7.54-08	2.85-08	7.83-09	1.10-09
14	3.000+6	2.16-07	1.92-07	1.51-07	9.99-08	5.19-08	1.98-08	5.72-09	9.05-10
15	2.500+6	1.45-07	1.27-07	9.78-08	6.32-08	3.23-08	1.26-08	3.87-09	7.18-10
16	2.000+6	9.17-08	7.94-08	5.99-08	3.78-08	1.91-08	7.71-09	2.54-09	5.74-10
17	1.660+6	6.44-08	5.53-08	4.11-08	2.56-08	1.29-08	5.36-09	1.87-09	4.92-10
18	1.500+6	4.91-08	4.19-08	3.09-08	1.91-08	9.68-09	4.10-09	1.49-09	4.28-10
19	1.330+6	3.05-08	2.58-08	1.88-08	1.15-08	5.87-09	2.57-09	9.72-10	2.95-10
20	1.000+6	1.48-08	1.24-08	8.84-09	5.34-09	2.75-09	1.25-09	5.01-10	1.73-10
21	8.000+5	8.56-09	7.07-09	4.97-09	2.97-09	1.53-09	7.10-10	2.98-10	1.11-10
22	7.000+5	5.55-09	4.54-09	3.16-09	1.86-09	9.63-10	4.52-10	1.93-10	7.40-11
23	6.000+5	3.35-09	2.71-09	1.85-09	1.07-09	5.52-10	2.60-10	1.12-10	4.40-11
24	5.120+5	2.43-09	1.94-09	1.30-09	7.46-10	3.81-10	1.81-10	8.00-11	3.27-11
25	5.100+5	1.97-09	1.57-09	1.04-09	5.92-10	3.02-10	1.43-10	6.29-11	2.56-11
26	4.500+5	1.21-09	9.48-10	6.15-10	3.42-10	1.74-10	8.38-11	3.81-11	1.63-11
27	4.000+5	5.67-10	4.32-10	2.70-10	1.47-10	7.39-11	3.51-11	1.53-11	6.27-12
28	3.000+5	3.34-11	2.77-11	2.01-11	1.34-11	8.44-12	5.19-12	3.14-12	1.85-12
29	2.000+5	5.37-12	4.28-12	2.95-12	1.87-12	1.15-12	6.96-13	4.19-13	2.50-13
30	1.500+5	5.66-13	4.60-13	3.34-13	2.29-13	1.55-13	1.05-13	7.11-14	4.77-14
31	1.000+5	3.76-15	2.80-15	1.84-15	1.16-15	7.44-16	4.82-16	3.16-16	2.08-16
32	7.500+4	3.90-18	2.53-18	1.44-18	8.35-19	5.03-19	3.12-19	1.98-19	1.28-19
33	6.000+4	5.86-24	3.08-24	1.55-24	8.60-25	5.16-25	3.30-25	2.22-25	1.56-25
34	4.500+4	5.80-53	1.21-53	4.75-54	2.39-54	8.89-55	1.13-54	6.02-55	4.06-55
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-3a. Neutron Dose Rate Transmission Factors for 1.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	4.49-07	3.95-07	3.15-07	2.33-07	1.62-07	1.08-07	7.01-08	4.42-08
2	1.649+7	4.14-07	3.64-07	2.92-07	2.16-07	1.51-07	1.02-07	6.69-08	4.27-08
3	1.568+7	3.85-07	3.40-07	2.75-07	2.06-07	1.45-07	9.83-08	6.47-08	4.10-08
4	1.492+7	3.74-07	3.31-07	2.67-07	2.00-07	1.41-07	9.63-08	6.38-08	4.08-08
5	1.455+7	3.65-07	3.22-07	2.60-07	1.94-07	1.38-07	9.39-08	6.26-08	4.04-08
6	1.419+7	3.57-07	3.16-07	2.55-07	1.91-07	1.35-07	9.28-08	6.21-08	4.03-08
7	1.384+7	3.51-07	3.11-07	2.51-07	1.88-07	1.34-07	9.20-08	6.17-08	4.00-08
8	1.350+7	3.54-07	3.12-07	2.52-07	1.88-07	1.33-07	9.10-08	6.07-08	3.92-08
9	1.284+7	3.34-07	2.94-07	2.37-07	1.77-07	1.25-07	8.54-08	5.71-08	3.70-08
10	1.221+7	2.51-07	2.24-07	1.84-07	1.42-07	1.04-07	7.45-08	5.24-08	3.58-08
11	1.162+7	2.36-07	2.11-07	1.74-07	1.34-07	9.96-08	7.20-08	5.14-08	3.57-08
12	1.105+7	3.23-07	2.83-07	2.24-07	1.63-07	1.14-07	7.74-08	5.25-08	3.53-08
13	1.051+7	2.78-07	2.44-07	1.96-07	1.46-07	1.04-07	7.29-08	5.06-08	3.46-08
14	1.000+7	3.15-07	2.76-07	2.19-07	1.61-07	1.13-07	7.75-08	5.29-08	3.57-08
15	9.512+6	3.33-07	2.90-07	2.29-07	1.66-07	1.15-07	7.85-08	5.33-08	3.58-08
16	9.048+6	2.74-07	2.42-07	1.95-07	1.47-07	1.06-07	7.57-08	5.35-08	3.72-08
17	8.607+6	2.70-07	2.38-07	1.92-07	1.45-07	1.05-07	7.47-08	5.32-08	3.75-08
18	8.187+6	3.10-07	2.72-07	2.18-07	1.62-07	1.16-07	8.23-08	5.86-08	4.15-08
19	7.788+6	2.73-07	2.42-07	1.98-07	1.53-07	1.14-07	8.50-08	6.36-08	4.72-08
20	7.408+6	2.61-07	2.35-07	1.96-07	1.55-07	1.19-07	8.99-08	6.82-08	5.09-08
21	7.047+6	3.88-07	3.41-07	2.72-07	2.00-07	1.41-07	9.75-08	6.73-08	4.60-08
22	6.703+6	4.49-07	3.93-07	3.11-07	2.26-07	1.56-07	1.04-07	6.94-08	4.59-08
23	6.592+6	5.35-07	4.61-07	3.54-07	2.47-07	1.61-07	1.03-07	6.56-08	4.22-08
24	6.376+6	4.23-07	3.69-07	2.91-07	2.12-07	1.46-07	9.79-08	6.56-08	4.35-08
25	6.065+6	2.97-07	2.63-07	2.14-07	1.63-07	1.18-07	8.34-08	5.82-08	3.95-08
26	5.770+6	2.64-07	2.37-07	1.98-07	1.55-07	1.16-07	8.35-08	5.87-08	3.96-08
27	5.488+6	3.79-07	3.28-07	2.55-07	1.82-07	1.22-07	7.89-08	5.06-08	3.19-08
28	5.221+6	1.50-07	1.36-07	1.14-07	9.12-08	6.98-08	5.21-08	3.80-08	2.68-08
29	4.966+6	2.00-07	1.78-07	1.46-07	1.11-07	8.06-08	5.66-08	3.88-08	2.56-08
30	4.724+6	1.68-07	1.49-07	1.22-07	9.27-08	6.72-08	4.73-08	3.25-08	2.14-08
31	4.493+6	1.05-07	9.50-08	8.05-08	6.46-08	4.96-08	3.69-08	2.66-08	1.81-08
32	4.066+6	6.31-08	5.87-08	5.19-08	4.39-08	3.59-08	2.85-08	2.20-08	1.60-08
33	3.679+6	4.82-08	4.56-08	4.14-08	3.64-08	3.12-08	2.62-08	2.14-08	1.67-08
34	3.329+6	5.55-08	5.20-08	4.65-08	4.00-08	3.34-08	2.74-08	2.20-08	1.70-08
35	3.166+6	9.06-08	8.22-08	6.96-08	5.60-08	4.34-08	3.29-08	2.45-08	1.77-08
36	3.012+6	1.11-07	9.80-08	7.96-08	6.07-08	4.47-08	3.25-08	2.36-08	1.69-08
37	2.865+6	9.14-08	8.14-08	6.69-08	5.21-08	3.94-08	2.95-08	2.21-08	1.64-08
38	2.725+6	7.93-08	7.12-08	5.96-08	4.75-08	3.69-08	2.83-08	2.15-08	1.61-08
39	2.592+6	7.45-08	6.81-08	5.85-08	4.80-08	3.80-08	2.91-08	2.16-08	1.53-08
40	2.466+6	1.54-07	1.32-07	1.00-07	6.98-08	4.58-08	2.88-08	1.75-08	1.01-08
41	2.385+6	2.61-07	2.15-07	1.51-07	9.20-08	5.00-08	2.51-08	1.17-08	5.10-09
42	2.365+6	3.41-07	2.75-07	1.84-07	1.01-07	4.73-08	2.04-08	8.31-09	3.21-09
43	2.346+6	1.73-07	1.38-07	9.10-08	5.00-08	2.41-08	1.11-08	5.06-09	2.33-09
44	2.307+6	3.40-08	2.81-08	2.04-08	1.34-08	8.45-09	5.25-09	3.26-09	2.01-09
45	2.231+6	1.60-08	1.36-08	1.04-08	7.39-09	5.09-09	3.46-09	2.34-09	1.54-09
46	2.123+6	1.00-08	8.65-09	6.82-09	5.05-09	3.64-09	2.58-09	1.81-09	1.24-09
47	2.019+6	5.46-09	4.94-09	4.18-09	3.38-09	2.65-09	2.03-09	1.52-09	1.09-09
48	1.921+6	3.48-09	3.26-09	2.92-09	2.52-09	2.09-09	1.69-09	1.32-09	9.76-10
49	1.827+6	6.39-09	5.49-09	4.29-09	3.18-09	2.31-09	1.66-09	1.18-09	8.13-10
50	1.738+6	3.22-09	2.92-09	2.49-09	2.03-09	1.61-09	1.26-09	9.57-10	6.99-10
51	1.653+6	2.26-09	2.11-09	1.89-09	1.62-09	1.35-09	1.09-09	8.59-10	6.46-10
52	1.572+6	3.04-09	2.74-09	2.32-09	1.88-09	1.48-09	1.13-09	8.48-10	6.04-10
53	1.496+6	2.50-09	2.28-09	1.97-09	1.62-09	1.30-09	1.01-09	7.63-10	5.47-10
54	1.423+6	2.06-09	1.91-09	1.68-09	1.42-09	1.16-09	9.17-10	7.00-10	5.04-10
55	1.353+6	1.40-09	1.34-09	1.23-09	1.10-09	9.44-10	7.84-10	6.24-10	4.66-10
56	1.287+6	1.63-09	1.52-09	1.36-09	1.17-09	9.66-10	7.71-10	5.91-10	4.22-10
57	1.225+6	1.54-09	1.44-09	1.28-09	1.09-09	8.99-10	7.14-10	5.44-10	3.85-10

Table C-3a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.26-09	1.18-09	1.06-09	9.15-10	7.63-10	6.17-10	4.80-10	3.48-10
59	1.108+6	7.51-10	7.23-10	6.77-10	6.17-10	5.49-10	4.76-10	4.01-10	3.21-10
60	1.003+6	6.52-10	6.33-10	6.02-10	5.59-10	5.09-10	4.54-10	3.95-10	3.30-10
61	9.616+5	8.77-10	8.43-10	7.87-10	7.14-10	6.32-10	5.45-10	4.56-10	3.64-10
62	9.072+5	1.11-09	1.05-09	9.56-10	8.43-10	7.22-10	6.01-10	4.86-10	3.73-10
63	8.629+5	1.04-09	9.92-10	9.10-10	8.09-10	6.98-10	5.85-10	4.76-10	3.67-10
64	8.209+5	9.73-10	9.29-10	8.57-10	7.66-10	6.66-10	5.63-10	4.61-10	3.60-10
65	7.808+5	1.13-09	1.07-09	9.61-10	8.36-10	7.06-10	5.79-10	4.61-10	3.49-10
66	7.427+5	1.12-09	1.05-09	9.46-10	8.20-10	6.89-10	5.62-10	4.44-10	3.33-10
67	7.065+5	1.06-09	1.00-09	9.02-10	7.83-10	6.58-10	5.37-10	4.23-10	3.16-10
68	6.721+5	1.00-09	9.44-10	8.53-10	7.43-10	6.26-10	5.11-10	4.02-10	2.99-10
69	6.393+5	9.52-10	8.99-10	8.13-10	7.09-10	5.97-10	4.86-10	3.81-10	2.81-10
70	6.081+5	8.69-10	8.23-10	7.49-10	6.57-10	5.57-10	4.55-10	3.57-10	2.63-10
71	5.784+5	6.96-10	6.66-10	6.15-10	5.51-10	4.77-10	3.99-10	3.21-10	2.43-10
72	5.502+5	7.80-10	7.40-10	6.73-10	5.90-10	4.99-10	4.06-10	3.14-10	2.25-10
73	5.234+5	6.82-10	6.50-10	5.96-10	5.27-10	4.50-10	3.68-10	2.86-10	2.04-10
74	4.979+5	4.45-10	4.31-10	4.05-10	3.71-10	3.30-10	2.83-10	2.33-10	1.78-10
75	4.505+5	3.13-10	3.06-10	2.94-10	2.77-10	2.56-10	2.31-10	2.04-10	1.73-10
76	4.076+5	4.00-10	3.88-10	3.67-10	3.39-10	3.05-10	2.69-10	2.30-10	1.88-10
77	3.877+5	4.46-10	4.30-10	4.04-10	3.69-10	3.29-10	2.86-10	2.40-10	1.92-10
78	3.688+5	4.76-10	4.58-10	4.28-10	3.88-10	3.43-10	2.95-10	2.46-10	1.94-10
79	3.337+5	4.90-10	4.70-10	4.38-10	3.96-10	3.48-10	2.98-10	2.46-10	1.92-10
80	3.020+5	4.82-10	4.63-10	4.31-10	3.90-10	3.44-10	2.94-10	2.43-10	1.89-10
81	2.985+5	4.83-10	4.64-10	4.32-10	3.91-10	3.44-10	2.94-10	2.43-10	1.89-10
82	2.972+5	4.82-10	4.63-10	4.31-10	3.90-10	3.43-10	2.93-10	2.42-10	1.89-10
83	2.945+5	4.76-10	4.58-10	4.27-10	3.86-10	3.40-10	2.91-10	2.41-10	1.88-10
84	2.873+5	4.77-10	4.58-10	4.27-10	3.87-10	3.40-10	2.91-10	2.39-10	1.86-10
85	2.732+5	4.61-10	4.44-10	4.14-10	3.75-10	3.31-10	2.83-10	2.33-10	1.81-10
86	2.472+5	4.41-10	4.25-10	3.97-10	3.61-10	3.20-10	2.74-10	2.26-10	1.76-10
87	2.352+5	4.31-10	4.15-10	3.89-10	3.54-10	3.13-10	2.69-10	2.23-10	1.73-10
88	2.237+5	3.92-10	3.79-10	3.57-10	3.28-10	2.93-10	2.55-10	2.14-10	1.70-10
89	2.128+5	3.71-10	3.59-10	3.40-10	3.14-10	2.82-10	2.48-10	2.11-10	1.71-10
90	2.024+5	3.53-10	3.43-10	3.25-10	3.02-10	2.75-10	2.44-10	2.10-10	1.74-10
91	1.926+5	3.64-10	3.53-10	3.35-10	3.11-10	2.83-10	2.51-10	2.17-10	1.80-10
92	1.832+5	4.18-10	4.04-10	3.80-10	3.48-10	3.11-10	2.72-10	2.30-10	1.86-10
93	1.742+5	4.70-10	4.51-10	4.20-10	3.81-10	3.35-10	2.87-10	2.39-10	1.88-10
94	1.657+5	5.15-10	4.92-10	4.[illegible]4-10	4.06-10	3.53-10	2.98-10	2.43-10	1.88-10
95	1.576+5	5.17-10	4.94-10	4.55-10	4.07-10	3.53-10	2.98-10	2.42-10	1.87-10
96	1.500+5	5.00-10	4.78-10	4.42-10	3.96-10	3.45-10	2.92-10	2.39-10	1.85-10
97	1.426+5	4.79-10	4.59-10	4.25-10	3.83-10	3.35-10	2.85-10	2.34-10	1.83-10
98	1.357+5	5.22-10	4.98-10	4.58-10	4.07-10	3.51-10	2.94-10	2.38-10	1.82-10
99	1.291+5	5.25-10	4.99-10	4.59-10	4.07-10	3.51-10	2.93-10	2.36-10	1.79-10
100	1.228+5	4.92-10	4.70-10	4.34-10	3.88-10	3.36-10	2.83-10	2.29-10	1.75-10
101	1.168+5	4.98-10	4.75-10	4.37-10	3.90-10	3.37-10	2.82-10	2.27-10	1.73-10
102	1.111+5	4.72-10	4.51-10	4.16-10	3.72-10	3.22-10	2.71-10	2.19-10	1.67-10
103	9.804+4	4.15-10	3.99-10	3.71-10	3.36-10	2.95-10	2.51-10	2.07-10	1.61-10
104	8.652+4	3.96-10	3.81-10	3.56-10	3.23-10	2.85-10	2.44-10	2.03-10	1.59-10
105	8.250+4	4.17-10	4.00-10	3.72-10	3.36-10	2.94-10	2.50-10	2.05-10	1.59-10
106	7.950+4	4.22-10	4.04-10	3.75-10	3.38-10	2.95-10	2.50-10	2.04-10	1.58-10
107	7.200+4	4.14-10	3.97-10	3.68-10	3.32-10	2.90-10	2.46-10	2.01-10	1.55-10
108	6.738+4	4.06-10	3.89-10	3.61-10	3.25-10	2.85-10	2.41-10	1.97-10	1.52-10
109	5.656+4	3.88-10	3.72-10	3.46-10	3.13-10	2.74-10	2.33-10	1.91-10	1.48-10
110	5.248+4	3.91-10	3.75-10	3.48-10	3.14-10	2.74-10	2.32-10	1.89-10	1.46-10
111	4.631+4	3.80-10	3.64-10	3.38-10	3.05-10	2.66-10	2.26-10	1.84-10	1.41-10
112	4.087+4	3.40-10	3.27-10	3.06-10	2.78-10	2.46-10	2.11-10	1.75-10	1.37-10
113	3.431+4	3.43-10	3.30-10	3.09-10	2.80-10	2.47-10	2.12-10	1.75-10	1.37-10
114	3.183+4	3.57-10	3.43-10	3.19-10	2.88-10	2.53-10	2.15-10	1.76-10	1.36-10

Table C-3a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	3.45-10	3.32-10	3.09-10	2.80-10	2.46-10	2.10-10	1.73-10	1.35-10
116	2.700+4	3.58-10	3.44-10	3.20-10	2.88-10	2.52-10	2.14-10	1.74-10	1.34-10
117	2.606+4	3.58-10	3.44-10	3.19-10	2.88-10	2.52-10	2.13-10	1.74-10	1.33-10
118	2.479+4	3.57-10	3.42-10	3.18-10	2.86-10	2.50-10	2.12-10	1.73-10	1.33-10
119	2.418+4	3.55-10	3.40-10	3.16-10	2.85-10	2.49-10	2.11-10	1.72-10	1.32-10
120	2.358+4	3.50-10	3.36-10	3.12-10	2.81-10	2.46-10	2.09-10	1.70-10	1.31-10
121	2.188+4	3.44-10	3.30-10	3.07-10	2.77-10	2.42-10	2.05-10	1.68-10	1.29-10
122	1.931+4	3.33-10	3.20-10	2.98-10	2.69-10	2.35-10	2.00-10	1.63-10	1.25-10
123	1.503+4	3.18-10	3.05-10	2.84-10	2.57-10	2.25-10	1.92-10	1.57-10	1.21-10
124	1.171+4	3.00-10	2.88-10	2.69-10	2.44-10	2.15-10	1.83-10	1.50-10	1.16-10
125	9.119+3	2.88-10	2.78-10	2.59-10	2.35-10	2.07-10	1.77-10	1.45-10	1.12-10
126	7.102+3	2.76-10	2.66-10	2.49-10	2.26-10	1.99-10	1.70-10	1.40-10	1.09-10
127	5.531+3	2.66-10	2.57-10	2.40-10	2.18-10	1.93-10	1.65-10	1.36-10	1.05-10
128	4.307+3	2.54-10	2.45-10	2.29-10	2.09-10	1.84-10	1.58-10	1.30-10	1.00-10
129	3.707+3	2.30-10	2.23-10	2.10-10	1.92-10	1.71-10	1.47-10	1.22-10	9.49-11
130	3.355+3	2.06-10	2.00-10	1.89-10	1.75-10	1.57-10	1.37-10	1.15-10	9.14-11
131	3.035+3	1.64-10	1.60-10	1.54-10	1.45-10	1.34-10	1.21-10	1.06-10	9.05-11
132	2.747+3	1.87-10	1.82-10	1.74-10	1.62-10	1.48-10	1.33-10	1.15-10	9.62-11
133	2.613+3	2.16-10	2.10-10	1.98-10	1.83-10	1.65-10	1.45-10	1.23-10	9.93-11
134	2.485+3	2.39-10	2.31-10	2.17-10	1.99-10	1.77-10	1.53-10	1.28-10	1.01-10
135	2.249+3	2.51-10	2.42-10	2.27-10	2.06-10	1.83-10	1.57-10	1.30-10	1.02-10
136	2.035+3	2.54-10	2.45-10	2.29-10	2.08-10	1.84-10	1.57-10	1.29-10	1.01-10
137	1.585+3	2.51-10	2.41-10	2.25-10	2.05-10	1.80-10	1.54-10	1.27-10	9.85-11
138	1.234+3	2.44-10	2.35-10	2.20-10	2.00-10	1.76-10	1.50-10	1.24-10	9.60-11
139	9.611+2	2.39-10	2.30-10	2.15-10	1.95-10	1.72-10	1.47-10	1.21-10	9.38-11
140	7.485+2	2.33-10	2.24-10	2.10-10	1.90-10	1.68-10	1.43-10	1.18-10	9.14-11
141	5.829+2	2.27-10	2.19-10	2.04-10	1.85-10	1.63-10	1.40-10	1.15-10	8.91-11
142	4.540+2	2.22-10	2.13-10	1.99-10	1.81-10	1.59-10	1.36-10	1.12-10	8.69-11
143	3.536+2	2.16-10	2.08-10	1.94-10	1.76-10	1.55-10	1.33-10	1.09-10	8.47-11
144	2.754+2	2.11-10	2.03-10	1.89-10	1.72-10	1.51-10	1.29-10	1.06-10	8.25-11
145	2.144+2	2.05-10	1.98-10	1.85-10	1.68-10	1.48-10	1.26-10	1.04-10	8.05-11
146	1.670+2	2.00-10	1.93-10	1.80-10	1.63-10	1.44-10	1.23-10	1.01-10	7.84-11
147	1.301+2	1.95-10	1.88-10	1.76-10	1.59-10	1.40-10	1.20-10	9.85-11	7.64-11
148	1.013+2	1.90-10	1.83-10	1.71-10	1.55-10	1.37-10	1.17-10	9.60-11	7.45-11
149	7.889+1	1.86-10	1.79-10	1.67-10	1.51-10	1.33-10	1.14-10	9.36-11	7.26-11
150	6.144+1	1.81-10	1.74-10	1.63-10	1.48-10	1.30-10	1.11-10	9.12-11	7.08-11
151	4.785+1	1.77-10	1.70-10	1.59-10	1.44-10	1.27-10	1.08-10	8.89-11	6.89-11
152	3.727+1	1.72-10	1.66-10	1.55-10	1.40-10	1.23-10	1.05-10	8.66-11	6.71-11
153	2.920+1	1.68-10	1.62-10	1.51-10	1.37-10	1.20-10	1.03-10	8.44-11	6.54-11
154	2.260+1	1.64-10	1.57-10	1.47-10	1.33-10	1.17-10	1.00-10	8.22-11	6.37-11
155	1.760+1	1.59-10	1.53-10	1.43-10	1.30-10	1.14-10	9.74-11	8.00-11	6.20-11
156	1.371+1	1.55-10	1.49-10	1.40-10	1.26-10	1.11-10	9.49-11	7.79-11	6.03-11
157	1.068+1	1.51-10	1.46-10	1.36-10	1.23-10	1.08-10	9.24-11	7.58-11	5.87-11
158	8.315+0	1.48-10	1.42-10	1.32-10	1.20-10	1.06-10	8.99-11	7.37-11	5.71-11
159	6.476+0	1.44-10	1.38-10	1.29-10	1.17-10	1.03-10	8.75-11	7.17-11	5.55-11
160	5.043+0	1.40-10	1.35-10	1.26-10	1.14-10	1.00-10	8.51-11	6.97-11	5.39-11
161	3.928+0	1.36-10	1.31-10	1.22-10	1.11-10	9.72-11	8.27-11	6.77-11	5.23-11
162	3.059+0	1.33-10	1.28-10	1.19-10	1.08-10	9.46-11	8.05-11	6.58-11	5.08-11
163	2.372+0	1.29-10	1.24-10	1.16-10	1.05-10	9.19-11	7.81-11	6.39-11	4.92-11
164	1.855+0	1.26-10	1.21-10	1.13-10	1.02-10	8.93-11	7.59-11	6.20-11	4.77-11
165	1.445+0	1.22-10	1.17-10	1.09-10	9.89-11	8.68-11	7.36-11	6.01-11	4.62-11
166	1.125+0	1.19-10	1.14-10	1.06-10	9.60-11	8.42-11	7.14-11	5.82-11	4.47-11
167	8.764-1	1.15-10	1.11-10	1.03-10	9.31-11	8.15-11	6.91-11	5.63-11	4.31-11
168	6.826-1	1.11-10	1.07-10	9.96-11	9.00-11	7.88-11	6.68-11	5.43-11	4.15-11
169	5.316-1	1.07-10	1.03-10	9.62-11	8.69-11	7.60-11	6.42-11	5.20-11	3.95-11
170	4.140-1	9.36-11	9.02-11	8.45-11	7.69-11	6.79-11	5.80-11	4.77-11	3.69-11
171	1.000-1	5.75-11	5.58-11	5.28-11	4.88-11	4.39-11	3.83-11	3.22-11	2.57-11
	1.000-5								

Table C-3b. Total Dose Rate Transmission Factors for 1.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	5.05-07	4.47-07	3.62-07	2.72-07	1.93-07	1.32-07	8.81-08	5.65-08
2	1.649+7	4.68-07	4.14-07	3.36-07	2.53-07	1.81-07	1.25-07	8.43-08	5.48-08
3	1.568+7	4.36-07	3.88-07	3.18-07	2.42-07	1.75-07	1.21-07	8.17-08	5.28-08
4	1.492+7	4.25-07	3.78-07	3.09-07	2.35-07	1.70-07	1.19-07	8.06-08	5.25-08
5	1.455+7	4.14-07	3.68-07	3.01-07	2.29-07	1.66-07	1.16-07	7.91-08	5.19-08
6	1.419+7	4.06-07	3.61-07	2.95-07	2.25-07	1.63-07	1.15-07	7.85-08	5.17-08
7	1.384+7	3.99-07	3.55-07	2.91-07	2.22-07	1.62-07	1.14-07	7.79-08	5.14-08
8	1.350+7	4.02-07	3.57-07	2.92-07	2.22-07	1.61-07	1.12-07	7.68-08	5.05-08
9	1.284+7	3.80-07	3.38-07	2.75-07	2.10-07	1.52-07	1.06-07	7.28-08	4.81-08
10	1.221+7	2.91-07	2.61-07	2.18-07	1.70-07	1.28-07	9.36-08	6.70-08	4.63-08
11	1.162+7	2.75-07	2.47-07	2.07-07	1.63-07	1.23-07	9.07-08	6.58-08	4.62-08
12	1.105+7	3.68-07	3.24-07	2.60-07	1.95-07	1.39-07	9.71-08	6.74-08	4.59-08
13	1.051+7	3.18-07	2.82-07	2.30-07	1.75-07	1.28-07	9.15-08	6.48-08	4.48-08
14	1.000+7	3.59-07	3.17-07	2.55-07	1.92-07	1.38-07	9.70-08	6.76-08	4.62-08
15	9.512+6	3.78-07	3.32-07	2.66-07	1.98-07	1.41-07	9.81-08	6.80-08	4.62-08
16	9.048+6	3.15-07	2.80-07	2.29-07	1.76-07	1.30-07	9.43-08	6.76-08	4.72-08
17	8.607+6	3.10-07	2.75-07	2.25-07	1.73-07	1.28-07	9.30-08	6.72-08	4.75-08
18	8.187+6	3.51-07	3.11-07	2.52-07	1.91-07	1.40-07	1.01-07	7.27-08	5.16-08
19	7.788+6	3.11-07	2.78-07	2.31-07	1.81-07	1.38-07	1.04-07	7.80-08	5.76-08
20	7.408+6	2.98-07	2.69-07	2.27-07	1.82-07	1.41-07	1.09-07	8.28-08	6.18-08
21	7.047+6	4.32-07	3.81-07	3.08-07	2.32-07	1.67-07	1.18-07	8.27-08	5.70-08
22	6.703+6	4.95-07	4.36-07	3.50-07	2.59-07	1.83-07	1.25-07	8.54-08	5.73-08
23	6.592+6	5.85-07	5.08-07	3.96-07	2.82-07	1.89-07	1.25-07	8.18-08	5.34-08
24	6.376+6	4.72-07	4.15-07	3.32-07	2.47-07	1.74-07	1.20-07	8.24-08	5.54-08
25	6.065+6	3.40-07	3.04-07	2.51-07	1.95-07	1.45-07	1.05-07	7.43-08	5.11-08
26	5.770+6	3.07-07	2.78-07	2.35-07	1.87-07	1.42-07	1.05-07	7.53-08	5.15-08
27	5.488+6	4.29-07	3.75-07	2.97-07	2.18-07	1.51-07	1.02-07	6.75-08	4.34-08
28	5.221+6	1.84-07	1.68-07	1.44-07	1.17-07	9.18-08	7.01-08	5.22-08	3.72-08
29	4.966+6	2.41-07	2.17-07	1.80-07	1.41-07	1.06-07	7.67-08	5.41-08	3.64-08
30	4.724+6	2.07-07	1.86-07	1.55-07	1.22-07	9.14-08	6.66-08	4.72-08	3.18-08
31	4.493+6	1.38-07	1.27-07	1.09-07	9.00-08	7.10-08	5.43-08	4.00-08	2.77-08
32	4.066+6	9.07-08	8.51-08	7.62-08	6.56-08	5.47-08	4.42-08	3.44-08	2.52-08
33	3.679+6	7.16-08	6.81-08	6.25-08	5.56-08	4.82-08	4.07-08	3.34-08	2.60-08
34	3.329+6	8.02-08	7.57-08	6.85-08	5.99-08	5.09-08	4.23-08	3.43-08	2.66-08
35	3.166+6	1.24-07	1.13-07	9.82-08	8.11-08	6.47-08	5.04-08	3.83-08	2.79-08
36	3.012+6	1.48-07	1.33-07	1.11-07	8.80-08	6.75-08	5.08-08	3.77-08	2.71-08
37	2.865+6	1.26-07	1.14-07	9.69-08	7.82-08	6.13-08	4.73-08	3.61-08	2.66-08
38	2.725+6	1.13-07	1.03-07	8.87-08	7.29-08	5.84-08	4.58-08	3.53-08	2.62-08
39	2.592+6	1.08-07	9.96-08	8.73-08	7.33-08	5.94-08	4.66-08	3.52-08	2.53-08
40	2.466+6	1.98-07	1.73-07	1.37-07	1.01-07	7.05-08	4.78-08	3.13-08	1.94-08
41	2.385+6	3.14-07	2.64-07	1.94-07	1.27-07	7.72-08	4.51-08	2.55-08	1.38-08
42	2.365+6	3.98-07	3.28-07	2.30-07	1.39-07	7.59-08	4.07-08	2.19-08	1.15-08
43	2.346+6	2.20-07	1.81-07	1.29-07	8.09-08	4.80-08	2.85-08	1.71-08	9.95-09
44	2.307+6	6.34-08	5.57-08	4.50-08	3.45-08	2.57-08	1.87-08	1.33-08	8.97-09
45	2.231+6	4.03-08	3.66-08	3.11-08	2.54-08	2.01-08	1.55-08	1.15-08	8.09-09
46	2.123+6	3.18-08	2.93-08	2.56-08	2.14-08	1.74-08	1.37-08	1.04-08	7.40-09
47	2.019+6	2.39-08	2.25-08	2.04-08	1.77-08	1.49-08	1.22-08	9.52-09	6.95-09
48	1.921+6	1.84-08	1.76-08	1.62-08	1.45-08	1.26-08	1.06-08	8.57-09	6.52-09
49	1.827+6	2.56-08	2.37-08	2.09-08	1.76-08	1.45-08	1.15-08	8.79-09	6.28-09
50	1.738+6	1.84-08	1.75-08	1.59-08	1.40-08	1.19-08	9.80-09	7.77-09	5.78-09
51	1.653+6	1.52-08	1.45-08	1.34-08	1.21-08	1.05-08	8.83-09	7.17-09	5.48-09
52	1.572+6	1.83-08	1.73-08	1.57-08	1.37-08	1.16-08	9.49-09	7.43-09	5.44-09
53	1.496+6	1.69-08	1.60-08	1.46-08	1.29-08	1.09-08	8.98-09	7.06-09	5.18-09
54	1.423+6	1.56-08	1.49-08	1.37-08	1.21-08	1.04-08	8.58-09	6.76-09	4.95-09
55	1.353+6	1.24-08	1.20-08	1.12-08	1.02-08	8.92-09	7.56-09	6.12-09	4.62-09
56	1.287+6	1.37-08	1.31-08	1.21-08	1.07-08	9.25-09	7.66-09	6.04-09	4.39-09
57	1.225+6	1.32-08	1.26-08	1.16-08	1.04-08	8.89-09	7.34-09	5.77-09	4.16-09

Table C-3b. (Continued)

Group No.	Upper Energy Boundary (eV)	$r_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.15-08	1.10-08	1.02-08	9.13-09	7.92-09	6.63-09	5.29-09	3.89-09
59	1.108+6	7.81-09	7.58-09	7.19-09	6.66-09	6.02-09	5.30-09	4.51-09	3.62-09
60	1.003+6	6.99-09	6.82-09	6.52-09	6.12-09	5.63-09	5.06-09	4.43-09	3.71-09
61	9.616+5	9.07-09	8.79-09	8.31-09	7.66-09	6.88-09	6.02-09	5.09-09	4.09-09
62	9.072+5	1.09-08	1.05-08	9.82-09	8.90-09	7.85-09	6.70-09	5.50-09	4.25-09
63	8.629+5	1.06-08	1.02-08	9.58-09	8.72-09	7.71-09	6.61-09	5.45-09	4.23-09
64	8.209+5	1.02-08	9.81-09	9.20-09	8.41-09	7.46-09	6.43-09	5.34-09	4.20-09
65	7.808+5	1.14-08	1.09-08	1.01-08	9.12-09	7.97-09	6.74-09	5.48-09	4.19-09
66	7.427+5	1.14-08	1.09-08	1.01-08	9.12-09	7.94-09	6.69-09	5.41-09	4.10-09
67	7.065+5	1.12-08	1.07-08	9.92-09	8.92-09	7.76-09	6.53-09	5.27-09	3.98-09
68	6.721+5	1.08-08	1.04-08	9.66-09	8.68-09	7.56-09	6.36-09	5.12-09	3.85-09
69	6.393+5	1.06-08	1.02-08	9.45-09	8.50-09	7.39-09	6.20-09	4.97-09	3.71-09
70	6.081+5	1.01-08	9.70-09	9.03-09	8.13-09	7.09-09	5.95-09	4.77-09	3.55-09
71	5.784+5	8.63-09	8.32-09	7.80-09	7.11-09	6.27-09	5.35-09	4.36-09	3.33-09
72	5.502+5	9.52-09	9.15-09	8.50-09	7.65-09	6.64-09	5.53-09	4.37-09	3.17-09
73	5.234+5	8.71-09	8.39-09	7.82-09	7.07-09	6.16-09	5.16-09	4.08-09	2.94-09
74	4.979+5	6.18-09	6.00-09	5.68-09	5.24-09	4.70-09	4.07-09	3.36-09	2.58-09
75	4.505+5	4.48-09	4.39-09	4.22-09	3.99-09	3.70-09	3.36-09	2.97-09	2.52-09
76	4.076+5	5.59-09	5.44-09	5.18-09	4.83-09	4.40-09	3.91-09	3.37-09	2.76-09
77	3.877+5	6.15-09	5.97-09	5.66-09	5.24-09	4.74-09	4.16-09	3.53-09	2.84-09
78	3.688+5	6.54-09	6.34-09	5.99-09	5.53-09	4.96-09	4.33-09	3.64-09	2.89-09
79	3.337+5	6.76-09	6.55-09	6.18-09	5.68-09	5.08-09	4.41-09	3.68-09	2.89-09
80	3.020+5	6.72-09	6.51-09	6.14-09	5.65-09	5.06-09	4.39-09	3.66-09	2.88-09
81	2.985+5	6.74-09	6.53-09	6.16-09	5.66-09	5.07-09	4.39-09	3.67-09	2.88-09
82	2.972+5	6.73-09	6.51-09	6.15-09	5.65-09	5.06-09	4.39-09	3.66-09	2.87-09
83	2.945+5	6.68-09	6.47-09	6.11-09	5.62-09	5.03-09	4.36-09	3.64-09	2.86-09
84	2.873+5	6.71-09	6.50-09	6.14-09	5.64-09	5.04-09	4.37-09	3.64-09	2.85-09
85	2.732+5	6.58-09	6.37-09	6.02-09	5.54-09	4.96-09	4.30-09	3.58-09	2.80-09
86	2.472+5	6.39-09	6.19-09	5.85-09	5.39-09	4.83-09	4.20-09	3.51-09	2.75-09
87	2.352+5	6.28-09	6.09-09	5.76-09	5.31-09	4.77-09	4.15-09	3.47-09	2.72-09
88	2.237+5	5.82-09	5.66-09	5.37-09	4.98-09	4.50-09	3.96-09	3.35-09	2.68-09
89	2.128+5	5.56-09	5.41-09	5.15-09	4.80-09	4.36-09	3.86-09	3.31-09	2.69-09
90	2.024+5	5.33-09	5.20-09	4.97-09	4.65-09	4.26-09	3.81-09	3.30-09	2.74-09
91	1.926+5	5.49-09	5.36-09	5.12-09	4.79-09	4.39-09	3.92-09	3.41-09	2.83-09
92	1.832+5	6.21-09	6.04-09	5.73-09	5.32-09	4.82-09	4.25-09	3.63-09	2.95-09
93	1.742+5	6.87-09	6.66-09	6.28-09	5.78-09	5.18-09	4.51-09	3.78-09	3.00-09
94	1.657+5	7.42-09	7.17-09	6.73-09	6.15-09	5.47-09	4.71-09	3.90-09	3.03-09
95	1.576+5	7.48-09	7.22-09	6.78-09	6.19-09	5.50-09	4.73-09	3.90-09	3.03-09
96	1.500+5	7.32-09	7.08-09	6.65-09	6.09-09	5.41-09	4.67-09	3.87-09	3.02-09
97	1.426+5	7.11-09	6.88-09	6.48-09	5.94-09	5.30-09	4.58-09	3.82-09	3.00-09
98	1.357+5	7.65-09	7.37-09	6.91-09	6.29-09	5.57-09	4.76-09	3.91-09	3.01-09
99	1.291+5	7.71-09	7.43-09	6.96-09	6.33-09	5.59-09	4.77-09	3.91-09	2.99-09
100	1.228+5	7.39-09	7.13-09	6.69-09	6.11-09	5.41-09	4.64-09	3.82-09	2.95-09
101	1.168+5	7.49-09	7.22-09	6.77-09	6.17-09	5.45-09	4.66-09	3.82-09	2.92-09
102	1.111+5	7.23-09	6.98-09	6.55-09	5.98-09	5.29-09	4.53-09	3.72-09	2.86-09
103	9.804+4	6.59-09	6.38-09	6.02-09	5.53-09	4.94-09	4.28-09	3.56-09	2.79-09
104	8.652+4	6.38-09	6.18-09	5.84-09	5.38-09	4.82-09	4.20-09	3.51-09	2.78-09
105	8.250+4	6.68-09	6.47-09	6.09-09	5.59-09	4 99-09	4.31-09	3.58-09	2.80-09
106	7.950+4	6.78-09	6.55-09	6.17-09	5.65-09	5.03-09	4.33-09	3.59-09	2.79-09
107	7.200+4	6.72-09	6.49-09	6.12-09	5.60-09	4.99-09	4.30-09	3.56-09	2.77-09
108	6.738+4	6.66-09	6.44-09	6.06-09	5.56-09	4.95-09	4.26-09	3.53-09	2.74-09
109	5.656+4	6.48-09	6.27-09	5.91-09	5.42-09	4.84-09	4.18-09	3.47-09	2.71-09
110	5.248+4	6.57-09	6.35-09	5.98-09	5.48-09	4.88-09	4.20-09	3.47-09	2.69-09
111	4.631+4	6.47-09	6.25-09	5.89-09	5.39-09	4.80-09	4.13-09	3.41-09	2.63-09
112	4.087+4	5.95-09	5.77-09	5.45-09	5.02-09	4.51-09	3.92-09	3.28-09	2.58-09
113	3.431+4	6.04-09	5.86-09	5.53-09	5.09-09	4.56-09	3.96-09	3.30-09	2.60-09
114	3.183+4	6.27-09	6.07-09	5.72-09	5.25-09	4.68-09	4.04-09	3.35-09	2.61-09

Table C-3b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	6.13-09	5.93-09	5.60-09	5.15-09	4.60-09	3.98-09	3.31-09	2.59-09
116	2.700+4	6.34-09	6.13-09	5.78-09	5.29-09	4.71-09	4.06-09	3.35-09	2.60-09
117	2.606+4	6.35-09	6.14-09	5.79-09	5.30-09	4.72-09	4.06-09	3.35-09	2.59-09
118	2.479+4	6.34-09	6.13-09	5.78-09	5.29-09	4.71-09	4.05-09	3.34-09	2.58-09
119	2.418+4	6.33-09	6.12-09	5.76-09	5.28-09	4.70-09	4.04-09	3.33-09	2.58-09
120	2.358+4	6.27-09	6.07-09	5.71-09	5.24-09	4.66-09	4.01-09	3.31-09	2.57-09
121	2.188+4	6.21-09	6.01-09	5.66-09	5.19-09	4.62-09	3.98-09	3.29-09	2.55-09
122	1.931+4	6.11-09	5.91-09	5.57-09	5.11-09	4.55-09	3.92-09	3.24-09	2.51-09
123	1.503+4	5.95-09	5.76-09	5.43-09	4.98-09	4.44-09	3.83-09	3.17-09	2.46-09
124	1.171+4	5.74-09	5.56-09	5.25-09	4.82-09	4.31-09	3.73-09	3.09-09	2.40-09
125	9.119+3	5.63-09	5.45-09	5.15-09	4.73-09	4.23-09	3.66-09	3.04-09	2.36-09
126	7.102+3	5.49-09	5.32-09	5.03-09	4.63-09	4.14-09	3.59-09	2.98-09	2.33-09
127	5.531+3	5.39-09	5.22-09	4.94-09	4.55-09	4.07-09	3.53-09	2.93-09	2.29-09
128	4.307+3	5.23-09	5.07-09	4.80-09	4.42-09	3.96-09	3.43-09	2.85-09	2.22-09
129	3.707+3	4.86-09	4.72-09	4.47-09	4.13-09	3.71-09	3.24-09	2.71-09	2.12-09
130	3.355+3	4.41-09	4.29-09	4.08-09	3.79-09	3.43-09	3.02-09	2.56-09	2.04-09
131	3.035+3	3.57-09	3.50-09	3.36-09	3.18-09	2.95-09	2.68-09	2.37-09	2.01-09
132	2.747+3	4.04-09	3.95-09	3.78-09	3.55-09	3.26-09	2.93-09	2.56-09	2.14-09
133	2.613+3	4.62-09	4.49-09	4.28-09	3.98-09	3.62-09	3.20-09	2.73-09	2.22-09
134	2.485+3	5.05-09	4.90-09	4.65-09	4.30-09	3.88-09	3.39-09	2.86-09	2.27-09
135	2.249+3	5.29-09	5.13-09	4.85-09	4.48-09	4.02-09	3.49-09	2.92-09	2.30-09
136	2.035+3	5.38-09	5.22-09	4.93-09	4.54-09	4.06-09	3.52-09	2.94-09	2.30-09
137	1.585+3	5.38-09	5.21-09	4.92-09	4.53-09	4.05-09	3.51-09	2.92-09	2.28-09
138	1.234+3	5.33-09	5.17-09	4.88-09	4.49-09	4.02-09	3.48-09	2.90-09	2.27-09
139	9.611+2	5.29-09	5.12-09	4.84-09	4.45-09	3.98-09	3.45-09	2.87-09	2.24-09
140	7.485+2	5.23-09	5.07-09	4.79-09	4.41-09	3.94-09	3.41-09	2.84-09	2.22-09
141	5.829+2	5.18-09	5.02-09	4.74-09	4.36-09	3.90-09	3.38-09	2.81-09	2.20-09
142	4.540+2	5.13-09	4.97-09	4.70-09	4.32-09	3.86-09	3.35-09	2.79-09	2.18-09
143	3.536+2	5.08-09	4.92-09	4.65-09	4.28-09	3.83-09	3.32-09	2.76-09	2.16-09
144	2.754+2	5.03-09	4.87-09	4.60-09	4.24-09	3.79-09	3.28-09	2.73-09	2.14-09
145	2.144+2	4.98-09	4.83-09	4.56-09	4.20-09	3.75-09	3.25-09	2.71-09	2.11-09
146	1.670+2	4.93-09	4.78-09	4.52-09	4.16-09	3.72-09	3.22-09	2.68-09	2.09-09
147	1.301+2	4.89-09	4.73-09	4.47-09	4.12-09	3.68-09	3.19-09	2.65-09	2.07-09
148	1.013+2	4.84-09	4.69-09	4.43-09	4.08-09	3.65-09	3.16-09	2.63-09	2.05-09
149	7.889+1	4.79-09	4.65-09	4.39-09	4.04-09	3.61-09	3.13-09	2.60-09	2.03-09
150	6.144+1	4.75-09	4.60-09	4.35-09	4.00-09	3.58-09	3.10-09	2.58-09	2.02-09
151	4.785+1	4.71-09	4.56-09	4.31-09	3.96-09	3.55-09	3.07-09	2.55-09	2.00-09
152	3.727+1	4.66-09	4.51-09	4.26-09	3.92-09	3.51-09	3.04-09	2.53-09	1.98-09
153	2.920+1	4.61-09	4.47-09	4.22-09	3.89-09	3.48-09	3.01-09	2.50-09	1.96-09
154	2.260+1	4.57-09	4.43-09	4.18-09	3.85-09	3.44-09	2.98-09	2.48-09	1.94-09
155	1.760+1	4.53-09	4.39-09	4.14-09	3.81-09	3.41-09	2.95-09	2.45-09	1.92-09
156	1.371+1	4.48-09	4.34-09	4.10-09	3.78-09	3.38-09	2.92-09	2.43-09	1.90-09
157	1.068+1	4.44-09	4.30-09	4.06-09	3.74-09	3.34-09	2.89-09	2.40-09	1.88-09
158	8.315+0	4.40-09	4.26-09	4.02-09	3.70-09	3.31-09	2.86-09	2.38-09	1.86-09
159	6.476+0	4.35-09	4.22-09	3.98-09	3.66-09	3.28-09	2.83-09	2.35-09	1.84-09
160	5.043+0	4.31-09	4.17-09	3.94-09	3.63-09	3.24-09	2.80-09	2.33-09	1.82-09
161	3.928+0	4.26-09	4.13-09	3.90-09	3.59-09	3.21-09	2.77-09	2.30-09	1.79-09
162	3.059+0	4.22-09	4.09-09	3.86-09	3.55-09	3.17-09	2.74-09	2.28-09	1.77-09
163	2.372+0	4.17-09	4.04-09	3.82-09	3.51-09	3.14-09	2.71-09	2.25-09	1.75-09
164	1.855+0	4.13-09	4.00-09	3.78-09	3.47-09	3.10-09	2.68-09	2.22-09	1.73-09
165	1.445+0	4.08-09	3.95-09	3.73-09	3.43-09	3.06-09	2.65-09	2.19-09	1.70-09
166	1.125+0	4.03-09	3.90-09	3.68-09	3.39-09	3.02-09	2.61-09	2.16-09	1.68-09
167	8.764-1	3.97-09	3.85-09	3.63-09	3.34-09	2.98-09	2.57-09	2.13-09	1.65-09
168	6.826-1	3.91-09	3.79-09	3.58-09	3.29-09	2.94-09	2.53-09	2.09-09	1.62-09
169	5.316-1	3.85-09	3.73-09	3.52-09	3.24-09	2.89-09	2.49-09	2.05-09	1.58-09
170	4.140-1	3.48-09	3.38-09	3.20-09	2.96-09	2.66-09	2.31-09	1.93-09	1.51-09
171	1.000-1	2.58-09	2.51-09	2.40-09	2.24-09	2.04-09	1.81-09	1.55-09	1.25-09
	1.000-5								

Table C-3c. Gamma-ray Dose Rate Transmission Factors for 1.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{RJ}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	1.63-07	1.38-07	9.78-08	5.40-08	2.00-08	3.81-09	3.69-10	9.80-10
2	1.200+7	1.32-07	1.11-07	7.79-08	4.25-08	1.56-08	2.99-09	3.43-10	8.38-10
3	1.000+7	1.00-07	8.34-08	5.80-08	3.11-08	1.12-08	2.15-09	3.03-10	6.66-10
4	8.000+6	7.90-08	6.55-08	4.50-08	2.37-08	8.41-09	1.59-09	2.57-10	5.24-10
5	7.500+6	6.98-08	5.77-08	3.94-08	2.06-08	7.23-09	1.37-09	2.35-10	4.65-10
6	7.000+6	6.05-08	4.98-08	3.37-08	1.74-08	6.07-09	1.14-09	2.11-10	4.04-10
7	6.500+6	5.12-08	4.19-08	2.81-08	1.44-08	4.96-09	9.33-10	1.85-10	3.43-10
8	6.000+6	4.20-08	3.42-08	2.27-08	1.14-08	3.92-09	7.38-10	1.57-10	2.83-10
9	5.500+6	3.34-08	2.70-08	1.77-08	8.79-09	2.98-09	5.64-10	1.28-10	2.26-10
10	5.000+6	2.56-08	2.05-08	1.33-08	6.51-09	2.19-09	4.16-10	1.01-10	1.73-10
11	4.500+6	1.87-08	1.49-08	9.52-09	4.58-09	1.53-09	2.92-10	7.47-11	1.26-10
12	4.000+6	1.28-08	1.01-08	6.33-09	2.99-09	9.94-10	1.92-10	5.11-11	8.53-11
13	3.500+6	7.93-09	6.17-09	3.80-09	1.76-09	5.86-10	1.15-10	3.12-11	5.22-11
14	3.000+6	4.30-09	3.30-09	1.99-09	9.08-10	3.04-10	6.14-11	1.64-11	2.79-11
15	2.500+6	1.90-09	1.44-09	8.48-10	3.82-10	1.30-10	2.73-11	6.99-12	1.23-11
16	2.000+6	7.29-10	5.41-10	3.12-10	1.39-10	4.80-11	1.07-11	2.14-12	4.31-12
17	1.660+6	3.41-10	2.50-10	1.41-10	6.22-11	2.20-11	5.30-12	5.59-13	1.69-12
18	1.500+6	1.92-10	1.40-10	7.86-11	3.49-11	1.26-11	3.28-12	1.28-13	8.62-13
19	1.330+6	7.24-11	5.26-11	2.99-11	1.38-11	5.23-12	1.40-12	6.13-14	3.88-13
20	1.000+6	1.48-11	1.06-11	5.89-12	2.70-12	1.04-12	2.96-13	5.02-15	6.51-14
21	8.000+5	4.30-12	3.00-12	1.63-12	7.42-13	2.91-13	8.84-14	8.22-15	1.31-14
22	7.000+5	1.67-12	1.16-12	6.31-13	2.90-13	1.17-13	3.70-14	4.75-15	4.30-15
23	6.000+5	5.51-13	3.79-13	2.05-13	9.54-14	3.92-14	1.30-14	2.21-15	1.01-15
24	5.120+5	2.59-13	1.74-13	9.23-14	4.26-14	1.80-14	6.57-15	1.71-15	6.33-17
25	5.100+5	1.71-13	1.16-13	6.20-14	2.91-14	1.24-14	4.54-15	1.16-15	2.60-17
26	4.500+5	6.18-14	4.16-14	2.25-14	1.10-14	5.05-15	2.12-15	7.58-16	2.15-16
27	4.000+5	1.66-14	1.16-14	6.75-15	3.56-15	1.74-15	7.70-16	2.92-16	8.92-17
28	3.000+5	4.58-16	3.56-16	2.41-16	1.51-16	9.07-17	5.28-17	2.98-17	1.62-17
29	2.000+5	9.33-18	6.97-18	4.52-18	2.74-18	1.61-18	9.24-19	5.18-19	2.83-19
30	1.500+5	2.08-19	1.66-19	1.20-19	8.22-20	5.56-20	3.76-20	2.54-20	1.71-20
31	1.000+5	1.19-23	8.70-24	5.68-24	3.61-24	2.31-24	1.50-24	9.83-25	6.47-25
32	7.500+4	1.46-29	9.12-30	5.22-30	3.04-30	1.83-30	1.14-30	7.24-31	4.66-31
33	6.000+4	3.08-41	1.56-41	7.93-42	4.41-42	2.65-42	1.69-42	1.14-42	8.02-43
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-4a. Neutron Dose Rate Transmission Factors for 1.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	9.51-09	8.21-09	6.38-09	4.56-09	3.07-09	1.98-09	1.24-09	7.65-10
2	1.649+7	8.61-09	7.43-09	5.79-09	4.16-09	2.82-09	1.84-09	1.17-09	7.33-10
3	1.568+7	7.79-09	6.78-09	5.35-09	3.90-09	2.67-09	1.75-09	1.12-09	6.95-10
4	1.492+7	7.55-09	6.57-09	5.18-09	3.78-09	2.60-09	1.71-09	1.11-09	6.94-10
5	1.455+7	7.38-09	6.41-09	5.04-09	3.67-09	2.52-09	1.67-09	1.08-09	6.87-10
6	1.419+7	7.23-09	6.28-09	4.94-09	3.60-09	2.48-09	1.65-09	1.08-09	6.84-10
7	1.384+7	7.10-09	6.17-09	4.87-09	3.55-09	2.45-09	1.63-09	1.06-09	6.76-10
8	1.350+7	7.19-09	6.23-09	4.89-09	3.55-09	2.43-09	1.60-09	1.04-09	6.53-10
9	1.284+7	6.63-09	5.74-09	4.49-09	3.25-09	2.22-09	1.47-09	9.51-10	6.05-10
10	1.221+7	4.67-09	4.11-09	3.31-09	2.50-09	1.81-09	1.28-09	8.88-10	6.04-10
11	1.162+7	4.44-09	3.92-09	3.17-09	2.40-09	1.75-09	1.24-09	8.77-10	6.09-10
12	1.105+7	6.73-09	5.72-09	4.36-09	3.07-09	2.06-09	1.36-09	9.02-10	6.01-10
13	1.051+7	5.62-09	4.83-09	3.76-09	2.72-09	1.88-09	1.28-09	8.74-10	5.93-10
14	1.000+7	6.59-09	5.61-09	4.29-09	3.04-09	2.05-09	1.36-09	9.06-10	6.03-10
15	9.512+6	7.02-09	5.93-09	4.47-09	3.12-09	2.08-09	1.37-09	9.09-10	6.04-10
16	9.048+6	5.41-09	4.67-09	3.66-09	2.68-09	1.89-09	1.32-09	9.19-10	6.35-10
17	8.607+6	5.35-09	4.61-09	3.60-09	2.63-09	1.85-09	1.29-09	9.00-10	6.30-10
18	8.187+6	6.28-09	5.36-09	4.11-09	2.94-09	2.03-09	1.40-09	9.83-10	6.99-10
19	7.788+6	5.18-09	4.50-09	3.57-09	2.68-09	1.96-09	1.44-09	1.08-09	8.15-10
20	7.408+6	4.87-09	4.30-09	3.50-09	2.70-09	2.03-09	1.52-09	1.15-09	8.55-10
21	7.047+6	8.21-09	6.96-09	5.28-09	3.70-09	2.47-09	1.63-09	1.08-09	7.16-10
22	6.703+6	9.91-09	8.35-09	6.25-09	4.27-09	2.76-09	1.73-09	1.08-09	6.82-10
23	6.592+6	1.24-08	1.01-08	7.15-09	4.57-09	2.74-09	1.62-09	9.62-10	5.91-10
24	6.376+6	8.26-09	6.94-09	5.17-09	3.54-09	2.30-09	1.46-09	9.35-10	6.04-10
25	6.065+6	4.85-09	4.21-09	3.32-09	2.44-09	1.71-09	1.17-09	7.96-10	5.32-10
26	5.770+6	4.13-09	3.65-09	2.97-09	2.26-09	1.64-09	1.15-09	7.87-10	5.18-10
27	5.488+6	6.65-09	5.52-09	4.04-09	2.69-09	1.69-09	1.02-09	6.18-10	3.71-10
28	5.221+6	1.90-09	1.70-09	1.41-09	1.11-09	8.32-10	6.10-10	4.39-10	3.06-10
29	4.966+6	2.61-09	2.28-09	1.81-09	1.35-09	9.52-10	6.52-10	4.38-10	2.84-10
30	4.724+6	2.04-09	1.79-09	1.43-09	1.06-09	7.55-10	5.22-10	3.55-10	2.33-10
31	4.493+6	1.16-09	1.04-09	8.80-10	7.01-10	5.36-10	3.97-10	2.86-10	1.94-10
32	4.066+6	6.71-10	6.24-10	5.52-10	4.67-10	3.82-10	3.04-10	2.35-10	1.71-10
33	3.679+6	5.17-10	4.89-10	4.45-10	3.92-10	3.36-10	2.82-10	2.31-10	1.81-10
34	3.329+6	6.01-10	5.63-10	5.03-10	4.32-10	3.62-10	2.97-10	2.39-10	1.86-10
35	3.166+6	9.96-10	9.00-10	7.59-10	6.08-10	4.71-10	3.57-10	2.66-10	1.92-10
36	3.012+6	1.25-09	1.09-09	8.69-10	6.55-10	4.79-10	3.48-10	2.54-10	1.84-10
37	2.865+6	9.94-10	8.77-10	7.14-10	5.54-10	4.20-10	3.18-10	2.42-10	1.84-10
38	2.725+6	8.46-10	7.60-10	6.39-10	5.16-10	4.07-10	3.18-10	2.46-10	1.86-10
39	2.592+6	8.29-10	7.64-10	6.66-10	5.55-10	4.46-10	3.46-10	2.57-10	1.80-10
40	2.466+6	2.10-09	1.74-09	1.27-09	8.58-10	5.49-10	3.35-10	1.94-10	1.05-10
41	2.385+6	4.47-09	3.42-09	2.17-09	1.18-09	5.74-10	2.46-10	8.64-11	2.01-11
42	2.365+6	6.70-09	4.81-09	2.67-09	1.19-09	4.61-10	1.56-10	3.66-11	1.13-12
43	2.346+6	2.31-09	1.64-09	8.96-10	4.04-10	1.64-10	6.00-11	1.75-11	3.22-12
44	2.307+6	1.72-10	1.35-10	9.11-11	5.67-11	3.41-11	2.04-11	1.22-11	7.31-12
45	2.231+6	6.15-11	5.11-11	3.82-11	2.69-11	1.84-11	1.25-11	8.38-12	5.52-12
46	2.123+6	3.54-11	3.05-11	2.40-11	1.79-11	1.29-11	9.21-12	6.48-12	4.43-12
47	2.019+6	1.91-11	1.74-11	1.48-11	1.20-11	9.46-12	7.27-12	5.45-12	3.90-12
48	1.921+6	1.24-11	1.17-11	1.05-11	9.02-12	7.52-12	6.07-12	4.74-12	3.52-12
49	1.827+6	2.24-11	1.93-11	1.52-11	1.14-11	8.34-12	6.02-12	4.30-12	2.96-12
50	1.738+6	1.16-11	1.05-11	9.03-12	7.40-12	5.88-12	4.58-12	3.50-12	2.56-12
51	1.653+6	8.25-12	7.72-12	6.89-12	5.91-12	4.92-12	3.99-12	3.14-12	2.36-12
52	1.572+6	1.10-11	9.96-12	8.47-12	6.88-12	5.41-12	4.15-12	3.10-12	2.21-12
53	1.496+6	9.14-12	8.37-12	7.23-12	5.97-12	4.76-12	3.70-12	2.79-12	2.00-12
54	1.423+6	7.57-12	7.02-12	6.18-12	5.21-12	4.24-12	3.35-12	2.56-12	1.84-12
55	1.353+6	5.15-12	4.91-12	4.52-12	4.02-12	3.45-12	2.87-12	2.28-12	1.70-12
56	1.287+6	5.98-12	5.60-12	5.00-12	4.28-12	3.53-12	2.81-12	2.15-12	1.54-12
57	1.225+6	5.68-12	5.30-12	4.70-12	4.00-12	3.28-12	2.60-12	1.98-12	1.40-12

Table C-4a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	4.61-12	4.32-12	3.87-12	3.33-12	2.78-12	2.24-12	1.74-12	1.26-12
59	1.108+6	2.73-12	2.63-12	2.46-12	2.24-12	1.99-12	1.73-12	1.45-12	1.16-12
60	1.003+6	2.37-12	2.30-12	2.18-12	2.03-12	1.85-12	1.65-12	1.43-12	1.20-12
61	9.616+5	3.19-12	3.07-12	2.86-12	2.59-12	2.29-12	1.97-12	1.65-12	1.32-12
62	9.072+5	4.03-12	3.82-12	3.48-12	3.06-12	2.62-12	2.18-12	1.76-12	1.35-12
63	8.629+5	3.79-12	3.61-12	3.31-12	2.93-12	2.53-12	2.12-12	1.72-12	1.33-12
64	8.209+5	3.54-12	3.37-12	3.11-12	2.78-12	2.41-12	2.04-12	1.67-12	1.30-12
65	7.808+5	4.12-12	3.88-12	3.49-12	3.03-12	2.55-12	2.09-12	1.67-12	1.26-12
66	7.427+5	4.07-12	3.83-12	3.43-12	2.97-12	2.49-12	2.03-12	1.60-12	1.20-12
67	7.065+5	3.86-12	3.63-12	3.27-12	2.83-12	2.38-12	1.94-12	1.52-12	1.14-12
68	6.721+5	3.63-12	3.42-12	3.09-12	2.68-12	2.26-12	1.84-12	1.45-12	1.08-12
69	6.393+5	3.45-12	3.25-12	2.94-12	2.56-12	2.15-12	1.75-12	1.37-12	1.01-12
70	6.081+5	3.14-12	2.97-12	2.70-12	2.37-12	2.00-12	1.64-12	1.28-12	9.44-13
71	5.784+5	2.51-12	2.40-12	2.21-12	1.98-12	1.71-12	1.44-12	1.15-12	8.73-13
72	5.502+5	2.81-12	2.66-12	2.42-12	2.12-12	1.79-12	1.46-12	1.13-12	8.07-13
73	5.234+5	2.45-12	2.34-12	2.14-12	1.89-12	1.62-12	1.32-12	1.03-12	7.33-13
74	4.979+5	1.60-12	1.55-12	1.46-12	1.33-12	1.18-12	1.02-12	8.35-13	6.38-13
75	4.505+5	1.12-12	1.10-12	1.05-12	9.93-13	9.18-13	8.30-13	7.31-13	6.19-13
76	4.076+5	1.44-12	1.39-12	1.32-12	1.22-12	1.10-12	9.65-13	8.25-13	6.74-13
77	3.877+5	1.60-12	1.55-12	1.45-12	1.32-12	1.18-12	1.02-12	8.62-13	6.91-13
78	3.688+5	1.71-12	1.64-12	1.54-12	1.39-12	1.23-12	1.06-12	8.81-13	6.96-13
79	3.337+5	1.76-12	1.69-12	1.57-12	1.42-12	1.25-12	1.07-12	8.82-13	6.89-13
80	3.020+5	1.73-12	1.66-12	1.55-12	1.40-12	1.23-12	1.05-12	8.71-13	6.80-13
81	2.985+5	1.74-12	1.67-12	1.55-12	1.40-12	1.24-12	1.06-12	8.70-13	6.79-13
82	2.972+5	1.73-12	1.66-12	1.55-12	1.40-12	1.23-12	1.05-12	8.68-13	6.77-13
83	2.945+5	1.71-12	1.64-12	1.53-12	1.39-12	1.22-12	1.05-12	8.63-13	6.74-13
84	2.873+5	1.71-12	1.65-12	1.53-12	1.39-12	1.22-12	1.04-12	8.59-13	6.68-13
85	2.732+5	1.66-12	1.59-12	1.49-12	1.35-12	1.19-12	1.02-12	8.37-13	6.51-13
86	2.472+5	1.58-12	1.52-12	1.43-12	1.30-12	1.15-12	9.83-13	8.12-13	6.32-13
87	2.352+5	1.55-12	1.49-12	1.39-12	1.27-12	1.12-12	9.64-13	7.98-13	6.22-13
88	2.237+5	1.41-12	1.36-12	1.28-12	1.18-12	1.05-12	9.14-13	7.68-13	6.11-13
89	2.128+5	1.33-12	1.29-12	1.22-12	1.12-12	1.01-12	8.89-13	7.56-13	6.13-13
90	2.024+5	1.27-12	1.23-12	1.17-12	1.08-12	9.85-13	8.74-13	7.54-13	6.24-13
91	1.926+5	1.31-12	1.27-12	1.20-12	1.12-12	1.01-12	8.99-13	7.77-13	6.45-13
92	1.832+5	1.50-12	1.45-12	1.36-12	1.25-12	1.12-12	9.74-13	8.25-13	6.68-13
93	1.742+5	1.69-12	1.62-12	1.51-12	1.37-12	1.20-12	1.03-12	8.55-13	6.75-13
94	1.657+5	1.85-12	1.77-12	1.63-12	1.46-12	1.27-12	1.07-12	8.73-13	6.75-13
95	1.576+5	1.86-12	1.77-12	1.63-12	1.46-12	1.27-12	1.07-12	8.69-13	6.70-13
96	1.500+5	1.79-12	1.71-12	1.58-12	1.42-12	1.24-12	1.05-12	8.56-13	6.64-13
97	1.426+5	1.72-12	1.65-12	1.53-12	1.37-12	1.20-12	1.02-12	8.40-13	6.56-13
98	1.357+5	1.87-12	1.79-12	1.64-12	1.46-12	1.26-12	1.06-12	8.53-13	6.51-13
99	1.291+5	1.88-12	1.79-12	1.64-12	1.46-12	1.26-12	1.05-12	8.45-13	6.42-13
100	1.228+5	1.77-12	1.69-12	1.56-12	1.39-12	1.20-12	1.01-12	8.21-13	6.29-13
101	1.168+5	1.79-12	1.70-12	1.57-12	1.40-12	1.21-12	1.01-12	8.14-13	6.18-13
102	1.111+5	1.69-12	1.62-12	1.49-12	1.33-12	1.16-12	9.71-13	7.85-13	5.98-13
103	9.804+4	1.49-12	1.43-12	1.33-12	1.20-12	1.06-12	9.00-13	7.41-13	5.77-13
104	8.652+4	1.42-12	1.36-12	1.27-12	1.16-12	1.02-12	8.76-13	7.26-13	5.71-13
105	8.250+4	1.50-12	1.44-12	1.33-12	1.20-12	1.05-12	8.96-13	7.35-13	5.71-13
106	7.950+4	1.51-12	1.45-12	1.34-12	1.21-12	1.06-12	8.96-13	7.32-13	5.65-13
107	7.200+4	1.48-12	1.42-12	1.32-12	1.19-12	1.04-12	8.82-13	7.21-13	5.56-13
108	6.738+4	1.45-12	1.39-12	1.29-12	1.17-12	1.02-12	8.64-13	7.06-13	5.44-13
109	5.656+4	1.39-12	1.33-12	1.24-12	1.12-12	9.82-13	8.36-13	6.85-13	5.31-13
110	5.248+4	1.40-12	1.34-12	1.25-12	1.12-12	9.82-13	8.32-13	6.79-13	5.22-13
111	4.631+4	1.36-12	1.30-12	1.21-12	1.09-12	9.54-13	8.08-13	6.58-13	5.05-13
112	4.087+4	1.22-12	1.17-12	1.10-12	9.97-13	8.82-13	7.57-13	6.26-13	4.91-13
113	3.431+4	1.23-12	1.18-12	1.11-12	1.00-12	8.86-13	7.58-13	6.26-13	4.89-13
114	3.183+4	1.28-12	1.23-12	1.14-12	1.03-12	9.05-13	7.70-13	6.30-13	4.87-13

Table C-4a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.24-12	1.19-12	1.11-12	1.00-12	8.83-13	7.53-13	6.20-13	4.82-13
116	2.700+4	1.28-12	1.23-12	1.15-12	1.03-12	9.03-13	7.66-13	6.25-13	4.81-13
117	2.606+4	1.28-12	1.23-12	1.14-12	1.03-12	9.01-13	7.63-13	6.22-13	4.78-13
118	2.479+4	1.28-12	1.23-12	1.14-12	1.03-12	8.96-13	7.59-13	6.18-13	4.75-13
119	2.418+4	1.27-12	1.22-12	1.13-12	1.02-12	8.92-13	7.56-13	6.16-13	4.72-13
120	2.358+4	1.25-12	1.20-12	1.12-12	1.01-12	8.81-13	7.47-13	6.09-13	4.68-13
121	2.188+4	1.23-12	1.18-12	1.10-12	9.91-13	8.67-13	7.35-13	6.00-13	4.61-13
122	1.931+4	1.19-12	1.15-12	1.07-12	9.63-13	8.43-13	7.16-13	5.84-13	4.49-13
123	1.503+4	1.14-12	1.09-12	1.02-12	9.20-13	8.07-13	6.86-13	5.61-13	4.32-13
124	1.171+4	1.07-12	1.03-12	9.64-13	8.73-13	7.68-13	6.55-13	5.37-13	4.15-13
125	9.119+3	1.03-12	9.94-13	9.28-13	8.42-13	7.42-13	6.33-13	5.20-13	4.02-13
126	7.102+3	9.88-13	9.52-13	8.90-13	8.09-13	7.13-13	6.10-13	5.02-13	3.89-13
127	5.531+3	9.54-13	9.19-13	8.60-13	7.82-13	6.90-13	5.91-13	4.86-13	3.77-13
128	4.307+3	9.09-13	8.76-13	8.20-13	7.47-13	6.60-13	5.65-13	4.65-13	3.59-13
129	3.707+3	8.25-13	7.98-13	7.50-13	6.87-13	6.11-13	5.27-13	4.37-13	3.40-13
130	3.355+3	7.39-13	7.16-13	6.78-13	6.25-13	5.62-13	4.90-13	4.12-13	3.27-13
131	3.035+3	5.86-13	5.73-13	5.50-13	5.18-13	4.78-13	4.32-13	3.81-13	3.24-13
132	2.747+3	6.69-13	6.52-13	6.22-13	5.81-13	5.31-13	4.75-13	4.12-13	3.44-13
133	2.613+3	7.75-13	7.51-13	7.10-13	6.56-13	5.91-13	5.18-13	4.39-13	3.56-13
134	2.485+3	8.56-13	8.27-13	7.77-13	7.11-13	6.33-13	5.48-13	4.57-13	3.62-13
135	2.249+3	8.99-13	8.67-13	8.12-13	7.39-13	6.54-13	5.62-13	4.65-13	3.64-13
136	2.035+3	9.10-13	8.77-13	8.20-13	7.45-13	6.57-13	5.62-13	4.63-13	3.61-13
137	1.585+3	8.97-13	8.64-13	8.07-13	7.32-13	6.46-13	5.52-13	4.54-13	3.53-13
138	1.234+3	8.75-13	8.43-13	7.87-13	7.14-13	6.30-13	5.38-13	4.43-13	3.44-13
139	9.611+2	8.56-13	8.24-13	7.70-13	6.98-13	6.16-13	5.26-13	4.33-13	3.36-13
140	7.485+2	8.35-13	8.03-13	7.50-13	6.81-13	6.00-13	5.13-13	4.22-13	3.27-13
141	5.829+2	8.13-13	7.83-13	7.31-13	6.64-13	5.85-13	5.00-13	4.11-13	3.19-13
142	4.540+2	7.93-13	7.63-13	7.13-13	6.47-13	5.70-13	4.87-13	4.01-13	3.11-13
143	3.536+2	7.73-13	7.44-13	6.95-13	6.31-13	5.56-13	4.75-13	3.91-13	3.03-13
144	2.754+2	7.54-13	7.26-13	6.78-13	6.15-13	5.42-13	4.63-13	3.81-13	2.96-13
145	2.144+2	7.35-13	7.08-13	6.61-13	6.00-13	5.29-13	4.51-13	3.71-13	2.88-13
146	1.670+2	7.17-13	6.90-13	6.45-13	5.85-13	5.15-13	4.40-13	3.62-13	2.81-13
147	1.301+2	6.99-13	6.73-13	6.29-13	5.70-13	5.02-13	4.29-13	3.53-13	2.74-13
148	1.013+2	6.82-13	6.56-13	6.13-13	5.56-13	4.90-13	4.18-13	3.44-13	2.67-13
149	7.889+1	6.65-13	6.40-13	5.98-13	5.42-13	4.77-13	4.08-13	3.35-13	2.60-13
150	6.144+1	6.48-13	6.24-13	5.83-13	5.28-13	4.65-13	3.97-13	3.27-13	2.53-13
151	4.785+1	6.32-13	6.09-13	5.68-13	5.15-13	4.54-13	3.87-13	3.18-13	2.47-13
152	3.727+1	6.16-13	5.93-13	5.54-13	5.02-13	4.42-13	3.77-13	3.10-13	2.40-13
153	2.920+1	6.01-13	5.78-13	5.40-13	4.90-13	4.31-13	3.68-13	3.02-13	2.34-13
154	2.260+1	5.86-13	5.63-13	5.26-13	4.77-13	4.20-13	3.58-13	2.94-13	2.28-13
155	1.760+1	5.71-13	5.49-13	5.13-13	4.65-13	4.09-13	3.49-13	2.86-13	2.22-13
156	1.371+1	5.56-13	5.35-13	5.00-13	4.53-13	3.98-13	3.40-13	2.79-13	2.16-13
157	1.068+1	5.42-13	5.22-13	4.87-13	4.41-13	3.88-13	3.31-13	2.71-13	2.10-13
158	8.315+0	5.28-13	5.08-13	4.74-13	4.30-13	3.78-13	3.22-13	2.64-13	2.04-13
159	6.476+0	5.14-13	4.95-13	4.62-13	4.18-13	3.68-13	3.13-13	2.57-13	1.99-13
160	5.043+0	5.01-13	4.82-13	4.50-13	4.07-13	3.58-13	3.05-13	2.50-13	1.93-13
161	3.928+0	4.88-13	4.69-13	4.38-13	3.96-13	3.48-13	2.96-13	2.43-13	1.87-13
162	3.059+0	4.75-13	4.57-13	4.26-13	3.86-13	3.39-13	2.88-13	2.36-13	1.82-13
163	2.372+0	4.62-13	4.44-13	4.14-13	3.75-13	3.29-13	2.80-13	2.29-13	1.76-13
164	1.855+0	4.50-13	4.32-13	4.03-13	3.65-13	3.20-13	2.72-13	2.22-13	1.71-13
165	1.445+0	4.37-13	4.20-13	3.92-13	3.54-13	3.11-13	2.64-13	2.15-13	1.65-13
166	1.125+0	4.25-13	4.08-13	3.80-13	3.44-13	3.01-13	2.56-13	2.08-13	1.60-13
167	8.764-1	4.12-13	3.96-13	3.69-13	3.33-13	2.92-13	2.47-13	2.01-13	1.54-13
168	6.826-1	3.98-13	3.83-13	3.57-13	3.22-13	2.82-13	2.39-13	1.94-13	1.49-13
169	5.316-1	3.85-13	3.70-13	3.44-13	3.11-13	2.72-13	2.30-13	1.86-13	1.42-13
170	4.140-1	3.35-13	3.23-13	3.03-13	2.75-13	2.43-13	2.08-13	1.71-13	1.32-13
171	1.000-1	2.06-13	2.00-13	1.89-13	1.75-13	1.57-13	1.37-13	1.15-13	9.21-14
	1.000-5								

Table C-4b. Total Dose Rate Transmission Factors for 1.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.24-08	1.08-08	8.65-09	6.40-09	4.49-09	3.04-09	2.01-09	1.28-09
2	1.649+7	1.13-08	9.93-09	7.94-09	5.91-09	4.18-09	2.86-09	1.91-09	1.24-09
3	1.568+7	1.04-08	9.18-09	7.42-09	5.59-09	4.00-09	2.76-09	1.85-09	1.19-09
4	1.492+7	1.01-08	8.91-09	7.21-09	5.44-09	3.90-09	2.70-09	1.83-09	1.19-09
5	1.455+7	9.87-09	8.69-09	7.02-09	5.29-09	3.80-09	2.64-09	1.79-09	1.18-09
6	1.419+7	9.68-09	8.53-09	6.89-09	5.20-09	3.74-09	2.61-09	1.78-09	1.17-09
7	1.384+7	9.51-09	8.39-09	6.79-09	5.13-09	3.70-09	2.58-09	1.76-09	1.16-09
8	1.350+7	9.61-09	8.45-09	6.81-09	5.12-09	3.67-09	2.55-09	1.73-09	1.13-09
9	1.284+7	8.96-09	7.88-09	6.34-09	4.77-09	3.42-09	2.38-09	1.62-09	1.07-09
10	1.221+7	6.61-09	5.90-09	4.88-09	3.81-09	2.86-09	2.10-09	1.51-09	1.05-09
11	1.162+7	6.30-09	5.64-09	4.68-09	3.67-09	2.77-09	2.05-09	1.49-09	1.05-09
12	1.105+7	8.98-09	7.78-09	6.13-09	4.50-09	3.18-09	2.21-09	1.53-09	1.04-09
13	1.051+7	7.64-09	6.69-09	5.36-09	4.03-09	2.92-09	2.08-09	1.47-09	1.02-09
14	1.000+7	8.79-09	7.63-09	6.02-09	4.44-09	3.15-09	2.20-09	1.52-09	1.04-09
15	9.512+6	9.30-09	8.01-09	6.25-09	4.55-09	3.19-09	2.21-09	1.52-09	1.03-09
16	9.048+6	7.42-09	6.52-09	5.25-09	3.99-09	2.93-09	2.11-09	1.51-09	1.06-09
17	8.607+6	7.32-09	6.42-09	5.16-09	3.91-09	2.86-09	2.07-09	1.48-09	1.05-09
18	8.187+6	8.37-09	7.27-09	5.76-09	4.29-09	3.09-09	2.21-09	1.59-09	1.13-09
19	7.788+6	7.09-09	6.27-09	5.12-09	3.96-09	2.99-09	2.25-09	1.70-09	1.27-09
20	7.408+6	6.69-09	5.99-09	4.99-09	3.96-09	3.06-09	2.35-09	1.79-09	1.33-09
21	7.047+6	1.06-08	9.11-09	7.12-09	5.20-09	3.65-09	2.52-09	1.74-09	1.18-09
22	6.703+6	1.25-08	1.07-08	8.26-09	5.90-09	4.01-09	2.67-09	1.77-09	1.16-09
23	6.592+6	1.53-08	1.27-08	9.37-09	6.32-09	4.07-09	2.58-09	1.65-09	1.06-09
24	6.376+6	1.09-08	9.32-09	7.22-09	5.20-09	3.59-09	2.43-09	1.64-09	1.10-09
25	6.065+6	7.00-09	6.20-09	5.05-09	3.88-09	2.86-09	2.06-09	1.46-09	1.00-09
26	5.770+6	6.19-09	5.57-09	4.67-09	3.69-09	2.80-09	2.06-09	1.47-09	1.00-09
27	5.488+6	9.24-09	7.89-09	6.06-09	4.32-09	2.94-09	1.96-09	1.29-09	8.24-10
28	5.221+6	3.39-09	3.10-09	2.66-09	2.18-09	1.72-09	1.32-09	9.92-10	7.08-10
29	4.966+6	4.46-09	4.00-09	3.33-09	2.61-09	1.97-09	1.45-09	1.03-09	6.96-10
30	4.724+6	3.77-09	3.39-09	2.84-09	2.25-09	1.71-09	1.26-09	9.08-10	6.17-10
31	4.493+6	2.51-09	2.32-09	2.03-09	1.69-09	1.35-09	1.05-09	7.82-10	5.45-10
32	4.066+6	1.72-09	1.62-09	1.46-09	1.27-09	1.07-09	8.74-10	6.86-10	5.03-10
33	3.679+6	1.39-09	1.33-09	1.22-09	1.10-09	9.55-10	8.11-10	6.68-10	5.19-10
34	3.329+6	1.54-09	1.46-09	1.33-09	1.17-09	1.01-09	8.43-10	6.87-10	5.34-10
35	3.166+6	2.30-09	2.13-09	1.86-09	1.56-09	1.26-09	9.99-10	7.67-10	5.61-10
36	3.012+6	2.74-09	2.48-09	2.09-09	1.69-09	1.32-09	1.01-09	7.64-10	5.53-10
37	2.865+6	2.37-09	2.16-09	1.85-09	1.53-09	1.22-09	9.60-10	7.41-10	5.50-10
38	2.725+6	2.14-09	1.98-09	1.73-09	1.45-09	1.19-09	9.46-10	7.37-10	5.50-10
39	2.592+6	2.10-09	1.96-09	1.74-09	1.49-09	1.22-09	9.74-10	7.44-10	5.36-10
40	2.466+6	3.96-09	3.44-09	2.73-09	2.04-09	1.46-09	1.01-09	6.74-10	4.23-10
41	2.385+6	6.95-09	5.64-09	3.99-09	2.57-09	1.58-09	9.39-10	5.45-10	3.03-10
42	2.365+6	9.61-09	7.38-09	4.71-09	2.68-09	1.49-09	8.44-10	4.78-10	2.62-10
43	2.346+6	4.32-09	3.43-09	2.36-09	1.52-09	9.71-10	6.26-10	3.99-10	2.42-10
44	2.307+6	1.19-09	1.07-09	9.13-10	7.42-10	5.83-10	4.45-10	3.27-10	2.24-10
45	2.231+6	8.55-10	7.95-10	7.02-10	5.95-10	4.87-10	3.86-10	2.93-10	2.08-10
46	2.123+6	7.29-10	6.84-10	6.13-10	5.28-10	4.39-10	3.52-10	2.71-10	1.94-10
47	2.019+6	5.92-10	5.63-10	5.15-10	4.54-10	3.87-10	3.19-10	2.51-10	1.84-10
48	1.921+6	4.70-10	4.52-10	4.20-10	3.78-10	3.31-10	2.80-10	2.27-10	1.74-10
49	1.827+6	6.23-10	5.86-10	5.27-10	4.55-10	3.81-10	3.07-10	2.37-10	1.70-10
50	1.738+6	4.78-10	4.55-10	4.18-10	3.71-10	3.19-10	2.65-10	2.12-10	1.58-10
51	1.653+6	4.03-10	3.87-10	3.59-10	3.24-10	2.84-10	2.40-10	1.96-10	1.50-10
52	1.572+6	4.79-10	4.56-10	4.17-10	3.68-10	3.15-10	2.59-10	2.04-10	1.50-10
53	1.496+6	4.48-10	4.27-10	3.93-10	3.48-10	2.99-10	2.47-10	1.95-10	1.44-10
54	1.423+6	4.20-10	4.01-10	3.71-10	3.31-10	2.86-10	2.37-10	1.88-10	1.38-10
55	1.353+6	3.41-10	3.29-10	3.08-10	2.80-10	2.47-10	2.10-10	1.70-10	1.29-10
56	1.287+6	3.73-10	3.57-10	3.31-10	2.96-10	2.57-10	2.14-10	1.69-10	1.23-10
57	1.225+6	3.62-10	3.46-10	3.20-10	2.87-10	2.48-10	2.06-10	1.62-10	1.17-10

Table C-4b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	3.16-10	3.04-10	2.83-10	2.55-10	2.22-10	1.87-10	1.50-10	1.10-10
59	1.108+6	2.19-10	2.13-10	2.02-10	1.88-10	1.70-10	1.50-10	1.28-10	1.03-10
60	1.003+6	1.97-10	1.92-10	1.84-10	1.73-10	1.59-10	1.43-10	1.25-10	1.05-10
61	9.616+5	2.54-10	2.46-10	2.33-10	2.16-10	1.94-10	1.70-10	1.44-10	1.16-10
62	9.072+5	3.04-10	2.93-10	2.74-10	2.50-10	2.21-10	1.90-10	1.56-10	1.21-10
63	8.629+5	2.96-10	2.86-10	2.69-10	2.46-10	2.18-10	1.87-10	1.55-10	1.20-10
64	8.209+5	2.85-10	2.75-10	2.59-10	2.37-10	2.11-10	1.83-10	1.52-10	1.20-10
65	7.808+5	3.17-10	3.05-10	2.84-10	2.57-10	2.26-10	1.92-10	1.57-10	1.20-10
66	7.427+5	3.19-10	3.06-10	2.85-10	2.58-10	2.26-10	1.91-10	1.55-10	1.18-10
67	7.065+5	3.13-10	3.01-10	2.80-10	2.53-10	2.21-10	1.87-10	1.51-10	1.15-10
68	6.721+5	3.05-10	2.93-10	2.74-10	2.47-10	2.16-10	1.83-10	1.47-10	1.11-10
69	6.393+5	3.00-10	2.88-10	2.69-10	2.43-10	2.12-10	1.79-10	1.44-10	1.08-10
70	6.081+5	2.87-10	2.76-10	2.58-10	2.33-10	2.04-10	1.72-10	1.38-10	1.03-10
71	5.784+5	2.47-10	2.39-10	2.25-10	2.05-10	1.81-10	1.55-10	1.27-10	9.70-11
72	5.502+5	2.73-10	2.62-10	2.44-10	2.21-10	1.92-10	1.61-10	1.28-10	9.28-11
73	5.234+5	2.51-10	2.42-10	2.26-10	2.05-10	1.79-10	1.51-10	1.19-10	8.62-11
74	4.979+5	1.80-10	1.75-10	1.66-10	1.53-10	1.38-10	1.19-10	9.87-11	7.58-11
75	4.505+5	1.31-10	1.29-10	1.24-10	1.17-10	1.09-10	9.87-11	8.72-11	7.39-11
76	4.076+5	1.63-10	1.59-10	1.52-10	1.42-10	1.29-10	1.15-10	9.90-11	8.12-11
77	3.877+5	1.79-10	1.74-10	1.65-10	1.53-10	1.39-10	1.22-10	1.04-10	8.36-11
78	3.688+5	1.90-10	1.85-10	1.75-10	1.62-10	1.46-10	1.27-10	1.07-10	8.51-11
79	3.337+5	1.97-10	1.91-10	1.81-10	1.66-10	1.49-10	1.30-10	1.09-10	8.55-11
80	3.020+5	1.96-10	1.90-10	1.80-10	1.66-10	1.49-10	1.29-10	1.08-10	8.50-11
81	2.985+5	1.97-10	1.91-10	1.80-10	1.66-10	1.49-10	1.30-10	1.08-10	8.50-11
82	2.972+5	1.96-10	1.90-10	1.80-10	1.66-10	1.49-10	1.29-10	1.08-10	8.49-11
83	2.945+5	1.95-10	1.89-10	1.79-10	1.65-10	1.48-10	1.29-10	1.08-10	8.47-11
84	2.873+5	1.96-10	1.90-10	1.80-10	1.66-10	1.49-10	1.29-10	1.08-10	8.44-11
85	2.732+5	1.93-10	1.87-10	1.77-10	1.63-10	1.46-10	1.27-10	1.06-10	8.31-11
86	2.472+5	1.87-10	1.82-10	1.72-10	1.59-10	1.43-10	1.24-10	1.04-10	8.15-11
87	2.352+5	1.85-10	1.79-10	1.70-10	1.57-10	1.41-10	1.23-10	1.03-10	8.07-11
88	2.237+5	1.71-10	1.67-10	1.58-10	1.47-10	1.33-10	1.17-10	9.94-11	7.96-11
89	2.128+5	1.64-10	1.60-10	1.52-10	1.42-10	1.29-10	1.15-10	9.83-11	7.99-11
90	2.024+5	1.57-10	1.54-10	1.47-10	1.38-10	1.26-10	1.13-10	9.81-11	8.13-11
91	1.926+5	1.62-10	1.58-10	1.51-10	1.42-10	1.30-10	1.16-10	1.01-10	8.41-11
92	1.832+5	1.83-10	1.78-10	1.69-10	1.57-10	1.43-10	1.26-10	1.08-10	8.76-11
93	1.742+5	2.02-10	1.96-10	1.85-10	1.71-10	1.54-10	1.34-10	1.13-10	8.94-11
94	1.657+5	2.18-10	2.10-10	1.98-10	1.82-10	1.62-10	1.40-10	1.16-10	9.05-11
95	1.576+5	2.19-10	2.12-10	2.00-10	1.83-10	1.63-10	1.41-10	1.16-10	9.05-11
96	1.500+5	2.15-10	2.08-10	1.96-10	1.80-10	1.61-10	1.39-10	1.15-10	9.02-11
97	1.426+5	2.09-10	2.03-10	1.91-10	1.76-10	1.57-10	1.37-10	1.14-10	8.97-11
98	1.357+5	2.25-10	2.17-10	2.04-10	1.86-10	1.65-10	1.42-10	1.17-10	9.01-11
99	1.291+5	2.27-10	2.19-10	2.06-10	1.88-10	1.66-10	1.42-10	1.17-10	8.96-11
100	1.228+5	2.18-10	2.11-10	1.98-10	1.81-10	1.61-10	1.39-10	1.14-10	8.84-11
101	1.168+5	2.21-10	2.13-10	2.01-10	1.83-10	1.63-10	1.39-10	1.14-10	8.78-11
102	1.111+5	2.14-10	2.07-10	1.95-10	1.78-10	1.58-10	1.36-10	1.12-10	8.60-11
103	9.804+4	1.96-10	1.90-10	1.80-10	1.65-10	1.48-10	1.28-10	1.07-10	8.41-11
104	8.652+4	1.90-10	1.84-10	1.75-10	1.61-10	1.45-10	1.26-10	1.06-10	8.38-11
105	8.250+4	1.99-10	1.93-10	1.82-10	1.67-10	1.50-10	1.30-10	1.08-10	8.44-11
106	7.950+4	2.02-10	1.95-10	1.84-10	1.69-10	1.51-10	1.31-10	1.08-10	8.43-11
107	7.200+4	2.00-10	1.94-10	1.83-10	1.68-10	1.50-10	1.30-10	1.08-10	8.38-11
108	6.738+4	1.99-10	1.93-10	1.82-10	1.67-10	1.49-10	1.29-10	1.07-10	8.30-11
109	5.656+4	1.94-10	1.88-10	1.78-10	1.63-10	1.46-10	1.26-10	1.05-10	8.21-11
110	5.248+4	1.97-10	1.91-10	1.80-10	1.65-10	1.47-10	1.27-10	1.05-10	8.16-11
111	4.631+4	1.94-10	1.88-10	1.77-10	1.63-10	1.45-10	1.25-10	1.04-10	8.01-11
112	4.087+4	1.79-10	1.74-10	1.65-10	1.52-10	1.37-10	1.19-10	9.98-11	7.88-11
113	3.431+4	1.82-10	1.77-10	1.67-10	1.54-10	1.38-10	1.20-10	1.01-10	7.93-11
114	3.183+4	1.89-10	1.83-10	1.73-10	1.59-10	1.42-10	1.23-10	1.02-10	7.97-11

Table C-4b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.85-10	1.79-10	1.70-10	1.56-10	1.40-10	1.21-10	1.01-10	7.93-11
116	2.700+4	1.91-10	1.85-10	1.75-10	1.61-10	1.43-10	1.24-10	1.03-10	7.96-11
117	2.606+4	1.92-10	1.86-10	1.75-10	1.61-10	1.44-10	1.24-10	1.02-10	7.94-11
118	2.479+4	1.92-10	1.86-10	1.75-10	1.61-10	1.43-10	1.24-10	1.02-10	7.92-11
119	2.418+4	1.91-10	1.85-10	1.75-10	1.60-10	1.43-10	1.23-10	1.02-10	7.90-11
120	2.358+4	1.90-10	1.84-10	1.73-10	1.59-10	1.42-10	1.23-10	1.02-10	7.87-11
121	2.188+4	1.88-10	1.82-10	1.72-10	1.58-10	1.41-10	1.22-10	1.01-10	7.81-11
122	1.931+4	1.85-10	1.80-10	1.70-10	1.56-10	1.39-10	1.20-10	9.95-11	7.71-11
123	1.503+4	1.81-10	1.75-10	1.66-10	1.52-10	1.36-10	1.18-10	9.75-11	7.57-11
124	1.171+4	1.75-10	1.70-10	1.61-10	1.48-10	1.33-10	1.15-10	9.54-11	7.42-11
125	9.119+3	1.72-10	1.67-10	1.58-10	1.46-10	1.30-10	1.13-10	9.40-11	7.32-11
126	7.102+3	1.69-10	1.63-10	1.55-10	1.43-10	1.28-10	1.11-10	9.25-11	7.22-11
127	5.531+3	1.66-10	1.61-10	1.52-10	1.41-10	1.26-10	1.09-10	9.11-11	7.11-11
128	4.307+3	1.61-10	1.57-10	1.48-10	1.37-10	1.23-10	1.07-10	8.87-11	6.91-11
129	3.707+3	1.50-10	1.46-10	1.39-10	1.28-10	1.16-10	1.01-10	8.44-11	6.62-11
130	3.355+3	1.37-10	1.33-10	1.27-10	1.18-10	1.07-10	9.41-11	7.98-11	6.38-11
131	3.035+3	1.11-10	1.09-10	1.05-10	9.90-11	9.18-11	8.34-11	7.38-11	6.29-11
132	2.747+3	1.26-10	1.23-10	1.18-10	1.10-10	1.02-10	9.14-11	7.98-11	6.68-11
133	2.613+3	1.43-10	1.39-10	1.33-10	1.24-10	1.13-10	9.97-11	8.53-11	6.93-11
134	2.485+3	1.56-10	1.52-10	1.44-10	1.34-10	1.21-10	1.06-10	8.92-11	7.10-11
135	2.249+3	1.64-10	1.59-10	1.51-10	1.39-10	1.25-10	1.09-10	9.12-11	7.19-11
136	2.035+3	1.67-10	1.62-10	1.53-10	1.41-10	1.27-10	1.10-10	9.19-11	7.20-11
137	1.585+3	1.67-10	1.62-10	1.53-10	1.41-10	1.27-10	1.10-10	9.16-11	7.17-11
138	1.234+3	1.66-10	1.61-10	1.52-10	1.40-10	1.26-10	1.09-10	9.11-11	7.13-11
139	9.611+2	1.65-10	1.60-10	1.51-10	1.39-10	1.25-10	1.08-10	9.03-11	7.06-11
140	7.485+2	1.63-10	1.58-10	1.50-10	1.38-10	1.24-10	1.08-10	8.96-11	7.01-11
141	5.829+2	1.62-10	1.57-10	1.49-10	1.37-10	1.23-10	1.07-10	8.89-11	6.96-11
142	4.540+2	1.61-10	1.56-10	1.48-10	1.36-10	1.22-10	1.06-10	8.82-11	6.90-11
143	3.536+2	1.60-10	1.55-10	1.46-10	1.35-10	1.21-10	1.05-10	8.76-11	6.85-11
144	2.754+2	1.58-10	1.54-10	1.45-10	1.34-10	1.20-10	1.04-10	8.69-11	6.80-11
145	2.144+2	1.57-10	1.52-10	1.44-10	1.33-10	1.19-10	1.04-10	8.63-11	6.75-11
146	1.670+2	1.56-10	1.51-10	1.43-10	1.32-10	1.18-10	1.03-10	8.56-11	6.70-11
147	1.301+2	1.55-10	1.50-10	1.42-10	1.31-10	1.17-10	1.02-10	8.50-11	6.65-11
148	1.013+2	1.54-10	1.49-10	1.41-10	1.30-10	1.17-10	1.01-10	8.43-11	6.60-11
149	7.889+1	1.53-10	1.48-10	1.40-10	1.29-10	1.16-10	1.00-10	8.37-11	6.55-11
150	6.144+1	1.51-10	1.47-10	1.39-10	1.28-10	1.15-10	9.97-11	8.31-11	6.50-11
151	4.785+1	1.50-10	1.46-10	1.38-10	1.27-10	1.14-10	9.90-11	8.25-11	6.45-11
152	3.727+1	1.49-10	1.45-10	1.37-10	1.26-10	1.13-10	9.82-11	8.18-11	6.40-11
153	2.920+1	1.48-10	1.44-10	1.36-10	1.25-10	1.12-10	9.75-11	8.12-11	6.35-11
154	2.260+1	1.47-10	1.43-10	1.35-10	1.24-10	1.11-10	9.67-11	8.06-11	6.30-11
155	1.760+1	1.46-10	1.4[illegible]-10	1.34-10	1.23-10	1.11-10	9.60-11	7.99-11	6.25-11
156	1.371+1	1.45-10	1.40-10	1.33-10	1.22-10	1.10-10	9.52-11	7.93-11	6.20-11
157	1.068+1	1.44-10	1.39-10	1.32-10	1.22-10	1.09-10	9.45-11	7.86-11	6.15-11
158	8.315+0	1.43-10	1.38-10	1.31-10	1.21-10	1.08-10	9.37-11	7.80-11	6.09-11
159	6.476+0	1.41-10	1.37-10	1.30-10	1.20-10	1.07-10	9.29-11	7.73-11	6.04-11
160	5.043+0	1.40-10	1.36-10	1.29-10	1.19-10	1.06-10	9.21-11	7.66-11	5.98-11
161	3.928+0	1.39-10	1.35-10	1.28-10	1.18-10	1.05-10	9.13-11	7.59-11	5.92-11
162	3.059+0	1.38-10	1.34-10	1.27-10	1.17-10	1.04-10	9.05-11	7.52-11	5.87-11
163	2.372+0	1.37-10	1.33-10	1.25-10	1.16-10	1.04-10	8.97-11	7.45-11	5.80-11
164	1.855+0	1.36-10	1.31-10	1.24-10	1.15-10	1.03-10	8.88-11	7.37-11	5.74-11
165	1.445+0	1.34-10	1.30-10	1.23-10	1.13-10	1.02-10	8.79-11	7.29-11	5.67-11
166	1.125+0	1.33-10	1.29-10	1.22-10	1.12-10	1.00-10	8.69-11	7.21-11	5.60-11
167	8.764-1	1.31-10	1.27-10	1.20-10	1.11-10	9.93-11	8.59-11	7.12-11	5.52-11
168	6.826-1	1.29-10	1.26-10	1.19-10	1.09-10	9.80-11	8.47-11	7.02-11	5.43-11
169	5.316-1	1.28-10	1.24-10	1.17-10	1.08-10	9.66-11	8.34-11	6.89-11	5.31-11
170	4.140-1	1.16-10	1.13-10	1.07-10	9.91-11	8.92-11	7.78-11	6.50-11	5.10-11
171	1.000-1	8.78-11	8.57-11	8.19-11	7.66-11	6.99-11	6.21-11	5.31-11	4.32-11
	1.000-5								

Table C-4c. Gamma-ray Dose Rate Transmission Factors for 1.50-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	1.52-08	1.16-08	6.89-09	2.90-09	7.76-10	7.95-11	8.68-11	9.04-11
2	1.200+7	1.13-08	8.65-09	5.08-09	2.12-09	5.70-10	5.78-11	6.82-11	7.04-11
3	1.000+7	7.71-09	5.83-09	3.37-09	1.39-09	3.72-10	3.64-11	4.81-11	4.89-11
4	8.000+6	5.48-09	4.10-09	2.33-09	9.39-10	2.48-10	2.32-11	3.31-11	3.31-11
5	7.500+6	4.57-09	3.41-09	1.92-09	7.67-10	2.02-10	1.85-11	2.76-11	2.74-11
6	7.000+6	3.70-09	2.74-09	1.53-09	6.05-10	1.59-10	1.44-11	2.23-11	2.20-11
7	6.500+6	2.88-09	2.12-09	1.17-09	4.58-10	1.20-10	1.07-11	1.73-11	1.71-11
8	6.000+6	2.15-09	1.57-09	8.55-10	3.31-10	8.71-11	7.65-12	1.29-11	1.27-11
9	5.500+6	1.52-09	1.10-09	5.91-10	2.27-10	5.98-11	5.19-12	9.19-12	8.99-12
10	5.000+6	1.02-09	7.28-10	3.86-10	1.47-10	3.89-11	3.34-12	6.16-12	6.01-12
11	4.500+6	6.33-10	4.49-10	2.34-10	8.79-11	2.35-11	1.99-12	3.82-12	3.72-12
12	4.000+6	3.54-10	2.48-10	1.27-10	4.72-11	1.27-11	1.08-12	2.12-12	2.07-12
13	3.500+6	1.71-10	1.18-10	5.91-11	2.18-11	6.00-12	5.19-13	1.02-12	9.95-13
14	3.000+6	6.71-11	4.55-11	2.24-11	8.29-12	2.33-12	2.11-13	4.00-13	3.95-13
15	2.500+6	1.93-11	1.28-11	6.26-12	2.34-12	6.83-13	6.43-14	1.20-13	1.19-13
16	2.000+6	4.35-12	2.83-12	1.34-12	5.01-13	1.48-13	1.51-14	2.49-14	2.52-14
17	1.660+6	1.32-12	8.36-13	3.85-13	1.42-13	4.27-14	5.46-15	5.95-15	6.42-15
18	1.500+6	5.44-13	3.44-13	1.59-13	6.01-14	1.90-14	3.03-15	2.10-15	2.54-15
19	1.330+6	1.27-13	8.26-14	4.10-14	1.70-14	5.81-15	1.02-15	6.35-16	8.14-16
20	1.000+6	1.05-14	6.63-15	3.20-15	1.31-15	4.49-16	8.13-17	4.55-17	6.00-17
21	8.000+5	1.45-15	8.83-16	4.08-16	1.63-16	5.55-17	1.08-17	4.58-18	6.58-18
22	7.000+5	3.40-16	2.08-16	9.77-17	4.03-17	1.42-17	3.05-18	9.13-19	1.53-18
23	6.000+5	6.23-17	3.80-17	1.81-17	7.61-18	2.76-18	6.53-19	1.20-19	2.60-19
24	5.120+5	1.85-17	1.08-17	4.92-18	2.05-18	7.79-19	2.28-19	1.59-20	3.74-20
25	5.100+5	1.04-17	6.23-18	2.96-18	1.27-18	4.88-19	1.39-19	4.72-21	2.70-20
26	4.500+5	2.35-18	1.44-18	7.16-19	3.31-19	1.43-19	5.36-20	1.49-20	1.47-21
27	4.000+5	4.35-19	2.97-19	1.70-19	8.85-20	4.24-20	1.81-20	6.35-21	1.54-21
28	3.000+5	5.33-21	4.09-21	2.74-21	1.70-21	1.02-21	5.89-22	3.29-22	1.77-22
29	2.000+5	1.37-23	1.01-23	6.44-24	3.87-24	2.25-24	1.27-24	6.99-25	3.70-25
30	1.500+5	7.48-26	5.98-26	4.31-26	2.96-26	2.00-26	1.35-26	9.16-27	6.15-27
31	1.000+5	3.73-32	2.72-32	1.77-32	1.13-32	7.21-33	4.68-33	3.07-33	2.02-33
32	7.500+4	5.36-41	3.34-41	1.91-41	1.11-41	6.72-42	4.18-42	2.65-42	1.71-42
33	6.000+4	1.59-58	8.06-59	4.10-59	2.28-59	1.37-59	8.76-60	5.89-60	4.15-60
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

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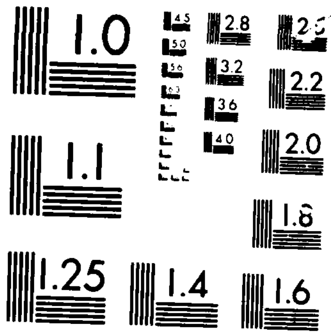
UNCLASSIFIED DE-AC05-84OR21400 F/G 18/6 NL



1.0
2.8
3.2
3.6
4.0
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2.0
1.1
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1.25
1.4
1.6

Table C-5a. Neutron Dose Rate Transmission Factors for 2.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.81-10	1.54-10	1.18-10	8.27-11	5.44-11	3.42-11	2.10-11	1.27-11
2	1.649+7	1.60-10	1.37-10	1.05-10	7.39-11	4.90-11	3.12-11	1.95-11	1.20-11
3	1.568+7	1.42-10	1.22-10	9.52-11	6.82-11	4.58-11	2.95-11	1.85-11	1.13-11
4	1.492+7	1.37-10	1.18-10	9.19-11	6.59-11	4.44-11	2.88-11	1.82-11	1.13-11
5	1.455+7	1.34-10	1.15-10	8.93-11	6.38-11	4.31-11	2.80-11	1.78-11	1.11-11
6	1.419+7	1.31-10	1.13-10	8.75-11	6.26-11	4.23-11	2.76-11	1.76-11	1.10-11
7	1.384+7	1.29-10	1.11-10	8.60-11	6.16-11	4.17-11	2.72-11	1.74-11	1.08-11
8	1.350+7	1.30-10	1.12-10	8.63-11	6.14-11	4.11-11	2.66-11	1.68-11	1.04-11
9	1.284+7	1.18-10	1.01-10	7.75-11	5.50-11	3.68-11	2.38-11	1.52-11	9.53-12
10	1.221+7	7.93-11	6.93-11	5.54-11	4.14-11	2.97-11	2.08-11	1.44-11	9.80-12
11	1.162+7	7.67-11	6.72-11	5.38-11	4.04-11	2.91-11	2.05-11	1.44-11	9.97-12
12	1.105+7	1.25-10	1.04-10	7.78-11	5.35-11	3.52-11	2.27-11	1.48-11	9.79-12
13	1.051+7	1.02-10	8.66-11	6.62-11	4.70-11	3.19-11	2.14-11	1.43-11	9.65-12
14	1.000+7	1.22-10	1.02-10	7.65-11	5.28-11	3.48-11	2.25-11	1.47-11	9.66-12
15	9.512+6	1.30-10	1.08-10	7.92-11	5.38-11	3.50-11	2.25-11	1.46-11	9.62-12
16	9.048+6	9.54-11	8.13-11	6.25-11	4.50-11	3.12-11	2.14-11	1.47-11	1.01-11
17	8.607+6	9.41-11	7.99-11	6.12-11	4.37-11	3.01-11	2.06-11	1.42-11	9.87-12
18	8.187+6	1.11-10	9.28-11	6.94-11	4.84-11	3.26-11	2.21-11	1.54-11	1.10-11
19	7.788+6	8.67-11	7.43-11	5.80-11	4.28-11	3.10-11	2.28-11	1.72-11	1.31-11
20	7.408+6	8.09-11	7.07-11	5.69-11	4.34-11	3.23-11	2.40-11	1.79-11	1.33-11
21	7.047+6	1.51-10	1.25-10	9.17-11	6.21-11	4.01-11	2.55-11	1.62-11	1.05-11
22	6.703+6	1.88-10	1.54-10	1.11-10	7.31-11	4.51-11	2.68-11	1.58-11	9.50-12
23	6.592+6	2.41-10	1.89-10	1.26-10	7.60-11	4.31-11	2.38-11	1.33-11	7.75-12
24	6.376+6	1.37-10	1.12-10	8.07-11	5.31-11	3.32-11	2.03-11	1.26-11	7.92-12
25	6.065+6	6.93-11	5.94-11	4.60-11	3.32-11	2.29-11	1.54-11	1.03-11	6.84-12
26	5.770+6	5.73-11	5.03-11	4.04-11	3.04-11	2.17-11	1.50-11	1.01-11	6.51-12
27	5.488+6	9.99-11	8.08-11	5.69-11	3.64-11	2.19-11	1.27-11	7.34-12	4.25-12
28	5.221+6	2.23-11	1.99-11	1.64-11	1.28-11	9.60-12	7.01-12	5.03-12	3.50-12
29	4.966+6	3.08-11	2.67-11	2.11-11	1.55-11	1.09-11	7.45-12	4.98-12	3.23-12
30	4.724+6	2.33-11	2.03-11	1.61-11	1.20-11	8.52-12	5.91-12	4.02-12	2.65-12
31	4.493+6	1.29-11	1.16-11	9.83-12	7.87-12	6.05-12	4.50-12	3.25-12	2.22-12
32	4.066+6	7.55-12	7.04-12	6.23-12	5.30-12	4.35-12	3.47-12	2.69-12	1.96-12
33	3.679+6	5.90-12	5.59-12	5.09-12	4.49-12	3.86-12	3.25-12	2.67-12	2.09-12
34	3.329+6	6.81-12	6.38-12	5.72-12	4.94-12	4.15-12	3.42-12	2.78-12	2.17-12
35	3.166+6	1.11-11	1.01-11	8.55-12	6.90-12	5.38-12	4.11-12	3.09-12	2.25-12
36	3.012+6	1.41-11	1.23-11	9.83-12	7.44-12	5.48-12	4.02-12	2.97-12	2.18-12
37	2.865+6	1.13-11	9.96-12	8.16-12	6.37-12	4.89-12	3.75-12	2.91-12	2.24-12
38	2.725+6	9.67-12	8.76-12	7.47-12	6.13-12	4.92-12	3.90-12	3.06-12	2.34-12
39	2.592+6	9.93-12	9.23-12	8.16-12	6.91-12	5.63-12	4.40-12	3.28-12	2.30-12
40	2.466+6	2.77-11	2.27-11	1.65-11	1.11-11	7.04-12	4.25-12	2.41-12	1.25-12
41	2.385+6	6.95-11	5.08-11	3.03-11	1.57-11	7.16-12	2.72-12	6.79-13	5.36-14
42	2.365+6	1.18-10	7.62-11	3.63-11	1.42-11	4.97-12	1.33-12	1.43-14	2.81-13
43	2.346+6	2.77-11	1.77-11	8.48-12	3.44-12	1.26-12	3.61-13	2.33-14	5.78-14
44	2.307+6	7.66-13	5.78-13	3.75-13	2.26-13	1.33-13	7.71-14	4.50-14	2.64-14
45	2.231+6	2.25-13	1.86-13	1.39-13	9.72-14	6.63-14	4.48-14	3.01-14	1.98-14
46	2.123+6	1.27-13	1.09-13	8.58-14	6.40-14	4.63-14	3.30-14	2.33-14	1.59-14
47	2.019+6	6.87-14	6.23-14	5.31-14	4.32-14	3.40-14	2.61-14	1.96-14	1.40-14
48	1.921+6	4.46-14	4.19-14	3.76-14	3.24-14	2.70-14	2.18-14	1.70-14	1.26-14
49	1.827+6	8.04-14	6.91-14	5.46-14	4.09-14	2.99-14	2.16-14	1.54-14	1.06-14
50	1.738+6	4.17-14	3.79-14	3.25-14	2.66-14	2.11-14	1.65-14	1.25-14	9.17-15
51	1.653+6	2.97-14	2.77-14	2.47-14	2.12-14	1.77-14	1.43-14	1.13-14	8.48-15
52	1.572+6	3.95-14	3.58-14	3.05-14	2.47-14	1.94-14	1.49-14	1.11-14	7.93-15
53	1.496+6	3.29-14	3.01-14	2.60-14	2.14-14	1.71-14	1.33-14	1.00-14	7.17-15
54	1.423+6	2.72-14	2.52-14	2.22-14	1.87-14	1.52-14	1.20-14	9.17-15	6.59-15
55	1.353+6	1.84-14	1.76-14	1.62-14	1.44-14	1.24-14	1.03-14	8.17-15	6.09-15
56	1.287+6	2.15-14	2.01-14	1.79-14	1.53-14	1.26-14	1.01-14	7.71-15	5.50-15
57	1.225+6	2.04-14	1.90-14	1.68-14	1.43-14	1.17-14	9.31-15	7.08-15	5.00-15

Table C-5a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.65-14	1.55-14	1.39-14	1.19-14	9.94-15	8.03-15	6.23-15	4.51-15
59	1.108+6	9.73-15	9.41-15	8.80-15	8.01-15	7.12-15	6.18-15	5.21-15	4.16-15
60	1.003+6	8.47-15	8.23-15	7.82-15	7.26-15	6.61-15	5.90-15	5.13-15	4.29-15
61	9.616+5	1.14-14	1.10-14	1.02-14	9.29-15	8.21-15	7.07-15	5.91-15	4.72-15
62	9.072+5	1.44-14	1.37-14	1.25-14	1.10-14	9.38-15	7.80-15	6.30-15	4.83-15
63	8.629+5	1.36-14	1.29-14	1.18-14	1.05-14	9.06-15	7.59-15	6.16-15	4.76-15
64	8.209+5	1.27-14	1.21-14	1.11-14	9.94-15	8.63-15	7.29-15	5.97-15	4.66-15
65	7.808+5	1.48-14	1.39-14	1.25-14	1.09-14	9.15-15	7.50-15	5.96-15	4.52-15
66	7.427+5	1.46-14	1.37-14	1.23-14	1.06-14	8.92-15	7.27-15	5.74-15	4.30-15
67	7.065+5	1.38-14	1.30-14	1.17-14	1.01-14	8.51-15	6.93-15	5.46-15	4.07-15
68	6.721+5	1.30-14	1.22-14	1.10-14	9.61-15	8.08-15	6.59-15	5.18-15	3.85-15
69	6.393+5	1.23-14	1.16-14	1.05-14	9.15-15	7.70-15	6.27-15	4.91-15	3.62-15
70	6.081+5	1.12-14	1.06-14	9.67-15	8.47-15	7.17-15	5.86-15	4.60-15	3.38-15
71	5.784+5	8.97-15	8.58-15	7.93-15	7.09-15	6.14-15	5.14-15	4.13-15	3.13-15
72	5.502+5	1.01-14	9.54-15	8.68-15	7.60-15	6.42-15	5.22-15	4.04-15	2.89-15
73	5.234+5	8.79-15	8.37-15	7.67-15	6.78-15	5.78-15	4.74-15	3.68-15	2.62-15
74	4.979+5	5.72-15	5.54-15	5.21-15	4.77-15	4.24-15	3.64-15	2.99-15	2.28-15
75	4.505+5	4.02-15	3.93-15	3.77-15	3.56-15	3.29-15	2.97-15	2.62-15	2.22-15
76	4.076+5	5.14-15	4.98-15	4.71-15	4.35-15	3.92-15	3.46-15	2.95-15	2.41-15
77	3.877+5	5.74-15	5.53-15	5.19-15	4.74-15	4.23-15	3.67-15	3.09-15	2.47-15
78	3.688+5	6.12-15	5.89-15	5.50-15	4.99-15	4.41-15	3.79-15	3.16-15	2.49-15
79	3.337+5	6.30-15	6.04-15	5.63-15	5.09-15	4.48-15	3.82-15	3.16-15	2.47-15
80	3.020+5	6.20-15	5.95-15	5.54-15	5.02-15	4.42-15	3.78-15	3.12-15	2.43-15
81	2.985+5	6.21-15	5.97-15	5.56-15	5.03-15	4.42-15	3.78-15	3.12-15	2.43-15
82	2.972+5	6.19-15	5.95-15	5.54-15	5.01-15	4.41-15	3.77-15	3.11-15	2.43-15
83	2.945+5	6.12-15	5.88-15	5.48-15	4.97-15	4.37-15	3.74-15	3.09-15	2.41-15
84	2.873+5	6.13-15	5.89-15	5.49-15	4.97-15	4.37-15	3.73-15	3.07-15	2.39-15
85	2.732+5	5.93-15	5.70-15	5.32-15	4.82-15	4.25-15	3.64-15	3.00-15	2.33-15
86	2.472+5	5.67-15	5.46-15	5.11-15	4.64-15	4.10-15	3.52-15	2.91-15	2.26-15
87	2.352+5	5.54-15	5.33-15	4.99-15	4.54-15	4.02-15	3.45-15	2.86-15	2.23-15
88	2.237+5	5.04-15	4.87-15	4.59-15	4.21-15	3.77-15	3.27-15	2.75-15	2.19-15
89	2.128+5	4.76-15	4.62-15	4.36-15	4.03-15	3.63-15	3.18-15	2.71-15	2.19-15
90	2.024+5	4.53-15	4.40-15	4.18-15	3.88-15	3.53-15	3.13-15	2.70-15	2.23-15
91	1.926+5	4.67-15	4.54-15	4.30-15	4.00-15	3.63-15	3.22-15	2.78-15	2.31-15
92	1.832+5	5.37-15	5.18-15	4.87-15	4.47-15	4.00-15	3.49-15	2.95-15	2.39-15
93	1.742+5	6.04-15	5.80-15	5.40-15	4.89-15	4.31-15	3.69-15	3.06-15	2.42-15
94	1.657+5	6.62-15	6.32-15	5.83-15	5.22-15	4.54-15	3.83-15	3.13-15	2.42-15
95	1.576+5	6.64-15	6.34-15	5.85-15	5.22-15	4.53-15	3.82-15	3.11-15	2.40-15
96	1.500+5	6.42-15	6.14-15	5.67-15	5.09-15	4.43-15	3.75-15	3.06-15	2.38-15
97	1.426+5	6.15-15	5.89-15	5.46-15	4.92-15	4.30-15	3.66-15	3.01-15	2.35-15
98	1.357+5	6.71-15	6.39-15	5.88-15	5.23-15	4.51-15	3.78-15	3.05-15	2.33-15
99	1.291+5	6.74-15	6.41-15	5.89-15	5.23-15	4.50-15	3.76-15	3.02-15	2.30-15
100	1.228+5	6.32-15	6.04-15	5.57-15	4.98-15	4.31-15	3.63-15	2.94-15	2.25-15
101	1.168+5	6.39-15	6.10-15	5.61-15	5.00-15	4.32-15	3.62-15	2.91-15	2.21-15
102	1.111+5	6.06-15	5.79-15	5.34-15	4.77-15	4.14-15	3.48-15	2.81-15	2.14-15
103	9.804+4	5.33-15	5.12-15	4.76-15	4.30-15	3.78-15	3.22-15	2.65-15	2.07-15
104	8.652+4	5.08-15	4.89-15	4.56-15	4.14-15	3.66-15	3.14-15	2.60-15	2.04-15
105	8.250+4	5.36-15	5.14-15	4.78-15	4.31-15	3.77-15	3.21-15	2.63-15	2.04-15
106	7.950+4	5.41-15	5.19-15	4.81-15	4.33-15	3.79-15	3.21-15	2.62-15	2.02-15
107	7.200+4	5.31-15	5.09-15	4.73-15	4.26-15	3.72-15	3.16-15	2.58-15	1.99-15
108	6.738+4	5.21-15	4.99-15	4.63-15	4.17-15	3.65-15	3.09-15	2.53-15	1.95-15
109	5.656+4	4.97-15	4.77-15	4.44-15	4.01-15	3.52-15	2.99-15	2.45-15	1.90-15
110	5.248+4	5.01-15	4.81-15	4.47-15	4.02-15	3.52-15	2.98-15	2.43-15	1.87-15
111	4.631+4	4.87-15	4.67-15	4.34-15	3.91-15	3.42-15	2.89-15	2.36-15	1.81-15
112	4.087+4	4.36-15	4.20-15	3.93-15	3.57-15	3.16-15	2.71-15	2.24-15	1.76-15
113	3.431+4	4.40-15	4.24-15	3.96-15	3.59-15	3.17-15	2.71-15	2.24-15	1.75-15
114	3.183+4	4.58-15	4.39-15	4.09-15	3.70-15	3.24-15	2.76-15	2.26-15	1.74-15

Table C-5a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	4.42-15	4.25-15	3.97-15	3.59-15	3.16-15	2.70-15	2.22-15	1.73-15
116	2.700+4	4.60-15	4.41-15	4.10-15	3.70-15	3.23-15	2.74-15	2.24-15	1.72-15
117	2.606+4	4.60-15	4.41-15	4.10-15	3.69-15	3.23-15	2.73-15	2.23-15	1.71-15
118	2.479+4	4.57-15	4.39-15	4.08-15	3.67-15	3.21-15	2.72-15	2.21-15	1.70-15
119	2.418+4	4.55-15	4.37-15	4.06-15	3.65-15	3.19-15	2.71-15	2.20-15	1.69-15
120	2.358+4	4.48-15	4.30-15	4.00-15	3.61-15	3.16-15	2.67-15	2.18-15	1.68-15
121	2.188+4	4.41-15	4.23-15	3.93-15	3.55-15	3.10-15	2.63-15	2.15-15	1.65-15
122	1.931+4	4.27-15	4.10-15	3.82-15	3.45-15	3.02-15	2.56-15	2.09-15	1.61-15
123	1.503+4	4.07-15	3.91-15	3.65-15	3.30-15	2.89-15	2.46-15	2.01-15	1.55-15
124	1.171+4	3.84-15	3.70-15	3.45-15	3.13-15	2.75-15	2.35-15	1.92-15	1.49-15
125	9.119+3	3.70-15	3.56-15	3.32-15	3.01-15	2.66-15	2.27-15	1.86-15	1.44-15
126	7.102+3	3.54-15	3.41-15	3.19-15	2.89-15	2.55-15	2.18-15	1.80-15	1.39-15
127	5.531+3	3.41-15	3.29-15	3.08-15	2.80-15	2.47-15	2.11-15	1.74-15	1.35-15
128	4.307+3	3.25-15	3.14-15	2.94-15	2.67-15	2.36-15	2.02-15	1.66-15	1.29-15
129	3.707+3	2.95-15	2.86-15	2.69-15	2.46-15	2.19-15	1.89-15	1.56-15	1.22-15
130	3.355+3	2.65-15	2.56-15	2.43-15	2.24-15	2.01-15	1.75-15	1.48-15	1.17-15
131	3.035+3	2.10-15	2.05-15	1.97-15	1.85-15	1.71-15	1.55-15	1.36-15	1.16-15
132	2.747+3	2.39-15	2.33-15	2.23-15	2.08-15	1.90-15	1.70-15	1.48-15	1.23-15
133	2.613+3	2.77-15	2.69-15	2.54-15	2.35-15	2.11-15	1.85-15	1.57-15	1.27-15
134	2.485+3	3.06-15	2.96-15	2.78-15	2.55-15	2.27-15	1.96-15	1.64-15	1.30-15
135	2.249+3	3.22-15	3.10-15	2.91-15	2.65-15	2.34-15	2.01-15	1.67-15	1.30-15
136	2.035+3	3.26-15	3.14-15	2.93-15	2.67-15	2.35-15	2.01-15	1.66-15	1.29-15
137	1.585+3	3.21-15	3.09-15	2.89-15	2.62-15	2.31-15	1.98-15	1.63-15	1.26-15
138	1.234+3	3.13-15	3.02-15	2.82-15	2.56-15	2.25-15	1.93-15	1.58-15	1.23-15
139	9.611+2	3.06-15	2.95-15	2.76-15	2.50-15	2.20-15	1.88-15	1.55-15	1.20-15
140	7.485+2	2.99-15	2.88-15	2.69-15	2.44-15	2.15-15	1.84-15	1.51-15	1.17-15
141	5.829+2	2.91-15	2.80-15	2.62-15	2.38-15	2.09-15	1.79-15	1.47-15	1.14-15
142	4.540+2	2.84-15	2.73-15	2.55-15	2.32-15	2.04-15	1.74-15	1.43-15	1.11-15
143	3.536+2	2.77-15	2.66-15	2.49-15	2.26-15	1.99-15	1.70-15	1.40-15	1.09-15
144	2.754+2	2.70-15	2.60-15	2.43-15	2.20-15	1.94-15	1.66-15	1.36-15	1.06-15
145	2.144+2	2.63-15	2.53-15	2.37-15	2.15-15	1.89-15	1.62-15	1.33-15	1.03-15
146	1.670+2	2.57-15	2.47-15	2.31-15	2.09-15	1.84-15	1.58-15	1.30-15	1.01-15
147	1.301+2	2.50-15	2.41-15	2.25-15	2.04-15	1.80-15	1.54-15	1.26-15	9.80-16
148	1.013+2	2.44-15	2.35-15	2.19-15	1.99-15	1.75-15	1.50-15	1.23-15	9.55-16
149	7.889+1	2.38-15	2.29-15	2.14-15	1.94-15	1.71-15	1.46-15	1.20-15	9.31-16
150	6.144+1	2.32-15	2.23-15	2.09-15	1.89-15	1.67-15	1.42-15	1.17-15	9.07-16
151	4.785+1	2.26-15	2.18-15	2.03-15	1.84-15	1.62-15	1.39-15	1.14-15	8.84-16
152	3.727+1	2.21-15	2.12-15	1.98-15	1.80-15	1.58-15	1.35-15	1.11-15	8.61-16
153	2.920+1	2.15-15	2.07-15	1.93-15	1.75-15	1.54-15	1.32-15	1.08-15	8.39-16
154	2.260+1	2.10-15	2.02-15	1.88-15	1.71-15	1.50-15	1.28-15	1.05-15	8.16-16
155	1.760+1	2.04-15	1.97-15	1.84-15	1.66-15	1.46-15	1.25-15	1.03-15	7.94-16
156	1.371+1	1.99-15	1.92-15	1.79-15	1.62-15	1.43-15	1.22-15	9.98-16	7.73-16
157	1.068+1	1.94-15	1.87-15	1.74-15	1.58-15	1.39-15	1.18-15	9.71-16	7.52-16
158	8.315+0	1.89-15	1.82-15	1.70-15	1.54-15	1.35-15	1.15-15	9.45-16	7.31-16
159	6.476+0	1.84-15	1.77-15	1.65-15	1.50-15	1.32-15	1.12-15	9.19-16	7.11-16
160	5.043+0	1.79-15	1.73-15	1.61-15	1.46-15	1.28-15	1.09-15	8.94-16	6.91-16
161	3.928+0	1.75-15	1.68-15	1.57-15	1.42-15	1.25-15	1.06-15	8.68-16	6.71-16
162	3.059+0	1.70-15	1.64-15	1.53-15	1.38-15	1.21-15	1.03-15	8.44-16	6.51-16
163	2.372+0	1.65-15	1.59-15	1.48-15	1.34-15	1.18-15	1.00-15	8.19-16	6.31-16
164	1.855+0	1.61-15	1.55-15	1.44-15	1.31-15	1.15-15	9.73-16	7.94-16	6.12-16
165	1.445+0	1.57-15	1.50-15	1.40-15	1.27-15	1.11-15	9.44-16	7.70-16	5.92-16
166	1.125+0	1.52-15	1.46-15	1.36-15	1.23-15	1.08-15	9.15-16	7.46-16	5.73-16
167	8.764-1	1.47-15	1.42-15	1.32-15	1.19-15	1.05-15	8.86-16	7.21-16	5.53-16
168	6.826-1	1.43-15	1.37-15	1.28-15	1.15-15	1.01-15	8.56-16	6.96-16	5.32-16
169	5.316-1	1.38-15	1.32-15	1.23-15	1.11-15	9.74-16	8.23-16	6.67-16	5.07-16
170	4.140-1	1.20-15	1.16-15	1.08-15	9.85-16	8.70-16	7.44-16	6.11-16	4.73-16
171	1.000-1	7.37-16	7.15-16	6.77-16	6.25-16	5.62-16	4.91-16	4.13-16	3.30-16
	1.000-5								

Table C-5b. Total Dose Rate Transmission Factors for 2.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	3.02-10	2.64-10	2.11-10	1.57-10	1.11-10	7.64-11	5.11-11	3.30-11
2	1.649+7	2.74-10	2.41-10	1.93-10	1.45-10	1.04-10	7.19-11	4.89-11	3.21-11
3	1.568+7	2.50-10	2.21-10	1.80-10	1.37-10	9.92-11	6.95-11	4.74-11	3.10-11
4	1.492+7	2.43-10	2.15-10	1.75-10	1.33-10	9.69-11	6.82-11	4.69-11	3.10-11
5	1.455+7	2.38-10	2.10-10	1.71-10	1.30-10	9.44-11	6.67-11	4.61-11	3.07-11
6	1.419+7	2.34-10	2.06-10	1.67-10	1.28-10	9.29-11	6.58-11	4.57-11	3.05-11
7	1.384+7	2.29-10	2.03-10	1.65-10	1.26-10	9.18-11	6.51-11	4.52-11	3.02-11
8	1.350+7	2.32-10	2.04-10	1.65-10	1.25-10	9.11-11	6.42-11	4.44-11	2.96-11
9	1.284+7	2.15-10	1.89-10	1.53-10	1.16-10	8.47-11	6.00-11	4.17-11	2.81-11
10	1.221+7	1.58-10	1.42-10	1.18-10	9.36-11	7.14-11	5.32-11	3.89-11	2.74-11
11	1.162+7	1.52-10	1.37-10	1.14-10	9.08-11	6.95-11	5.21-11	3.85-11	2.74-11
12	1.105+7	2.19-10	1.89-10	1.50-10	1.11-10	7.95-11	5.61-11	3.94-11	2.72-11
13	1.051+7	1.85-10	1.62-10	1.31-10	9.93-11	7.29-11	5.26-11	3.77-11	2.64-11
14	1.000+7	2.14-10	1.85-10	1.46-10	1.09-10	7.81-11	5.52-11	3.88-11	2.67-11
15	9.512+6	2.25-10	1.94-10	1.51-10	1.11-10	7.87-11	5.51-11	3.85-11	2.64-11
16	9.048+6	1.77-10	1.56-10	1.26-10	9.66-11	7.16-11	5.23-11	3.77-11	2.65-11
17	8.607+6	1.74-10	1.53-10	1.23-10	9.42-11	6.96-11	5.07-11	3.67-11	2.60-11
18	8.187+6	1.97-10	1.71-10	1.35-10	1.01-10	7.38-11	5.34-11	3.87-11	2.76-11
19	7.788+6	1.64-10	1.45-10	1.19-10	9.29-11	7.10-11	5.40-11	4.11-11	3.06-11
20	7.408+6	1.53-10	1.38-10	1.15-10	9.24-11	7.21-11	5.56-11	4.25-11	3.17-11
21	7.047+6	2.49-10	2.13-10	1.66-10	1.21-10	8.58-11	5.97-11	4.14-11	2.82-11
22	6.703+6	2.97-10	2.52-10	1.93-10	1.38-10	9.40-11	6.28-11	4.18-11	2.75-11
23	6.592+6	3.67-10	3.01-10	2.17-10	1.46-10	9.41-11	6.03-11	3.90-11	2.51-11
24	6.376+6	2.44-10	2.09-10	1.62-10	1.17-10	8.22-11	5.67-11	3.89-11	2.61-11
25	6.065+6	1.53-10	1.36-10	1.12-10	8.77-11	6.60-11	4.86-11	3.50-11	2.42-11
26	5.770+6	1.36-10	1.24-10	1.05-10	8.42-11	6.50-11	4.87-11	3.53-11	2.42-11
27	5.488+6	2.03-10	1.73-10	1.34-10	9.77-11	6.85-11	4.70-11	3.18-11	2.07-11
28	5.221+6	7.71-11	7.12-11	6.21-11	5.19-11	4.19-11	3.29-11	2.50-11	1.80-11
29	4.966+6	9.93-11	9.01-11	7.65-11	6.18-11	4.80-11	3.61-11	2.63-11	1.81-11
30	4.724+6	8.63-11	7.86-11	6.73-11	5.48-11	4.29-11	3.26-11	2.39-11	1.65-11
31	4.493+6	6.17-11	5.75-11	5.10-11	4.33-11	3.54-11	2.79-11	2.11-11	1.49-11
32	4.066+6	4.51-11	4.27-11	3.90-11	3.43-11	2.92-11	2.40-11	1.90-11	1.40-11
33	3.679+6	3.72-11	3.57-11	3.31-11	2.99-11	2.62-11	2.24-11	1.84-11	1.43-11
34	3.329+6	4.05-11	3.86-11	3.55-11	3.16-11	2.74-11	2.31-11	1.90-11	1.47-11
35	3.166+6	5.81-11	5.42-11	4.82-11	4.11-11	3.40-11	2.73-11	2.12-11	1.56-11
36	3.012+6	6.79-11	6.22-11	5.38-11	4.46-11	3.58-11	2.81-11	2.14-11	1.56-11
37	2.865+6	6.04-11	5.59-11	4.90-11	4.12-11	3.37-11	2.69-11	2.09-11	1.55-11
38	2.725+6	5.61-11	5.23-11	4.65-11	3.98-11	3.30-11	2.66-11	2.09-11	1.56-11
39	2.592+6	5.54-11	5.21-11	4.69-11	4.05-11	3.38-11	2.72-11	2.10-11	1.53-11
40	2.466+6	9.63-11	8.50-11	6.95-11	5.38-11	4.00-11	2.87-11	1.98-11	1.28-11
41	2.385+6	1.66-10	1.35-10	9.78-11	6.62-11	4.33-11	2.76-11	1.72-11	1.01-11
42	2.365+6	2.35-10	1.76-10	1.13-10	6.83-11	4.18-11	2.59-11	1.59-11	9.18-12
43	2.346+6	1.02-10	8.28-11	6.06-11	4.28-11	2.99-11	2.06-11	1.38-11	8.58-12
44	2.307+6	3.62-11	3.34-11	2.92-11	2.45-11	1.98-11	1.54-11	1.15-11	7.93-12
45	2.231+6	2.82-11	2.64-11	2.37-11	2.04-11	1.70-11	1.36-11	1.04-11	7.42-12
46	2.123+6	2.47-11	2.34-11	2.12-11	1.84-11	1.55-11	1.26-11	9.73-12	6.99-12
47	2.019+6	2.07-11	1.97-11	1.81-11	1.61-11	1.38-11	1.15-11	9.06-12	6.66-12
48	1.921+6	1.67-11	1.61-11	1.50-11	1.36-11	1.19-11	1.01-11	8.22-12	6.30-12
49	1.827+6	2.16-11	2.05-11	1.86-11	1.62-11	1.37-11	1.11-11	8.65-12	6.23-12
50	1.738+6	1.70-11	1.63-11	1.50-11	1.34-11	1.16-11	9.71-12	7.77-12	5.80-12
51	1.653+6	1.45-11	1.40-11	1.30-11	1.18-11	1.04-11	8.82-12	7.21-12	5.53-12
52	1.572+6	1.72-11	1.64-11	1.51-11	1.34-11	1.15-11	9.53-12	7.54-12	5.55-12
53	1.496+6	1.62-11	1.55-11	1.43-11	1.27-11	1.10-11	9.12-12	7.24-12	5.33-12
54	1.423+6	1.53-11	1.46-11	1.36-11	1.22-11	1.05-11	8.79-12	6.99-12	5.13-12
55	1.353+6	1.25-11	1.21-11	1.14-11	1.04-11	9.15-12	7.80-12	6.34-12	4.80-12
56	1.287+6	1.37-11	1.31-11	1.22-11	1.10-11	9.52-12	7.95-12	6.31-12	4.61-12
57	1.225+6	1.33-11	1.28-11	1.18-11	1.06-11	9.21-12	7.68-12	6.07-12	4.40-12

Table C-5b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.17-11	1.12-11	1.05-11	9.48-12	8.29-12	6.99-12	5.62-12	4.14-12
59	1.108+6	8.17-12	7.95-12	7.56-12	7.03-12	6.38-12	5.64-12	4.81-12	3.87-12
60	1.003+6	7.37-12	7.19-12	6.89-12	6.48-12	5.97-12	5.38-12	4.72-12	3.96-12
61	9.616+5	9.47-12	9.20-12	8.72-12	8.07-12	7.28-12	6.39-12	5.42-12	4.35-12
62	9.072+5	1.13-11	1.09-11	1.02-11	9.35-12	8.29-12	7.12-12	5.88-12	4.55-12
63	8.629+5	1.11-11	1.07-11	1.00-11	9.20-12	8.18-12	7.05-12	5.83-12	4.53-12
64	8.209+5	1.06-11	1.03-11	9.70-12	8.90-12	7.95-12	6.88-12	5.73-12	4.51-12
65	7.808+5	1.18-11	1.14-11	1.06-11	9.65-12	8.50-12	7.24-12	5.91-12	4.53-12
66	7.427+5	1.19-11	1.14-11	1.07-11	9.68-12	8.50-12	7.21-12	5.86-12	4.46-12
67	7.065+5	1.17-11	1.12-11	1.05-11	9.52-12	8.35-12	7.08-12	5.74-12	4.35-12
68	6.721+5	1.14-11	1.10-11	1.03-11	9.32-12	8.18-12	6.92-12	5.60-12	4.23-12
69	6.393+5	1.13-11	1.08-11	1.01-11	9.17-12	8.04-12	6.79-12	5.47-12	4.09-12
70	6.081+5	1.08-11	1.04-11	9.74-12	8.83-12	7.75-12	6.55-12	5.27-12	3.93-12
71	5.784+5	9.37-12	9.06-12	8.52-12	7.79-12	6.91-12	5.91-12	4.84-12	3.70-12
72	5.502+5	1.03-11	9.93-12	9.27-12	8.39-12	7.33-12	6.14-12	4.88-12	3.55-12
73	5.234+5	9.52-12	9.19-12	8.60-12	7.81-12	6.85-12	5.75-12	4.57-12	3.30-12
74	4.979+5	6.88-12	6.68-12	6.34-12	5.87-12	5.27-12	4.57-12	3.78-12	2.91-12
75	4.505+5	5.03-12	4.92-12	4.74-12	4.49-12	4.17-12	3.78-12	3.34-12	2.84-12
76	4.076+5	6.23-12	6.07-12	5.80-12	5.42-12	4.95-12	4.41-12	3.80-12	3.12-12
77	3.877+5	6.84-12	6.65-12	6.32-12	5.87-12	5.32-12	4.69-12	3.99-12	3.21-12
78	3.688+5	7.27-12	7.06-12	6.69-12	6.19-12	5.58-12	4.88-12	4.11-12	3.27-12
79	3.337+5	7.52-12	7.30-12	6.91-12	6.37-12	5.73-12	4.99-12	4.18-12	3.29-12
80	3.020+5	7.49-12	7.27-12	6.88-12	6.35-12	5.71-12	4.97-12	4.16-12	3.27-12
81	2.985+5	7.52-12	7.29-12	6.90-12	6.37-12	5.72-12	4.98-12	4.16-12	3.27-12
82	2.972+5	7.50-12	7.28-12	6.89-12	6.36-12	5.71-12	4.97-12	4.16-12	3.27-12
83	2.945+5	7.45-12	7.23-12	6.85-12	6.32-12	5.68-12	4.95-12	4.14-12	3.26-12
84	2.873+5	7.50-12	7.28-12	6.89-12	6.35-12	5.70-12	4.96-12	4.14-12	3.25-12
85	2.732+5	7.37-12	7.15-12	6.77-12	6.25-12	5.62-12	4.89-12	4.08-12	3.20-12
86	2.472+5	7.18-12	6.97-12	6.61-12	6.11-12	5.49-12	4.78-12	4.00-12	3.14-12
87	2.352+5	7.08-12	6.87-12	6.52-12	6.02-12	5.42-12	4.73-12	3.96-12	3.11-12
88	2.237+5	6.58-12	6.40-12	6.09-12	5.66-12	5.13-12	4.52-12	3.83-12	3.07-12
89	2.128+5	6.29-12	6.13-12	5.85-12	5.46-12	4.98-12	4.42-12	3.79-12	3.08-12
90	2.024+5	6.05-12	5.91-12	5.65-12	5.30-12	4.86-12	4.36-12	3.78-12	3.14-12
91	1.926+5	6.24-12	6.09-12	5.82-12	5.46-12	5.01-12	4.49-12	3.90-12	3.24-12
92	1.832+5	7.03-12	6.84-12	6.51-12	6.06-12	5.50-12	4.86-12	4.16-12	3.38-12
93	1.742+5	7.74-12	7.51-12	7.12-12	6.57-12	5.91-12	5.16-12	4.34-12	3.45-12
94	1.657+5	8.33-12	8.07-12	7.61-12	6.99-12	6.24-12	5.39-12	4.48-12	3.50-12
95	1.576+5	8.41-12	8.14-12	7.67-12	7.04-12	6.28-12	5.42-12	4.50-12	3.50-12
96	1.500+5	8.26-12	8.00-12	7.55-12	6.94-12	6.20-12	5.37-12	4.46-12	3.49-12
97	1.426+5	8.04-12	7.79-12	7.36-12	6.78-12	6.07-12	5.27-12	4.41-12	3.47-12
98	1.357+5	8.62-12	8.33-12	7.84-12	7.18-12	6.38-12	5.49-12	4.52-12	3.49-12
99	1.291+5	8.70-12	8.41-12	7.91-12	7.23-12	6.42-12	5.51-12	4.52-12	3.47-12
100	1.228+5	8.37-12	8.10-12	7.63-12	7.00-12	6.23-12	5.37-12	4.43-12	3.43-12
101	1.168+5	8.49-12	8.21-12	7.72-12	7.07-12	6.28-12	5.39-12	4.43-12	3.40-12
102	1.111+5	8.23-12	7.96-12	7.50-12	6.88-12	6.12-12	5.26-12	4.34-12	3.34-12
103	9.804+4	7.56-12	7.33-12	6.94-12	6.40-12	5.73-12	4.98-12	4.16-12	3.27-12
104	8.652+4	7.34-12	7.13-12	6.75-12	6.24-12	5.61-12	4.90-12	4.11-12	3.26-12
105	8.250+4	7.68-12	7.45-12	7.04-12	6.48-12	5.80-12	5.03-12	4.19-12	3.28-12
106	7.950+4	7.79-12	7.55-12	7.13-12	6.56-12	5.86-12	5.07-12	4.21-12	3.28-12
107	7.200+4	7.74-12	7.50-12	7.08-12	6.51-12	5.82-12	5.04-12	4.18-12	3.26-12
108	6.738+4	7.69-12	7.46-12	7.04-12	6.48-12	5.79-12	5.01-12	4.16-12	3.23-12
109	5.656+4	7.52-12	7.29-12	6.89-12	6.34-12	5.68-12	4.92-12	4.10-12	3.20-12
110	5.248+4	7.63-12	7.39-12	6.98-12	6.42-12	5.73-12	4.95-12	4.10-12	3.18-12
111	4.631+4	7.53-12	7.29-12	6.89-12	6.33-12	5.65-12	4.88-12	4.04-12	3.13-12
112	4.087+4	6.97-12	6.76-12	6.41-12	5.92-12	5.33-12	4.65-12	3.89-12	3.08-12
113	3.431+4	7.08-12	6.87-12	6.51-12	6.01-12	5.40-12	4.70-12	3.93-12	3.10-12
114	3.183+4	7.35-12	7.12-12	6.73-12	6.20-12	5.55-12	4.81-12	3.99-12	3.12-12

Table C-5b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gJ}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	7.20-12	6.98-12	6.60-12	6.09-12	5.46-12	4.74-12	3.96-12	3.10-12
116	2.700+4	7.44-12	7.21-12	6.81-12	6.26-12	5.60-12	4.84-12	4.01-12	3.11-12
117	2.606+4	7.46-12	7.23-12	6.83-12	6.28-12	5.61-12	4.84-12	4.01-12	3.11-12
118	2.479+4	7.45-12	7.22-12	6.82-12	6.27-12	5.60-12	4.83-12	4.00-12	3.10-12
119	2.418+4	7.44-12	7.21-12	6.81-12	6.26-12	5.59-12	4.83-12	3.99-12	3.09-12
120	2.358+4	7.38-12	7.15-12	6.76-12	6.21-12	5.55-12	4.80-12	3.97-12	3.08-12
121	2.188+4	7.32-12	7.10-12	6.70-12	6.17-12	5.51-12	4.76-12	3.95-12	3.06-12
122	1.931+4	7.22-12	7.00-12	6.62-12	6.09-12	5.44-12	4.71-12	3.90-12	3.02-12
123	1.503+4	7.07-12	6.85-12	6.48-12	5.96-12	5.34-12	4.62-12	3.83-12	2.97-12
124	1.171+4	6.85-12	6.65-12	6.29-12	5.80-12	5.20-12	4.51-12	3.75-12	2.92-12
125	9.119+3	6.74-12	6.54-12	6.19-12	5.71-12	5.12-12	4.44-12	3.70-12	2.88-12
126	7.102+3	6.60-12	6.41-12	6.07-12	5.60-12	5.03-12	4.37-12	3.64-12	2.84-12
127	5.531+3	6.51-12	6.32-12	5.98-12	5.52-12	4.96-12	4.31-12	3.59-12	2.80-12
128	4.307+3	6.34-12	6.16-12	5.83-12	5.39-12	4.84-12	4.20-12	3.50-12	2.73-12
129	3.707+3	5.91-12	5.75-12	5.46-12	5.05-12	4.55-12	3.98-12	3.33-12	2.61-12
130	3.355+3	5.38-12	5.24-12	4.99-12	4.64-12	4.22-12	3.71-12	3.15-12	2.52-12
131	3.035+3	4.38-12	4.29-12	4.13-12	3.91-12	3.62-12	3.29-12	2.91-12	2.48-12
132	2.747+3	4.95-12	4.83-12	4.63-12	4.36-12	4.01-12	3.61-12	3.15-12	2.64-12
133	2.613+3	5.64-12	5.49-12	5.23-12	4.88-12	4.44-12	3.93-12	3.37-12	2.74-12
134	2.485+3	6.15-12	5.98-12	5.68-12	5.27-12	4.76-12	4.17-12	3.52-12	2.81-12
135	2.249+3	6.44-12	6.26-12	5.93-12	5.48-12	4.93-12	4.30-12	3.60-12	2.84-12
136	2.035+3	6.56-12	6.37-12	6.03-12	5.57-12	5.00-12	4.35-12	3.63-12	2.85-12
137	1.585+3	6.58-12	6.38-12	6.04-12	5.58-12	5.00-12	4.35-12	3.63-12	2.84-12
138	1.234+3	6.54-12	6.35-12	6.01-12	5.55-12	4.98-12	4.33-12	3.61-12	2.83-12
139	9.611+2	6.50-12	6.30-12	5.97-12	5.51-12	4.94-12	4.29-12	3.58-12	2.80-12
140	7.485+2	6.45-12	6.26-12	5.93-12	5.47-12	4.91-12	4.26-12	3.56-12	2.78-12
141	5.829+2	6.41-12	6.22-12	5.89-12	5.43-12	4.87-12	4.23-12	3.53-12	2.76-12
142	4.540+2	6.37-12	6.18-12	5.85-12	5.40-12	4.84-12	4.21-12	3.51-12	2.75-12
143	3.536+2	6.32-12	6.14-12	5.81-12	5.36-12	4.81-12	4.18-12	3.49-12	2.73-12
144	2.754+2	6.28-12	6.09-12	5.77-12	5.33-12	4.78-12	4.15-12	3.46-12	2.71-12
145	2.144+2	6.24-12	6.05-12	5.73-12	5.29-12	4.75-12	4.12-12	3.44-12	2.69-12
146	1.670+2	6.20-12	6.01-12	5.70-12	5.26-12	4.72-12	4.10-12	3.42-12	2.68-12
147	1.301+2	6.16-12	5.98-12	5.66-12	5.22-12	4.69-12	4.07-12	3.39-12	2.66-12
148	1.013+2	6.12-12	5.94-12	5.62-12	5.19-12	4.66-12	4.04-12	3.37-12	2.64-12
149	7.889+1	6.08-12	5.90-12	5.59-12	5.15-12	4.63-12	4.02-12	3.35-12	2.62-12
150	6.144+1	6.04-12	5.86-12	5.55-12	5.12-12	4.60-12	3.99-12	3.33-12	2.61-12
151	4.785+1	6.00-12	5.83-12	5.52-12	5.09-12	4.57-12	3.97-12	3.31-12	2.59-12
152	3.727+1	5.96-12	5.78-12	5.48-12	5.05-12	4.54-12	3.94-12	3.28-12	2.57-12
153	2.920+1	5.92-12	5.75-12	5.44-12	5.02-12	4.51-12	3.92-12	3.26-12	2.55-12
154	2.260+1	5.88-12	5.71-12	5.41-12	4.99-12	4.48-12	3.89-12	3.24-12	2.54-12
155	1.760+1	5.85-12	5.67-12	5.37-12	4.96-12	4.45-12	3.86-12	3.22-12	2.52-12
156	1.371+1	5.81-12	5.64-12	5.34-12	4.92-12	4.42-12	3.84-12	3.20-12	2.50-12
157	1.068+1	5.77-12	5.60-12	5.30-12	4.89-12	4.39-12	3.81-12	3.17-12	2.48-12
158	8.315+0	5.73-12	5.56-12	5.26-12	4.86-12	4.36-12	3.78-12	3.15-12	2.46-12
159	6.476+0	5.69-12	5.52-12	5.23-12	4.82-12	4.32-12	3.75-12	3.13-12	2.44-12
160	5.043+0	5.65-12	5.48-12	5.19-12	4.79-12	4.29-12	3.73-12	3.10-12	2.42-12
161	3.928+0	5.61-12	5.44-12	5.15-12	4.75-12	4.26-12	3.70-12	3.08-12	2.40-12
162	3.059+0	5.57-12	5.40-12	5.11-12	4.72-12	4.23-12	3.67-12	3.05-12	2.38-12
163	2.372+0	5.52-12	5.36-12	5.07-12	4.68-12	4.19-12	3.64-12	3.02-12	2.36-12
164	1.855+0	5.48-12	5.31-12	5.03-12	4.64-12	4.16-12	3.60-12	2.99-12	2.33-12
165	1.445+0	5.43-12	5.27-12	4.99-12	4.60-12	4.12-12	3.57-12	2.97-12	2.31-12
166	1.125+0	5.38-12	5.22-12	4.94-12	4.55-12	4.08-12	3.54-12	2.93-12	2.28-12
167	8.764-1	5.32-12	5.16-12	4.89-12	4.51-12	4.04-12	3.50-12	2.90-12	2.25-12
168	6.826-1	5.25-12	5.10-12	4.83-12	4.45-12	3.99-12	3.45-12	2.86-12	2.22-12
169	5.316-1	5.19-12	5.04-12	4.77-12	4.40-12	3.94-12	3.40-12	2.81-12	2.17-12
170	4.140-1	4.73-12	4.59-12	4.36-12	4.04-12	3.64-12	3.18-12	2.66-12	2.09-12
171	1.000-1	3.61-12	3.52-12	3.37-12	3.15-12	2.88-12	2.56-12	2.19-12	1.78-12
	1.000-5								

Table C-5c. Gamma-ray Dose Rate Transmission Factors for 2.00-m-thick Standard Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	1.34-09	9.38-10	4.75-10	1.65-10	3.82-11	1.21-12	7.74-12	6.86-12
2	1.200+7	9.21-10	6.43-10	3.23-10	1.12-10	2.63-11	7.37-13	5.54-12	4.89-12
3	1.000+7	5.58-10	3.85-10	1.90-10	6.54-11	1.55-11	3.21-13	3.43-12	3.00-12
4	8.000+6	3.54-10	2.41-10	1.16-10	3.89-11	9.02-12	1.33-13	2.03-12	1.75-12
5	7.500+6	2.78-10	1.88-10	8.99-11	2.98-11	6.92-12	8.65-14	1.58-12	1.36-12
6	7.000+6	2.10-10	1.41-10	6.65-11	2.19-11	5.09-12	5.20-14	1.18-12	1.01-12
7	6.500+6	1.50-10	9.99-11	4.66-11	1.52-11	3.56-12	2.86-14	8.35-13	7.18-13
8	6.000+6	1.01-10	6.66-11	3.07-11	9.99-12	2.35-12	1.41-14	5.61-13	4.81-13
9	5.500+6	6.33-11	4.13-11	1.88-11	6.09-12	1.45-12	5.88-15	3.53-13	3.02-13
10	5.000+6	3.70-11	2.38-11	1.07-11	3.45-12	8.30-13	1.78-15	2.06-13	1.76-13
11	4.500+6	1.95-11	1.24-11	5.48-12	1.77-12	4.29-13	2.76-16	1.08-13	9.27-14
12	4.000+6	8.94-12	5.59-12	2.42-12	7.82-13	1.93-13	9.71-17	4.93-14	4.24-14
13	3.500+6	3.33-12	2.05-12	8.76-13	2.85-13	7.21-14	1.94-16	1.86-14	1.60-14
14	3.000+6	9.46-13	5.72-13	2.42-13	8.05-14	2.10-14	1.70-16	5.40-15	4.72-15
15	2.500+6	1.76-13	1.05-13	4.47-14	1.55-14	4.21-15	6.29-17	1.09-15	9.64-16
16	2.000+6	2.31-14	1.34-14	5.53-15	1.91-15	5.21-16	8.17-18	1.34-16	1.19-16
17	1.660+6	4.44-15	2.47-15	9.74-16	3.28-16	8.98-17	3.66-18	2.03-17	1.84-17
18	1.500+6	1.34-15	7.47-16	3.00-16	1.05-16	3.08-17	2.74-18	5.62-18	5.53-18
19	1.330+6	2.00-16	1.20-16	5.59-17	2.26-17	7.40-18	9.67-19	1.16-18	1.27-18
20	1.000+6	6.50-18	3.76-18	1.68-18	6.68-19	2.16-19	2.72-20	3.42-20	3.70-20
21	8.000+5	4.14-19	2.24-19	9.34-20	3.52-20	1.10-20	1.29-21	1.77-21	1.86-21
22	7.000+5	5.90-20	3.25-20	1.41-20	5.52-21	1.80-21	2.64-22	2.42-22	2.77-22
23	6.000+5	6.01-21	3.34-21	1.48-21	5.96-22	2.01-22	3.49-23	2.19-23	2.78-23
24	5.120+5	1.09-21	5.63-22	2.32-22	9.14-23	3.24-23	7.80-24	1.04-24	2.70-24
25	5.100+5	5.34-22	2.93-22	1.29-22	5.29-23	1.88-23	4.18-24	1.03-24	1.86-24
26	4.500+5	7.86-23	4.49-23	2.13-23	9.55-24	3.94-24	1.35-24	2.78-25	5.10-26
27	4.000+5	1.10-23	7.44-24	4.23-24	2.19-24	1.04-24	4.36-25	1.47-25	3.04-26
28	3.000+5	6.07-26	4.64-26	3.10-26	1.93-26	1.15-26	6.66-27	3.72-27	1.99-27
29	2.000+5	1.94-29	1.42-29	9.04-30	5.42-30	3.14-30	1.77-30	9.66-31	5.07-31
30	1.500+5	2.69-32	2.15-32	1.55-32	1.07-32	7.21-33	4.88-33	3.30-33	2.21-33
31	1.000+5	1.16-40	8.48-41	5.54-41	3.52-41	2.25-41	1.46-41	9.58-42	6.30-42
32	7.500+4	1.97-52	1.23-52	7.02-53	4.09-53	2.47-53	1.53-53	9.74-54	6.27-54
33	6.000+4	8.13-76	4.05-76	2.00-76	1.08-76	6.20-77	3.94-77	2.60-77	2.39-77
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-6a. Neutron Dose Rate Transmission Factors for 0.05-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	5.43-05	5.81-05	6.53-05	7.67-05	9.38-05	1.19-04	1.56-04	1.92-04
2	1.649+7	5.90-05	6.07-05	6.53-05	7.52-05	9.46-05	1.30-04	1.93-04	2.96-04
3	1.568+7	2.72-04	2.85-04	3.11-04	3.59-04	4.43-04	5.99-04	9.43-04	2.32-03
4	1.492+7	2.64-04	2.77-04	3.04-04	3.51-04	4.32-04	5.78-04	8.80-04	1.82-03
5	1.455+7	2.58-04	2.71-04	2.98-04	3.44-04	4.21-04	5.57-04	8.23-04	1.46-03
6	1.419+7	2.53-04	2.66-04	2.92-04	3.37-04	4.11-04	5.38-04	7.72-04	1.18-03
7	1.384+7	2.47-04	2.60-04	2.86-04	3.30-04	4.01-04	5.18-04	7.23-04	9.52-04
8	1.350+7	2.37-04	2.50-04	2.76-04	3.18-04	3.85-04	4.93-04	6.69-04	7.77-04
9	1.284+7	2.26-04	2.38-04	2.63-04	3.02-04	3.65-04	4.62-04	6.09-04	6.23-04
10	1.221+7	2.14-04	2.26-04	2.48-04	2.85-04	3.41-04	4.24-04	5.39-04	4.76-04
11	1.162+7	2.03-04	2.15-04	2.36-04	2.70-04	3.21-04	3.95-04	4.87-04	3.90-04
12	1.105+7	1.90-04	2.01-04	2.21-04	2.53-04	3.01-04	3.70-04	4.59-04	3.69-04
13	1.051+7	1.80-04	1.90-04	2.09-04	2.38-04	2.81-04	3.40-04	4.08-04	2.96-04
14	1.000+7	1.73-04	1.82-04	2.00-04	2.27-04	2.67-04	3.21-04	3.79-04	2.65-04
15	9.512+6	1.68-04	1.77-04	1.94-04	2.20-04	2.57-04	3.07-04	3.56-04	2.39-04
16	9.048+6	1.67-04	1.76-04	1.92-04	2.17-04	2.51-04	2.94-04	3.29-04	2.06-04
17	8.607+6	1.65-04	1.74-04	1.90-04	2.14-04	2.46-04	2.86-04	3.13-04	1.93-04
18	8.187+6	1.62-04	1.70-04	1.86-04	2.09-04	2.41-04	2.78-04	3.02-04	1.85-04
19	7.788+6	1.62-04	1.70-04	1.85-04	2.07-04	2.37-04	2.69-04	2.84-04	1.73-04
20	7.408+6	1.58-04	1.66-04	1.80-04	2.01-04	2.27-04	2.55-04	2.60-04	1.57-04
21	7.047+6	1.53-04	1.61-04	1.76-04	1.97-04	2.24-04	2.53-04	2.64-04	1.65-04
22	6.703+6	1.53-04	1.61-04	1.76-04	1.96-04	2.23-04	2.50-04	2.57-04	1.65-04
23	6.592+6	1.53-04	1.60-04	1.74-04	1.95-04	2.20-04	2.48-04	2.58-04	1.71-04
24	6.376+6	1.58-04	1.66-04	1.79-04	1.98-04	2.22-04	2.46-04	2.49-04	1.76-04
25	6.065+6	1.62-04	1.69-04	1.82-04	2.00-04	2.21-04	2.40-04	2.38-04	1.84-04
26	5.770+6	1.55-04	1.62-04	1.74-04	1.91-04	2.10-04	2.25-04	2.22-04	1.84-04
27	5.488+6	5.47-05	5.80-05	6.43-05	7.44-05	8.98-05	1.13-04	1.49-04	1.95-04
28	5.221+6	7.00-05	7.30-05	7.93-05	9.09-05	1.11-04	1.44-04	1.98-04	2.78-04
29	4.966+6	2.19-04	2.30-04	2.52-04	2.91-04	3.57-04	4.77-04	7.31-04	1.71-03
30	4.724+6	2.19-04	2.30-04	2.53-04	2.92-04	3.58-04	4.72-04	7.00-04	1.35-03
31	4.493+6	2.19-04	2.31-04	2.55-04	2.95-04	3.59-04	4.65-04	6.54-04	9.95-04
32	4.066+6	2.27-04	2.39-04	2.63-04	3.02-04	3.62-04	4.55-04	5.97-04	6.76-04
33	3.679+6	2.28-04	2.40-04	2.63-04	2.99-04	3.53-04	4.30-04	5.26-04	4.62-04
34	3.329+6	2.09-04	2.21-04	2.44-04	2.79-04	3.30-04	4.00-04	4.79-04	3.79-04
35	3.166+6	1.96-04	2.07-04	2.27-04	2.59-04	3.07-04	3.76-04	4.63-04	3.92-04
36	3.012+6	1.90-04	1.99-04	2.17-04	2.46-04	2.90-04	3.53-04	4.35-04	3.67-04
37	2.865+6	1.87-04	1.96-04	2.13-04	2.40-04	2.80-04	3.35-04	3.98-04	2.97-04
38	2.725+6	1.83-04	1.91-04	2.07-04	2.32-04	2.68-04	3.16-04	3.64-04	2.50-04
39	2.592+6	1.80-04	1.88-04	2.03-04	2.25-04	2.57-04	2.96-04	3.25-04	2.02-04
40	2.466+6	1.68-04	1.75-04	1.89-04	2.12-04	2.44-04	2.87-04	3.29-04	2.21-04
41	2.385+6	1.58-04	1.65-04	1.79-04	2.02-04	2.35-04	2.80-04	3.29-04	2.34-04
42	2.365+6	1.51-04	1.58-04	1.72-04	1.94-04	2.27-04	2.73-04	3.28-04	2.45-04
43	2.346+6	1.50-04	1.58-04	1.71-04	1.92-04	2.23-04	2.62-04	2.99-04	1.97-04
44	2.307+6	1.53-04	1.60-04	1.72-04	1.91-04	2.15-04	2.43-04	2.54-04	1.53-04
45	2.231+6	1.55-04	1.61-04	1.72-04	1.87-04	2.07-04	2.27-04	2.25-04	1.36-04
46	2.123+6	1.54-04	1.59-04	1.69-04	1.83-04	2.00-04	2.14-04	2.04-04	1.28-04
47	2.019+6	1.55-04	1.60-04	1.68-04	1.79-04	1.91-04	1.97-04	1.79-04	1.17-04
48	1.921+6	1.53-04	1.57-04	1.63-04	1.70-04	1.77-04	1.75-04	1.53-04	1.13-04
49	1.827+6	1.47-04	1.52-04	1.60-04	1.71-04	1.84-04	1.94-04	1.85-04	1.33-04
50	1.738+6	1.51-04	1.55-04	1.62-04	1.70-04	1.80-04	1.85-04	1.75-04	1.46-04
51	1.653+6	1.53-04	1.57-04	1.63-04	1.71-04	1.79-04	1.82-04	1.75-04	1.65-04
52	1.572+6	1.43-04	1.47-04	1.55-04	1.64-04	1.76-04	1.85-04	1.85-04	1.81-04
53	1.496+6	8.54-05	8.97-05	9.76-05	1.10-04	1.27-04	1.51-04	1.83-04	2.16-04
54	1.423+6	9.27-05	9.69-05	1.05-04	1.18-04	1.38-04	1.67-04	2.08-04	2.59-04
55	1.353+6	2.46-04	2.57-04	2.80-04	3.17-04	3.76-04	4.73-04	6.60-04	1.30-03
56	1.287+6	2.28-04	2.39-04	2.60-04	2.94-04	3.48-04	4.35-04	5.91-04	9.24-04
57	1.225+6	2.20-04	2.31-04	2.51-04	2.84-04	3.34-04	4.12-04	5.39-04	6.73-04

Table C-6a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gJ}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165 + 6	2.17-04	2.28-04	2.47-04	2.79-04	3.25-04	3.93-04	4.87-04	4.72-04
59	1.108 + 6	2.22-04	2.32-04	2.51-04	2.78-04	3.13-04	3.53-04	3.76-04	2.30-04
60	1.003 + 6	2.28-04	2.35-04	2.49-04	2.66-04	2.86-04	2.98-04	2.74-04	1.51-04
61	9.616 + 5	2.21-04	2.28-04	2.40-04	2.59-04	2.81-04	3.03-04	2.96-04	1.62-04
62	9.072 + 5	2.06-04	2.13-04	2.25-04	2.43-04	2.67-04	2.94-04	2.98-04	1.62-04
63	8.629 + 5	2.02-04	2.08-04	2.18-04	2.34-04	2.53-04	2.70-04	2.58-04	1.34-04
64	8.209 + 5	1.92-04	1.97-04	2.06-04	2.18-04	2.31-04	2.40-04	2.17-04	1.14-04
65	7.808 + 5	1.75-04	1.79-04	1.88-04	2.00-04	2.14-04	2.26-04	2.10-04	1.07-04
66	7.427 + 5	1.63-04	1.68-04	1.75-04	1.86-04	1.99-04	2.07-04	1.89-04	9.57-05
67	7.065 + 5	1.54-04	1.58-04	1.64-04	1.73-04	1.83-04	1.88-04	1.67-04	8.52-05
68	6.721 + 5	1.45-04	1.48-04	1.54-04	1.62-04	1.70-04	1.71-04	1.47-04	7.70-05
69	6.393 + 5	1.37-04	1.40-04	1.45-04	1.51-04	1.57-04	1.56-04	1.30-04	6.98-05
70	6.081 + 5	1.30-04	1.32-04	1.36-04	1.40-04	1.43-04	1.38-04	1.11-04	6.28-05
71	5.784 + 5	1.21-04	1.22-04	1.23-04	1.24-04	1.22-04	1.11-04	8.50-05	5.54-05
72	5.502 + 5	1.12-04	1.14-04	1.16-04	1.18-04	1.17-04	1.09-04	8.37-05	5.15-05
73	5.234 + 5	1.05-04	1.06-04	1.07-04	1.07-04	1.04-04	9.39-05	7.10-05	4.65-05
74	4.979 + 5	8.77-05	8.71-05	8.56-05	8.22-05	7.56-05	6.51-05	5.22-05	4.03-05
75	4.505 + 5	6.53-05	6.47-05	6.34-05	6.09-05	5.71-05	5.22-05	4.69-05	4.02-05
76	4.076 + 5	6.77-05	6.78-05	6.77-05	6.69-05	6.45-05	5.97-05	5.30-05	4.55-05
77	3.877 + 5	7.05-05	7.11-05	7.19-05	7.24-05	7.18-05	6.89-05	6.39-05	5.87-05
78	3.688 + 5	7.12-05	7.19-05	7.29-05	7.40-05	7.46-05	7.38-05	7.15-05	6.61-05
79	3.337 + 5	5.35-05	5.49-05	5.76-05	6.17-05	6.71-05	7.37-05	7.96-05	7.54-05
80	3.020 + 5	5.59-05	5.75-05	6.05-05	6.51-05	7.14-05	7.95-05	8.75-05	8.47-05
81	2.985 + 5	1.27-04	1.31-04	1.41-04	1.57-04	1.83-04	2.27-04	3.19-04	6.60-04
82	2.972 + 5	1.18-04	1.23-04	1.31-04	1.45-04	1.66-04	2.01-04	2.62-04	3.61-04
83	2.945 + 5	1.10-04	1.14-04	1.21-04	1.33-04	1.50-04	1.76-04	2.12-04	2.03-04
84	2.873 + 5	1.04-04	1.08-04	1.14-04	1.24-04	1.38-04	1.56-04	1.75-04	1.25-04
85	2.732 + 5	9.72-05	1.00-04	1.06-04	1.14-04	1.25-04	1.38-04	1.46-04	8.54-05
86	2.472 + 5	9.12-05	9.36-05	9.79-05	1.04-04	1.12-04	1.19-04	1.16-04	5.71-05
87	2.352 + 5	8.48-05	8.68-05	9.03-05	9.52-05	1.01-04	1.04-04	9.45-05	4.45-05
88	2.237 + 5	7.83-05	7.97-05	8.22-05	8.54-05	8.80-05	8.68-05	7.24-05	3.61-05
89	2.128 + 5	7.02-05	7.13-05	7.30-05	7.48-05	7.55-05	7.19-05	5.69-05	3.13-05
90	2.024 + 5	6.31-05	6.37-05	6.46-05	6.51-05	6.41-05	5.88-05	4.48-05	2.80-05
91	1.926 + 5	5.76-05	5.80-05	5.86-05	5.88-05	5.74-05	5.19-05	3.93-05	2.59-05
92	1.832 + 5	5.27-05	5.35-05	5.46-05	5.58-05	5.59-05	5.25-05	4.07-05	2.42-05
93	1.742 + 5	4.84-05	4.91-05	5.03-05	5.15-05	5.18-05	4.89-05	3.81-05	2.27-05
94	1.657 + 5	4.38-05	4.46-05	4.60-05	4.76-05	4.86-05	4.67-05	3.72-05	2.12-05
95	1.576 + 5	4.02-05	4.09-05	4.21-05	4.33-05	4.38-05	4.16-05	3.26-05	1.99-05
96	1.500 + 5	3.70-05	3.75-05	3.82-05	3.88-05	3.84-05	3.55-05	2.74-05	1.87-05
97	1.426 + 5	3.40-05	3.44-05	3.49-05	3.52-05	3.45-05	3.15-05	2.46-05	1.79-05
98	1.357 + 5	3.15-05	3.19-05	3.26-05	3.32-05	3.31-05	3.09-05	2.45-05	1.77-05
99	1.291 + 5	2.92-05	2.97-05	3.04-05	3.12-05	3.13-05	2.96-05	2.40-05	1.77-05
100	1.228 + 5	2.71-05	2.75-05	2.80-05	2.85-05	2.83-05	2.65-05	2.19-05	1.75-05
101	1.168 + 5	2.54-05	2.57-05	2.62-05	2.66-05	2.65-05	2.50-05	2.12-05	1.78-05
102	1.111 + 5	2.38-05	2.41-05	2.45-05	2.48-05	2.48-05	2.36-05	2.11-05	1.93-05
103	9.804 + 4	2.40-05	2.42-05	2.45-05	2.48-05	2.49-05	2.47-05	2.45-05	2.57-05
104	8.652 + 4	2.37-05	2.39-05	2.43-05	2.48-05	2.54-05	2.63-05	2.80-05	3.08-05
105	8.250 + 4	1.67-05	1.72-05	1.81-05	1.97-05	2.20-05	2.52-05	2.97-05	3.58-05
106	7.950 + 4	1.79-05	1.85-05	1.95-05	2.11-05	2.36-05	2.70-05	3.18-05	3.82-05
107	7.200 + 4	3.89-05	4.05-05	4.36-05	4.89-05	5.75-05	7.24-05	1.03-04	2.16-04
108	6.738 + 4	3.54-05	3.68-05	3.94-05	4.38-05	5.06-05	6.17-05	8.11-05	1.11-04
109	5.656 + 4	3.31-05	3.43-05	3.65-05	4.01-05	4.54-05	5.32-05	6.40-05	5.77-05
110	5.248 + 4	3.07-05	3.17-05	3.36-05	3.66-05	4.10-05	4.69-05	5.29-05	3.70-05
111	4.631 + 4	2.81-05	2.89-05	3.05-05	3.30-05	3.63-05	4.02-05	4.23-05	2.39-05
112	4.087 + 4	2.56-05	2.62-05	2.73-05	2.89-05	3.08-05	3.23-05	3.04-05	1.48-05
113	3.431 + 4	2.21-05	2.25-05	2.33-05	2.43-05	2.53-05	2.54-05	2.19-05	1.04-05
114	3.183 + 4	1.93-05	1.95-05	1.98-05	2.00-05	1.98-05	1.83-05	1.41-05	8.23-06

Table C-6a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.56-05	1.55-05	1.53-05	1.47-05	1.37-05	1.17-05	9.01-06	7.06-06
116	2.700+4	1.50-05	1.52-05	1.55-05	1.59-05	1.59-05	1.50-05	1.17-05	6.65-06
117	2.606+4	1.34-05	1.36-05	1.41-05	1.46-05	1.50-05	1.45-05	1.18-05	6.28-06
118	2.479+4	1.24-05	1.26-05	1.30-05	1.34-05	1.37-05	1.32-05	1.06-05	6.00-06
119	2.418+4	1.17-05	1.19-05	1.23-05	1.26-05	1.28-05	1.22-05	9.74-06	5.86-06
120	2.358+4	1.11-05	1.13-05	1.16-05	1.19-05	1.19-05	1.13-05	8.98-06	5.69-06
121	2.188+4	1.06-05	1.07-05	1.10-05	1.12-05	1.12-05	1.05-05	8.29-06	5.49-06
122	1.931+4	9.96-06	1.01-05	1.03-05	1.04-05	1.03-05	9.55-06	7.55-06	5.21-06
123	1.503+4	9.23-06	9.33-06	9.45-06	9.51-06	9.31-06	8.52-06	6.75-06	4.87-06
124	1.171+4	8.54-06	8.60-06	8.65-06	8.62-06	8.34-06	7.54-06	6.04-06	4.56-06
125	9.119+3	7.62-06	7.62-06	7.59-06	7.44-06	7.07-06	6.33-06	5.27-06	4.26-06
126	7.102+3	6.95-06	6.98-06	7.00-06	6.95-06	6.72-06	6.16-06	5.28-06	4.34-06
127	5.531+3	6.26-06	6.31-06	6.36-06	6.39-06	6.29-06	5.95-06	5.33-06	4.52-06
128	4.307+3	5.75-06	5.80-06	5.87-06	5.93-06	5.93-06	5.79-06	5.45-06	4.80-06
129	3.707+3	5.70-06	5.75-06	5.84-06	5.94-06	6.02-06	6.02-06	5.87-06	5.32-06
130	3.355+3	6.13-06	6.20-06	6.31-06	6.46-06	6.61-06	6.74-06	6.76-06	6.40-06
131	3.035+3	6.94-06	7.02-06	7.15-06	7.34-06	7.56-06	7.77-06	7.90-06	7.75-06
132	2.747+3	6.92-06	7.03-06	7.22-06	7.50-06	7.85-06	8.24-06	8.59-06	8.60-06
133	2.613+3	1.00-05	1.03-05	1.09-05	1.18-05	1.31-05	1.53-05	1.95-05	3.31-05
134	2.485+3	9.56-06	9.84-06	1.04-05	1.12-05	1.24-05	1.40-05	1.65-05	1.69-05
135	2.249+3	9.21-06	9.47-06	9.96-06	1.07-05	1.17-05	1.31-05	1.45-05	1.13-05
136	2.035+3	8.95-06	9.19-06	9.64-06	1.03-05	1.12-05	1.22-05	1.28-05	8.59-06
137	1.585+3	8.79-06	9.01-06	9.41-06	9.99-06	1.07-05	1.14-05	1.13-05	6.91-06
138	1.234+3	8.62-06	8.81-06	9.15-06	9.61-06	1.01-05	1.05-05	9.76-06	5.85-06
139	9.611+2	8.47-06	8.65-06	8.95-06	9.36-06	9.76-06	9.90-06	8.93-06	5.44-06
140	7.485+2	8.29-06	8.44-06	8.70-06	9.02-06	9.29-06	9.22-06	8.02-06	5.04-06
141	5.829+2	8.10-06	8.23-06	8.44-06	8.69-06	8.84-06	8.60-06	7.28-06	4.74-06
142	4.540+2	7.92-06	8.02-06	8.19-06	8.35-06	8.39-06	8.00-06	6.62-06	4.47-06
143	3.536+2	7.71-06	7.77-06	7.87-06	7.93-06	7.81-06	7.26-06	5.90-06	4.23-06
144	2.754+2	7.46-06	7.53-06	7.64-06	7.72-06	7.64-06	7.13-06	5.80-06	4.13-06
145	2.144+2	7.25-06	7.31-06	7.39-06	7.44-06	7.31-06	6.76-06	5.48-06	4.00-06
146	1.670+2	7.04-06	7.09-06	7.15-06	7.17-06	7.00-06	6.43-06	5.22-06	3.90-06
147	1.301+2	6.83-06	6.88-06	6.92-06	6.91-06	6.72-06	6.15-06	5.02-06	3.82-06
148	1.013+2	6.64-06	6.67-06	6.71-06	6.68-06	6.48-06	5.91-06	4.86-06	3.78-06
149	7.889+1	6.45-06	6.48-06	6.51-06	6.47-06	6.26-06	5.72-06	4.77-06	3.78-06
150	6.144+1	6.27-06	6.30-06	6.32-06	6.29-06	6.09-06	5.58-06	4.72-06	3.82-06
151	4.785+1	6.11-06	6.14-06	6.17-06	6.13-06	5.95-06	5.49-06	4.73-06	3.91-06
152	3.727+1	5.96-06	5.99-06	6.03-06	6.01-06	5.86-06	5.46-06	4.80-06	4.06-06
153	2.920+1	5.83-06	5.87-06	5.92-06	5.92-06	5.81-06	5.49-06	4.95-06	4.28-06
154	2.260+1	5.72-06	5.76-06	5.83-06	5.87-06	5.81-06	5.59-06	5.17-06	4.60-06
155	1.760+1	5.61-06	5.67-06	5.76-06	5.84-06	5.86-06	5.75-06	5.49-06	5.03-06
156	1.371+1	5.58-06	5.65-06	5.76-06	5.90-06	6.02-06	6.07-06	6.01-06	5.72-06
157	1.068+1	5.58-06	5.71-06	5.93-06	6.26-06	6.68-06	7.14-06	7.56-06	7.83-06
158	8.315+0	6.61-06	6.77-06	7.06-06	7.50-06	8.10-06	8.85-06	9.71-06	1.08-05
159	6.476+0	1.14-05	1.17-05	1.25-05	1.36-05	1.54-05	1.84-05	2.41-05	4.33-05
160	5.043+0	1.15-05	1.18-05	1.25-05	1.36-05	1.51-05	1.74-05	2.09-05	2.31-05
161	3.928+0	1.14-05	1.18-05	1.24-05	1.33-05	1.46-05	1.63-05	1.81-05	1.43-05
162	3.059+0	1.13-05	1.16-05	1.22-05	1.30-05	1.41-05	1.52-05	1.58-05	1.03-05
163	2.372+0	1.12-05	1.14-05	1.19-05	1.26-05	1.35-05	1.42-05	1.39-05	8.42-06
164	1.855+0	1.09-05	1.12-05	1.16-05	1.22-05	1.28-05	1.32-05	1.23-05	7.38-06
165	1.445+0	1.07-05	1.09-05	1.13-05	1.18-05	1.22-05	1.23-05	1.10-05	6.74-06
166	1.125+0	1.04-05	1.06-05	1.09-05	1.13-05	1.17-05	1.15-05	9.94-06	6.29-06
167	8.764-1	1.02-05	1.03-05	1.06-05	1.09-05	1.11-05	1.08-05	9.09-06	5.94-06
168	6.826-1	9.90-06	1.00-05	1.03-05	1.05-05	1.06-05	1.01-05	8.40-06	5.67-06
169	5.316-1	9.65-06	9.77-06	9.96-06	1.01-05	1.01-05	9.58-06	7.87-06	5.44-06
170	4.140-1	9.35-06	9.44-06	9.55-06	9.61-06	9.45-06	8.75-06	7.12-06	5.17-06
171	1.000-1	8.71-06	8.68-06	8.58-06	8.35-06	7.85-06	6.94-06	5.64-06	4.41-06
	1.000-5								

Table C-6b. Total Dose Rate Transmission Factors for 0.05-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	2.02-04	2.12-04	2.30-04	2.54-04	2.79-04	2.96-04	2.69-04	1.36-04
2	1.649+7	1.98-04	2.08-04	2.25-04	2.48-04	2.72-04	2.87-04	2.61-04	1.30-04
3	1.568+7	1.93-04	2.03-04	2.20-04	2.43-04	2.65-04	2.78-04	2.48-04	1.24-04
4	1.492+7	1.91-04	2.01-04	2.17-04	2.39-04	2.61-04	2.74-04	2.45-04	1.22-04
5	1.455+7	1.89-04	1.98-04	2.15-04	2.36-04	2.58-04	2.70-04	2.42-04	1.19-04
6	1.419+7	1.87-04	1.96-04	2.12-04	2.33-04	2.54-04	2.67-04	2.39-04	1.17-04
7	1.384+7	1.83-04	1.92-04	2.07-04	2.28-04	2.49-04	2.61-04	2.33-04	1.15-04
8	1.350+7	1.77-04	1.86-04	2.01-04	2.20-04	2.41-04	2.53-04	2.27-04	1.13-04
9	1.284+7	1.69-04	1.77-04	1.92-04	2.10-04	2.30-04	2.41-04	2.17-04	1.09-04
10	1.221+7	1.59-04	1.67-04	1.80-04	1.96-04	2.13-04	2.22-04	1.97-04	1.00-04
11	1.162+7	1.52-04	1.59-04	1.71-04	1.87-04	2.04-04	2.12-04	1.88-04	9.76-05
12	1.105+7	1.46-04	1.53-04	1.66-04	1.83-04	2.01-04	2.14-04	1.98-04	1.01-04
13	1.051+7	1.39-04	1.46-04	1.58-04	1.73-04	1.90-04	2.01-04	1.85-04	9.50-05
14	1.000+7	1.39-04	1.46-04	1.57-04	1.73-04	1.90-04	2.02-04	1.88-04	9.79-05
15	9.512+6	1.40-04	1.46-04	1.58-04	1.73-04	1.91-04	2.04-04	1.90-04	9.89-05
16	9.048+6	1.40-04	1.47-04	1.58-04	1.72-04	1.88-04	1.99-04	1.83-04	9.63-05
17	8.607+6	1.40-04	1.47-04	1.57-04	1.72-04	1.88-04	1.99-04	1.84-04	9.74-05
18	8.187+6	1.40-04	1.47-04	1.58-04	1.73-04	1.90-04	2.02-04	1.87-04	9.83-05
19	7.788+6	1.42-04	1.48-04	1.59-04	1.74-04	1.90-04	2.00-04	1.82-04	9.70-05
20	7.408+6	1.41-04	1.48-04	1.58-04	1.73-04	1.87-04	1.96-04	1.77-04	9.66-05
21	7.047+6	1.42-04	1.48-04	1.60-04	1.75-04	1.93-04	2.06-04	1.93-04	1.03-04
22	6.703+6	1.43-04	1.50-04	1.62-04	1.78-04	1.96-04	2.10-04	1.97-04	1.06-04
23	6.592+6	1.44-04	1.51-04	1.63-04	1.80-04	1.99-04	2.16-04	2.06-04	1.09-04
24	6.376+6	1.48-04	1.55-04	1.67-04	1.84-04	2.03-04	2.16-04	2.02-04	1.10-04
25	6.065+6	1.49-04	1.56-04	1.68-04	1.84-04	2.00-04	2.10-04	1.90-04	1.06-04
26	5.770+6	1.58-04	1.64-04	1.75-04	1.88-04	2.02-04	2.08-04	1.84-04	1.05-04
27	5.488+6	1.55-04	1.62-04	1.74-04	1.90-04	2.08-04	2.21-04	2.05-04	1.11-04
28	5.221+6	1.50-04	1.56-04	1.66-04	1.80-04	1.92-04	1.95-04	1.68-04	9.66-05
29	4.966+6	1.53-04	1.60-04	1.71-04	1.85-04	1.99-04	2.05-04	1.80-04	1.01-04
30	4.724+6	1.50-04	1.57-04	1.68-04	1.82-04	1.95-04	2.01-04	1.76-04	9.94-05
31	4.493+6	1.50-04	1.55-04	1.64-04	1.74-04	1.84-04	1.84-04	1.56-04	9.23-05
32	4.066+6	1.47-04	1.52-04	1.59-04	1.68-04	1.74-04	1.69-04	1.40-04	8.85-05
33	3.679+6	1.43-04	1.47-04	1.52-04	1.59-04	1.62-04	1.56-04	1.27-04	8.54-05
34	3.329+6	1.33-04	1.38-04	1.46-04	1.54-04	1.60-04	1.57-04	1.30-04	8.62-05
35	3.166+6	1.38-04	1.43-04	1.51-04	1.61-04	1.71-04	1.74-04	1.51-04	9.09-05
36	3.012+6	1.38-04	1.43-04	1.51-04	1.62-04	1.73-04	1.79-04	1.61-04	9.26-05
37	2.865+6	1.38-04	1.43-04	1.50-04	1.60-04	1.70-04	1.75-04	1.55-04	9.07-05
38	2.725+6	1.38-04	1.42-04	1.48-04	1.58-04	1.67-04	1.71-04	1.52-04	8.92-05
39	2.592+6	1.39-04	1.42-04	1.48-04	1.56-04	1.64-04	1.65-04	1.44-04	8.72-05
40	2.466+6	1.37-04	1.41-04	1.49-04	1.59-04	1.71-04	1.79-04	1.66-04	9.26-05
41	2.385+6	1.34-04	1.39-04	1.48-04	1.60-04	1.75-04	1.89-04	1.84-04	9.92-05
42	2.365+6	1.32-04	1.37-04	1.46-04	1.59-04	1.77-04	1.95-04	1.97-04	1.05-04
43	2.346+6	1.30-04	1.35-04	1.43-04	1.56-04	1.71-04	1.85-04	1.80-04	9.56-05
44	2.307+6	1.29-04	1.33-04	1.41-04	1.51-04	1.61-04	1.68-04	1.52-04	8.49-05
45	2.231+6	1.30-04	1.34-04	1.40-04	1.48-04	1.56-04	1.59-04	1.39-04	8.06-05
46	2.123+6	1.31-04	1.34-04	1.40-04	1.47-04	1.54-04	1.53-04	1.31-04	7.79-05
47	2.019+6	1.34-04	1.37-04	1.41-04	1.47-04	1.50-04	1.46-04	1.20-04	7.53-05
48	1.921+6	1.32-04	1.34-04	1.37-04	1.40-04	1.39-04	1.31-04	1.06-04	7.26-05
49	1.827+6	1.29-04	1.32-04	1.38-04	1.45-04	1.52-04	1.53-04	1.31-04	7.59-05
50	1.738+6	1.25-04	1.28-04	1.33-04	1.39-04	1.43-04	1.40-04	1.16-04	7.14-05
51	1.653+6	1.23-04	1.25-04	1.29-04	1.32-04	1.33-04	1.26-04	1.02-04	6.80-05
52	1.572+6	1.26-04	1.28-04	1.32-04	1.37-04	1.40-04	1.36-04	1.12-04	6.88-05
53	1.496+6	1.26-04	1.28-04	1.32-04	1.36-04	1.39-04	1.33-04	1.08-04	6.71-05
54	1.423+6	1.28-04	1.30-04	1.34-04	1.37-04	1.38-04	1.30-04	1.03-04	6.51-05
55	1.353+6	1.33-04	1.33-04	1.33-04	1.30-04	1.24-04	1.09-04	8.44-05	6.05-05
56	1.287+6	1.23-04	1.25-04	1.27-04	1.28-04	1.27-04	1.17-04	9.08-05	5.84-05
57	1.225+6	1.20-04	1.22-04	1.24-04	1.27-04	1.26-04	1.17-04	9.09-05	5.62-05

Table C-6b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.12-04	1.14-04	1.17-04	1.19-04	1.19-04	1.10-04	8.44-05	5.28-05
59	1.108+6	9.71-05	9.79-05	9.87-05	9.81-05	9.37-05	8.24-05	6.41-05	4.75-05
60	1.003+6	9.34-05	9.30-05	9.17-05	8.85-05	8.20-05	7.13-05	5.82-05	4.68-05
61	9.616+5	1.06-04	1.06-04	1.06-04	1.05-04	9.94-05	8.76-05	6.79-05	5.00-05
62	9.072+5	1.08-04	1.09-04	1.10-04	1.11-04	1.08-04	9.80-05	7.52-05	5.03-05
63	8.629+5	1.07-04	1.08-04	1.08-04	1.08-04	1.04-04	9.34-05	7.14-05	4.89-05
64	8.209+5	1.02-04	1.02-04	1.02-04	1.01-04	9.73-05	8.66-05	6.64-05	4.69-05
65	7.808+5	9.89-05	9.97-05	1.01-04	1.01-04	9.93-05	9.06-05	6.95-05	4.56-05
66	7.427+5	9.65-05	9.74-05	9.86-05	9.93-05	9.75-05	8.92-05	6.82-05	4.37-05
67	7.065+5	9.38-05	9.46-05	9.56-05	9.60-05	9.40-05	8.56-05	6.51-05	4.16-05
68	6.721+5	9.14-05	9.21-05	9.29-05	9.31-05	9.08-05	8.22-05	6.21-05	3.96-05
69	6.393+5	8.89-05	8.95-05	9.02-05	9.02-05	8.76-05	7.88-05	5.90-05	3.72-05
70	6.081+5	8.60-05	8.64-05	8.66-05	8.58-05	8.23-05	7.29-05	5.38-05	3.45-05
71	5.784+5	7.91-05	7.89-05	7.80-05	7.57-05	7.06-05	6.05-05	4.49-05	3.14-05
72	5.502+5	7.81-05	7.82-05	7.79-05	7.65-05	7.23-05	6.26-05	4.52-05	2.88-05
73	5.234+5	7.38-05	7.36-05	7.28-05	7.07-05	6.56-05	5.55-05	3.95-05	2.54-05
74	4.979+5	5.89-05	5.78-05	5.56-05	5.16-05	4.55-05	3.71-05	2.81-05	2.05-05
75	4.505+5	3.96-05	3.87-05	3.70-05	3.43-05	3.05-05	2.62-05	2.19-05	1.81-05
76	4.076+5	4.31-05	4.27-05	4.19-05	4.00-05	3.65-05	3.06-05	2.36-05	1.83-05
77	3.877+5	4.41-05	4.40-05	4.36-05	4.22-05	3.91-05	3.31-05	2.45-05	1.80-05
78	3.688+5	4.31-05	4.31-05	4.28-05	4.17-05	3.89-05	3.30-05	2.41-05	1.71-05
79	3.337+5	4.02-05	4.02-05	3.99-05	3.89-05	3.63-05	3.09-05	2.23-05	1.56-05
80	3.020+5	3.83-05	3.83-05	3.81-05	3.72-05	3.47-05	2.95-05	2.12-05	1.46-05
81	2.985+5	3.81-05	3.81-05	3.78-05	3.69-05	3.45-05	2.94-05	2.11-05	1.44-05
82	2.972+5	3.78-05	3.77-05	3.75-05	3.65-05	3.41-05	2.90-05	2.08-05	1.43-05
83	2.945+5	3.69-05	3.68-05	3.65-05	3.55-05	3.30-05	2.79-05	2.01-05	1.41-05
84	2.873+5	3.55-05	3.54-05	3.49-05	3.38-05	3.12-05	2.63-05	1.91-05	1.35-05
85	2.732+5	3.34-05	3.33-05	3.28-05	3.17-05	2.93-05	2.46-05	1.78-05	1.24-05
86	2.472+5	3.05-05	3.03-05	2.98-05	2.86-05	2.62-05	2.18-05	1.59-05	1.13-05
87	2.352+5	2.87-05	2.85-05	2.80-05	2.67-05	2.44-05	2.02-05	1.48-05	1.07-05
88	2.237+5	2.62-05	2.59-05	2.53-05	2.41-05	2.17-05	1.80-05	1.36-05	1.01-05
89	2.128+5	2.42-05	2.39-05	2.33-05	2.21-05	1.99-05	1.66-05	1.27-05	9.75-06
90	2.024+5	2.22-05	2.19-05	2.13-05	2.01-05	1.81-05	1.52-05	1.21-05	9.57-06
91	1.926+5	2.17-05	2.15-05	2.09-05	1.98-05	1.79-05	1.50-05	1.19-05	9.53-06
92	1.832+5	2.32-05	2.31-05	2.28-05	2.19-05	2.01-05	1.69-05	1.26-05	9.38-06
93	1.742+5	2.31-05	2.30-05	2.27-05	2.20-05	2.04-05	1.72-05	1.26-05	9.07-06
94	1.657+5	2.29-05	2.29-05	2.29-05	2.25-05	2.12-05	1.82-05	1.30-05	8.64-06
95	1.576+5	2.17-05	2.17-05	2.17-05	2.13-05	2.01-05	1.72-05	1.23-05	8.25-06
96	1.500+5	2.02-05	2.02-05	2.00-05	1.95-05	1.82-05	1.54-05	1.12-05	7.90-06
97	1.426+5	1.92-05	1.92-05	1.90-05	1.84-05	1.70-05	1.44-05	1.06-05	7.61-06
98	1.357+5	1.92-05	1.92-05	1.92-05	1.88-05	1.77-05	1.51-05	1.08-05	7.26-06
99	1.291+5	1.87-05	1.88-05	1.88-05	1.86-05	1.77-05	1.53-05	1.08-05	6.87-06
100	1.228+5	1.76-05	1.76-05	1.76-05	1.72-05	1.62-05	1.38-05	9.85-06	6.52-06
101	1.168+5	1.69-05	1.69-05	1.69-05	1.65-05	1.55-05	1.33-05	9.42-06	6.18-06
102	1.111+5	1.55-05	1.55-05	1.54-05	1.50-05	1.40-05	1.19-05	8.46-06	5.68-06
103	9.804+4	1.33-05	1.32-05	1.30-05	1.25-05	1.15-05	9.65-06	7.05-06	5.05-06
104	8.652+4	1.14-05	1.13-05	1.10-05	1.04-05	9.41-06	7.87-06	6.12-06	4.77-06
105	8.250+4	1.24-05	1.23-05	1.22-05	1.19-05	1.10-05	9.32-06	6.71-06	4.63-06
106	7.950+4	1.14-05	1.14-05	1.12-05	1.08-05	9.95-06	8.35-06	6.15-06	4.45-06
107	7.200+4	1.11-05	1.11-05	1.10-05	1.06-05	9.88-06	8.34-06	6.02-06	4.18-06
108	6.738+4	1.01-05	1.01-05	9.95-06	9.63-06	8.91-06	7.50-06	5.46-06	3.84-06
109	5.656+4	8.93-06	8.89-06	8.75-06	8.43-06	7.74-06	6.49-06	4.79-06	3.47-06
110	5.248+4	8.44-06	8.40-06	8.29-06	7.99-06	7.35-06	6.18-06	4.55-06	3.25-06
111	4.631+4	7.68-06	7.63-06	7.52-06	7.24-06	6.65-06	5.59-06	4.13-06	2.97-06
112	4.087+4	6.70-06	6.64-06	6.48-06	6.17-06	5.60-06	4.69-06	3.58-06	2.67-06
113	3.431+4	6.01-06	5.94-06	5.80-06	5.51-06	4.99-06	4.19-06	3.23-06	2.43-06
114	3.183+4	5.08-06	5.00-06	4.83-06	4.54-06	4.09-06	3.49-06	2.87-06	2.29-06

Table C-6b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	3.97-06	3.90-06	3.76-06	3.54-06	3.26-06	2.94-06	2.62-06	2.28-06
116	2.700+4	5.48-06	5.44-06	5.35-06	5.14-06	4.73-06	4.05-06	3.20-06	2.47-06
117	2.606+4	5.72-06	5.71-06	5.68-06	5.54-06	5.19-06	4.49-06	3.41-06	2.47-06
118	2.479+4	5.63-06	5.63-06	5.60-06	5.47-06	5.14-06	4.46-06	3.39-06	2.44-06
119	2.418+4	5.54-06	5.54-06	5.51-06	5.38-06	5.06-06	4.39-06	3.34-06	2.41-06
120	2.358+4	5.38-06	5.38-06	5.34-06	5.22-06	4.90-06	4.26-06	3.26-06	2.36-06
121	2.188+4	5.08-06	5.08-06	5.05-06	4.93-06	4.64-06	4.04-06	3.12-06	2.29-06
122	1.931+4	4.67-06	4.67-06	4.64-06	4.53-06	4.27-06	3.75-06	2.94-06	2.18-06
123	1.503+4	4.22-06	4.22-06	4.19-06	4.09-06	3.87-06	3.42-06	2.74-06	2.07-06
124	1.171+4	3.93-06	3.92-06	3.88-06	3.79-06	3.58-06	3.19-06	2.60-06	1.99-06
125	9.119+3	3.71-06	3.68-06	3.62-06	3.50-06	3.27-06	2.91-06	2.43-06	1.93-06
126	7.102+3	3.84-06	3.82-06	3.78-06	3.67-06	3.46-06	3.08-06	2.55-06	1.99-06
127	5.531+3	3.93-06	3.91-06	3.87-06	3.77-06	3.56-06	3.17-06	2.61-06	2.01-06
128	4.307+3	3.92-06	3.89-06	3.84-06	3.72-06	3.49-06	3.09-06	2.55-06	1.98-06
129	3.707+3	3.88-06	3.84-06	3.77-06	3.63-06	3.38-06	2.98-06	2.47-06	1.93-06
130	3.355+3	3.69-06	3.65-06	3.57-06	3.41-06	3.16-06	2.79-06	2.34-06	1.86-06
131	3.035+3	3.25-06	3.20-06	3.10-06	2.95-06	2.73-06	2.46-06	2.15-06	1.82-06
132	2.747+3	3.50-06	3.46-06	3.37-06	3.21-06	2.98-06	2.66-06	2.30-06	1.91-06
133	2.613+3	3.73-06	3.70-06	3.62-06	3.47-06	3.23-06	2.87-06	2.44-06	1.97-06
134	2.485+3	3.86-06	3.83-06	3.76-06	3.63-06	3.39-06	3.02-06	2.53-06	2.02-06
135	2.249+3	3.97-06	3.95-06	3.89-06	3.77-06	3.54-06	3.15-06	2.62-06	2.07-06
136	2.035+3	4.04-06	4.02-06	3.97-06	3.86-06	3.64-06	3.24-06	2.68-06	2.10-06
137	1.585+3	4.10-06	4.08-06	4.03-06	3.92-06	3.69-06	3.29-06	2.72-06	2.12-06
138	1.234+3	4.15-06	4.13-06	4.07-06	3.95-06	3.72-06	3.31-06	2.75-06	2.17-06
139	9.611+2	4.13-06	4.11-06	4.06-06	3.94-06	3.71-06	3.30-06	2.73-06	2.13-06
140	7.485+2	4.16-06	4.14-06	4.09-06	3.96-06	3.72-06	3.31-06	2.74-06	2.14-06
141	5.829+2	4.20-06	4.17-06	4.11-06	3.99-06	3.74-06	3.32-06	2.75-06	2.15-06
142	4.540+2	4.22-06	4.19-06	4.13-06	3.99-06	3.74-06	3.32-06	2.75-06	2.15-06
143	3.536+2	4.16-06	4.12-06	4.05-06	3.90-06	3.63-06	3.22-06	2.70-06	2.14-06
144	2.754+2	4.30-06	4.28-06	4.21-06	4.08-06	3.82-06	3.39-06	2.81-06	2.20-06
145	2.144+2	4.34-06	4.31-06	4.25-06	4.11-06	3.85-06	3.42-06	2.83-06	2.22-06
146	1.670+2	4.37-06	4.35-06	4.28-06	4.15-06	3.88-06	3.44-06	2.85-06	2.23-06
147	1.301+2	4.41-06	4.38-06	4.32-06	4.18-06	3.91-06	3.47-06	2.87-06	2.25-06
148	1.013+2	4.44-06	4.42-06	4.35-06	4.21-06	3.94-06	3.49-06	2.88-06	2.26-06
149	7.889+1	4.47-06	4.45-06	4.38-06	4.24-06	3.96-06	3.51-06	2.90-06	2.27-06
150	6.144+1	4.50-06	4.47-06	4.41-06	4.26-06	3.99-06	3.53-06	2.91-06	2.28-06
151	4.785+1	4.53-06	4.50-06	4.43-06	4.28-06	4.01-06	3.54-06	2.92-06	2.29-06
152	3.727+1	4.55-06	4.52-06	4.45-06	4.30-06	4.02-06	3.56-06	2.93-06	2.30-06
153	2.920+1	4.57-06	4.54-06	4.47-06	4.32-06	4.04-06	3.57-06	2.94-06	2.30-06
154	2.260+1	4.59-06	4.56-06	4.49-06	4.34-06	4.05-06	3.58-06	2.95-06	2.31-06
155	1.760+1	4.60-06	4.57-06	4.50-06	4.35-06	4.06-06	3.58-06	2.95-06	2.31-06
156	1.371+1	4.61-06	4.58-06	4.51-06	4.35-06	4.07-06	3.59-06	2.96-06	2.31-06
157	1.068+1	4.61-06	4.58-06	4.51-06	4.36-06	4.07-06	3.59-06	2.96-06	2.31-06
158	8.315+0	4.61-06	4.58-06	4.51-06	4.36-06	4.07-06	3.59-06	2.96-06	2.31-06
159	6.476+0	4.61-06	4.58-06	4.51-06	4.36-06	4.07-06	3.59-06	2.95-06	2.31-06
160	5.043+0	4.60-06	4.57-06	4.50-06	4.35-06	4.06-06	3.58-06	2.95-06	2.30-06
161	3.928+0	4.59-06	4.56-06	4.49-06	4.34-06	4.05-06	3.57-06	2.94-06	2.30-06
162	3.059+0	4.58-06	4.55-06	4.48-06	4.33-06	4.04-06	3.57-06	2.94-06	2.30-06
163	2.372+0	4.56-06	4.53-06	4.46-06	4.31-06	4.03-06	3.56-06	2.93-06	2.29-06
164	1.855+0	4.54-06	4.51-06	4.44-06	4.30-06	4.01-06	3.54-06	2.92-06	2.28-06
165	1.445+0	4.51-06	4.49-06	4.42-06	4.28-06	4.00-06	3.53-06	2.91-06	2.28-06
166	1.125+0	4.49-06	4.46-06	4.40-06	4.25-06	3.98-06	3.52-06	2.91-06	2.27-06
167	8.764-1	4.46-06	4.43-06	4.37-06	4.23-06	3.96-06	3.51-06	2.90-06	2.27-06
168	6.826-1	4.43-06	4.40-06	4.34-06	4.21-06	3.94-06	3.49-06	2.89-06	2.26-06
169	5.316-1	4.40-06	4.38-06	4.32-06	4.18-06	3.92-06	3.48-06	2.88-06	2.25-06
170	4.140-1	4.21-06	4.18-06	4.12-06	3.99-06	3.73-06	3.33-06	2.79-06	2.22-06
171	1.000-1	3.97-06	3.92-06	3.83-06	3.66-06	3.41-06	3.06-06	2.64-06	2.18-06
	1.000-5								

Table C-6c. Gamma-ray Dose Rate Transmission Factors for 0.05-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	9.50-06	9.95-06	1.08-05	1.20-05	1.38-05	1.59-05	1.75-05	8.35-06
2	1.200+7	8.32-06	8.73-06	9.48-06	1.06-05	1.21-05	1.40-05	1.53-05	7.27-06
3	1.000+7	7.16-06	7.53-06	8.20-06	9.18-06	1.05-05	1.21-05	1.31-05	6.17-06
4	8.000+6	6.44-06	6.78-06	7.39-06	8.28-06	9.46-06	1.09-05	1.17-05	5.45-06
5	7.500+6	6.15-06	6.48-06	7.06-06	7.91-06	9.04-06	1.04-05	1.11-05	5.12-06
6	7.000+6	5.86-06	6.17-06	6.73-06	7.54-06	8.60-06	9.83-06	1.05-05	4.77-06
7	6.500+6	5.57-06	5.86-06	6.39-06	7.16-06	8.16-06	9.29-06	9.81-06	4.41-06
8	6.000+6	5.27-06	5.55-06	6.05-06	6.78-06	7.71-06	8.74-06	9.14-06	4.04-06
9	5.500+6	4.97-06	5.24-06	5.71-06	6.38-06	7.24-06	8.18-06	8.44-06	3.67-06
10	5.000+6	4.65-06	4.89-06	5.33-06	5.96-06	6.74-06	7.57-06	7.71-06	3.30-06
11	4.500+6	4.35-06	4.58-06	4.98-06	5.56-06	6.27-06	6.98-06	7.01-06	2.94-06
12	4.000+6	4.03-06	4.24-06	4.61-06	5.13-06	5.76-06	6.36-06	6.26-06	2.58-06
13	3.500+6	3.69-06	3.88-06	4.22-06	4.67-06	5.21-06	5.69-06	5.47-06	2.23-06
14	3.000+6	3.34-06	3.50-06	3.79-06	4.18-06	4.63-06	4.98-06	4.65-06	1.90-06
15	2.500+6	2.96-06	3.10-06	3.34-06	3.66-06	4.00-06	4.22-06	3.80-06	1.58-06
16	2.000+6	2.63-06	2.74-06	2.94-06	3.18-06	3.43-06	3.54-06	3.07-06	1.34-06
17	1.660+6	2.43-06	2.53-06	2.69-06	2.89-06	3.08-06	3.12-06	2.64-06	1.20-06
18	1.500+6	2.30-06	2.39-06	2.52-06	2.69-06	2.84-06	2.85-06	2.37-06	1.12-06
19	1.330+6	2.11-06	2.18-06	2.28-06	2.39-06	2.48-06	2.43-06	1.97-06	1.00-06
20	1.000+6	1.95-06	1.98-06	2.03-06	2.08-06	2.10-06	1.99-06	1.57-06	8.69-07
21	8.000+5	1.89-06	1.90-06	1.91-06	1.92-06	1.90-06	1.76-06	1.37-06	7.91-07
22	7.000+5	1.88-06	1.88-06	1.87-06	1.85-06	1.79-06	1.63-06	1.25-06	7.37-07
23	6.000+5	1.92-06	1.91-06	1.88-06	1.83-06	1.74-06	1.55-06	1.16-06	6.78-07
24	5.120+5	1.96-06	1.94-06	1.90-06	1.84-06	1.74-06	1.53-06	1.12-06	6.44-07
25	5.100+5	1.99-06	1.97-06	1.94-06	1.88-06	1.76-06	1.53-06	1.10-06	6.13-07
26	4.500+5	2.05-06	2.06-06	2.05-06	2.01-06	1.89-06	1.60-06	1.07-06	5.35-07
27	4.000+5	3.45-06	3.45-06	3.41-06	3.25-06	2.86-06	2.07-06	9.27-07	2.96-07
28	3.000+5	1.30-07	1.30-07	1.30-07	1.28-07	1.23-07	1.10-07	8.52-08	5.88-08
29	2.000+5	1.96-07	1.93-07	1.85-07	1.70-07	1.44-07	1.05-07	6.31-08	3.89-08
30	1.500+5	9.79-08	9.44-08	8.74-08	7.61-08	5.98-08	3.99-08	2.33-08	1.50-08
31	1.000+5	2.66-08	2.47-08	2.11-08	1.61-08	1.05-08	5.67-09	3.09-09	1.96-09
32	7.500+4	4.55-09	3.93-09	2.94-09	1.83-09	9.03-10	4.07-10	2.25-10	1.39-10
33	6.000+4	1.49-10	1.12-10	6.39-11	2.75-11	1.07-11	5.61-12	3.54-12	2.42-12
34	4.500+4	6.88-16	2.70-16	5.51-17	1.54-17	7.94-18	4.74-18	3.12-18	4.68-19
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-7a. Neutron Dose Rate Transmission Factors for 0.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.41-05	1.29-05	1.09-05	8.52-06	6.19-06	4.28-06	2.87-06	1.84-06
2	1.649+7	1.32-05	1.20-05	1.02-05	7.95-06	5.80-06	4.03-06	2.72-06	1.77-06
3	1.568+7	1.24-05	1.13-05	9.58-06	7.52-06	5.52-06	3.87-06	2.62-06	1.69-06
4	1.492+7	1.21-05	1.10-05	9.33-06	7.32-06	5.38-06	3.78-06	2.57-06	1.67-06
5	1.455+7	1.17-05	1.07-05	9.07-06	7.12-06	5.23-06	3.68-06	2.51-06	1.64-06
6	1.419+7	1.15-05	1.05-05	8.88-06	6.98-06	5.13-06	3.62-06	2.48-06	1.63-06
7	1.384+7	1.12-05	1.03-05	8.71-06	6.86-06	5.06-06	3.58-06	2.46-06	1.62-06
8	1.350+7	1.12-05	1.02-05	8.65-06	6.81-06	5.02-06	3.55-06	2.43-06	1.60-06
9	1.284+7	1.06-05	9.73-06	8.26-06	6.52-06	4.82-06	3.41-06	2.35-06	1.55-06
10	1.221+7	8.87-06	8.13-06	6.95-06	5.54-06	4.18-06	3.04-06	2.15-06	1.47-06
11	1.162+7	8.36-06	7.68-06	6.58-06	5.28-06	4.01-06	2.94-06	2.11-06	1.46-06
12	1.105+7	9.74-06	8.92-06	7.58-06	5.97-06	4.39-06	3.10-06	2.15-06	1.44-06
13	1.051+7	8.78-06	8.05-06	6.87-06	5.44-06	4.06-06	2.91-06	2.05-06	1.40-06
14	1.000+7	9.38-06	8.61-06	7.34-06	5.81-06	4.30-06	3.06-06	2.13-06	1.44-06
15	9.512+6	9.65-06	8.84-06	7.52-06	5.93-06	4.36-06	3.07-06	2.12-06	1.42-06
16	9.048+6	8.65-06	7.94-06	6.78-06	5.39-06	4.04-06	2.91-06	2.06-06	1.41-06
17	8.607+6	8.43-06	7.74-06	6.61-06	5.26-06	3.94-06	2.86-06	2.04-06	1.41-06
18	8.187+6	9.00-06	8.27-06	7.07-06	5.62-06	4.21-06	3.05-06	2.17-06	1.50-06
19	7.788+6	8.45-06	7.79-06	6.71-06	5.41-06	4.15-06	3.09-06	2.27-06	1.62-06
20	7.408+6	8.21-06	7.60-06	6.61-06	5.41-06	4.24-06	3.23-06	2.42-06	1.76-06
21	7.047+6	1.02-05	9.36-06	8.05-06	6.45-06	4.87-06	3.54-06	2.53-06	1.75-06
22	6.703+6	1.10-05	1.02-05	8.73-06	6.98-06	5.25-06	3.78-06	2.67-06	1.81-06
23	6.592+6	1.21-05	1.11-05	9.50-06	7.52-06	5.53-06	3.88-06	2.66-06	1.76-06
24	6.376+6	1.13-05	1.04-05	8.92-06	7.14-06	5.36-06	3.86-06	2.71-06	1.83-06
25	6.065+6	9.65-06	8.90-06	7.69-06	6.22-06	4.77-06	3.53-06	2.54-06	1.75-06
26	5.770+6	9.26-06	8.57-06	7.45-06	6.11-06	4.76-06	3.58-06	2.60-06	1.80-06
27	5.488+6	1.10-05	1.01-05	8.63-06	6.84-06	5.08-06	3.60-06	2.48-06	1.64-06
28	5.221+6	6.80-06	6.29-06	5.49-06	4.54-06	3.59-06	2.75-06	2.05-06	1.46-06
29	4.966+6	8.27-06	7.62-06	6.57-06	5.32-06	4.09-06	3.03-06	2.17-06	1.47-06
30	4.724+6	7.73-06	7.12-06	6.12-06	4.95-06	3.79-06	2.80-06	2.00-06	1.35-06
31	4.493+6	6.01-06	5.56-06	4.85-06	4.00-06	3.15-06	2.39-06	1.75-06	1.21-06
32	4.066+6	4.43-06	4.14-06	3.68-06	3.12-06	2.56-06	2.03-06	1.56-06	1.13-06
33	3.679+6	3.56-06	3.36-06	3.05-06	2.67-06	2.26-06	1.88-06	1.51-06	1.16-06
34	3.329+6	3.88-06	3.64-06	3.27-06	2.82-06	2.36-06	1.92-06	1.53-06	1.17-06
35	3.166+6	5.53-06	5.11-06	4.46-06	3.68-06	2.91-06	2.24-06	1.69-06	1.22-06
36	3.012+6	6.32-06	5.80-06	4.99-06	4.02-06	3.08-06	2.29-06	1.68-06	1.19-06
37	2.865+6	5.74-06	5.28-06	4.55-06	3.70-06	2.87-06	2.16-06	1.60-06	1.16-06
38	2.725+6	5.31-06	4.89-06	4.22-06	3.44-06	2.68-06	2.03-06	1.52-06	1.11-06
39	2.592+6	4.84-06	4.48-06	3.90-06	3.22-06	2.55-06	1.96-06	1.48-06	1.07-06
40	2.466+6	7.03-06	6.40-06	5.38-06	4.18-06	3.03-06	2.09-06	1.40-06	9.10-07
41	2.385+6	9.10-06	8.24-06	6.82-06	5.11-06	3.45-06	2.15-06	1.29-06	7.53-07
42	2.365+6	1.02-05	9.27-06	7.65-06	5.62-06	3.62-06	2.09-06	1.17-06	6.43-07
43	2.346+6	7.28-06	6.55-06	5.36-06	3.93-06	2.58-06	1.57-06	9.31-07	5.47-07
44	2.307+6	4.04-06	3.63-06	2.98-06	2.25-06	1.57-06	1.06-06	7.01-07	4.55-07
45	2.231+6	2.79-06	2.51-06	2.08-06	1.60-06	1.16-06	8.14-07	5.64-07	3.82-07
46	2.123+6	2.15-06	1.94-06	1.61-06	1.25-06	9.20-07	6.59-07	4.65-07	3.20-07
47	2.019+6	1.50-06	1.37-06	1.16-06	9.33-07	7.18-07	5.39-07	3.97-07	2.82-07
48	1.921+6	1.01-06	9.41-07	8.30-07	7.00-07	5.69-07	4.49-07	3.45-07	2.54-07
49	1.827+6	1.68-06	1.50-06	1.21-06	9.06-07	6.40-07	4.42-07	3.04-07	2.05-07
50	1.738+6	9.75-07	8.77-07	7.29-07	5.69-07	4.27-07	3.15-07	2.31-07	1.66-07
51	1.653+6	6.50-07	5.97-07	5.15-07	4.24-07	3.37-07	2.63-07	2.01-07	1.49-07
52	1.572+6	8.50-07	7.61-07	6.29-07	4.86-07	3.61-07	2.63-07	1.89-07	1.32-07
53	1.496+6	7.05-07	6.32-07	5.23-07	4.06-07	3.03-07	2.22-07	1.60-07	1.13-07
54	1.423+6	5.66-07	5.10-07	4.26-07	3.36-07	2.55-07	1.89-07	1.38-07	9.71-08
55	1.353+6	3.13-07	2.94-07	2.65-07	2.29-07	1.91-07	1.54-07	1.20-07	8.82-08
56	1.287+6	3.84-07	3.50-07	2.98-07	2.42-07	1.89-07	1.43-07	1.06-07	7.43-08
57	1.225+6	3.74-07	3.37-07	2.82-07	2.23-07	1.70-07	1.26-07	9.12-08	6.27-08

Table C-7a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	2.75-07	2.49-07	2.10-07	1.68-07	1.31-07	9.96-08	7.41-08	5.23-08
59	1.108+6	1.29-07	1.23-07	1.12-07	9.90-08	8.54-08	7.21-08	5.96-08	4.71-08
60	1.003+6	1.07-07	1.03-07	9.68-08	8.85-08	7.91-08	6.93-08	5.93-08	4.89-08
61	9.616+5	1.55-07	1.47-07	1.34-07	1.18-07	1.01-07	8.42-08	6.87-08	5.39-08
62	9.072+5	2.08-07	1.91-07	1.66-07	1.39-07	1.13-07	8.98-08	7.02-08	5.28-08
63	8.629+5	1.82-07	1.69-07	1.49-07	1.26-07	1.04-07	8.43-08	6.66-08	5.06-08
64	8.209+5	1.54-07	1.44-07	1.29-07	1.12-07	9.40-08	7.74-08	6.23-08	4.83-08
65	7.808+5	1.82-07	1.66-07	1.44-07	1.19-07	9.61-08	7.63-08	5.96-08	4.50-08
66	7.427+5	1.81-07	1.65-07	1.41-07	1.15-07	9.15-08	7.18-08	5.53-08	4.11-08
67	7.065+5	1.66-07	1.51-07	1.29-07	1.05-07	8.40-08	6.56-08	5.02-08	3.70-08
68	6.721+5	1.52-07	1.38-07	1.18-07	9.68-08	7.69-08	5.99-08	4.55-08	3.32-08
69	6.393+5	1.38-07	1.25-07	1.07-07	8.77-08	6.97-08	5.41-08	4.08-08	2.94-08
70	6.081+5	1.12-07	1.03-07	8.96-08	7.48-08	6.05-08	4.76-08	3.63-08	2.61-08
71	5.784+5	7.66-08	7.24-08	6.56-08	5.73-08	4.85-08	3.97-08	3.14-08	2.35-08
72	5.502+5	8.67-08	8.06-08	7.12-08	6.03-08	4.93-08	3.90-08	2.95-08	2.08-08
73	5.234+5	6.97-08	6.55-08	5.89-08	5.08-08	4.23-08	3.39-08	2.59-08	1.83-08
74	4.979+5	4.20-08	4.04-08	3.77-08	3.42-08	3.00-08	2.55-08	2.07-08	1.57-08
75	4.505+5	2.83-08	2.76-08	2.63-08	2.47-08	2.27-08	2.04-08	1.79-08	1.50-08
76	4.076+5	3.63-08	3.50-08	3.28-08	3.00-08	2.68-08	2.34-08	1.99-08	1.62-08
77	3.877+5	4.20-08	4.01-08	3.72-08	3.34-08	2.93-08	2.50-08	2.08-08	1.66-08
78	3.688+5	4.51-08	4.30-08	3.95-08	3.52-08	3.05-08	2.57-08	2.11-08	1.65-08
79	3.337+5	4.56-08	4.34-08	3.97-08	3.52-08	3.03-08	2.54-08	2.06-08	1.60-08
80	3.020+5	4.59-08	4.35-08	3.97-08	3.51-08	3.01-08	2.51-08	2.03-08	1.56-08
81	2.985+5	4.58-08	4.35-08	3.97-08	3.50-08	3.00-08	2.50-08	2.02-08	1.55-08
82	2.972+5	4.53-08	4.30-08	3.93-08	3.47-08	2.98-08	2.49-08	2.01-08	1.55-08
83	2.945+5	4.36-08	4.15-08	3.80-08	3.37-08	2.91-08	2.44-08	1.98-08	1.53-08
84	2.873+5	4.18-08	3.98-08	3.67-08	3.27-08	2.83-08	2.38-08	1.94-08	1.51-08
85	2.732+5	4.16-08	3.97-08	3.64-08	3.23-08	2.79-08	2.34-08	1.89-08	1.45-08
86	2.472+5	3.85-08	3.68-08	3.39-08	3.03-08	2.63-08	2.21-08	1.80-08	1.38-08
87	2.352+5	3.68-08	3.52-08	3.25-08	2.91-08	2.53-08	2.14-08	1.74-08	1.34-08
88	2.237+5	3.29-08	3.16-08	2.95-08	2.66-08	2.35-08	2.01-08	1.66-08	1.31-08
89	2.128+5	3.06-08	2.95-08	2.76-08	2.52-08	2.23-08	1.93-08	1.62-08	1.30-08
90	2.024+5	2.82-08	2.72-08	2.57-08	2.36-08	2.13-08	1.87-08	1.61-08	1.32-08
91	1.926+5	2.87-08	2.77-08	2.62-08	2.41-08	2.17-08	1.91-08	1.65-08	1.37-08
92	1.832+5	3.56-08	3.41-08	3.16-08	2.84-08	2.49-08	2.13-08	1.77-08	1.41-08
93	1.742+5	3.88-08	3.69-08	3.39-08	3.02-08	2.61-08	2.19-08	1.79-08	1.40-08
94	1.657+5	4.49-08	4.23-08	3.81-08	3.31-08	2.79-08	2.28-08	1.81-08	1.37-08
95	1.576+5	4.28-08	4.04-08	3.65-08	3.18-08	2.69-08	2.21-08	1.77-08	1.35-08
96	1.500+5	3.77-08	3.58-08	3.27-08	2.90-08	2.49-08	2.09-08	1.70-08	1.33-08
97	1.426+5	3.61-08	3.43-08	3.15-08	2.80-08	2.42-08	2.04-08	1.67-08	1.32-08
98	1.357+5	4.18-08	3.94-08	3.56-08	3.10-08	2.61-08	2.14-08	1.70-08	1.30-08
99	1.291+5	4.53-08	4.24-08	3.78-08	3.24-08	2.68-08	2.16-08	1.68-08	1.25-08
100	1.228+5	4.03-08	3.80-08	3.42-08	2.97-08	2.49-08	2.03-08	1.61-08	1.21-08
101	1.168+5	4.00-08	3.76-08	3.38-08	2.93-08	2.45-08	1.99-08	1.56-08	1.17-08
102	1.111+5	3.63-08	3.43-08	3.10-08	2.70-08	2.27-08	1.86-08	1.47-08	1.10-08
103	9.804+4	2.95-08	2.80-08	2.57-08	2.28-08	1.96-08	1.64-08	1.33-08	1.03-08
104	8.652+4	2.35-08	2.26-08	2.12-08	1.92-08	1.71-08	1.48-08	1.24-08	1.01-08
105	8.250+4	3.16-08	2.99-08	2.72-08	2.38-08	2.02-08	1.66-08	1.33-08	1.01-08
106	7.950+4	2.82-08	2.68-08	2.46-08	2.18-08	1.88-08	1.57-08	1.28-08	9.91-09
107	7.200+4	3.05-08	2.89-08	2.62-08	2.29-08	1.94-08	1.60-08	1.27-08	9.64-09
108	6.738+4	2.84-08	2.69-08	2.44-08	2.15-08	1.83-08	1.51-08	1.20-08	9.16-09
109	5.656+4	2.52-08	2.40-08	2.20-08	1.94-08	1.67-08	1.39-08	1.12-08	8.64-09
110	5.248+4	2.53-08	2.40-08	2.19-08	1.93-08	1.65-08	1.37-08	1.09-08	8.33-09
111	4.631+4	2.39-08	2.27-08	2.07-08	1.83-08	1.56-08	1.29-08	1.03-08	7.81-09
112	4.087+4	2.03-08	1.94-08	1.79-08	1.60-08	1.38-08	1.16-08	9.44-09	7.25-09
113	3.431+4	1.88-08	1.80-08	1.66-08	1.49-08	1.29-08	1.09-08	8.82-09	6.77-09
114	3.183+4	1.49-08	1.44-08	1.35-08	1.24-08	1.11-08	9.63-09	8.15-09	6.59-09

Table C-7a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.13-08	1.11-08	1.07-08	1.01-08	9.38-09	8.60-09	7.74-09	6.79-09
116	2.700+4	1.97-08	1.88-08	1.74-08	1.55-08	1.35-08	1.15-08	9.44-09	7.47-09
117	2.606+4	2.44-08	2.30-08	2.08-08	1.81-08	1.52-08	1.24-08	9.80-09	7.38-09
118	2.479+4	2.47-08	2.32-08	2.09-08	1.81-08	1.52-08	1.23-08	9.69-09	7.25-09
119	2.418+4	2.43-08	2.29-08	2.06-08	1.79-08	1.50-08	1.22-08	9.57-09	7.17-09
120	2.358+4	2.35-08	2.21-08	2.00-08	1.73-08	1.45-08	1.18-08	9.34-09	7.00-09
121	2.188+4	2.23-08	2.10-08	1.90-08	1.65-08	1.39-08	1.13-08	8.96-09	6.74-09
122	1.931+4	2.05-08	1.93-08	1.75-08	1.53-08	1.29-08	1.06-08	8.37-09	6.30-09
123	1.503+4	1.80-08	1.70-08	1.55-08	1.36-08	1.15-08	9.46-09	7.52-09	5.68-09
124	1.171+4	1.55-08	1.47-08	1.34-08	1.18-08	1.01-08	8.39-09	6.71-09	5.09-09
125	9.119+3	1.20-08	1.15-08	1.07-08	9.61-09	8.41-09	7.16-09	5.90-09	4.63-09
126	7.102+3	1.26-08	1.21-08	1.11-08	9.89-09	8.56-09	7.19-09	5.85-09	4.52-09
127	5.531+3	1.25-08	1.19-08	1.09-08	9.65-09	8.29-09	6.91-09	5.57-09	4.26-09
128	4.307+3	1.11-08	1.06-08	9.72-09	8.66-09	7.49-09	6.27-09	5.07-09	3.89-09
129	3.707+3	9.86-09	9.44-09	8.74-09	7.84-09	6.83-09	5.76-09	4.69-09	3.60-09
130	3.355+3	8.60-09	8.27-09	7.72-09	7.00-09	6.17-09	5.28-09	4.37-09	3.42-09
131	3.035+3	6.59-09	6.41-09	6.10-09	5.68-09	5.18-09	4.62-09	4.02-09	3.37-09
132	2.747+3	7.49-09	7.25-09	6.85-09	6.32-09	5.70-09	5.02-09	4.30-09	3.54-09
133	2.613+3	8.62-09	8.30-09	7.76-09	7.05-09	6.25-09	5.39-09	4.52-09	3.62-09
134	2.485+3	9.33-09	8.94-09	8.30-09	7.48-09	6.55-09	5.59-09	4.62-09	3.65-09
135	2.249+3	9.94-09	9.49-09	8.75-09	7.82-09	6.78-09	5.72-09	4.67-09	3.64-09
136	2.035+3	1.00-08	9.57-09	8.79-09	7.81-09	6.73-09	5.64-09	4.57-09	3.53-09
137	1.585+3	9.50-09	9.04-09	8.29-09	7.36-09	6.33-09	5.29-09	4.28-09	3.30-09
138	1.234+3	8.54-09	8.14-09	7.49-09	6.66-09	5.76-09	4.84-09	3.93-09	3.04-09
139	9.611+2	8.50-09	8.09-09	7.42-09	6.59-09	5.67-09	4.75-09	3.84-09	2.96-09
140	7.485+2	7.91-09	7.53-09	6.92-09	6.14-09	5.29-09	4.43-09	3.59-09	2.77-09
141	5.829+2	7.37-09	7.02-09	6.44-09	5.73-09	4.94-09	4.14-09	3.36-09	2.59-09
142	4.540+2	6.78-09	6.46-09	5.94-09	5.29-09	4.57-09	3.84-09	3.12-09	2.41-09
143	3.536+2	5.90-09	5.65-09	5.23-09	4.70-09	4.10-09	3.48-09	2.87-09	2.25-09
144	2.754+2	6.20-09	5.90-09	5.42-09	4.82-09	4.16-09	3.49-09	2.83-09	2.19-09
145	2.144+2	5.85-09	5.57-09	5.11-09	4.54-09	3.92-09	3.28-09	2.67-09	2.06-09
146	1.670+2	5.51-09	5.24-09	4.81-09	4.27-09	3.68-09	3.09-09	2.51-09	1.94-09
147	1.301+2	5.18-09	4.93-09	4.52-09	4.01-09	3.46-09	2.90-09	2.35-09	1.82-09
148	1.013+2	4.87-09	4.64-09	4.25-09	3.77-09	3.25-09	2.72-09	2.21-09	1.71-09
149	7.889+1	4.58-09	4.36-09	4.00-09	3.54-09	3.05-09	2.55-09	2.07-09	1.60-09
150	6.144+1	4.31-09	4.09-09	3.75-09	3.33-09	2.86-09	2.40-09	1.94-09	1.50-09
151	4.785+1	4.05-09	3.85-09	3.52-09	3.12-09	2.69-09	2.25-09	1.82-09	1.41-09
152	3.727+1	3.79-09	3.61-09	3.30-09	2.93-09	2.52-09	2.10-09	1.71-09	1.32-09
153	2.920+1	3.56-09	3.39-09	3.10-09	2.75-09	2.36-09	1.97-09	1.60-09	1.24-09
154	2.260+1	3.34-09	3.17-09	2.90-09	2.57-09	2.21-09	1.84-09	1.49-09	1.15-09
155	1.760+1	3.13-09	2.97-09	2.72-09	2.40-09	2.07-09	1.73-09	1.40-09	1.08-09
156	1.371+1	2.93-09	2.78-09	2.54-09	2.25-09	1.93-09	1.61-09	1.31-09	1.01-09
157	1.068+1	2.74-09	2.60-09	2.38-09	2.11-09	1.81-09	1.51-09	1.22-09	9.43-10
158	8.315+0	2.57-09	2.44-09	2.23-09	1.97-09	1.69-09	1.41-09	1.14-09	8.81-10
159	6.476+0	2.40-09	2.28-09	2.08-09	1.84-09	1.58-09	1.32-09	1.07-09	8.22-10
160	5.043+0	2.24-09	2.13-09	1.95-09	1.72-09	1.47-09	1.23-09	9.94-10	7.67-10
161	3.928+0	2.10-09	1.99-09	1.82-09	1.60-09	1.38-09	1.15-09	9.27-10	7.15-10
162	3.059+0	1.96-09	1.86-09	1.70-09	1.50-09	1.29-09	1.07-09	8.65-10	6.67-10
163	2.372+0	1.83-09	1.74-09	1.59-09	1.40-09	1.20-09	9.98-10	8.06-10	6.21-10
164	1.855+0	1.71-09	1.62-09	1.48-09	1.31-09	1.12-09	9.32-10	7.52-10	5.79-10
165	1.445+0	1.60-09	1.52-09	1.38-09	1.22-09	1.04-09	8.69-10	7.01-10	5.39-10
166	1.125+0	1.49-09	1.41-09	1.29-09	1.14-09	9.73-10	8.10-10	6.53-10	5.02-10
167	8.764-1	1.39-09	1.32-09	1.20-09	1.06-09	9.06-10	7.54-10	6.07-10	4.67-10
168	6.826-1	1.29-09	1.22-09	1.12-09	9.84-10	8.42-10	7.00-10	5.63-10	4.32-10
169	5.316-1	1.20-09	1.13-09	1.03-09	9.11-10	7.78-10	6.45-10	5.18-10	3.95-10
170	4.140-1	9.83-10	9.37-10	8.62-10	7.68-10	6.64-10	5.58-10	4.55-10	3.52-10
171	1.000-1	4.22-10	4.07-10	3.82-10	3.48-10	3.09-10	2.67-10	2.23-10	1.78-10
	1.000-5								

Table C-7b. Total Dose Rate Transmission Factors for 0.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	1.47-05	1.34-05	1.14-05	8.94-06	6.55-06	4.57-06	3.09-06	2.00-06
2	1.649+7	1.37-05	1.25-05	1.06-05	8.37-06	6.15-06	4.32-06	2.94-06	1.92-06
3	1.568+7	1.29-05	1.18-05	1.00-05	7.92-06	5.86-06	4.14-06	2.83-06	1.84-06
4	1.492+7	1.26-05	1.15-05	9.77-06	7.72-06	5.71-06	4.05-06	2.78-06	1.82-06
5	1.455+7	1.22-05	1.12-05	9.51-06	7.51-06	5.56-06	3.94-06	2.72-06	1.79-06
6	1.419+7	1.20-05	1.10-05	9.32-06	7.36-06	5.46-06	3.88-06	2.68-06	1.77-06
7	1.384+7	1.17-05	1.07-05	9.14-06	7.23-06	5.38-06	3.84-06	2.66-06	1.76-06
8	1.350+7	1.16-05	1.07-05	9.08-06	7.19-06	5.34-06	3.81-06	2.63-06	1.74-06
9	1.284+7	1.11-05	1.02-05	8.68-06	6.89-06	5.13-06	3.67-06	2.54-06	1.69-06
10	1.221+7	9.30-06	8.55-06	7.33-06	5.88-06	4.46-06	3.27-06	2.34-06	1.60-06
11	1.162+7	8.78-06	8.08-06	6.95-06	5.61-06	4.29-06	3.17-06	2.29-06	1.59-06
12	1.105+7	1.02-05	9.35-06	7.98-06	6.32-06	4.69-06	3.34-06	2.34-06	1.58-06
13	1.051+7	9.20-06	8.46-06	7.24-06	5.78-06	4.34-06	3.14-06	2.23-06	1.52-06
14	1.000+7	9.82-06	9.03-06	7.73-06	6.15-06	4.59-06	3.30-06	2.32-06	1.57-06
15	9.512+6	1.01-05	9.26-06	7.91-06	6.27-06	4.65-06	3.31-06	2.31-06	1.55-06
16	9.048+6	9.06-06	8.33-06	7.14-06	5.72-06	4.31-06	3.14-06	2.24-06	1.54-06
17	8.607+6	8.83-06	8.12-06	6.97-06	5.57-06	4.21-06	3.08-06	2.21-06	1.54-06
18	8.187+6	9.40-06	8.65-06	7.42-06	5.94-06	4.48-06	3.27-06	2.34-06	1.62-06
19	7.788+6	8.82-06	8.15-06	7.04-06	5.71-06	4.41-06	3.31-06	2.44-06	1.74-06
20	7.408+6	8.56-06	7.93-06	6.92-06	5.69-06	4.48-06	3.44-06	2.59-06	1.88-06
21	7.047+6	1.05-05	9.72-06	8.39-06	6.76-06	5.13-06	3.76-06	2.70-06	1.87-06
22	6.703+6	1.14-05	1.05-05	9.06-06	7.29-06	5.51-06	4.00-06	2.84-06	1.94-06
23	6.592+6	1.25-05	1.15-05	9.85-06	7.84-06	5.81-06	4.11-06	2.83-06	1.88-06
24	6.376+6	1.17-05	1.08-05	9.27-06	7.45-06	5.64-06	4.09-06	2.89-06	1.96-06
25	6.065+6	1.00-05	9.25-06	8.02-06	6.52-06	5.03-06	3.75-06	2.71-06	1.87-06
26	5.770+6	9.63-06	8.92-06	7.78-06	6.41-06	5.03-06	3.80-06	2.78-06	1.92-06
27	5.488+6	1.14-05	1.05-05	8.98-06	7.16-06	5.36-06	3.84-06	2.67-06	1.76-06
28	5.221+6	7.11-06	6.60-06	5.77-06	4.80-06	3.82-06	2.95-06	2.21-06	1.58-06
29	4.966+6	8.61-06	7.95-06	6.89-06	5.61-06	4.35-06	3.24-06	2.34-06	1.60-06
30	4.724+6	8.07-06	7.45-06	6.44-06	5.23-06	4.04-06	3.01-06	2.16-06	1.47-06
31	4.493+6	6.33-06	5.87-06	5.14-06	4.26-06	3.38-06	2.59-06	1.91-06	1.33-06
32	4.066+6	4.72-06	4.42-06	3.94-06	3.37-06	2.78-06	2.22-06	1.71-06	1.24-06
33	3.679+6	3.82-06	3.62-06	3.29-06	2.89-06	2.47-06	2.05-06	1.66-06	1.27-06
34	3.329+6	4.14-06	3.90-06	3.52-06	3.05-06	2.56-06	2.10-06	1.68-06	1.29-06
35	3.166+6	5.84-06	5.42-06	4.75-06	3.95-06	3.16-06	2.45-06	1.85-06	1.34-06
36	3.012+6	6.65-06	6.13-06	5.30-06	4.31-06	3.34-06	2.51-06	1.85-06	1.32-06
37	2.865+6	6.07-06	5.61-06	4.86-06	3.98-06	3.12-06	2.38-06	1.78-06	1.28-06
38	2.725+6	5.64-06	5.21-06	4.53-06	3.72-06	2.93-06	2.25-06	1.69-06	1.23-06
39	2.592+6	5.17-06	4.80-06	4.20-06	3.50-06	2.80-06	2.17-06	1.64-06	1.19-06
40	2.466+6	7.40-06	6.76-06	5.73-06	4.50-06	3.30-06	2.32-06	1.58-06	1.04-06
41	2.385+6	9.50-06	8.63-06	7.19-06	5.45-06	3.75-06	2.40-06	1.48-06	8.81-07
42	2.365+6	1.07-05	9.67-06	8.03-06	5.98-06	3.93-06	2.35-06	1.36-06	7.70-07
43	2.346+6	7.66-06	6.92-06	5.71-06	4.25-06	2.86-06	1.80-06	1.11-06	6.67-07
44	2.307+6	4.36-06	3.94-06	3.28-06	2.52-06	1.81-06	1.26-06	8.59-07	5.68-07
45	2.231+6	3.09-06	2.80-06	2.36-06	1.85-06	1.38-06	1.00-06	7.14-07	4.91-07
46	2.123+6	2.44-06	2.22-06	1.88-06	1.49-06	1.13-06	8.40-07	6.09-07	4.25-07
47	2.019+6	1.78-06	1.63-06	1.41-06	1.16-06	9.20-07	7.10-07	5.35-07	3.85-07
48	1.921+6	1.25-06	1.17-06	1.05-06	9.02-07	7.49-07	6.05-07	4.73-07	3.53-07
49	1.827+6	1.96-06	1.77-06	1.47-06	1.14-06	8.47-07	6.16-07	4.42-07	3.06-07
50	1.738+6	1.22-06	1.12-06	9.56-07	7.77-07	6.12-07	4.73-07	3.59-07	2.61-07
51	1.653+6	8.73-07	8.13-07	7.20-07	6.12-07	5.06-07	4.08-07	3.21-07	2.41-07
52	1.572+6	1.10-06	1.00-06	8.56-07	6.94-07	5.45-07	4.19-07	3.15-07	2.26-07
53	1.496+6	9.50-07	8.69-07	7.47-07	6.11-07	4.84-07	3.75-07	2.84-07	2.04-07
54	1.423+6	8.09-07	7.45-07	6.48-07	5.38-07	4.34-07	3.41-07	2.59-07	1.87-07
55	1.353+6	5.25-07	4.99-07	4.58-07	4.07-07	3.49-07	2.90-07	2.31-07	1.72-07
56	1.287+6	6.08-07	5.67-07	5.02-07	4.28-07	3.53-07	2.82-07	2.17-07	1.57-07
57	1.225+6	5.98-07	5.54-07	4.85-07	4.08-07	3.33-07	2.63-07	2.01-07	1.43-07

Table C-7b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	4.78-07	4.45-07	3.95-07	3.38-07	2.81-07	2.27-07	1.77-07	1.28-07
59	1.108+6	2.80-07	2.69-07	2.51-07	2.29-07	2.03-07	1.76-07	1.48-07	1.18-07
60	1.003+6	2.44-07	2.37-07	2.25-07	2.09-07	1.90-07	1.69-07	1.46-07	1.21-07
61	9.616+5	3.30-07	3.17-07	2.95-07	2.67-07	2.36-07	2.02-07	1.69-07	1.34-07
62	9.072+5	4.10-07	3.87-07	3.51-07	3.09-07	2.64-07	2.20-07	1.78-07	1.36-07
63	8.629+5	3.81-07	3.62-07	3.31-07	2.94-07	2.54-07	2.13-07	1.73-07	1.33-07
64	8.209+5	3.43-07	3.28-07	3.03-07	2.72-07	2.38-07	2.02-07	1.67-07	1.30-07
65	7.808+5	3.85-07	3.64-07	3.30-07	2.90-07	2.48-07	2.07-07	1.67-07	1.28-07
66	7.427+5	3.90-07	3.67-07	3.31-07	2.89-07	2.46-07	2.04-07	1.63-07	1.24-07
67	7.065+5	3.75-07	3.53-07	3.19-07	2.79-07	2.38-07	1.97-07	1.57-07	1.18-07
68	6.721+5	3.62-07	3.41-07	3.09-07	2.70-07	2.30-07	1.90-07	1.51-07	1.13-07
69	6.393+5	3.47-07	3.28-07	2.97-07	2.61-07	2.22-07	1.83-07	1.44-07	1.07-07
70	6.081+5	3.14-07	2.99-07	2.73-07	2.42-07	2.07-07	1.72-07	1.36-07	1.00-07
71	5.784+5	2.52-07	2.42-07	2.26-07	2.04-07	1.78-07	1.51-07	1.22-07	9.31-08
72	5.502+5	2.78-07	2.66-07	2.44-07	2.17-07	1.87-07	1.54-07	1.21-07	8.78-08
73	5.234+5	2.47-07	2.37-07	2.20-07	1.97-07	1.70-07	1.42-07	1.11-07	8.04-08
74	4.979+5	1.73-07	1.68-07	1.58-07	1.46-07	1.30-07	1.12-07	9.20-08	7.03-08
75	4.505+5	1.24-07	1.21-07	1.16-07	1.10-07	1.01-07	9.16-08	8.06-08	6.80-08
76	4.076+5	1.53-07	1.48-07	1.41-07	1.31-07	1.19-07	1.06-07	9.06-08	7.43-08
77	3.877+5	1.71-07	1.66-07	1.57-07	1.44-07	1.30-07	1.13-07	9.56-08	7.66-08
78	3.688+5	1.83-07	1.77-07	1.66-07	1.52-07	1.36-07	1.18-07	9.82-08	7.75-08
79	3.337+5	1.87-07	1.81-07	1.70-07	1.55-07	1.38-07	1.19-07	9.86-08	7.71-08
80	3.020+5	1.90-07	1.83-07	1.72-07	1.57-07	1.39-07	1.19-07	9.86-08	7.66-08
81	2.985+5	1.90-07	1.84-07	1.72-07	1.57-07	1.39-07	1.19-07	9.86-08	7.65-08
82	2.972+5	1.89-07	1.82-07	1.71-07	1.56-07	1.38-07	1.19-07	9.82-08	7.64-08
83	2.945+5	1.84-07	1.78-07	1.67-07	1.53-07	1.36-07	1.17-07	9.72-08	7.59-08
84	2.873+5	1.80-07	1.74-07	1.64-07	1.50-07	1.34-07	1.15-07	9.60-08	7.52-08
85	2.732+5	1.82-07	1.76-07	1.65-07	1.51-07	1.34-07	1.15-07	9.52-08	7.38-08
86	2.472+5	1.74-07	1.68-07	1.58-07	1.45-07	1.29-07	1.11-07	9.22-08	7.17-08
87	2.352+5	1.69-07	1.64-07	1.54-07	1.41-07	1.26-07	1.09-07	9.04-08	7.05-08
88	2.237+5	1.56-07	1.51-07	1.43-07	1.32-07	1.19-07	1.04-07	8.73-08	6.93-08
89	2.128+5	1.48-07	1.44-07	1.37-07	1.27-07	1.15-07	1.01-07	8.58-08	6.93-08
90	2.024+5	1.39-07	1.36-07	1.29-07	1.21-07	1.10-07	9.82-08	8.49-08	7.02-08
91	1.926+5	1.42-07	1.38-07	1.32-07	1.23-07	1.13-07	1.01-07	8.72-08	7.25-08
92	1.832+5	1.69-07	1.64-07	1.55-07	1.43-07	1.28-07	1.12-07	9.45-08	7.59-08
93	1.742+5	1.81-07	1.75-07	1.64-07	1.51-07	1.34-07	1.16-07	9.68-08	7.65-08
94	1.657+5	2.01-07	1.94-07	1.81-07	1.64-07	1.44-07	1.22-07	1.00-07	7.69-08
95	1.576+5	1.96-07	1.89-07	1.77-07	1.60-07	1.41-07	1.20-07	9.89-08	7.64-08
96	1.500+5	1.81-07	1.75-07	1.65-07	1.50-07	1.34-07	1.15-07	9.60-08	7.56-08
97	1.426+5	1.77-07	1.71-07	1.61-07	1.47-07	1.31-07	1.14-07	9.52-08	7.55-08
98	1.357+5	1.98-07	1.90-07	1.77-07	1.61-07	1.41-07	1.21-07	9.87-08	7.62-08
99	1.291+5	2.10-07	2.01-07	1.87-07	1.68-07	1.47-07	1.24-07	9.99-08	7.55-08
100	1.228+5	1.96-07	1.89-07	1.76-07	1.59-07	1.40-07	1.19-07	9.67-08	7.39-08
101	1.168+5	1.97-07	1.89-07	1.76-07	1.59-07	1.39-07	1.18-07	9.58-08	7.27-08
102	1.111+5	1.87-07	1.80-07	1.68-07	1.52-07	1.34-07	1.13-07	9.23-08	7.03-08
103	9.804+4	1.64-07	1.59-07	1.49-07	1.36-07	1.21-07	1.04-07	8.65-08	6.75-08
104	8.652+4	1.40-07	1.36-07	1.29-07	1.20-07	1.09-07	9.56-08	8.16-08	6.64-08
105	8.250+4	1.75-07	1.69-07	1.58-07	1.44-07	1.27-07	1.08-07	8.88-08	6.84-08
106	7.950+4	1.63-07	1.57-07	1.48-07	1.35-07	1.20-07	1.04-07	8.62-08	6.76-08
107	7.200+4	1.74-07	1.68-07	1.57-07	1.43-07	1.26-07	1.07-07	8.79-08	6.76-08
108	6.738+4	1.68-07	1.62-07	1.52-07	1.38-07	1.22-07	1.04-07	8.55-08	6.59-08
109	5.656+4	1.57-07	1.52-07	1.43-07	1.31-07	1.16-07	9.97-08	8.24-08	6.42-08
110	5.248+4	1.60-07	1.54-07	1.44-07	1.32-07	1.17-07	9.98-08	8.21-08	6.34-08
111	4.631+4	1.56-07	1.50-07	1.41-07	1.29-07	1.14-07	9.73-08	7.99-08	6.14-08
112	4.087+4	1.41-07	1.37-07	1.29-07	1.18-07	1.05-07	9.08-08	7.52-08	5.86-08
113	3.431+4	1.35-07	1.31-07	1.23-07	1.13-07	1.01-07	8.71-08	7.22-08	5.62-08
114	3.183+4	1.13-07	1.10-07	1.05-07	9.74-08	8.85-08	7.83-08	6.70-08	5.46-08

Table C-7b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	8.97-08	8.80-08	8.51-08	8.10-08	7.59-08	6.99-08	6.30-08	5.52-08
116	2.700+4	1.41-07	1.37-07	1.29-07	1.19-07	1.06-07	9.24-08	7.77-08	6.20-08
117	2.606+4	1.65-07	1.59-07	1.48-07	1.34-07	1.18-07	1.01-07	8.21-08	6.28-08
118	2.479+4	1.67-07	1.60-07	1.50-07	1.36-07	1.19-07	1.01-07	8.21-08	6.25-08
119	2.418+4	1.65-07	1.59-07	1.49-07	1.35-07	1.18-07	1.00-07	8.16-08	6.22-08
120	2.358+4	1.63-07	1.57-07	1.46-07	1.33-07	1.17-07	9.91-08	8.07-08	6.16-08
121	2.188+4	1.59-07	1.53-07	1.43-07	1.30-07	1.14-07	9.71-08	7.92-08	6.05-08
122	1.931+4	1.53-07	1.47-07	1.38-07	1.25-07	1.10-07	9.40-08	7.68-08	5.88-08
123	1.503+4	1.44-07	1.39-07	1.30-07	1.18-07	1.05-07	8.94-08	7.32-08	5.62-08
124	1.171+4	1.33-07	1.29-07	1.21-07	1.11-07	9.81-08	8.41-08	6.91-08	5.32-08
125	9.119+3	1.14-07	1.11-07	1.05-07	9.65-08	8.67-08	7.56-08	6.35-08	5.04-08
126	7.102+3	1.21-07	1.17-07	1.11-07	1.02-07	9.06-08	7.84-08	6.53-08	5.12-08
127	5.531+3	1.23-07	1.19-07	1.12-07	1.03-07	9.14-08	7.87-08	6.50-08	5.04-08
128	4.307+3	1.16-07	1.12-07	1.06-07	9.72-08	8.67-08	7.49-08	6.20-08	4.82-08
129	3.707+3	1.09-07	1.05-07	9.95-08	9.15-08	8.19-08	7.09-08	5.90-08	4.60-08
130	3.355+3	9.86-08	9.58-08	9.08-08	8.40-08	7.57-08	6.62-08	5.57-08	4.41-08
131	3.035+3	8.00-08	7.82-08	7.50-08	7.05-08	6.50-08	5.86-08	5.14-08	4.33-08
132	2.747+3	8.93-08	8.70-08	8.31-08	7.78-08	7.11-08	6.35-08	5.50-08	4.56-08
133	2.613+3	1.00-07	9.72-08	9.23-08	8.57-08	7.76-08	6.83-08	5.82-08	4.71-08
134	2.485+3	1.07-07	1.03-07	9.80-08	9.05-08	8.15-08	7.12-08	6.01-08	4.80-08
135	2.249+3	1.13-07	1.09-07	1.03-07	9.48-08	8.49-08	7.37-08	6.16-08	4.86-08
136	2.035+3	1.15-07	1.12-07	1.05-07	9.65-08	8.61-08	7.45-08	6.20-08	4.86-08
137	1.585+3	1.14-07	1.10-07	1.04-07	9.53-08	8.50-08	7.35-08	6.11-08	4.78-08
138	1.234+3	1.09-07	1.06-07	9.99-08	9.19-08	8.23-08	7.14-08	5.97-08	4.71-08
139	9.611+2	1.10-07	1.07-07	1.00-07	9.22-08	8.23-08	7.12-08	5.92-08	4.63-08
140	7.485+2	1.08-07	1.04-07	9.83-08	9.03-08	8.06-08	6.98-08	5.81-08	4.55-08
141	5.829+2	1.05-07	1.02-07	9.62-08	8.84-08	7.90-08	6.84-08	5.69-08	4.47-08
142	4.540+2	1.02-07	9.90-08	9.35-08	8.60-08	7.69-08	6.67-08	5.56-08	4.36-08
143	3.536+2	9.52-08	9.24-08	8.75-08	8.09-08	7.28-08	6.36-08	5.35-08	4.26-08
144	2.754+2	1.01-07	9.76-08	9.22-08	8.48-08	7.58-08	6.58-08	5.49-08	4.32-08
145	2.144+2	9.95-08	9.64-08	9.10-08	8.37-08	7.49-08	6.50-08	5.42-08	4.26-08
146	1.670+2	9.82-08	9.51-08	8.98-08	8.26-08	7.39-08	6.41-08	5.35-08	4.21-08
147	1.301+2	9.69-08	9.39-08	8.86-08	8.15-08	7.30-08	6.33-08	5.28-08	4.16-08
148	1.013+2	9.57-08	9.27-08	8.75-08	8.05-08	7.21-08	6.25-08	5.22-08	4.10-08
149	7.889+1	9.44-08	9.15-08	8.64-08	7.95-08	7.12-08	6.17-08	5.15-08	4.05-08
150	6.144+1	9.32-08	9.03-08	8.53-08	7.85-08	7.03-08	6.10-08	5.09-08	4.01-08
151	4.785+1	9.21-08	8.92-08	8.43-08	7.76-08	6.94-08	6.03-08	5.03-08	3.96-08
152	3.727+1	9.09-08	8.81-08	8.32-08	7.66-08	6.86-08	5.95-08	4.97-08	3.91-08
153	2.920+1	8.98-08	8.70-08	8.22-08	7.57-08	6.78-08	5.88-08	4.91-08	3.87-08
154	2.260+1	8.87-08	8.59-08	8.12-08	7.47-08	6.69-08	5.81-08	4.86-08	3.82-08
155	1.760+1	8.76-08	8.49-08	8.02-08	7.39-08	6.62-08	5.75-08	4.80-08	3.78-08
156	1.371+1	8.65-08	8.39-08	7.92-08	7.30-08	6.54-08	5.68-08	4.75-08	3.74-08
157	1.068+1	8.55-08	8.29-08	7.83-08	7.21-08	6.46-08	5.62-08	4.69-08	3.70-08
158	8.315+0	8.45-08	8.19-08	7.74-08	7.13-08	6.39-08	5.55-08	4.64-08	3.65-08
159	6.476+0	8.35-08	8.09-08	7.65-08	7.05-08	6.32-08	5.49-08	4.59-08	3.61-08
160	5.043+0	8.25-08	8.00-08	7.56-08	6.97-08	6.25-08	5.43-08	4.54-08	3.58-08
161	3.928+0	8.15-08	7.90-08	7.47-08	6.89-08	6.18-08	5.37-08	4.49-08	3.54-08
162	3.059+0	8.06-08	7.81-08	7.39-08	6.81-08	6.11-08	5.31-08	4.44-08	3.50-08
163	2.372+0	7.96-08	7.72-08	7.30-08	6.73-08	6.04-08	5.26-08	4.40-08	3.46-08
164	1.855+0	7.87-08	7.63-08	7.22-08	6.66-08	5.98-08	5.20-08	4.35-08	3.43-08
165	1.445+0	7.77-08	7.54-08	7.13-08	6.58-08	5.91-08	5.14-08	4.30-08	3.39-08
166	1.125+0	7.68-08	7.45-08	7.05-08	6.51-08	5.84-08	5.09-08	4.26-08	3.35-08
167	8.764-1	7.58-08	7.35-08	6.96-08	6.43-08	5.77-08	5.03-08	4.21-08	3.31-08
168	6.826-1	7.47-08	7.25-08	6.87-08	6.34-08	5.70-08	4.97-08	4.16-08	3.28-08
169	5.316-1	7.37-08	7.15-08	6.78-08	6.26-08	5.63-08	4.90-08	4.10-08	3.22-08
170	4.140-1	6.78-08	6.60-08	6.27-08	5.82-08	5.27-08	4.63-08	3.92-08	3.12-08
171	1.000-1	5.36-08	5.24-08	5.02-08	4.72-08	4.35-08	3.90-08	3.38-08	2.80-08
	1.000-5								

Table C-7c. Gamma-ray Dose Rate Transmission Factors for 0.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	8.58-07	7.84-07	6.49-07	4.61-07	2.50-07	8.27-08	1.36-08	6.20-10
2	1.200+7	7.52-07	6.86-07	5.66-07	4.00-07	2.16-07	7.20-08	1.25-08	5.99-10
3	1.000+7	6.41-07	5.83-07	4.79-07	3.35-07	1.79-07	6.02-08	1.08-08	5.97-10
4	8.000+6	5.63-07	5.11-07	4.17-07	2.90-07	1.53-07	5.14-08	9.43-09	5.96-10
5	7.500+6	5.26-07	4.76-07	3.87-07	2.68-07	1.41-07	4.71-08	8.72-09	5.89-10
6	7.000+6	4.86-07	4.39-07	3.55-07	2.44-07	1.27-07	4.24-08	7.94-09	5.75-10
7	6.500+6	4.43-07	3.99-07	3.21-07	2.18-07	1.13-07	3.75-08	7.12-09	5.53-10
8	6.000+6	3.97-07	3.56-07	2.85-07	1.92-07	9.82-08	3.25-08	6.26-09	5.20-10
9	5.500+6	3.49-07	3.12-07	2.47-07	1.65-07	8.33-08	2.75-08	5.40-09	4.75-10
10	5.000+6	3.01-07	2.68-07	2.11-07	1.39-07	6.92-08	2.28-08	4.56-09	4.19-10
11	4.500+6	2.54-07	2.25-07	1.75-07	1.14-07	5.58-08	1.84-08	3.75-09	3.52-10
12	4.000+6	2.06-07	1.81-07	1.39-07	8.90-08	4.30-08	1.43-08	2.98-09	2.72-10
13	3.500+6	1.59-07	1.38-07	1.05-07	6.56-08	3.12-08	1.04-08	2.25-09	1.83-10
14	3.000+6	1.13-07	9.76-08	7.28-08	4.46-08	2.09-08	7.09-09	1.60-09	9.56-11
15	2.500+6	7.19-08	6.12-08	4.47-08	2.67-08	1.24-08	4.32-09	1.04-09	2.40-11
16	2.000+6	4.23-08	3.56-08	2.55-08	1.49-08	6.85-09	2.48-09	6.50-10	2.74-11
17	1.660+6	2.79-08	2.33-08	1.64-08	9.46-09	4.36-09	1.63-09	4.64-10	5.04-11
18	1.500+6	2.03-08	1.68-08	1.18-08	6.73-09	3.12-09	1.20-09	3.61-10	5.37-11
19	1.330+6	1.15-08	9.46-09	6.53-09	3.72-09	1.75-09	6.96-10	2.17-10	3.52-11
20	1.000+6	4.82-09	3.89-09	2.63-09	1.48-09	7.04-10	2.90-10	9.78-11	2.20-11
21	8.000+5	2.45-09	1.96-09	1.30-09	7.22-10	3.45-10	1.46-10	5.24-11	1.42-11
22	7.000+5	1.44-09	1.14-09	7.46-10	4.11-10	1.97-10	8.44-11	3.10-11	8.84-12
23	6.000+5	7.69-10	6.00-10	3.86-10	2.09-10	1.00-10	4.32-11	1.61-11	4.76-12
24	5.120+5	5.11-10	3.94-10	2.48-10	1.32-10	6.32-11	2.77-11	1.08-11	3.55-12
25	5.100+5	3.95-10	3.02-10	1.89-10	1.00-10	4.79-11	2.09-11	8.04-12	2.59-12
26	4.500+5	2.14-10	1.61-10	9.81-11	5.13-11	2.47-11	1.11-11	4.55-12	1.63-12
27	4.000+5	8.44-11	6.20-11	3.70-11	1.92-11	9.27-12	4.08-12	1.54-12	4.64-13
28	3.000+5	2.08-12	1.65-12	1.14-12	7.15-13	4.30-13	2.52-13	1.43-13	7.92-14
29	2.000+5	1.11-13	8.24-14	5.20-14	3.05-14	1.74-14	9.72-15	5.28-15	2.77-15
30	1.500+5	1.05-15	7.95-16	5.32-16	3.44-16	2.23-16	1.45-16	9.58-17	6.33-17
31	1.000+5	5.45-21	3.31-21	1.81-21	1.03-21	6.09-22	3.73-22	2.34-22	1.50-22
32	7.500+4	5.00-30	2.00-30	8.79-31	4.48-31	2.48-31	1.45-31	8.74-32	5.45-32
33	6.000+4	3.44-60	7.41-61	2.86-61	1.29-61	1.23-61	6.60-62	3.15-62	2.14-62
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-8a. Neutron Dose Rate Transmission Factors for 1.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	2.79-07	2.43-07	1.91-07	1.37-07	9.22-08	5.95-08	3.74-08	2.30-08
2	1.649+7	2.52-07	2.19-07	1.72-07	1.24-07	8.44-08	5.50-08	3.51-08	2.19-08
3	1.568+7	2.27-07	1.99-07	1.58-07	1.15-07	7.93-08	5.22-08	3.34-08	2.08-08
4	1.492+7	2.20-07	1.92-07	1.53-07	1.12-07	7.69-08	5.09-08	3.28-08	2.06-08
5	1.455+7	2.14-07	1.87-07	1.48-07	1.08-07	7.46-08	4.95-08	3.21-08	2.03-08
6	1.419+7	2.09-07	1.83-07	1.45-07	1.06-07	7.33-08	4.88-08	3.18-08	2.02-08
7	1.384+7	2.05-07	1.79-07	1.42-07	1.05-07	7.24-08	4.83-08	3.15-08	2.00-08
8	1.350+7	2.05-07	1.80-07	1.42-07	1.04-07	7.18-08	4.76-08	3.09-08	1.95-08
9	1.284+7	1.92-07	1.68-07	1.33-07	9.72-08	6.70-08	4.45-08	2.90-08	1.84-08
10	1.221+7	1.44-07	1.27-07	1.03-07	7.74-08	5.55-08	3.87-08	2.65-08	1.78-08
11	1.162+7	1.35-07	1.19-07	9.67-08	7.32-08	5.29-08	3.73-08	2.59-08	1.77-08
12	1.105+7	1.82-07	1.58-07	1.23-07	8.86-08	6.02-08	3.98-08	2.62-08	1.72-08
13	1.051+7	1.56-07	1.36-07	1.08-07	7.87-08	5.48-08	3.72-08	2.51-08	1.68-08
14	1.000+7	1.73-07	1.50-07	1.18-07	8.53-08	5.84-08	3.90-08	2.58-08	1.70-08
15	9.512+6	1.79-07	1.55-07	1.21-07	8.67-08	5.88-08	3.89-08	2.56-08	1.68-08
16	9.048+6	1.46-07	1.28-07	1.02-07	7.54-08	5.33-08	3.68-08	2.53-08	1.72-08
17	8.607+6	1.41-07	1.24-07	9.85-08	7.30-08	5.18-08	3.60-08	2.49-08	1.72-08
18	8.187+6	1.59-07	1.39-07	1.10-07	8.07-08	5.67-08	3.91-08	2.71-08	1.87-08
19	7.788+6	1.39-07	1.23-07	9.92-08	7.53-08	5.51-08	3.99-08	2.90-08	2.09-08
20	7.408+6	1.32-07	1.18-07	9.71-08	7.54-08	5.66-08	4.19-08	3.09-08	2.25-08
21	7.047+6	1.90-07	1.66-07	1.31-07	9.62-08	6.70-08	4.55-08	3.07-08	2.06-08
22	6.703+6	2.16-07	1.88-07	1.48-07	1.07-07	7.33-08	4.85-08	3.17-08	2.06-08
23	6.592+6	2.51-07	2.16-07	1.65-07	1.15-07	7.55-08	4.78-08	3.01-08	1.90-08
24	6.376+6	2.01-07	1.75-07	1.37-07	9.92-08	6.79-08	4.51-08	2.96-08	1.93-08
25	6.065+6	1.43-07	1.26-07	1.02-07	7.67-08	5.50-08	3.83-08	2.63-08	1.76-08
26	5.770+6	1.27-07	1.13-07	9.36-08	7.25-08	5.35-08	3.82-08	2.66-08	1.78-08
27	5.488+6	1.73-07	1.50-07	1.16-07	8.30-08	5.57-08	3.61-08	2.30-08	1.44-08
28	5.221+6	7.41-08	6.67-08	5.58-08	4.40-08	3.33-08	2.45-08	1.77-08	1.24-08
29	4.966+6	9.63-08	8.54-08	6.94-08	5.27-08	3.80-08	2.65-08	1.81-08	1.19-08
30	4.724+6	8.27-08	7.32-08	5.94-08	4.50-08	3.25-08	2.27-08	1.55-08	1.02-08
31	4.493+6	5.32-08	4.80-08	4.04-08	3.21-08	2.44-08	1.80-08	1.28-08	8.70-09
32	4.066+6	3.34-08	3.09-08	2.70-08	2.26-08	1.82-08	1.43-08	1.09-08	7.90-09
33	3.679+6	2.60-08	2.45-08	2.20-08	1.91-08	1.61-08	1.33-08	1.07-08	8.29-09
34	3.329+6	3.00-08	2.79-08	2.47-08	2.09-08	1.72-08	1.39-08	1.10-08	8.39-09
35	3.166+6	4.73-08	4.26-08	3.58-08	2.84-08	2.18-08	1.63-08	1.20-08	8.57-09
36	3.012+6	5.78-08	5.08-08	4.08-08	3.08-08	2.24-08	1.60-08	1.14-08	8.07-09
37	2.865+6	4.78-08	4.23-08	3.45-08	2.65-08	1.97-08	1.45-08	1.07-08	7.77-09
38	2.725+6	4.11-08	3.66-08	3.02-08	2.36-08	1.80-08	1.36-08	1.02-08	7.47-09
39	2.592+6	3.63-08	3.30-08	2.81-08	2.29-08	1.79-08	1.37-08	1.01-08	7.22-09
40	2.466+6	7.36-08	6.28-08	4.79-08	3.35-08	2.21-08	1.40-08	8.63-09	5.08-09
41	2.385+6	1.30-07	1.06-07	7.45-08	4.52-08	2.47-08	1.24-08	5.83-09	2.54-09
42	2.365+6	1.71-07	1.36-07	8.90-08	4.80-08	2.24-08	9.59-09	3.85-09	1.46-09
43	2.346+6	7.51-08	5.95-08	3.92-08	2.19-08	1.10-08	5.21-09	2.39-09	1.09-09
44	2.307+6	1.85-08	1.50-08	1.06-08	6.68-09	3.98-09	2.32-09	1.35-09	7.89-10
45	2.231+6	7.86-09	6.52-09	4.77-09	3.21-09	2.06-09	1.31-09	8.29-10	5.26-10
46	2.123+6	4.39-09	3.68-09	2.75-09	1.90-09	1.27-09	8.35-10	5.52-10	3.64-10
47	2.019+6	2.10-09	1.84-09	1.47-09	1.11-09	8.10-10	5.84-10	4.18-10	2.93-10
48	1.921+6	1.19-09	1.09-09	9.43-10	7.75-10	6.14-10	4.71-10	3.50-10	2.50-10
49	1.827+6	2.79-09	2.25-09	1.58-09	1.02-09	6.32-10	3.94-10	2.48-10	1.58-10
50	1.738+6	9.67-10	8.21-10	6.30-10	4.54-10	3.19-10	2.24-10	1.58-10	1.11-10
51	1.653+6	5.13-10	4.60-10	3.84-10	3.05-10	2.34-10	1.77-10	1.32-10	9.57-11
52	1.572+6	7.58-10	6.41-10	4.89-10	3.50-10	2.43-10	1.67-10	1.15-10	7.80-11
53	1.496+6	5.37-10	4.59-10	3.56-10	2.59-10	1.83-10	1.28-10	8.87-11	6.08-11
54	1.423+6	3.66-10	3.19-10	2.55-10	1.92-10	1.40-10	1.00-10	7.12-11	4.93-11
55	1.353+6	1.68-10	1.58-10	1.40-10	1.20-10	9.87-11	7.86-11	6.04-11	4.40-11
56	1.287+6	2.17-10	1.94-10	1.61-10	1.27-10	9.60-11	7.10-11	5.12-11	3.54-11
57	1.225+6	2.10-10	1.84-10	1.49-10	1.13-10	8.32-11	5.98-11	4.21-11	2.84-11

Table C-8a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	1.42-10	1.26-10	1.04-10	8.05-11	6.05-11	4.47-11	3.24-11	2.26-11
59	1.108+6	5.93-11	5.58-11	5.03-11	4.39-11	3.73-11	3.11-11	2.54-11	2.01-11
60	1.003+6	4.79-11	4.59-11	4.28-11	3.88-11	3.44-11	2.99-11	2.54-11	2.09-11
61	9.616+5	7.19-11	6.75-11	6.07-11	5.26-11	4.44-11	3.66-11	2.96-11	2.31-11
62	9.072+5	1.00-10	9.08-11	7.72-11	6.27-11	4.96-11	3.86-11	2.96-11	2.21-11
63	8.629+5	8.47-11	7.77-11	6.72-11	5.57-11	4.49-11	3.55-11	2.76-11	2.09-11
64	8.209+5	6.94-11	6.43-11	5.67-11	4.80-11	3.96-11	3.20-11	2.54-11	1.96-11
65	7.808+5	8.49-11	7.62-11	6.39-11	5.12-11	3.99-11	3.08-11	2.35-11	1.76-11
66	7.427+5	8.40-11	7.46-11	6.16-11	4.84-11	3.70-11	2.80-11	2.10-11	1.54-11
67	7.065+5	7.47-11	6.64-11	5.47-11	4.29-11	3.27-11	2.46-11	1.82-11	1.32-11
68	6.721+5	6.63-11	5.89-11	4.85-11	3.79-11	2.87-11	2.14-11	1.57-11	1.12-11
69	6.393+5	5.77-11	5.12-11	4.21-11	3.28-11	2.47-11	1.82-11	1.33-11	9.32-12
70	6.081+5	4.35-11	3.91-11	3.28-11	2.61-11	2.01-11	1.51-11	1.11-11	7.81-12
71	5.784+5	2.63-11	2.45-11	2.16-11	1.83-11	1.49-11	1.19-11	9.15-12	6.73-12
72	5.502+5	3.05-11	2.77-11	2.35-11	1.90-11	1.47-11	1.11-11	8.07-12	5.57-12
73	5.234+5	2.22-11	2.05-11	1.78-11	1.47-11	1.17-11	9.04-12	6.69-12	4.63-12
74	4.979+5	1.13-11	1.08-11	9.93-12	8.86-12	7.66-12	6.41-12	5.14-12	3.86-12
75	4.505+5	7.13-12	6.93-12	6.58-12	6.13-12	5.59-12	5.00-12	4.37-12	3.68-12
76	4.076+5	9.58-12	9.14-12	8.45-12	7.59-12	6.66-12	5.73-12	4.82-12	3.92-12
77	3.877+5	1.14-11	1.08-11	9.75-12	8.53-12	7.28-12	6.09-12	4.99-12	3.95-12
78	3.688+5	1.24-11	1.16-11	1.04-11	8.94-12	7.50-12	6.16-12	4.96-12	3.86-12
79	3.337+5	1.24-11	1.15-11	1.02-11	8.73-12	7.26-12	5.92-12	4.72-12	3.62-12
80	3.020+5	1.23-11	1.14-11	1.01-11	8.55-12	7.06-12	5.71-12	4.52-12	3.44-12
81	2.985+5	1.23-11	1.14-11	1.00-11	8.52-12	7.03-12	5.69-12	4.50-12	3.42-12
82	2.972+5	1.20-11	1.12-11	9.87-12	8.40-12	6.95-12	5.64-12	4.47-12	3.41-12
83	2.945+5	1.14-11	1.06-11	9.43-12	8.08-12	6.74-12	5.50-12	4.39-12	3.36-12
84	2.873+5	1.06-11	9.96-12	8.92-12	7.70-12	6.47-12	5.31-12	4.26-12	3.27-12
85	2.732+5	1.04-11	9.74-12	8.69-12	7.48-12	6.24-12	5.09-12	4.04-12	3.07-12
86	2.472+5	9.23-12	8.67-12	7.81-12	6.78-12	5.71-12	4.70-12	3.75-12	2.85-12
87	2.352+5	8.61-12	8.11-12	7.32-12	6.39-12	5.41-12	4.46-12	3.57-12	2.73-12
88	2.237+5	7.41-12	7.04-12	6.44-12	5.71-12	4.92-12	4.14-12	3.38-12	2.64-12
89	2.128+5	6.74-12	6.43-12	5.93-12	5.30-12	4.62-12	3.94-12	3.27-12	2.61-12
90	2.024+5	6.05-12	5.81-12	5.41-12	4.91-12	4.35-12	3.79-12	3.23-12	2.66-12
91	1.926+5	6.15-12	5.90-12	5.50-12	4.99-12	4.44-12	3.87-12	3.31-12	2.75-12
92	1.832+5	8.00-12	7.55-12	6.84-12	5.99-12	5.12-12	4.29-12	3.53-12	2.80-12
93	1.742+5	8.93-12	8.34-12	7.44-12	6.40-12	5.35-12	4.39-12	3.53-12	2.74-12
94	1.657+5	1.10-11	1.00-11	8.61-12	7.09-12	5.68-12	4.47-12	3.46-12	2.59-12
95	1.576+5	1.01-11	9.26-12	7.99-12	6.62-12	5.33-12	4.23-12	3.30-12	2.50-12
96	1.500+5	8.29-12	7.70-12	6.81-12	5.80-12	4.82-12	3.93-12	3.15-12	2.45-12
97	1.426+5	7.72-12	7.21-12	6.43-12	5.53-12	4.63-12	3.81-12	3.07-12	2.41-12
98	1.357+5	9.49-12	8.68-12	7.48-12	6.19-12	4.97-12	3.93-12	3.05-12	2.30-12
99	1.291+5	1.06-11	9.56-12	8.03-12	6.44-12	5.02-12	3.86-12	2.92-12	2.14-12
100	1.228+5	8.74-12	7.98-12	6.86-12	5.64-12	4.51-12	3.54-12	2.73-12	2.03-12
101	1.168+5	8.52-12	7.76-12	6.65-12	5.45-12	4.34-12	3.39-12	2.60-12	1.91-12
102	1.111+5	7.26-12	6.66-12	5.78-12	4.80-12	3.87-12	3.06-12	2.36-12	1.75-12
103	9.804+4	5.28-12	4.93-12	4.40-12	3.78-12	3.16-12	2.58-12	2.06-12	1.57-12
104	8.652+4	3.90-12	3.72-12	3.42-12	3.06-12	2.67-12	2.28-12	1.90-12	1.54-12
105	8.250+4	5.71-12	5.28-12	4.63-12	3.89-12	3.18-12	2.55-12	1.99-12	1.50-12
106	7.950+4	4.82-12	4.50-12	4.02-12	3.46-12	2.89-12	2.37-12	1.89-12	1.46-12
107	7.200+4	5.31-12	4.91-12	4.30-12	3.62-12	2.95-12	2.36-12	1.84-12	1.38-12
108	6.738+4	4.71-12	4.37-12	3.86-12	3.27-12	2.69-12	2.16-12	1.70-12	1.28-12
109	5.656+4	3.94-12	3.68-12	3.29-12	2.82-12	2.36-12	1.92-12	1.53-12	1.17-12
110	5.248+4	3.90-12	3.63-12	3.23-12	2.76-12	2.29-12	1.85-12	1.46-12	1.10-12
111	4.631+4	3.55-12	3.32-12	2.95-12	2.53-12	2.10-12	1.70-12	1.34-12	1.00-12
112	4.087+4	2.83-12	2.68-12	2.43-12	2.12-12	1.80-12	1.49-12	1.19-12	9.09-13
113	3.431+4	2.55-12	2.41-12	2.19-12	1.93-12	1.64-12	1.36-12	1.09-12	8.32-13
114	3.183+4	1.93-12	1.85-12	1.73-12	1.57-12	1.38-12	1.20-12	1.01-12	8.11-13

Table C-8a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.43-12	1.40-12	1.34-12	1.26-12	1.17-12	1.07-12	9.63-13	8.46-13
116	2.700+4	2.67-12	2.53-12	2.29-12	2.01-12	1.71-12	1.43-12	1.17-12	9.19-13
117	2.606+4	3.51-12	3.24-12	2.83-12	2.38-12	1.93-12	1.53-12	1.19-12	8.89-13
118	2.479+4	3.55-12	3.27-12	2.84-12	2.37-12	1.91-12	1.51-12	1.17-12	8.64-13
119	2.418+4	3.46-12	3.18-12	2.77-12	2.32-12	1.87-12	1.48-12	1.14-12	8.49-13
120	2.358+4	3.28-12	3.03-12	2.65-12	2.22-12	1.80-12	1.43-12	1.11-12	8.21-13
121	2.188+4	3.02-12	2.80-12	2.45-12	2.06-12	1.68-12	1.34-12	1.04-12	7.76-13
122	1.931+4	2.66-12	2.47-12	2.17-12	1.84-12	1.51-12	1.21-12	9.43-13	7.05-13
123	1.503+4	2.19-12	2.04-12	1.81-12	1.55-12	1.28-12	1.03-12	8.12-13	6.09-13
124	1.171+4	1.77-12	1.66-12	1.49-12	1.29-12	1.08-12	8.82-13	6.98-13	5.26-13
125	9.119+3	1.29-12	1.22-12	1.12-12	1.00-12	8.66-13	7.30-13	5.97-13	4.67-13
126	7.102+3	1.35-12	1.27-12	1.16-12	1.02-12	8.67-13	7.20-13	5.81-13	4.48-13
127	5.531+3	1.31-12	1.23-12	1.12-12	9.72-13	8.22-13	6.77-13	5.40-13	4.11-13
128	4.307+3	1.12-12	1.06-12	9.64-13	8.48-13	7.24-13	6.00-13	4.81-13	3.67-13
129	3.707+3	9.72-13	9.26-13	8.50-13	7.55-13	6.50-13	5.44-13	4.40-13	3.36-13
130	3.355+3	8.32-13	7.97-13	7.39-13	6.65-13	5.82-13	4.95-13	4.07-13	3.17-13
131	3.035+3	6.24-13	6.06-13	5.75-13	5.33-13	4.85-13	4.31-13	3.74-13	3.13-13
132	2.747+3	7.14-13	6.90-13	6.49-13	5.96-13	5.34-13	4.68-13	4.00-13	3.29-13
133	2.613+3	8.30-13	7.96-13	7.39-13	6.67-13	5.86-13	5.03-13	4.19-13	3.35-13
134	2.485+3	9.04-13	8.62-13	7.93-13	7.08-13	6.15-13	5.20-13	4.27-13	3.36-13
135	2.249+3	9.66-13	9.17-13	8.37-13	7.39-13	6.34-13	5.29-13	4.29-13	3.33-13
136	2.035+3	9.72-13	9.19-13	8.34-13	7.32-13	6.23-13	5.16-13	4.16-13	3.20-13
137	1.585+3	9.00-13	8.51-13	7.72-13	6.76-13	5.75-13	4.76-13	3.82-13	2.93-13
138	1.234+3	7.89-13	7.48-13	6.81-13	6.00-13	5.13-13	4.27-13	3.45-13	2.66-13
139	9.611+2	7.74-13	7.32-13	6.65-13	5.84-13	4.97-13	4.12-13	3.32-13	2.55-13
140	7.485+2	7.06-13	6.69-13	6.08-13	5.34-13	4.56-13	3.79-13	3.05-13	2.35-13
141	5.829+2	6.45-13	6.11-13	5.57-13	4.90-13	4.19-13	3.48-13	2.81-13	2.16-13
142	4.540+2	5.82-13	5.52-13	5.04-13	4.45-13	3.81-13	3.18-13	2.57-13	1.98-13
143	3.536+2	4.96-13	4.73-13	4.36-13	3.89-13	3.37-13	2.85-13	2.34-13	1.83-13
144	2.754+2	5.20-13	4.93-13	4.49-13	3.96-13	3.39-13	2.83-13	2.28-13	1.76-13
145	2.144+2	4.84-13	4.58-13	4.18-13	3.68-13	3.15-13	2.63-13	2.12-13	1.64-13
146	1.670+2	4.49-13	4.26-13	3.88-13	3.42-13	2.93-13	2.44-13	1.97-13	1.52-13
147	1.301+2	4.17-13	3.96-13	3.61-13	3.18-13	2.72-13	2.27-13	1.83-13	1.42-13
148	1.013+2	3.88-13	3.68-13	3.35-13	2.95-13	2.53-13	2.11-13	1.70-13	1.32-13
149	7.889+1	3.60-13	3.42-13	3.12-13	2.75-13	2.35-13	1.96-13	1.58-13	1.22-13
150	6.144+1	3.35-13	3.18-13	2.90-13	2.55-13	2.18-13	1.82-13	1.47-13	1.14-13
151	4.785+1	3.12-13	2.95-13	2.69-13	2.37-13	2.03-13	1.69-13	1.37-13	1.06-13
152	3.727+1	2.89-13	2.74-13	2.50-13	2.20-13	1.89-13	1.57-13	1.27-13	9.81-14
153	2.920+1	2.69-13	2.55-13	2.33-13	2.05-13	1.76-13	1.46-13	1.18-13	9.13-14
154	2.260+1	2.50-13	2.37-13	2.16-13	1.90-13	1.63-13	1.36-13	1.10-13	8.47-14
155	1.760+1	2.33-13	2.20-13	2.01-13	1.77-13	1.52-13	1.26-13	1.02-13	7.87-14
156	1.371+1	2.16-13	2.05-13	1.87-13	1.65-13	1.41-13	1.17-13	9.48-14	7.32-14
157	1.068+1	2.01-13	1.91-13	1.74-13	1.53-13	1.31-13	1.09-13	8.81-14	6.80-14
158	8.315+0	1.87-13	1.77-13	1.61-13	1.42-13	1.22-13	1.01-13	8.19-14	6.32-14
159	6.476+0	1.74-13	1.65-13	1.50-13	1.32-13	1.13-13	9.42-14	7.61-14	5.87-14
160	5.043+0	1.62-13	1.53-13	1.40-13	1.23-13	1.05-13	8.76-14	7.08-14	5.46-14
161	3.928+0	1.50-13	1.42-13	1.30-13	1.14-13	9.79-14	8.15-14	6.58-14	5.07-14
162	3.059+0	1.40-13	1.33-13	1.21-13	1.06-13	9.11-14	7.58-14	6.12-14	4.71-14
163	2.372+0	1.30-13	1.23-13	1.12-13	9.90-14	8.46-14	7.04-14	5.68-14	4.38-14
164	1.855+0	1.21-13	1.15-13	1.05-13	9.22-14	7.88-14	6.55-14	5.29-14	4.07-14
165	1.445+0	1.13-13	1.07-13	9.74-14	8.58-14	7.33-14	6.09-14	4.91-14	3.78-14
166	1.125+0	1.05-13	9.95-14	9.06-14	7.98-14	6.82-14	5.67-14	4.56-14	3.51-14
167	8.764-1	9.75-14	9.24-14	8.42-14	7.41-14	6.33-14	5.26-14	4.24-14	3.26-14
168	6.826-1	9.04-14	8.57-14	7.81-14	6.87-14	5.87-14	4.88-14	3.93-14	3.01-14
169	5.316-1	8.35-14	7.91-14	7.21-14	6.35-14	5.42-14	4.49-14	3.60-14	2.75-14
170	4.140-1	6.85-14	6.53-14	6.00-14	5.34-14	4.62-14	3.88-14	3.16-14	2.45-14
171	1.000-1	2.89-14	2.79-14	2.62-14	2.39-14	2.12-14	1.83-14	1.53-14	1.22-14
	1.000-5								

Table C-8b. Total Dose Rate Transmission Factors for 1.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gJ}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	3.12-07	2.73-07	2.17-07	1.58-07	1.09-07	7.19-08	4.62-08	2.89-08
2	1.649+7	2.83-07	2.48-07	1.97-07	1.45-07	1.00-07	6.68-08	4.36-08	2.77-08
3	1.568+7	2.56-07	2.25-07	1.81-07	1.35-07	9.44-08	6.36-08	4.17-08	2.63-08
4	1.492+7	2.48-07	2.18-07	1.75-07	1.30-07	9.17-08	6.20-08	4.09-08	2.61-08
5	1.455+7	2.41-07	2.12-07	1.70-07	1.27-07	8.90-08	6.04-08	4.00-08	2.57-08
6	1.419+7	2.36-07	2.08-07	1.67-07	1.24-07	8.74-08	5.95-08	3.96-08	2.56-08
7	1.384+7	2.31-07	2.04-07	1.64-07	1.22-07	8.64-08	5.89-08	3.92-08	2.54-08
8	1.350+7	2.32-07	2.04-07	1.64-07	1.22-07	8.57-08	5.82-08	3.86-08	2.48-08
9	1.284+7	2.17-07	1.91-07	1.54-07	1.14-07	8.04-08	5.47-08	3.64-08	2.36-08
10	1.221+7	1.66-07	1.48-07	1.21-07	9.24-08	6.75-08	4.80-08	3.35-08	2.27-08
11	1.162+7	1.56-07	1.39-07	1.14-07	8.78-08	6.46-08	4.64-08	3.28-08	2.26-08
12	1.105+7	2.07-07	1.81-07	1.43-07	1.05-07	7.29-08	4.94-08	3.33-08	2.21-08
13	1.051+7	1.78-07	1.57-07	1.26-07	9.37-08	6.60-08	4.63-08	3.18-08	2.15-08
14	1.000+7	1.97-07	1.72-07	1.37-07	1.01-07	7.09-08	4.85-08	3.28-08	2.18-08
15	9.512+6	2.04-07	1.78-07	1.40-07	1.03-07	7.14-08	4.84-08	3.26-08	2.16-08
16	9.048+6	1.68-07	1.48-07	1.20-07	9.01-08	6.50-08	4.59-08	3.20-08	2.19-08
17	8.607+6	1.63-07	1.44-07	1.16-07	8.75-08	6.33-08	4.48-08	3.15-08	2.18-08
18	8.187+6	1.81-07	1.59-07	1.28-07	9.56-08	6.85-08	4.82-08	3.38-08	2.34-08
19	7.788+6	1.60-07	1.42-07	1.16-07	8.97-08	6.67-08	4.90-08	3.59-08	2.59-08
20	7.408+6	1.52-07	1.36-07	1.13-07	8.94-08	6.81-08	5.10-08	3.80-08	2.76-08
21	7.047+6	2.14-07	1.88-07	1.51-07	1.12-07	7.98-08	5.54-08	3.81-08	2.57-08
22	6.703+6	2.41-07	2.12-07	1.69-07	1.24-07	8.69-08	5.89-08	3.94-08	2.59-08
23	6.592+6	2.78-07	2.41-07	1.87-07	1.34-07	8.97-08	5.85-08	3.79-08	2.42-08
24	6.376+6	2.27-07	1.99-07	1.58-07	1.17-07	8.19-08	5.58-08	3.76-08	2.48-08
25	6.065+6	1.65-07	1.47-07	1.21-07	9.26-08	6.79-08	4.84-08	3.39-08	2.30-08
26	5.770+6	1.49-07	1.34-07	1.12-07	8.84-08	6.65-08	4.85-08	3.43-08	2.33-08
27	5.488+6	1.99-07	1.74-07	1.38-07	1.01-07	6.96-08	4.67-08	3.08-08	1.97-08
28	5.221+6	9.14-08	8.30-08	7.05-08	5.67-08	4.39-08	3.30-08	2.43-08	1.72-08
29	4.966+6	1.17-07	1.05-07	8.66-08	6.73-08	5.00-08	3.59-08	2.51-08	1.68-08
30	4.724+6	1.02-07	9.17-08	7.60-08	5.91-08	4.39-08	3.17-08	2.22-08	1.49-08
31	4.493+6	6.97-08	6.37-08	5.45-08	4.43-08	3.45-08	2.61-08	1.90-08	1.31-08
32	4.066+6	4.70-08	4.38-08	3.88-08	3.30-08	2.71-08	2.16-08	1.67-08	1.22-08
33	3.679+6	3.77-08	3.57-08	3.24-08	2.84-08	2.43-08	2.02-08	1.64-08	1.26-08
34	3.329+6	4.24-08	3.98-08	3.56-08	3.07-08	2.57-08	2.10-08	1.68-08	1.28-08
35	3.166+6	6.37-08	5.81-08	4.97-08	4.05-08	3.19-08	2.44-08	1.83-08	1.32-08
36	3.012+6	7.62-08	6.80-08	5.62-08	4.39-08	3.31-08	2.45-08	1.79-08	1.28-08
37	2.865+6	6.51-08	5.85-08	4.90-08	3.89-08	3.00-08	2.28-08	1.71-08	1.24-08
38	2.725+6	5.76-08	5.21-08	4.41-08	3.57-08	2.80-08	2.16-08	1.64-08	1.20-08
39	2.592+6	5.20-08	4.78-08	4.15-08	3.45-08	2.76-08	2.15-08	1.63-08	1.17-08
40	2.466+6	9.47-08	8.24-08	6.50-08	4.77-08	3.34-08	2.26-08	1.48-08	9.31-09
41	2.385+6	1.57-07	1.31-07	9.52-08	6.18-08	3.72-08	2.14-08	1.19-08	6.43-09
42	2.365+6	2.01-07	1.63-07	1.12-07	6.59-08	3.54-08	1.86-08	9.80-09	5.11-09
43	2.346+6	9.72-08	7.97-08	5.65-08	3.58-08	2.14-08	1.27-08	7.60-09	4.44-09
44	2.307+6	3.27-08	2.83-08	2.22-08	1.64-08	1.17-08	8.29-09	5.76-09	3.84-09
45	2.231+6	1.92-08	1.72-08	1.43-08	1.13-08	8.69-09	6.55-09	4.81-09	3.36-09
46	2.123+6	1.43-08	1.30-08	1.11-08	9.13-09	7.27-09	5.64-09	4.24-09	3.01-09
47	2.019+6	1.05-08	9.77-09	8.69-09	7.44-09	6.17-09	4.97-09	3.85-09	2.81-09
48	1.921+6	7.94-09	7.55-09	6.92-09	6.12-09	5.25-09	4.36-09	3.49-09	2.64-09
49	1.827+6	1.17-08	1.06-08	9.08-09	7.45-09	5.95-09	4.63-09	3.50-09	2.48-09
50	1.738+6	7.83-09	7.33-09	6.56-09	5.66-09	4.75-09	3.86-09	3.04-09	2.24-09
51	1.653+6	6.20-09	5.90-09	5.41-09	4.80-09	4.13-09	3.46-09	2.79-09	2.12-09
52	1.572+6	7.39-09	6.93-09	6.21-09	5.37-09	4.49-09	3.64-09	2.85-09	2.09-09
53	1.496+6	6.79-09	6.39-09	5.77-09	5.02-09	4.23-09	3.45-09	2.70-09	1.98-09
54	1.423+6	6.28-09	5.95-09	5.41-09	4.75-09	4.03-09	3.30-09	2.59-09	1.89-09
55	1.353+6	4.84-09	4.65-09	4.34-09	3.92-09	3.43-09	2.90-09	2.34-09	1.77-09
56	1.287+6	5.32-09	5.06-09	4.64-09	4.11-09	3.52-09	2.91-09	2.29-09	1.67-09
57	1.225+6	5.29-09	5.02-09	4.58-09	4.04-09	3.43-09	2.81-09	2.20-09	1.58-09

Table C-8b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gJ}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	4.56-09	4.35-09	4.00-09	3.55-09	3.05-09	2.53-09	2.01-09	1.47-09
59	1.108+6	3.06-09	2.97-09	2.80-09	2.58-09	2.32-09	2.03-09	1.72-09	1.37-09
60	1.003+6	2.74-09	2.67-09	2.54-09	2.38-09	2.17-09	1.94-09	1.69-09	1.40-09
61	9.616+5	3.59-09	3.47-09	3.26-09	2.99-09	2.67-09	2.31-09	1.94-09	1.54-09
62	9.072+5	4.28-09	4.10-09	3.81-09	3.43-09	3.00-09	2.54-09	2.07-09	1.59-09
63	8.629+5	4.11-09	3.95-09	3.68-09	3.33-09	2.93-09	2.49-09	2.04-09	1.57-09
64	8.209+5	3.82-09	3.68-09	3.44-09	3.14-09	2.78-09	2.39-09	1.98-09	1.55-09
65	7.808+5	4.19-09	4.01-09	3.72-09	3.34-09	2.92-09	2.47-09	2.01-09	1.55-09
66	7.427+5	4.27-09	4.09-09	3.78-09	3.38-09	2.94-09	2.47-09	2.00-09	1.52-09
67	7.065+5	4.21-09	4.02-09	3.72-09	3.32-09	2.88-09	2.42-09	1.95-09	1.47-09
68	6.721+5	4.15-09	3.97-09	3.66-09	3.27-09	2.83-09	2.37-09	1.90-09	1.42-09
69	6.393+5	4.08-09	3.90-09	3.60-09	3.21-09	2.77-09	2.31-09	1.84-09	1.36-09
70	6.081+5	3.82-09	3.66-09	3.39-09	3.03-09	2.63-09	2.19-09	1.74-09	1.29-09
71	5.784+5	3.18-09	3.06-09	2.86-09	2.60-09	2.29-09	1.94-09	1.58-09	1.20-09
72	5.502+5	3.49-09	3.35-09	3.10-09	2.78-09	2.40-09	2.00-09	1.57-09	1.14-09
73	5.234+5	3.15-09	3.03-09	2.82-09	2.54-09	2.21-09	1.84-09	1.46-09	1.05-09
74	4.979+5	2.25-09	2.18-09	2.06-09	1.90-09	1.70-09	1.46-09	1.20-09	9.22-10
75	4.505+5	1.62-09	1.58-09	1.52-09	1.43-09	1.33-09	1.20-09	1.06-09	8.93-10
76	4.076+5	1.98-09	1.93-09	1.84-09	1.71-09	1.56-09	1.38-09	1.19-09	9.76-10
77	3.877+5	2.22-09	2.16-09	2.04-09	1.88-09	1.70-09	1.48-09	1.26-09	1.01-09
78	3.688+5	2.37-09	2.29-09	2.16-09	1.99-09	1.78-09	1.54-09	1.29-09	1.02-09
79	3.337+5	2.43-09	2.35-09	2.21-09	2.03-09	1.81-09	1.56-09	1.30-09	1.02-09
80	3.020+5	2.47-09	2.39-09	2.24-09	2.05-09	1.83-09	1.57-09	1.30-09	1.01-09
81	2.985+5	2.47-09	2.39-09	2.25-09	2.05-09	1.83-09	1.57-09	1.30-09	1.01-09
82	2.972+5	2.46-09	2.37-09	2.23-09	2.04-09	1.82-09	1.57-09	1.30-09	1.01-09
83	2.945+5	2.40-09	2.32-09	2.19-09	2.01-09	1.79-09	1.55-09	1.29-09	1.01-09
84	2.873+5	2.35-09	2.28-09	2.15-09	1.97-09	1.76-09	1.52-09	1.27-09	9.97-10
85	2.732+5	2.38-09	2.30-09	2.16-09	1.98-09	1.77-09	1.52-09	1.26-09	9.81-10
86	2.472+5	2.28-09	2.21-09	2.08-09	1.91-09	1.71-09	1.48-09	1.23-09	9.55-10
87	2.352+5	2.22-09	2.15-09	2.03-09	1.87-09	1.67-09	1.45-09	1.20-09	9.40-10
88	2.237+5	2.06-09	2.00-09	1.89-09	1.75-09	1.58-09	1.38-09	1.16-09	9.24-10
89	2.128+5	1.96-09	1.90-09	1.81-09	1.68-09	1.52-09	1.34-09	1.14-09	9.25-10
90	2.024+5	1.84-09	1.79-09	1.71-09	1.60-09	1.47-09	1.31-09	1.13-09	9.37-10
91	1.926+5	1.88-09	1.83-09	1.75-09	1.64-09	1.50-09	1.34-09	1.16-09	9.68-10
92	1.832+5	2.23-09	2.16-09	2.04-09	1.89-09	1.70-09	1.49-09	1.26-09	1.01-09
93	1.742+5	2.38-09	2.30-09	2.17-09	1.99-09	1.78-09	1.55-09	1.29-09	1.02-09
94	1.657+5	2.64-09	2.54-09	2.38-09	2.16-09	1.91-09	1.63-09	1.34-09	1.03-09
95	1.576+5	2.58-09	2.48-09	2.33-09	2.12-09	1.88-09	1.61-09	1.33-09	1.03-09
96	1.500+5	2.39-09	2.31-09	2.18-09	2.00-09	1.78-09	1.54-09	1.29-09	1.02-09
97	1.426+5	2.34-09	2.26-09	2.14-09	1.96-09	1.76-09	1.53-09	1.28-09	1.02-09
98	1.357+5	2.60-09	2.51-09	2.35-09	2.14-09	1.89-09	1.62-09	1.33-09	1.03-09
99	1.291+5	2.75-09	2.65-09	2.47-09	2.23-09	1.96-09	1.66-09	1.35-09	1.02-09
100	1.228+5	2.59-09	2.50-09	2.34-09	2.12-09	1.87-09	1.60-09	1.31-09	1.00-09
101	1.168+5	2.60-09	2.50-09	2.34-09	2.12-09	1.87-09	1.59-09	1.30-09	9.87-10
102	1.111+5	2.48-09	2.39-09	2.24-09	2.04-09	1.80-09	1.53-09	1.25-09	9.57-10
103	9.804+4	2.19-09	2.12-09	2.00-09	1.84-09	1.64-09	1.42-09	1.18-09	9.21-10
104	8.652+4	1.89-09	1.84-09	1.75-09	1.62-09	1.47-09	1.30-09	1.11-09	9.07-10
105	8.250+4	2.34-09	2.26-09	2.12-09	1.94-09	1.72-09	1.47-09	1.21-09	9.37-10
106	7.950+4	2.18-09	2.11-09	1.99-09	1.83-09	1.63-09	1.42-09	1.18-09	9.27-10
107	7.200+4	2.33-09	2.25-09	2.12-09	1.93-09	1.71-09	1.47-09	1.21-09	9.29-10
108	6.738+4	2.26-09	2.18-09	2.05-09	1.87-09	1.66-09	1.43-09	1.18-09	9.10-10
109	5.656+4	2.13-09	2.06-09	1.94-09	1.78-09	1.59-09	1.37-09	1.14-09	8.89-10
110	5.248+4	2.16-09	2.09-09	1.97-09	1.80-09	1.60-09	1.38-09	1.14-09	8.80-10
111	4.631+4	2.12-09	2.05-09	1.93-09	1.76-09	1.57-09	1.35-09	1.11-09	8.57-10
112	4.087+4	1.94-09	1.88-09	1.77-09	1.63-09	1.46-09	1.26-09	1.05-09	8.19-10
113	3.431+4	1.85-09	1.80-09	1.70-09	1.57-09	1.40-09	1.22-09	1.01-09	7.89-10
114	3.183+4	1.57-09	1.52-09	1.45-09	1.36-09	1.24-09	1.10-09	9.40-10	7.66-10

Table C-8b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.25-09	1.23-09	1.19-09	1.13-09	1.06-09	9.78-10	8.83-10	7.74-10
116	2.700+4	1.94-09	1.88-09	1.78-09	1.64-09	1.48-09	1.29-09	1.09-09	8.70-10
117	2.606+4	2.25-09	2.17-09	2.04-09	1.86-09	1.64-09	1.41-09	1.15-09	8.85-10
118	2.479+4	2.28-09	2.20-09	2.06-09	1.88-09	1.66-09	1.41-09	1.15-09	8.82-10
119	2.418+4	2.26-09	2.18-09	2.05-09	1.86-09	1.65-09	1.41-09	1.15-09	8.78-10
120	2.358+4	2.23-09	2.15-09	2.02-09	1.84-09	1.63-09	1.39-09	1.14-09	8.70-10
121	2.188+4	2.18-09	2.10-09	1.98-09	1.80-09	1.60-09	1.37-09	1.12-09	8.58-10
122	1.931+4	2.11-09	2.04-09	1.92-09	1.75-09	1.55-09	1.33-09	1.09-09	8.37-10
123	1.503+4	[illegible].00-09	1.94-09	1.82-09	1.67-09	1.48-09	1.27-09	1.05-09	8.05-10
124	1.171+4	1.88-09	1.82-09	1.71-09	1.57-09	1.40-09	1.21-09	9.96-10	7.69-10
125	9.119+3	1.62-09	1.58-09	1.50-09	1.39-09	1.25-09	1.09-09	9.21-10	7.33-10
126	7.102+3	1.73-09	1.67-09	1.58-09	1.46-09	1.31-09	1.14-09	9.50-10	7.46-10
127	5.531+3	1.76-09	1.71-09	1.61-09	1.48-09	1.33-09	1.15-09	9.51-10	7.40-10
128	4.307+3	1.67-09	1.62-09	1.53-09	1.41-09	1.27-09	1.10-09	9.13-10	7.11-10
129	3.707+3	1.58-09	1.53-09	1.45-09	1.34-09	1.20-09	1.04-09	8.71-10	6.81-10
130	3.355+3	1.44-09	1.40-09	1.33-09	1.23-09	1.11-09	9.77-10	8.24-10	6.54-10
131	3.035+3	1.18-09	1.15-09	1.10-09	1.04-09	9.60-10	8.67-10	7.61-10	6.41-10
132	2.747+3	1.31-09	1.28-09	1.22-09	1.14-09	1.05-09	9.39-10	8.15-10	6.76-10
133	2.613+3	1.46-09	1.42-09	1.35-09	1.26-09	1.14-09	1.01-09	8.62-10	6.99-10
134	2.485+3	1.55-09	1.51-09	1.43-09	1.33-09	1.20-09	1.05-09	8.91-10	7.13-10
135	2.249+3	1.64-09	1.59-09	1.51-09	1.39-09	1.25-09	1.09-09	9.16-10	7.25-10
136	2.035+3	1.68-09	1.63-09	1.54-09	1.42-09	1.28-09	1.11-09	9.25-10	7.26-10
137	1.585+3	1.67-09	1.62-09	1.53-09	1.41-09	1.27-09	1.10-09	9.18-10	7.20-10
138	1.234+3	1.62-09	1.57-09	1.49-09	1.38-09	1.24-09	1.08-09	9.08-10	7.20-10
139	9.611+2	1.63-09	1.58-09	1.49-09	1.38-09	1.23-09	1.07-09	8.95-10	7.02-10
140	7.485+2	1.60-09	1.55-09	1.47-09	1.36-09	1.22-09	1.06-09	8.83-10	6.94-10
141	5.829+2	1.57-09	1.53-09	1.45-09	1.33-09	1.20-09	1.04-09	8.71-10	6.85-10
142	4.540+2	1.54-09	1.49-09	1.41-09	1.31-09	1.17-09	1.02-09	8.55-10	6.73-10
143	3.536+2	1.45-09	1.41-09	1.34-09	1.24-09	1.12-09	9.81-10	8.28-10	6.62-10
144	2.754+2	1.53-09	1.49-09	1.41-09	1.30-09	1.17-09	1.02-09	8.52-10	6.72-10
145	2.144+2	1.52-09	1.48-09	1.40-09	1.29-09	1.16-09	1.01-09	8.47-10	6.67-10
146	1.670+2	1.51-09	1.46-09	1.39-09	1.28-09	1.15-09	1.00-09	8.40-10	6.62-10
147	1.301+2	1.50-09	1.45-09	1.38-09	1.27-09	1.14-09	9.96-10	8.34-10	6.58-10
148	1.013+2	1.48-09	1.44-09	1.37-09	1.26-09	1.14-09	9.89-10	8.29-10	6.53-10
149	7.889+1	1.47-09	1.43-09	1.36-09	1.25-09	1.13-09	9.83-10	8.23-10	6.49-10
150	6.144+1	1.46-09	1.42-09	1.35-09	1.24-09	1.12-09	9.76-10	8.18-10	6.45-10
151	4.785+1	1.45-09	1.41-09	1.34-09	1.24-09	1.11-09	9.70-10	8.13-10	6.41-10
152	3.727+1	1.44-09	1.40-09	1.33-09	1.23-09	1.10-09	9.63-10	8.07-10	6.37-10
153	2.920+1	1.43-09	1.39-09	1.32-09	1.22-09	1.10-09	9.57-10	8.03-10	6.33-10
154	2.260+1	1.42-09	1.38-09	1.31-09	1.21-09	1.09-09	9.51-10	7.98-10	6.29-10
155	1.760+1	1.41-09	1.37-09	1.30-09	1.20-09	1.08-09	9.46-10	7.93-10	6.26-10
156	1.371+1	1.40-09	1.36-09	1.29-09	1.20-09	1.08-09	9.40-10	7.88-10	6.22-10
157	1.068+1	1.39-09	1.35-09	1.28-09	1.19-09	1.07-09	9.35-10	7.84-10	6.19-10
158	8.315+0	1.39-09	1.35-09	1.28-09	1.18-09	1.06-09	9.29-10	7.79-10	6.15-10
159	6.476+0	1.38-09	1.34-09	1.27-09	1.17-09	1.06-09	9.24-10	7.75-10	6.12-10
160	5.043+0	1.37-09	1.33-09	1.26-09	1.17-09	1.05-09	9.19-10	7.71-10	6.09-10
161	3.928+0	1.36-09	1.32-09	1.25-09	1.16-09	1.05-09	9.13-10	7.67-10	6.06-10
162	3.059+0	1.35-09	1.31-09	1.25-09	1.15-09	1.04-09	9.09-10	7.63-10	6.03-10
163	2.372+0	1.34-09	1.30-09	1.24-09	1.15-09	1.03-09	9.04-10	7.59-10	5.99-10
164	1.855+0	1.33-09	1.30-09	1.23-09	1.14-09	1.03-09	8.99-10	7.55-10	5.96-10
165	1.445+0	1.32-09	1.29-09	1.22-09	1.13-09	1.02-09	8.94-10	7.51-10	5.93-10
166	1.125+0	1.31-09	1.28-09	1.21-09	1.13-09	1.02-09	8.89-10	7.47-10	5.90-10
167	8.764-1	1.30-09	1.27-09	1.20-09	1.12-09	1.01-09	8.83-10	7.42-10	5.86-10
168	6.826-1	1.29-09	1.26-09	1.19-09	1.11-09	1.00-09	8.77-10	7.37-10	5.82-10
169	5.316-1	1.28-09	1.25-09	1.19-09	1.10-09	9.94-10	8.70-10	7.31-10	5.76-10
170	4.140-1	1.19-09	1.16-09	1.11-09	1.03-09	9.39-10	8.28-10	7.03-10	5.63-10
171	1.000-1	9.83-10	9.62-10	9.25-10	8.72-10	8.04-10	7.24-10	6.31-10	5.23-10
	1.000-5								

Table C-8c. Gamma-ray Dose Rate Transmission Factors for 1.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	4.52-08	3.62-08	2.33-08	1.11-08	3.44-09	5.27-10	2.09-10	2.86-10
2	1.200+7	3.76-08	3.01-08	1.93-08	9.17-09	2.86-09	4.44-10	1.85-10	2.50-10
3	1.000+7	2.96-08	2.36-08	1.50-08	7.07-09	2.21-09	3.42-10	1.53-10	2.02-10
4	8.000+6	2.39-08	1.89-08	1.19-08	5.56-09	1.72-09	2.63-10	1.23-10	1.60-10
5	7.500+6	2.12-08	1.67-08	1.05-08	4.85-09	1.49-09	2.29-10	1.10-10	1.41-10
6	7.000+6	1.84-08	1.44-08	8.99-09	4.13-09	1.27-09	1.94-10	9.55-11	1.22-10
7	6.500+6	1.55-08	1.21-08	7.48-09	3.40-09	1.04-09	1.59-10	8.10-11	1.03-10
8	6.000+6	1.26-08	9.81-09	6.01-09	2.71-09	8.26-10	1.26-10	6.66-11	8.39-11
9	5.500+6	9.85-09	7.62-09	4.62-09	2.06-09	6.28-10	9.65-11	5.27-11	6.59-11
10	5.000+6	7.43-09	5.70-09	3.42-09	1.51-09	4.59-10	7.08-11	4.00-11	4.97-11
11	4.500+6	5.31-09	4.05-09	2.39-09	1.04-09	3.17-10	4.90-11	2.85-11	3.53-11
12	4.000+6	3.51-09	2.64-09	1.54-09	6.61-10	2.02-10	3.14-11	1.87-11	2.31-11
13	3.500+6	2.07-09	1.54-09	8.80-10	3.73-10	1.15-10	1.81-11	1.09-11	1.35-11
14	3.000+6	1.04-09	7.66-10	4.30-10	1.80-10	5.60-11	9.08-12	5.41-12	6.75-12
15	2.500+6	4.12-10	2.98-10	1.64-10	6.83-11	2.17-11	3.64-12	2.15-12	2.71-12
16	2.000+6	1.36-10	9.63-11	5.16-11	2.13-11	6.89-12	1.22-12	6.28-13	8.30-13
17	1.660+6	5.56-11	3.87-11	2.03-11	8.30-12	2.74-12	5.42-13	1.89-13	2.89-13
18	1.500+6	2.84-11	1.97-11	1.03-11	4.24-12	1.45-12	3.17-13	7.31-14	1.37-13
19	1.330+6	9.05-12	6.30-12	3.38-12	1.48-12	5.33-13	1.21-13	2.90-14	5.50-14
20	1.000+6	1.35-12	9.17-13	4.79-13	2.08-13	7.58-14	1.80-14	3.21-15	7.15-15
21	8.000+5	2.99-13	1.98-13	1.00-13	4.28-14	1.57-14	4.00-15	3.32-16	1.22-15
22	7.000+5	9.57-14	6.30-14	3.20-14	1.39-14	5.23-15	1.40-15	4.82-17	3.71-16
23	6.000+5	2.49-14	1.63-14	8.24-15	3.62-15	1.39-15	3.92-16	5.63-18	8.61-17
24	5.120+5	9.69-15	6.13-15	3.00-15	1.30-15	5.13-16	1.65-16	2.56-17	1.44-17
25	5.100+5	5.91-15	3.78-15	1.89-15	8.39-16	3.34-16	1.06-16	1.40-17	1.13-17
26	4.500+5	1.70-15	1.08-15	5.51-16	2.56-16	1.12-16	4.28-17	1.26-17	1.74-18
27	4.000+5	3.54-16	2.41-16	1.37-16	7.08-17	3.36-17	1.41-17	4.78-18	1.02-18
28	3.000+5	2.61-18	1.98-18	1.31-18	8.10-19	4.80-19	2.75-19	1.53-19	8.16-20
29	2.000+5	5.54-21	3.95-21	2.45-21	1.44-21	8.17-22	4.53-22	2.43-22	1.26-22
30	1.500+5	9.10-25	6.82-25	4.57-25	2.96-25	1.91-25	1.25-25	8.23-26	5.44-26
31	1.000+5	2.86-35	1.69-35	9.32-36	5.30-36	3.14-36	1.93-36	1.21-36	7.75-37
32	7.500+4	2.20-53	8.49-54	3.78-54	1.93-54	1.07-54	6.25-55	3.77-55	2.35-55
33	6.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-9a. Neutron Dose Rate Transmission Factors for 1.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	4.28-09	3.65-09	2.77-09	1.92-09	1.24-09	7.64-10	4.59-10	2.72-10
2	1.649+7	3.74-09	3.19-09	2.43-09	1.69-09	1.10-09	6.89-10	4.22-10	2.56-10
3	1.568+7	3.24-09	2.79-09	2.16-09	1.53-09	1.01-09	6.43-10	3.96-10	2.39-10
4	1.492+7	3.12-09	2.69-09	2.07-09	1.47-09	9.79-10	6.24-10	3.88-10	2.37-10
5	1.455+7	3.04-09	2.61-09	2.01-09	1.42-09	9.47-10	6.05-10	3.79-10	2.34-10
6	1.419+7	2.97-09	2.55-09	1.96-09	1.39-09	9.28-10	5.95-10	3.74-10	2.32-10
7	1.384+7	2.90-09	2.49-09	1.93-09	1.37-09	9.14-10	5.86-10	3.69-10	2.28-10
8	1.350+7	2.93-09	2.51-09	1.93-09	1.36-09	9.02-10	5.74-10	3.57-10	2.19-10
9	1.284+7	2.65-09	2.27-09	1.74-09	1.23-09	8.14-10	5.19-10	3.25-10	2.02-10
10	1.221+7	1.84-09	1.60-09	1.27-09	9.32-10	6.54-10	4.46-10	3.02-10	2.01-10
11	1.162+7	1.74-09	1.51-09	1.20-09	8.89-10	6.28-10	4.33-10	2.96-10	2.01-10
12	1.105+7	2.60-09	2.19-09	1.65-09	1.14-09	7.41-10	4.70-10	2.99-10	1.93-10
13	1.051+7	2.14-09	1.83-09	1.40-09	9.89-10	6.65-10	4.37-10	2.87-10	1.89-10
14	1.000+7	2.44-09	2.06-09	1.56-09	1.08-09	7.12-10	4.56-10	2.92-10	1.88-10
15	9.512+6	2.52-09	2.12-09	1.59-09	1.09-09	7.10-10	4.52-10	2.88-10	1.85-10
16	9.048+6	1.92-09	1.65-09	1.27-09	9.14-10	6.28-10	4.23-10	2.85-10	1.92-10
17	8.607+6	1.85-09	1.59-09	1.23-09	8.82-10	6.06-10	4.09-10	2.77-10	1.89-10
18	8.187+6	2.12-09	1.80-09	1.38-09	9.74-10	6.60-10	4.42-10	2.99-10	2.05-10
19	7.788+6	1.75-09	1.51-09	1.19-09	8.78-10	6.28-10	4.47-10	3.24-10	2.35-10
20	7.408+6	1.63-09	1.43-09	1.15-09	8.74-10	6.41-10	4.66-10	3.39-10	2.46-10
21	7.047+6	2.62-09	2.22-09	1.68-09	1.17-09	7.78-10	5.03-10	3.24-10	2.09-10
22	6.703+6	3.07-09	2.59-09	1.95-09	1.33-09	8.59-10	5.33-10	3.27-10	2.01-10
23	6.592+6	3.66-09	3.01-09	2.17-09	1.41-09	8.57-10	5.03-10	2.94-10	1.75-10
24	6.376+6	2.52-09	2.12-09	1.59-09	1.09-09	7.05-10	4.43-10	2.77-10	1.74-10
25	6.065+6	1.52-09	1.31-09	1.03-09	7.49-10	5.19-10	3.50-10	2.33-10	1.53-10
26	5.770+6	1.28-09	1.13-09	9.12-10	6.87-10	4.92-10	3.41-10	2.31-10	1.51-10
27	5.488+6	1.92-09	1.60-09	1.18-09	7.95-10	5.03-10	3.07-10	1.85-10	1.10-10
28	5.221+6	6.14-10	5.46-10	4.49-10	3.48-10	2.58-10	1.87-10	1.33-10	9.15-11
29	4.966+6	8.14-10	7.10-10	5.63-10	4.16-10	2.92-10	1.99-10	1.32-10	8.54-11
30	4.724+6	6.53-10	5.69-10	4.53-10	3.35-10	2.37-10	1.62-10	1.09-10	7.10-11
31	4.493+6	3.80-10	3.42-10	2.85-10	2.25-10	1.70-10	1.24-10	8.84-11	5.98-11
32	4.066+6	2.28-10	2.10-10	1.84-10	1.54-10	1.24-10	9.75-11	7.45-11	5.40-11
33	3.679+6	1.79-10	1.68-10	1.51-10	1.31-10	1.11-10	9.16-11	7.41-11	5.73-11
34	3.329+6	2.09-10	1.94-10	1.71-10	1.45-10	1.19-10	9.61-11	7.61-11	5.81-11
35	3.166+6	3.33-10	2.99-10	2.49-10	1.97-10	1.50-10	1.12-10	8.25-11	5.90-11
36	3.012+6	4.18-10	3.61-10	2.85-10	2.12-10	1.53-10	1.09-10	7.81-11	5.56-11
37	2.865+6	3.31-10	2.90-10	2.34-10	1.79-10	1.33-10	9.91-11	7.40-11	5.48-11
38	2.725+6	2.78-10	2.47-10	2.04-10	1.62-10	1.25-10	9.59-11	7.30-11	5.44-11
39	2.592+6	2.56-10	2.35-10	2.02-10	1.67-10	1.32-10	1.02-10	7.57-11	5.36-11
40	2.466+6	6.28-10	5.22-10	3.86-10	2.63-10	1.69-10	1.04-10	6.13-11	3.39-11
41	2.385+6	1.41-09	1.07-09	6.80-10	3.73-10	1.83-10	7.92-11	2.78-11	6.41-12
42	2.365+6	2.12-09	1.49-09	8.04-10	3.52-10	1.36-10	4.46-11	9.10-12	1.59-12
43	2.346+6	5.53-10	3.93-10	2.19-10	1.03-10	4.41-11	1.66-11	4.82-12	7.13-13
44	2.307+6	5.49-11	4.11-11	2.58-11	1.46-11	7.78-12	4.02-12	2.03-12	1.03-12
45	2.231+6	1.35-11	1.05-11	7.05-12	4.33-12	2.56-12	1.49-12	8.69-13	5.11-13
46	2.123+6	5.33-12	4.23-12	2.93-12	1.87-12	1.16-12	7.16-13	4.46-13	2.81-13
47	2.019+6	1.78-12	1.51-12	1.16-12	8.45-13	5.98-13	4.20-13	2.95-13	2.04-13
48	1.921+6	9.05-13	8.23-13	7.03-13	5.70-13	4.43-13	3.33-13	2.41-13	1.66-13
49	1.827+6	2.80-12	2.07-12	1.29-12	7.37-13	4.11-13	2.29-13	1.29-13	7.45-14
50	1.738+6	5.41-13	4.37-13	3.12-13	2.09-13	1.37-13	9.05-14	6.09-14	4.16-14
51	1.653+6	2.28-13	1.99-13	1.61-13	1.23-13	9.11-14	6.65-14	4.80-14	3.40-14
52	1.572+6	3.78-13	3.03-13	2.14-13	1.41-13	9.06-14	5.81-14	3.76-14	2.43-14
53	1.496+6	2.22-13	1.81-13	1.30-13	8.78-14	5.76-14	3.76-14	2.47-14	1.63-14
54	1.423+6	1.24-13	1.04-13	7.84-14	5.52-14	3.78-14	2.56-14	1.74-14	1.18-14
55	1.353+6	4.34-14	4.02-14	3.53-14	2.97-14	2.40-14	1.87-14	1.41-14	1.02-14
56	1.287+6	6.03-14	5.24-14	4.16-14	3.12-14	2.26-14	1.60-14	1.12-14	7.54-15
57	1.225+6	5.74-14	4.84-14	3.68-14	2.63-14	1.82-14	1.24-14	8.33-15	5.44-15

Table C-9a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	3.39-14	2.90-14	2.25-14	1.64-14	1.17-14	8.21-15	5.75-15	3.92-15
59	1.108+6	1.09-14	1.02-14	9.05-15	7.74-15	6.45-15	5.30-15	4.30-15	3.39-15
60	1.003+6	8.52-15	8.15-15	7.54-15	6.78-15	5.96-15	5.13-15	4.33-15	3.55-15
61	9.616+5	1.35-14	1.25-14	1.11-14	9.44-15	7.82-15	6.35-15	5.06-15	3.92-15
62	9.072+5	2.04-14	1.79-14	1.46-14	1.14-14	8.63-15	6.51-15	4.90-15	3.63-15
63	8.629+5	1.60-14	1.43-14	1.20-14	9.59-15	7.49-15	5.79-15	4.43-15	3.33-15
64	8.209+5	1.23-14	1.12-14	9.63-15	7.95-15	6.41-15	5.09-15	3.99-15	3.05-15
65	7.808+5	1.61-14	1.39-14	1.11-14	8.43-15	6.30-15	4.70-15	3.51-15	2.59-15
66	7.427+5	1.57-14	1.33-14	1.03-14	7.63-15	5.54-15	4.03-15	2.93-15	2.12-15
67	7.065+5	1.30-14	1.11-14	8.58-15	6.32-15	4.57-15	3.29-15	2.37-15	1.69-15
68	6.721+5	1.08-14	9.15-15	7.08-15	5.20-15	3.73-15	2.66-15	1.89-15	1.32-15
69	6.393+5	8.60-15	7.31-15	5.65-15	4.13-15	2.95-15	2.09-15	1.47-15	1.01-15
70	6.081+5	5.63-15	4.91-15	3.93-15	2.98-15	2.20-15	1.60-15	1.14-15	7.95-16
71	5.784+5	2.89-15	2.66-15	2.30-15	1.91-15	1.53-15	1.20-15	9.10-16	6.64-16
72	5.502+5	3.43-15	3.04-15	2.50-15	1.95-15	1.47-15	1.08-15	7.69-16	5.23-16
73	5.234+5	2.28-15	2.07-15	1.76-15	1.43-15	1.11-15	8.42-16	6.16-16	4.23-16
74	4.979+5	1.05-15	9.98-16	9.17-16	8.13-16	6.99-16	5.81-16	4.64-16	3.48-16
75	4.505+5	6.46-16	6.27-16	5.95-16	5.53-16	5.04-16	4.50-16	3.92-16	3.30-16
76	4.076+5	8.85-16	8.41-16	7.72-16	6.89-16	6.01-16	5.14-16	4.32-16	3.51-16
77	3.877+5	1.07-15	1.01-15	8.99-16	7.78-16	6.57-16	5.46-16	4.45-16	3.52-16
78	3.688+5	1.18-15	1.09-15	9.58-16	8.13-16	6.73-16	5.49-16	4.39-16	3.41-16
79	3.337+5	1.16-15	1.07-15	9.34-16	7.85-16	6.44-16	5.20-16	4.12-16	3.15-16
80	3.020+5	1.15-15	1.05-15	9.13-16	7.62-16	6.21-16	4.97-16	3.91-16	2.97-16
81	2.985+5	1.14-15	1.05-15	9.08-16	7.58-16	6.17-16	4.94-16	3.88-16	2.94-16
82	2.972+5	1.11-15	1.02-15	8.91-16	7.46-16	6.09-16	4.89-16	3.85-16	2.93-16
83	2.945+5	1.04-15	9.63-16	8.45-16	7.14-16	5.89-16	4.76-16	3.78-16	2.89-16
84	2.873+5	9.63-16	8.95-16	7.93-16	6.76-16	5.62-16	4.58-16	3.65-16	2.80-16
85	2.732+5	9.37-16	8.69-16	7.67-16	6.51-16	5.38-16	4.35-16	3.43-16	2.59-16
86	2.472+5	8.13-16	7.60-16	6.78-16	5.83-16	4.87-16	3.97-16	3.15-16	2.39-16
87	2.352+5	7.51-16	7.04-16	6.31-16	5.45-16	4.58-16	3.75-16	2.99-16	2.27-16
88	2.237+5	6.38-16	6.03-16	5.49-16	4.83-16	4.14-16	3.46-16	2.82-16	2.20-16
89	2.128+5	5.76-16	5.47-16	5.02-16	4.46-16	3.87-16	3.28-16	2.72-16	2.17-16
90	2.024+5	5.12-16	4.90-16	4.55-16	4.11-16	3.63-16	3.15-16	2.68-16	2.21-16
91	1.926+5	5.20-16	4.98-16	4.62-16	4.18-16	3.70-16	3.22-16	2.75-16	2.28-16
92	1.832+5	6.88-16	6.46-16	5.80-16	5.04-16	4.28-16	3.57-16	2.92-16	2.32-16
93	1.742+5	7.75-16	7.19-16	6.34-16	5.39-16	4.47-16	3.64-16	2.91-16	2.26-16
94	1.657+5	9.80-16	8.82-16	7.43-16	5.99-16	4.72-16	3.67-16	2.82-16	2.11-16
95	1.576+5	8.91-16	8.04-16	6.80-16	5.52-16	4.38-16	3.44-16	2.67-16	2.02-16
96	1.500+5	7.05-16	6.49-16	5.67-16	4.77-16	3.92-16	3.18-16	2.54-16	1.97-16
97	1.426+5	6.50-16	6.03-16	5.32-16	4.52-16	3.76-16	3.07-16	2.47-16	1.93-16
98	1.357+5	8.20-16	7.40-16	6.26-16	5.09-16	4.03-16	3.15-16	2.43-16	1.83-16
99	1.291+5	9.36-16	8.25-16	6.74-16	5.27-16	4.03-16	3.06-16	2.30-16	1.68-16
100	1.228+5	7.38-16	6.65-16	5.61-16	4.54-16	3.58-16	2.78-16	2.13-16	1.58-16
101	1.168+5	7.14-16	6.42-16	5.40-16	4.35-16	3.42-16	2.64-16	2.01-16	1.48-16
102	1.111+5	5.92-16	5.38-16	4.61-16	3.78-16	3.01-16	2.36-16	1.81-16	1.34-16
103	9.804+4	4.14-16	3.85-16	3.41-16	2.91-16	2.42-16	1.96-16	1.56-16	1.19-16
104	8.652+4	3.00-16	2.85-16	2.62-16	2.33-16	2.03-16	1.73-16	1.44-16	1.16-16
105	8.250+4	4.50-16	4.13-16	3.58-16	2.98-16	2.42-16	1.92-16	1.50-16	1.13-16
106	7.950+4	3.73-16	3.48-16	3.08-16	2.63-16	2.19-16	1.78-16	1.42-16	1.10-16
107	7.200+4	4.13-16	3.79-16	3.29-16	2.75-16	2.23-16	1.77-16	1.38-16	1.03-16
108	6.738+4	3.62-16	3.34-16	2.93-16	2.46-16	2.01-16	1.61-16	1.26-16	9.46-17
109	5.656+4	2.97-16	2.77-16	2.46-16	2.10-16	1.75-16	1.42-16	1.13-16	8.58-17
110	5.248+4	2.94-16	2.73-16	2.41-16	2.05-16	1.69-16	1.36-16	1.07-16	8.06-17
111	4.631+4	2.65-16	2.47-16	2.19-16	1.86-16	1.54-16	1.24-16	9.73-17	7.29-17
112	4.087+4	2.09-16	1.97-16	1.78-16	1.55-16	1.31-16	1.08-16	8.65-17	6.59-17
113	3.431+4	1.87-16	1.77-16	1.60-16	1.40-16	1.19-16	9.85-17	7.89-17	6.01-17
114	3.183+4	1.40-16	1.35-16	1.25-16	1.13-16	1.00-16	8.65-17	7.27-17	5.86-17

Table C-9a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	1.04-16	1.01-16	9.69-17	9.13-17	8.47-17	7.74-17	6.97-17	6.12-17
116	2.700+4	1.96-16	1.85-16	1.67-16	1.46-16	1.24-16	1.03-16	8.42-17	6.64-17
117	2.606+4	2.61-16	2.40-16	2.08-16	1.73-16	1.40-16	1.11-16	8.58-17	6.40-17
118	2.479+4	2.63-16	2.41-16	2.08-16	1.72-16	1.39-16	1.09-16	8.39-17	6.21-17
119	2.418+4	2.56-16	2.35-16	2.03-16	1.68-16	1.36-16	1.07-16	8.23-17	6.10-17
120	2.358+4	2.42-16	2.23-16	1.93-16	1.61-16	1.30-16	1.03-16	7.93-17	5.89-17
121	2.188+4	2.22-16	2.04-16	1.78-16	1.49-16	1.21-16	9.60-17	7.44-17	5.54-17
122	1.931+4	1.93-16	1.79-16	1.57-16	1.32-16	1.08-16	8.61-17	6.71-17	5.01-17
123	1.503+4	1.57-16	1.46-16	1.29-16	1.10-16	9.09-17	7.32-17	5.74-17	4.30-17
124	1.171+4	1.26-16	1.18-16	1.06-16	9.12-17	7.63-17	6.22-17	4.91-17	3.70-17
125	9.119+3	9.07-17	8.63-17	7.92-17	7.04-17	6.09-17	5.13-17	4.19-17	3.28-17
126	7.102+3	9.50-17	8.98-17	8.15-17	7.15-17	6.09-17	5.05-17	4.07-17	3.13-17
127	5.531+3	9.21-17	8.68-17	7.83-17	6.82-17	5.76-17	4.73-17	3.78-17	2.87-17
128	4.307+3	7.84-17	7.42-17	6.75-17	5.93-17	5.05-17	4.19-17	3.36-17	2.56-17
129	3.707+3	6.80-17	6.47-17	5.94-17	5.27-17	4.54-17	3.79-17	3.06-17	2.34-17
130	3.355+3	5.81-17	5.56-17	5.16-17	4.64-17	4.05-17	3.45-17	2.83-17	2.21-17
131	3.035+3	4.35-17	4.22-17	4.00-17	3.72-17	3.38-17	3.00-17	2.60-17	2.18-17
132	2.747+3	4.98-17	4.81-17	4.52-17	4.15-17	3.72-17	3.26-17	2.78-17	2.29-17
133	2.613+3	5.80-17	5.55-17	5.16-17	4.65-17	4.09-17	3.50-17	2.92-17	2.33-17
134	2.485+3	6.31-17	6.02-17	5.53-17	4.94-17	4.28-17	3.62-17	2.97-17	2.34-17
135	2.249+3	6.75-17	6.40-17	5.84-17	5.15-17	4.41-17	3.68-17	2.99-17	2.32-17
136	2.035+3	6.78-17	6.41-17	5.82-17	5.10-17	4.33-17	3.59-17	2.89-17	2.22-17
137	1.585+3	6.27-17	5.93-17	5.37-17	4.70-17	3.99-17	3.30-17	2.65-17	2.03-17
138	1.234+3	5.49-17	5.20-17	4.73-17	4.16-17	3.56-17	2.96-17	2.39-17	1.84-17
139	9.611+2	5.38-17	5.08-17	4.62-17	4.05-17	3.45-17	2.86-17	2.30-17	1.77-17
140	7.485+2	4.90-17	4.64-17	4.21-17	3.70-17	3.16-17	2.62-17	2.11-17	1.62-17
141	5.829+2	4.47-17	4.23-17	3.85-17	3.39-17	2.89-17	2.41-17	1.94-17	1.49-17
142	4.540+2	4.03-17	3.82-17	3.49-17	3.08-17	2.63-17	2.20-17	1.77-17	1.37-17
143	3.536+2	3.43-17	3.27-17	3.01-17	2.68-17	2.33-17	1.97-17	1.61-17	1.26-17
144	2.754+2	3.59-17	3.40-17	3.10-17	2.73-17	2.34-17	1.95-17	1.58-17	1.22-17
145	2.144+2	3.34-17	3.16-17	2.88-17	2.54-17	2.17-17	1.81-17	1.46-17	1.13-17
146	1.670+2	3.10-17	2.94-17	2.68-17	2.36-17	2.02-17	1.68-17	1.36-17	1.05-17
147	1.301+2	2.88-17	2.73-17	2.48-17	2.19-17	1.87-17	1.56-17	1.26-17	9.74-18
148	1.013+2	2.67-17	2.53-17	2.31-17	2.03-17	1.74-17	1.45-17	1.17-17	9.05-18
149	7.889+1	2.48-17	2.35-17	2.14-17	1.89-17	1.62-17	1.35-17	1.09-17	8.41-18
150	6.144+1	2.31-17	2.19-17	1.99-17	1.75-17	1.50-17	1.25-17	1.01-17	7.81-18
151	4.785+1	2.14-17	2.03-17	1.85-17	1.63-17	1.40-17	1.16-17	9.40-18	7.25-18
152	3.727+1	1.99-17	1.89-17	1.72-17	1.51-17	1.30-17	1.08-17	8.73-18	6.74-18
153	2.920+1	1.85-17	1.76-17	1.60-17	1.41-17	1.21-17	1.00-17	8.12-18	6.27-18
154	2.260+1	1.72-17	1.63-17	1.48-17	1.31-17	1.12-17	9.32-18	7.54-18	5.82-18
155	1.760+1	1.60-17	1.51-17	1.38-17	1.22-17	1.04-17	8.66-18	7.00-18	5.40-18
156	1.371+1	1.49-17	1.41-17	1.28-17	1.13-17	9.67-18	8.05-18	6.51-18	5.02-18
157	1.068+1	1.38-17	1.31-17	1.19-17	1.05-17	8.99-18	7.48-18	6.05-18	4.67-18
158	8.315+0	1.28-17	1.22-17	1.11-17	9.76-18	8.35-18	6.95-18	5.62-18	4.33-18
159	6.476+0	1.19-17	1.13-17	1.03-17	9.08-18	7.77-18	6.46-18	5.22-18	4.03-18
160	5.043+0	1.11-17	1.05-17	9.58-18	8.44-18	7.22-18	6.01-18	4.85-18	3.74-18
161	3.928+0	1.03-17	9.77-18	8.91-18	7.85-18	6.71-18	5.59-18	4.51-18	3.48-18
162	3.059+0	9.60-18	9.10-18	8.29-18	7.30-18	6.25-18	5.20-18	4.19-18	3.23-18
163	2.372+0	8.93-18	8.46-18	7.71-18	6.79-18	5.80-18	4.83-18	3.89-18	3.00-18
164	1.855+0	8.31-18	7.88-18	7.18-18	6.32-18	5.40-18	4.49-18	3.62-18	2.79-18
165	1.445+0	7.74-18	7.33-18	6.68-18	5.88-18	5.03-18	4.18-18	3.37-18	2.59-18
166	1.125+0	7.20-18	6.82-18	6.21-18	5.47-18	4.67-18	3.88-18	3.13-18	2.41-18
167	8.764-1	6.69-18	6.34-18	5.77-18	5.08-18	4.34-18	3.61-18	2.90-18	2.23-18
168	6.826-1	6.20-18	5.87-18	5.35-18	4.71-18	4.03-18	3.34-18	2.69-18	2.06-18
169	5.316-1	5.73-18	5.43-18	4.94-18	4.35-18	3.71-18	3.08-18	2.47-18	1.88-18
170	4.140-1	4.70-18	4.47-18	4.11-18	3.66-18	3.16-18	2.66-18	2.16-18	1.68-18
171	1.000-1	1.98-18	1.91-18	1.79-18	1.64-18	1.45-18	1.25-18	1.05-18	8.37-19
	1.000-5								

Table C-9b. Total Dose Rate Transmission Factors for 1.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733 + 7	5.35-09	4.61-09	3.58-09	2.55-09	1.71-09	1.10-09	6.93-10	4.26-10
2	1.649 + 7	4.73-09	4.08-09	3.18-09	2.28-09	1.54-09	1.01-09	6.46-10	4.05-10
3	1.568 + 7	4.16-09	3.62-09	2.86-09	2.08-09	1.43-09	9.49-10	6.12-10	3.83-10
4	1.492 + 7	4.02-09	3.49-09	2.76-09	2.01-09	1.39-09	9.24-10	6.01-10	3.80-10
5	1.455 + 7	3.91-09	3.39-09	2.67-09	1.95-09	1.35-09	8.99-10	5.87-10	3.74-10
6	1.419 + 7	3.82-09	3.32-09	2.62-09	1.91-09	1.32-09	8.84-10	5.80-10	3.71-10
7	1.384 + 7	3.74-09	3.25-09	2.57-09	1.88-09	1.30-09	8.72-10	5.72-10	3.66-10
8	1.350 + 7	3.77-09	3.27-09	2.57-09	1.87-09	1.29-09	8.57-10	5.59-10	3.55-10
9	1.284 + 7	3.45-09	2.99-09	2.36-09	1.72-09	1.18-09	7.92-10	5.20-10	3.34-10
10	1.221 + 7	2.50-09	2.20-09	1.78-09	1.35-09	9.78-10	6.92-10	4.82-10	3.27-10
11	1.162 + 7	2.36-09	2.09-09	1.69-09	1.29-09	9.43-10	6.73-10	4.74-10	3.27-10
12	1.105 + 7	3.37-09	2.89-09	2.23-09	1.59-09	1.09-09	7.24-10	4.81-10	3.18-10
13	1.051 + 7	2.83-09	2.45-09	1.92-09	1.41-09	9.85-10	6.75-10	4.60-10	3.09-10
14	1.000 + 7	3.18-09	2.73-09	2.12-09	1.53-09	1.05-09	7.05-10	4.71-10	3.11-10
15	9.512 + 6	3.29-09	2.81-09	2.16-09	1.54-09	1.05-09	7.01-10	4.65-10	3.06-10
16	9.048 + 6	2.58-09	2.25-09	1.78-09	1.32-09	9.43-10	6.60-10	4.58-10	3.12-10
17	8.607 + 6	2.49-09	2.17-09	1.72-09	1.28-09	9.14-10	6.41-10	4.47-10	3.08-10
18	8.187 + 6	2.81-09	2.43-09	1.90-09	1.39-09	9.83-10	6.83-10	4.76-10	3.29-10
19	7.788 + 6	2.37-09	2.08-09	1.68-09	1.28-09	9.43-10	6.90-10	5.05-10	3.66-10
20	7.408 + 6	2.23-09	1.98-09	1.63-09	1.27-09	9.57-10	7.12-10	5.28-10	3.83-10
21	7.047 + 6	3.38-09	2.91-09	2.27-09	1.64-09	1.14-09	7.70-10	5.18-10	3.44-10
22	6.703 + 6	3.91-09	3.35-09	2.58-09	1.84-09	1.24-09	8.14-10	5.28-10	3.39-10
23	6.592 + 6	4.60-09	3.85-09	2.86-09	1.95-09	1.26-09	7.89-10	4.94-10	3.09-10
24	6.376 + 6	3.35-09	2.88-09	2.22-09	1.59-09	1.09-09	7.27-10	4.81-10	3.14-10
25	6.065 + 6	2.19-09	1.93-09	1.56-09	1.18-09	8.61-10	6.10-10	4.25-10	2.87-10
26	5.770 + 6	1.92-09	1.72-09	1.43-09	1.12-09	8.34-10	6.05-10	4.26-10	2.88-10
27	5.488 + 6	2.71-09	2.31-09	1.78-09	1.27-09	8.66-10	5.74-10	3.74-10	2.37-10
28	5.221 + 6	1.07-09	9.74-10	8.28-10	6.68-10	5.20-10	3.94-10	2.91-10	2.06-10
29	4.966 + 6	1.37-09	1.23-09	1.01-09	7.89-10	5.89-10	4.26-10	3.00-10	2.02-10
30	4.724 + 6	1.18-09	1.05-09	8.74-10	6.85-10	5.15-10	3.76-10	2.68-10	1.81-10
31	4.493 + 6	7.92-10	7.27-10	6.28-10	5.17-10	4.09-10	3.13-10	2.32-10	1.61-10
32	4.066 + 6	5.49-10	5.15-10	4.61-10	3.96-10	3.30-10	2.66-10	2.07-10	1.51-10
33	3.679 + 6	4.51-10	4.28-10	3.91-10	3.46-10	2.98-10	2.50-10	2.04-10	1.57-10
34	3.329 + 6	5.02-10	4.72-10	4.26-10	3.71-10	3.14-10	2.59-10	2.08-10	1.60-10
35	3.166 + 6	7.33-10	6.73-10	5.82-10	4.82-10	3.85-10	3.00-10	2.28-10	1.66-10
36	3.012 + 6	8.75-10	7.84-10	6.55-10	5.21-10	4.01-10	3.03-10	2.26-10	1.62-10
37	2.865 + 6	7.50-10	6.79-10	5.77-10	4.68-10	3.69-10	2.86-10	2.18-10	1.60-10
38	2.725 + 6	6.71-10	6.13-10	5.29-10	4.38-10	3.52-10	2.77-10	2.13-10	1.58-10
39	2.592 + 6	6.25-10	5.80-10	5.12-10	4.34-10	3.55-10	2.81-10	2.14-10	1.55-10
40	2.466 + 6	1.17-09	1.02-09	8.06-10	6.00-10	4.29-10	2.97-10	1.99-10	1.26-10
41	2.385 + 6	2.16-09	1.74-09	1.22-09	7.78-10	4.71-10	2.77-10	1.58-10	8.76-11
42	2.365 + 6	3.03-09	2.27-09	1.41-09	7.84-10	4.28-10	2.37-10	1.33-10	7.30-11
43	2.346 + 6	1.12-09	8.93-10	6.24-10	4.10-10	2.67-10	1.73-10	1.12-10	6.90-11
44	2.307 + 6	3.62-10	3.23-10	2.69-10	2.15-10	1.66-10	1.25-10	9.17-11	6.29-11
45	2.231 + 6	2.46-10	2.28-10	1.99-10	1.68-10	1.36-10	1.07-10	8.15-11	5.79-11
46	2.123 + 6	2.05-10	1.92-10	1.71-10	1.47-10	1.22-10	9.75-11	7.50-11	5.39-11
47	2.019 + 6	1.69-10	1.60-10	1.45-10	1.28-10	1.08-10	8.88-11	6.98-11	5.12-11
48	1.921 + 6	1.36-10	1.30-10	1.20-10	1.08-10	9.38-11	7.89-11	6.39-11	4.86-11
49	1.827 + 6	1.82-10	1.70-10	1.51-10	1.30-10	1.07-10	8.60-11	6.61-11	4.74-11
50	1.738 + 6	1.37-10	1.30-10	1.19-10	1.05-10	8.96-11	7.41-11	5.88-11	4.37-11
51	1.653 + 6	1.14-10	1.09-10	1.01-10	9.10-11	7.93-11	6.69-11	5.44-11	4.16-11
52	1.572 + 6	1.33-10	1.26-10	1.15-10	1.01-10	8.63-11	7.11-11	5.61-11	4.14-11
53	1.496 + 6	1.25-10	1.19-10	1.09-10	9.65-11	8.25-11	6.81-11	5.38-11	3.97-11
54	1.423 + 6	1.19-10	1.14-10	1.04-10	9.28-11	7.96-11	6.59-11	5.20-11	3.81-11
55	1.353 + 6	9.53-11	9.19-11	8.59-11	7.80-11	6.86-11	5.82-11	4.72-11	3.57-11
56	1.287 + 6	1.04-10	9.91-11	9.16-11	8.18-11	7.07-11	5.88-11	4.66-11	3.42-11
57	1.225 + 6	1.03-10	9.86-11	9.08-11	8.07-11	6.93-11	5.73-11	4.51-11	3.26-11

Table C-9b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	9.04-11	8.66-11	8.02-11	7.18-11	6.23-11	5.20-11	4.15-11	3.05-11
59	1.108+6	6.25-11	6.06-11	5.74-11	5.30-11	4.78-11	4.20-11	3.56-11	2.84-11
60	1.003+6	5.62-11	5.48-11	5.23-11	4.90-11	4.49-11	4.02-11	3.50-11	2.91-11
61	9.616+5	7.30-11	7.07-11	6.67-11	6.13-11	5.49-11	4.78-11	4.02-11	3.20-11
62	9.072+5	8.63-11	8.30-11	7.74-11	7.02-11	6.17-11	5.26-11	4.30-11	3.31-11
63	8.629+5	8.36-11	8.05-11	7.53-11	6.85-11	6.05-11	5.17-11	4.25-11	3.28-11
64	8.209+5	7.81-11	7.54-11	7.08-11	6.48-11	5.76-11	4.96-11	4.13-11	3.24-11
65	7.808+5	8.52-11	8.19-11	7.63-11	6.90-11	6.06-11	5.16-11	4.22-11	3.26-11
66	7.427+5	8.71-11	8.36-11	7.77-11	7.00-11	6.12-11	5.17-11	4.20-11	3.21-11
67	7.065+5	8.62-11	8.27-11	7.68-11	6.91-11	6.03-11	5.09-11	4.11-11	3.12-11
68	6.721+5	8.54-11	8.19-11	7.60-11	6.84-11	5.95-11	5.00-11	4.02-11	3.03-11
69	6.393+5	8.45-11	8.10-11	7.51-11	6.74-11	5.86-11	4.90-11	3.91-11	2.91-11
70	6.081+5	7.98-11	7.66-11	7.13-11	6.41-11	5.58-11	4.68-11	3.73-11	2.77-11
71	5.784+5	6.72-11	6.49-11	6.08-11	5.54-11	4.89-11	4.16-11	3.40-11	2.59-11
72	5.502+5	7.37-11	7.08-11	6.59-11	5.93-11	5.15-11	4.29-11	3.40-11	2.47-11
73	5.234+5	6.71-11	6.46-11	6.03-11	5.45-11	4.75-11	3.98-11	3.15-11	2.28-11
74	4.979+5	4.84-11	4.70-11	4.45-11	4.10-11	3.67-11	3.17-11	2.62-11	2.00-11
75	4.505+5	3.50-11	3.43-11	3.30-11	3.11-11	2.88-11	2.61-11	2.30-11	1.94-11
76	4.076+5	4.29-11	4.18-11	3.98-11	3.71-11	3.39-11	3.01-11	2.59-11	2.12-11
77	3.877+5	4.79-11	4.65-11	4.41-11	4.08-11	3.68-11	3.23-11	2.74-11	2.19-11
78	3.688+5	5.11-11	4.95-11	4.68-11	4.31-11	3.86-11	3.36-11	2.82-11	2.23-11
79	3.337+5	5.25-11	5.08-11	4.79-11	4.40-11	3.94-11	3.41-11	2.84-11	2.23-11
80	3.020+5	5.33-11	5.16-11	4.86-11	4.46-11	3.98-11	3.44-11	2.85-11	2.22-11
81	2.985+5	5.34-11	5.16-11	4.87-11	4.46-11	3.98-11	3.44-11	2.85-11	2.22-11
82	2.972+5	5.30-11	5.13-11	4.84-11	4.44-11	3.96-11	3.42-11	2.84-11	2.21-11
83	2.945+5	5.19-11	5.03-11	4.74-11	4.36-11	3.90-11	3.38-11	2.81-11	2.20-11
84	2.873+5	5.09-11	4.93-11	4.66-11	4.29-11	3.84-11	3.33-11	2.78-11	2.18-11
85	2.732+5	5.15-11	4.99-11	4.70-11	4.32-11	3.86-11	3.34-11	2.77-11	2.15-11
86	2.472+5	4.96-11	4.80-11	4.54-11	4.18-11	3.74-11	3.24-11	2.69-11	2.10-11
87	2.352+5	4.83-11	4.69-11	4.43-11	4.08-11	3.66-11	3.17-11	2.64-11	2.07-11
88	2.237+5	4.49-11	4.36-11	4.14-11	3.83-11	3.46-11	3.03-11	2.56-11	2.03-11
89	2.128+5	4.27-11	4.16-11	3.96-11	3.68-11	3.34-11	2.95-11	2.52-11	2.04-11
90	2.024+5	4.03-11	3.93-11	3.76-11	3.52-11	3.22-11	2.88-11	2.49-11	2.06-11
91	1.926+5	4.11-11	4.01-11	3.83-11	3.59-11	3.29-11	2.95-11	2.56-11	2.13-11
92	1.832+5	4.86-11	4.72-11	4.47-11	4.14-11	3.73-11	3.28-11	2.78-11	2.23-11
93	1.742+5	5.19-11	5.02-11	4.75-11	4.37-11	3.91-11	3.40-11	2.85-11	2.26-11
94	1.657+5	5.73-11	5.53-11	5.19-11	4.73-11	4.19-11	3.60-11	2.96-11	2.28-11
95	1.576+5	5.61-11	5.42-11	5.09-11	4.65-11	4.13-11	3.55-11	2.93-11	2.27-11
96	1.500+5	5.23-11	5.06-11	4.77-11	4.39-11	3.93-11	3.41-11	2.85-11	2.25-11
97	1.426+5	5.12-11	4.96-11	4.69-11	4.32-11	3.87-11	3.37-11	2.83-11	2.25-11
98	1.357+5	5.67-11	5.48-11	5.14-11	4.70-11	4.16-11	3.57-11	2.94-11	2.28-11
99	1.291+5	6.00-11	5.78-11	5.41-11	4.91-11	4.32-11	3.67-11	2.99-11	2.27-11
100	1.228+5	5.66-11	5.47-11	5.13-11	4.67-11	4.14-11	3.54-11	2.90-11	2.22-11
101	1.168+5	5.69-11	5.49-11	5.14-11	4.68-11	4.14-11	3.53-11	2.88-11	2.20-11
102	1.111+5	5.44-11	5.25-11	4.93-11	4.50-11	3.98-11	3.41-11	2.79-11	2.13-11
103	9.804+4	4.84-11	4.69-11	4.43-11	4.07-11	3.64-11	3.16-11	2.63-11	2.06-11
104	8.652+4	4.19-11	4.08-11	3.88-11	3.61-11	3.28-11	2.90-11	2.48-11	2.02-11
105	8.250+4	5.16-11	4.99-11	4.70-11	4.30-11	3.82-11	3.29-11	2.71-11	2.09-11
106	7.950+4	4.83-11	4.68-11	4.42-11	4.07-11	3.64-11	3.16-11	2.64-11	2.07-11
107	7.200+4	5.16-11	4.99-11	4.69-11	4.29-11	3.81-11	3.28-11	2.70-11	2.08-11
108	6.738+4	5.00-11	4.84-11	4.55-11	4.17-11	3.71-11	3.20-11	2.64-11	2.04-11
109	5.656+4	4.74-11	4.59-11	4.33-11	3.98-11	3.56-11	3.08-11	2.56-11	2.00-11
110	5.248+4	4.81-11	4.66-11	4.39-11	4.03-11	3.59-11	3.09-11	2.56-11	1.98-11
111	4.631+4	4.72-11	4.57-11	4.31-11	3.95-11	3.52-11	3.03-11	2.50-11	1.93-11
112	4.087+4	4.33-11	4.20-11	3.97-11	3.66-11	3.28-11	2.84-11	2.37-11	1.85-11
113	3.431+4	4.16-11	4.03-11	3.82-11	3.52-11	3.16-11	2.74-11	2.28-11	1.78-11
114	3.183+4	3.52-11	3.43-11	3.27-11	3.05-11	2.78-11	2.47-11	2.12-11	1.73-11

Table C-9b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	2.82-11	2.77-11	2.68-11	2.55-11	2.39-11	2.21-11	1.99-11	1.74-11
116	2.700+4	4.35-11	4.22-11	4.00-11	3.70-11	3.33-11	2.91-11	2.46-11	1.96-11
117	2.606+4	5.02-11	4.85-11	4.56-11	4.17-11	3.70-11	3.17-11	2.60-11	2.00-11
118	2.479+4	5.08-11	4.91-11	4.61-11	4.21-11	3.73-11	3.19-11	2.61-11	1.99-11
119	2.418+4	5.05-11	4.88-11	4.59-11	4.19-11	3.71-11	3.17-11	2.60-11	1.99-11
120	2.358+4	4.98-11	4.81-11	4.53-11	4.14-11	3.67-11	3.14-11	2.57-11	1.97-11
121	2.188+4	4.88-11	4.72-11	4.44-11	4.06-11	3.60-11	3.09-11	2.53-11	1.94-11
122	1.931+4	4.74-11	4.58-11	4.31-11	3.95-11	3.51-11	3.01-11	2.47-11	1.90-11
123	1.503+4	4.51-11	4.37-11	4.12-11	3.77-11	3.36-11	2.89-11	2.38-11	1.83-11
124	1.171+4	4.24-11	4.11-11	3.88-11	3.57-11	3.18-11	2.75-11	2.27-11	1.75-11
125	9.119+3	3.69-11	3.58-11	3.40-11	3.15-11	2.85-11	2.49-11	2.10-11	1.67-11
126	7.102+3	3.92-11	3.80-11	3.60-11	3.32-11	2.98-11	2.60-11	2.17-11	1.71-11
127	5.531+3	4.00-11	3.88-11	3.67-11	3.38-11	3.03-11	2.62-11	2.18-11	1.69-11
128	4.307+3	3.81-11	3.70-11	3.50-11	3.23-11	2.90-11	2.51-11	2.09-11	1.63-11
129	3.707+3	3.59-11	3.49-11	3.31-11	3.06-11	2.75-11	2.39-11	2.00-11	1.56-11
130	3.355+3	3.29-11	3.20-11	3.04-11	2.82-11	2.55-11	2.24-11	1.89-11	1.50-11
131	3.035+3	2.69-11	2.63-11	2.53-11	2.38-11	2.20-11	1.99-11	1.75-11	1.47-11
132	2.747+3	2.99-11	2.92-11	2.80-11	2.62-11	2.41-11	2.15-11	1.87-11	1.55-11
133	2.613+3	3.34-11	3.25-11	3.10-11	2.88-11	2.62-11	2.32-11	1.98-11	1.60-11
134	2.485+3	3.55-11	3.45-11	3.28-11	3.05-11	2.75-11	2.42-11	2.05-11	1.64-11
135	2.249+3	3.75-11	3.64-11	3.45-11	3.19-11	2.87-11	2.51-11	2.11-11	1.67-11
136	2.035+3	3.84-11	3.73-11	3.53-11	3.26-11	2.93-11	2.55-11	2.13-11	1.67-11
137	1.585+3	3.83-11	3.71-11	3.52-11	3.25-11	2.91-11	2.53-11	2.12-11	1.66-11
138	1.234+3	3.72-11	3.62-11	3.43-11	3.17-11	2.86-11	2.50-11	2.10-11	1.67-11
139	9.611+2	3.73-11	3.62-11	3.43-11	3.17-11	2.84-11	2.47-11	2.06-11	1.62-11
140	7.485+2	3.67-11	3.57-11	3.38-11	3.12-11	2.80-11	2.44-11	2.04-11	1.60-11
141	5.829+2	3.62-11	3.52-11	3.33-11	3.08-11	2.77-11	2.41-11	2.01-11	1.58-11
142	4.540+2	3.55-11	3.44-11	3.26-11	3.02-11	2.71-11	2.37-11	1.98-11	1.56-11
143	3.536+2	3.34-11	3.25-11	3.09-11	2.86-11	2.59-11	2.27-11	1.92-11	1.53-11
144	2.754+2	3.53-11	3.43-11	3.25-11	3.01-11	2.71-11	2.36-11	1.98-11	1.56-11
145	2.144+2	3.51-11	3.41-11	3.24-11	2.99-11	2.69-11	2.35-11	1.97-11	1.55-11
146	1.670+2	3.49-11	3.39-11	3.21-11	2.97-11	2.68-11	2.33-11	1.96-11	1.54-11
147	1.301+2	3.47-11	3.37-11	3.19-11	2.95-11	2.66-11	2.32-11	1.94-11	1.53-11
148	1.013+2	3.45-11	3.35-11	3.17-11	2.94-11	2.64-11	2.31-11	1.93-11	1.53-11
149	7.889+1	3.42-11	3.33-11	3.16-11	2.92-11	2.63-11	2.29-11	1.92-11	1.52-11
150	6.144+1	3.40-11	3.31-11	3.14-11	2.90-11	2.61-11	2.28-11	1.91-11	1.51-11
151	4.785+1	3.39-11	3.29-11	3.12-11	2.89-11	2.60-11	2.27-11	1.90-11	1.50-11
152	3.727+1	3.36-11	3.27-11	3.10-11	2.87-11	2.58-11	2.26-11	1.89-11	1.49-11
153	2.920+1	3.35-11	3.25-11	3.08-11	2.85-11	2.57-11	2.25-11	1.88-11	1.49-11
154	2.260+1	3.33-11	3.23-11	3.07-11	2.84-11	2 56-11	2.23-11	1.87-11	1.48-11
155	1.760+1	3.31-11	3.21-11	3.05-11	2.82-11	2.55-11	2.22-11	1.87-11	1.47-11
156	1.371+1	3.29-11	3.20-11	3.03-11	2.81-11	2.53-11	2.21-11	1.86-11	1.47-11
157	1.068+1	3.27-11	3.18-11	3.02-11	2.80-11	2.52-11	2.20-11	1.85-11	1.46-11
158	8.315+0	3.25-11	3.16-11	3.00-11	2.78-11	2.51-11	2.19-11	1.84-11	1.45-11
159	6.476+0	3.24-11	3.15-11	2.99-11	2.77-11	2.50-11	2.18-11	1.83-11	1.45-11
160	5.043+0	3.22-11	3.13-11	2.97-11	2.75-11	2.48-11	2.17-11	1.82-11	1.44-11
161	3.928+0	3.20-11	3.11-11	2.96-11	2.74-11	2.47-11	2.16-11	1.82-11	1.44-11
162	3.059+0	3.19-11	3.10-11	2.94-11	2.73-11	2.46-11	2.15-11	1.81-11	1.43-11
163	2.372+0	3.17-11	3.08-11	2.93-11	2.71-11	2.45-11	2.14-11	1.80-11	1.42-11
164	1.855+0	3.15-11	3.06-11	2.91-11	2.70-11	2.44-11	2.13-11	1.79-11	1.42-11
165	1.445+0	3.13-11	3.05-11	2.89-11	2.69-11	2.43-11	2.12-11	1.79-11	1.41-11
166	1.125+0	3.11-11	3.03-11	2.88-11	2.67-11	2.41-11	2.11-11	1.78-11	1.41-11
167	8.764-1	3.09-11	3.01-11	2.86-11	2.65-11	2.40-11	2.10-11	1.77-11	1.40-11
168	6.826-1	3.07-11	2.98-11	2.84-11	2.64-11	2.39-11	2.09-11	1.76-11	1.39-11
169	5.316-1	3.05-11	2.96-11	2.82-11	2.62-11	2.37-11	2.08-11	1.75-11	1.38-11
170	4.140-1	2.84-11	2.77-11	2.64-11	2.46-11	2.24-11	1.98-11	1.68-11	1.35-11
171	1.000-1	2.36-11	2.31-11	2.22-11	2.10-11	1.94-11	1.74-11	1.52-11	1.26-11
	1.000-5								

Table C-9c. Gamma-ray Dose Rate Transmission Factors for 1.50-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	2.12-09	1.52-09	8.01-10	2.94-10	7.28-11	4.52-12	1.29-11	1.21-11
2	1.200+7	1.66-09	1.18-09	6.22-10	2.29-10	5.75-11	3.47-12	1.05-11	9.75-12
3	1.000+7	1.18-09	8.40-10	4.37-10	1.60-10	4.02-11	2.24-12	7.57-12	7.00-12
4	8.000+6	8.64-10	6.08-10	3.12-10	1.12-10	2.77-11	1.44-12	5.25-12	4.81-12
5	7.500+6	7.24-10	5.07-10	2.58-10	9.21-11	2.28-11	1.15-12	4.36-12	3.97-12
6	7.000+6	5.84-10	4.07-10	2.05-10	7.29-11	1.80-11	8.86-13	3.49-12	3.17-12
7	6.500+6	4.52-10	3.13-10	1.56-10	5.51-11	1.37-11	6.55-13	2.68-12	2.43-12
8	6.000+6	3.32-10	2.28-10	1.13-10	3.96-11	9.87-12	4.62-13	1.96-12	1.78-12
9	5.500+6	2.29-10	1.56-10	7.64-11	2.67-11	6.72-12	3.08-13	1.36-12	1.23-12
10	5.000+6	1.49-10	1.01-10	4.88-11	1.70-11	4.31-12	1.92-13	8.87-13	8.04-13
11	4.500+6	8.97-11	5.99-11	2.86-11	9.88-12	2.53-12	1.10-13	5.29-13	4.79-13
12	4.000+6	4.77-11	3.15-11	1.47-11	5.08-12	1.32-12	5.73-14	2.79-13	2.53-13
13	3.500+6	2.13-11	1.38-11	6.38-12	2.20-12	5.81-13	2.63-14	1.25-13	1.14-13
14	3.000+6	7.51-12	4.80-12	2.18-12	7.61-13	2.06-13	1.00-14	4.44-14	4.08-14
15	2.500+6	1.83-12	1.15-12	5.20-13	1.86-13	5.22-14	2.72-15	1.14-14	1.06-14
16	2.000+6	3.27-13	2.00-13	8.82-14	3.14-14	8.88-15	4.95-16	1.92-15	1.79-15
17	1.660+6	8.04-14	4.78-14	2.03-14	7.08-15	2.02-15	1.65-16	3.75-16	3.64-16
18	1.500+6	2.87-14	1.70-14	7.26-15	2.62-15	7.92-16	9.56-17	1.19-16	1.26-16
19	1.330+6	5.31-15	3.31-15	1.57-15	6.41-16	2.13-16	3.14-17	2.95-17	3.40-17
20	1.000+6	2.70-16	1.62-16	7.45-17	2.98-17	9.82-18	1.44-18	1.35-18	1.55-18
21	8.000+5	2.45-17	1.40-17	6.04-18	2.32-18	7.46-19	1.09-19	9.80-20	1.12-19
22	7.000+5	4.33-18	2.48-18	1.10-18	4.39-19	1.47-19	2.49-20	1.63-20	2.03-20
23	6.000+5	5.58-19	3.20-19	1.45-19	5.87-20	2.02-20	3.82-21	1.85-21	2.55-21
24	5.120+5	1.22-19	6.55-20	2.76-20	1.09-20	3.89-21	9.65-22	9.74-23	3.07-22
25	5.100+5	6.19-20	3.48-20	1.55-20	6.38-21	2.28-21	5.24-22	1.08-22	2.14-22
26	4.500+5	1.01-20	5.81-21	2.74-21	1.22-21	4.97-22	1.67-22	3.20-23	8.58-24
27	4.000+5	1.38-21	9.28-22	5.24-22	2.69-22	1.27-22	5.25-23	1.72-23	3.14-24
28	3.000+5	3.05-24	2.31-24	1.53-24	9.43-25	5.58-25	3.20-25	1.77-25	9.46-26
29	2.000+5	2.67-28	1.90-28	1.18-28	6.90-29	3.93-29	2.18-29	1.17-29	6.02-30
30	1.500+5	7.83-34	5.86-34	3.93-34	2.54-34	1.65-34	1.07-34	7.08-35	4.68-35
31	1.000+5	1.48-49	8.78-50	4.83-50	2.75-50	1.63-50	9.98-51	6.27-51	4.01-51
32	7.500+4	9.13-77	3.29-77	2.58-77	1.53-77	8.09-78	0.0	0.0	0.0
33	6.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

Table C-10a. Neutron Dose Rate Transmission Factors for 2.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	5.83-11	4.90-11	3.65-11	2.47-11	1.55-11	9.27-12	5.37-12	3.08-12
2	1.649+7	4.93-11	4.15-11	3.10-11	2.11-11	1.34-11	8.14-12	4.83-12	2.85-12
3	1.568+7	4.13-11	3.51-11	2.67-11	1.86-11	1.21-11	7.45-12	4.47-12	2.64-12
4	1.492+7	3.96-11	3.37-11	2.56-11	1.78-11	1.16-11	7.20-12	4.37-12	2.61-12
5	1.455+7	3.84-11	3.26-11	2.47-11	1.72-11	1.12-11	6.96-12	4.25-12	2.57-12
6	1.419+7	3.75-11	3.18-11	2.41-11	1.67-11	1.09-11	6.81-12	4.17-12	2.53-12
7	1.384+7	3.65-11	3.10-11	2.35-11	1.64-11	1.07-11	6.67-12	4.08-12	2.47-12
8	1.350+7	3.68-11	3.12-11	2.35-11	1.62-11	1.05-11	6.48-12	3.91-12	2.34-12
9	1.284+7	3.24-11	2.73-11	2.06-11	1.42-11	9.20-12	5.72-12	3.49-12	2.13-12
10	1.221+7	2.13-11	1.84-11	1.44-11	1.05-11	7.25-12	4.90-12	3.29-12	2.19-12
11	1.162+7	2.04-11	1.76-11	1.38-11	1.01-11	7.05-12	4.80-12	3.26-12	2.20-12
12	1.105+7	3.27-11	2.72-11	2.00-11	1.34-11	8.54-12	5.28-12	3.28-12	2.08-12
13	1.051+7	2.62-11	2.21-11	1.66-11	1.15-11	7.57-12	4.86-12	3.13-12	2.03-12
14	1.000+7	3.03-11	2.53-11	1.87-11	1.27-11	8.10-12	5.04-12	3.14-12	1.99-12
15	9.512+6	3.12-11	2.58-11	1.88-11	1.26-11	7.97-12	4.92-12	3.05-12	1.93-12
16	9.048+6	2.25-11	1.90-11	1.44-11	1.02-11	6.86-12	4.54-12	3.01-12	2.00-12
17	8.607+6	2.15-11	1.82-11	1.38-11	9.72-12	6.53-12	4.32-12	2.88-12	1.94-12
18	8.187+6	2.47-11	2.07-11	1.54-11	1.06-11	7.04-12	4.61-12	3.08-12	2.11-12
19	7.788+6	1.93-11	1.65-11	1.28-11	9.30-12	6.56-12	4.64-12	3.35-12	2.45-12
20	7.408+6	1.79-11	1.56-11	1.24-11	9.25-12	6.69-12	4.80-12	3.46-12	2.49-12
21	7.047+6	3.12-11	2.60-11	1.92-11	1.30-11	8.31-12	5.17-12	3.20-12	2.00-12
22	6.703+6	3.72-11	3.08-11	2.25-11	1.49-11	9.20-12	5.43-12	3.15-12	1.84-12
23	6.592+6	4.48-11	3.58-11	2.47-11	1.53-11	8.87-12	4.91-12	2.68-12	1.51-12
24	6.376+6	2.69-11	2.22-11	1.61-11	1.07-11	6.67-12	4.03-12	2.43-12	1.48-12
25	6.065+6	1.40-11	1.20-11	9.24-12	6.61-12	4.50-12	2.98-12	1.95-12	1.27-12
26	5.770+6	1.15-11	1.00-11	7.99-12	5.94-12	4.19-12	2.85-12	1.89-12	1.22-12
27	5.488+6	1.81-11	1.48-11	1.06-11	6.91-12	4.22-12	2.48-12	1.43-12	8.23-13
28	5.221+6	4.66-12	4.13-12	3.38-12	2.60-12	1.92-12	1.38-12	9.79-13	6.73-13
29	4.966+6	6.20-12	5.37-12	4.23-12	3.10-12	2.16-12	1.46-12	9.69-13	6.23-13
30	4.724+6	4.79-12	4.16-12	3.30-12	2.44-12	1.72-12	1.18-12	7.94-13	5.19-13
31	4.493+6	2.72-12	2.44-12	2.04-12	1.62-12	1.23-12	9.01-13	6.44-13	4.37-13
32	4.066+6	1.64-12	1.52-12	1.33-12	1.12-12	9.05-13	7.14-13	5.47-13	3.97-13
33	3.679+6	1.30-12	1.23-12	1.11-12	9.62-13	8.16-13	6.77-13	5.48-13	4.24-13
34	3.329+6	1.51-12	1.41-12	1.25-12	1.06-12	8.77-13	7.10-13	5.65-13	4.33-13
35	3.166+6	2.38-12	2.14-12	1.79-12	1.43-12	1.10-12	8.24-13	6.11-13	4.39-13
36	3.012+6	3.01-12	2.60-12	2.06-12	1.54-12	1.12-12	8.06-13	5.84-13	4.20-13
37	2.865+6	2.39-12	2.10-12	1.71-12	1.32-12	9.94-13	7.49-13	5.67-13	4.26-13
38	2.725+6	2.03-12	1.82-12	1.53-12	1.23-12	9.67-13	7.52-13	5.78-13	4.35-13
39	2.592+6	1.98-12	1.82-12	1.59-12	1.33-12	1.06-12	8.25-13	6.15-13	4.35-13
40	2.466+6	5.27-12	4.35-12	3.20-12	2.17-12	1.39-12	8.49-13	4.90-13	2.63-13
41	2.385+6	1.37-11	1.00-11	6.05-12	3.18-12	1.48-12	5.75-13	1.52-13	4.06-15
42	2.365+6	2.33-11	1.47-11	6.80-12	2.64-12	9.22-13	2.35-13	1.17-14	6.25-14
43	2.346+6	3.60-12	2.34-12	1.17-12	5.11-13	2.02-13	6.31-14	7.79-15	7.47-15
44	2.307+6	1.35-13	9.46-14	5.49-14	2.90-14	1.44-14	6.79-15	2.98-15	1.24-15
45	2.231+6	1.84-14	1.36-14	8.52-15	4.93-15	2.75-15	1.50-15	8.05-16	4.37-16
46	2.123+6	4.98-15	3.78-15	2.47-15	1.50-15	8.87-16	5.19-16	3.07-16	1.85-16
47	2.019+6	1.17-15	9.76-16	7.36-16	5.25-16	3.67-16	2.55-16	1.77-16	1.23-16
48	1.921+6	5.66-16	5.14-16	4.38-16	3.53-16	2.73-16	2.03-16	1.44-16	9.62-17
49	1.827+6	2.19-15	1.49-15	8.44-16	4.44-16	2.28-16	1.15-16	5.69-17	2.84-17
50	1.738+6	2.07-16	1.58-16	1.06-16	6.62-17	4.09-17	2.55-17	1.64-17	1.08-17
51	1.653+6	6.73-17	5.78-17	4.54-17	3.37-17	2.43-17	1.72-17	1.20-17	8.29-18
52	1.572+6	1.26-16	9.52-17	6.21-17	3.79-17	2.27-17	1.36-17	8.20-18	5.00-18
53	1.496+6	5.82-17	4.47-17	2.99-17	1.87-17	1.14-17	6.99-18	4.32-18	2.70-18
54	1.423+6	2.52-17	2.02-17	1.43-17	9.46-18	6.11-18	3.94-18	2.57-18	1.68-18
55	1.353+6	6.46-18	5.95-18	5.17-18	4.29-18	3.42-18	2.64-18	1.97-18	1.40-18
56	1.287+6	9.63-18	8.13-18	6.22-18	4.48-18	3.13-18	2.15-18	1.46-18	9.63-19
57	1.225+6	9.03-18	7.30-18	5.25-18	3.55-18	2.33-18	1.52-18	9.85-19	6.25-19

Table C-10a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	4.55-18	3.76-18	2.78-18	1.94-18	1.32-18	8.96-19	6.11-19	4.09-19
59	1.108+6	1.18-18	1.09-18	9.57-19	8.09-19	6.68-19	5.45-19	4.40-19	3.46-19
60	1.003+6	8.97-19	8.56-19	7.89-19	7.07-19	6.18-19	5.30-19	4.46-19	3.64-19
61	9.616+5	1.47-18	1.36-18	1.19-18	1.00-18	8.20-19	6.60-19	5.23-19	4.03-19
62	9.072+5	2.35-18	2.03-18	1.60-18	1.21-18	8.96-19	6.64-19	4.93-19	3.63-19
63	8.629+5	1.74-18	1.53-18	1.26-18	9.83-19	7.55-19	5.75-19	4.37-19	3.27-19
64	8.209+5	1.28-18	1.15-18	9.76-19	7.95-19	6.33-19	4.98-19	3.88-19	2.95-19
65	7.808+5	1.77-18	1.49-18	1.14-18	8.40-19	6.12-19	4.47-19	3.29-19	2.40-19
66	7.427+5	1.70-18	1.40-18	1.03-18	7.33-19	5.16-19	3.66-19	2.62-19	1.86-19
67	7.065+5	1.33-18	1.09-18	8.10-19	5.74-19	4.03-19	2.84-19	2.01-19	1.41-19
68	6.721+5	1.03-18	8.48-19	6.30-19	4.47-19	3.12-19	2.18-19	1.52-19	1.05-19
69	6.393+5	7.70-19	6.35-19	4.73-19	3.35-19	2.33-19	1.62-19	1.12-19	7.64-20
70	6.081+5	4.57-19	3.92-19	3.07-19	2.29-19	1.66-19	1.19-19	8.47-20	5.85-20
71	5.784+5	2.17-19	1.99-19	1.71-19	1.41-19	1.13-19	8.77-20	6.64-20	4.83-20
72	5.502+5	2.60-19	2.29-19	1.86-19	1.43-19	1.07-19	7.79-20	5.54-20	3.76-20
73	5.234+5	1.67-19	1.51-19	1.28-19	1.03-19	7.99-20	6.02-20	4.39-20	3.01-20
74	4.979+5	7.49-20	7.13-20	6.54-20	5.80-20	4.98-20	4.13-20	3.30-20	2.47-20
75	4.505+5	4.60-20	4.46-20	4.23-20	3.93-20	3.58-20	3.19-20	2.78-20	2.34-20
76	4.076+5	6.31-20	6.00-20	5.50-20	4.90-20	4.27-20	3.65-20	3.06-20	2.49-20
77	3.877+5	7.70-20	7.19-20	6.42-20	5.54-20	4.67-20	3.87-20	3.15-20	2.50-20
78	3.688+5	8.43-20	7.79-20	6.83-20	5.78-20	4.78-20	3.89-20	3.11-20	2.41-20
79	3.337+5	8.30-20	7.63-20	6.65-20	5.57-20	4.56-20	3.67-20	2.90-20	2.22-20
80	3.020+5	8.20-20	7.50-20	6.49-20	5.40-20	4.38-20	3.50-20	2.75-20	2.09-20
81	2.985+5	8.16-20	7.46-20	6.45-20	5.36-20	4.36-20	3.48-20	2.73-20	2.07-20
82	2.972+5	7.96-20	7.30-20	6.33-20	5.28-20	4.30-20	3.45-20	2.71-20	2.06-20
83	2.945+5	7.42-20	6.85-20	5.99-20	5.05-20	4.15-20	3.35-20	2.66-20	2.03-20
84	2.873+5	6.84-20	6.35-20	5.61-20	4.77-20	3.96-20	3.22-20	2.57-20	1.97-20
85	2.732+5	6.65-20	6.16-20	5.42-20	4.59-20	3.78-20	3.05-20	2.41-20	1.82-20
86	2.472+5	5.75-20	5.36-20	4.77-20	4.10-20	3.42-20	2.78-20	2.21-20	1.67-20
87	2.352+5	5.30-20	4.96-20	4.44-20	3.83-20	3.21-20	2.63-20	2.09-20	1.59-20
88	2.237+5	4.49-20	4.24-20	3.85-20	3.39-20	2.90-20	2.42-20	1.97-20	1.54-20
89	2.128+5	4.04-20	3.84-20	3.52-20	3.12-20	2.71-20	2.30-20	1.90-20	1.52-20
90	2.024+5	3.59-20	3.44-20	3.19-20	2.88-20	2.54-20	2.20-20	1.87-20	1.54-20
91	1.926+5	3.65-20	3.49-20	3.24-20	2.92-20	2.59-20	2.25-20	1.92-20	1.60-20
92	1.832+5	4.84-20	4.53-20	4.07-20	3.53-20	2.99-20	2.50-20	2.04-20	1.62-20
93	1.742+5	5.46-20	5.06-20	4.45-20	3.78-20	3.13-20	2.54-20	2.03-20	1.58-20
94	1.657+5	6.95-20	6.23-20	5.23-20	4.20-20	3.30-20	2.56-20	1.97-20	1.47-20
95	1.576+5	6.30-20	5.66-20	4.77-20	3.86-20	3.06-20	2.39-20	1.86-20	1.41-20
96	1.500+5	4.94-20	4.55-20	3.97-20	3.33-20	2.73-20	2.21-20	1.77-20	1.37-20
97	1.426+5	4.55-20	4.21-20	3.71-20	3.15-20	2.62-20	2.14-20	1.72-20	1.34-20
98	1.357+5	5.77-20	5.19-20	4.38-20	3.55-20	2.81-20	2.19-20	1.69-20	1.27-20
99	1.291+5	6.62-20	5.80-20	4.72-20	3.67-20	2.80-20	2.12-20	1.59-20	1.16-20
100	1.228+5	5.17-20	4.65-20	3.91-20	3.15-20	2.48-20	1.93-20	1.48-20	1.10-20
101	1.168+5	5.00-20	4.48-20	3.76-20	3.02-20	2.37-20	1.83-20	1.39-20	1.02-20
102	1.111+5	4.12-20	3.74-20	3.20-20	2.62-20	2.08-20	1.63-20	1.25-20	9.22-21
103	9.804+4	2.87-20	2.67-20	2.36-20	2.01-20	1.67-20	1.35-20	1.08-20	8.21-21
104	8.652+4	2.07-20	1.97-20	1.81-20	1.61-20	1.40-20	1.19-20	9.92-21	8.01-21
105	8.250+4	3.12-20	2.86-20	2.48-20	2.06-20	1.67-20	1.33-20	1.03-20	7.76-21
106	7.950+4	2.58-20	2.40-20	2.13-20	1.82-20	1.51-20	1.23-20	9.80-21	7.55-21
107	7.200+4	2.86-20	2.62-20	2.27-20	1.89-20	1.53-20	1.22-20	9.48-21	7.10-21
108	6.738+4	2.50-20	2.31-20	2.02-20	1.70-20	1.38-20	1.11-20	8.66-21	6.51-21
109	5.656+4	2.05-20	1.91-20	1.69-20	1.45-20	1.20-20	9.76-21	7.74-21	5.90-21
110	5.248+4	2.02-20	1.88-20	1.66-20	1.41-20	1.16-20	9.35-21	7.35-21	5.54-21
111	4.631+4	1.83-20	1.70-20	1.50-20	1.28-20	1.06-20	8.52-21	6.69-21	5.01-21
112	4.087+4	1.44-20	1.35-20	1.22-20	1.07-20	9.02-21	7.43-21	5.94-21	4.53-21
113	3.431+4	1.29-20	1.21-20	1.10-20	9.64-21	8.19-21	6.77-21	5.42-21	4.13-21
114	3.183+4	9.65-21	9.26-21	8.61-21	7.80-21	6.89-21	5.94-21	4.99-21	4.02-21

Table C-10a. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	7.12-21	6.95-21	6.66-21	6.27-21	5.82-21	5.32-21	4.79-21	4.21-21
116	2.700+4	1.35-20	1.27-20	1.15-20	1.00-20	8.53-21	7.10-21	5.79-21	4.56-21
117	2.606+4	1.79-20	1.65-20	1.43-20	1.19-20	9.62-21	7.61-21	5.89-21	4.39-21
118	2.479+4	1.81-20	1.66-20	1.43-20	1.19-20	9.52-21	7.49-21	5.76-21	4.27-21
119	2.418+4	1.76-20	1.61-20	1.40-20	1.16-20	9.31-21	7.33-21	5.65-21	4.19-21
120	2.358+4	1.67-20	1.53-20	1.33-20	1.10-20	8.92-21	7.05-21	5.44-21	4.04-21
121	2.188+4	1.52-20	1.40-20	1.22-20	1.02-20	8.30-21	6.59-21	5.11-21	3.80-21
122	1.931+4	1.33-20	1.23-20	1.08-20	9.06-21	7.41-21	5.91-21	4.60-21	3.44-21
123	1.503+4	1.08-20	1.00-20	8.88-21	7.56-21	6.24-21	5.02-21	3.94-21	2.95-21
124	1.171+4	8.63-21	8.09-21	7.25-21	6.25-21	5.23-21	4.26-21	3.37-21	2.54-21
125	9.119+3	6.22-21	5.92-21	5.43-21	4.83-21	4.18-21	3.52-21	2.88-21	2.25-21
126	7.102+3	6.52-21	6.16-21	5.59-21	4.90-21	4.17-21	3.46-21	2.79-21	2.15-21
127	5.531+3	6.32-21	5.95-21	5.37-21	4.67-21	3.95-21	3.25-21	2.59-21	1.97-21
128	4.307+3	5.38-21	5.09-21	4.63-21	4.07-21	3.46-21	2.87-21	2.30-21	1.75-21
129	3.707+3	4.66-21	4.44-21	4.07-21	3.61-21	3.11-21	2.60-21	2.10-21	1.61-21
130	3.355+3	3.98-21	3.81-21	3.53-21	3.18-21	2.78-21	2.36-21	1.94-21	1.51-21
131	3.035+3	2.98-21	2.89-21	2.74-21	2.55-21	2.31-21	2.06-21	1.78-21	1.49-21
132	2.747+3	3.41-21	3.30-21	3.10-21	2.85-21	2.55-21	2.23-21	1.91-21	1.57-21
133	2.613+3	3.97-21	3.81-21	3.53-21	3.19-21	2.80-21	2.40-21	2.00-21	1.60-21
134	2.485+3	4.33-21	4.12-21	3.79-21	3.38-21	2.94-21	2.48-21	2.04-21	1.60-21
135	2.249+3	4.63-21	4.39-21	4.00-21	3.53-21	3.02-21	2.52-21	2.05-21	1.59-21
136	2.035+3	4.65-21	4.40-21	3.99-21	3.49-21	2.97-21	2.46-21	1.98-21	1.52-21
137	1.585+3	4.30-21	4.06-21	3.68-21	3.22-21	2.74-21	2.26-21	1.82-21	1.39-21
138	1.234+3	3.76-21	3.56-21	3.24-21	2.85-21	2.44-21	2.03-21	1.64-21	1.26-21
139	9.611+2	3.69-21	3.48-21	3.16-21	2.77-21	2.36-21	1.96-21	1.57-21	1.21-21
140	7.485+2	3.36-21	3.18-21	2.89-21	2.54-21	2.16-21	1.80-21	1.45-21	1.11-21
141	5.829+2	3.06-21	2.90-21	2.64-21	2.32-21	1.98-21	1.65-21	1.33-21	1.02-21
142	4.540+2	2.76-21	2.62-21	2.39-21	2.11-21	1.81-21	1.50-21	1.22-21	9.37-22
143	3.536+2	2.35-21	2.24-21	2.06-21	1.84-21	1.60-21	1.35-21	1.10-21	8.66-22
144	2.754+2	2.46-21	2.33-21	2.13-21	1.87-21	1.60-21	1.33-21	1.08-21	8.33-22
145	2.144+2	2.29-21	2.17-21	1.98-21	1.74-21	1.49-21	1.24-21	1.00-21	7.74-22
146	1.670+2	2.12-21	2.01-21	1.83-21	1.62-21	1.38-21	1.15-21	9.31-22	7.19-22
147	1.301+2	1.97-21	1.87-21	1.70-21	1.50-21	1.28-21	1.07-21	8.65-22	6.68-22
148	1.013+2	1.83-21	1.73-21	1.58-21	1.39-21	1.19-21	9.93-22	8.03-22	6.20-22
149	7.889+1	1.70-21	1.61-21	1.47-21	1.29-21	1.11-21	9.23-22	7.46-22	5.76-22
150	6.144+1	1.58-21	1.50-21	1.36-21	1.20-21	1.03-21	8.57-22	6.93-22	5.35-22
151	4.785+1	1.47-21	1.39-21	1.27-21	1.12-21	9.57-22	7.97-22	6.44-22	4.97-22
152	3.727+1	1.36-21	1.29-21	1.18-21	1.04-21	8.88-22	7.40-22	5.98-22	4.62-22
153	2.920+1	1.27-21	1.20-21	1.10-21	9.66-22	8.27-22	6.88-22	5.56-22	4.30-22
154	2.260+1	1.18-21	1.12-21	1.02-21	8.96-22	7.67-22	6.39-22	5.16-22	3.99-22
155	1.760+1	1.09-21	1.04-21	9.46-22	8.33-22	7.13-22	5.94-22	4.80-22	3.70-22
156	1.371+1	1.02-21	9.64-22	8.79-22	7.74-22	6.63-22	5.52-22	4.46-22	3.44-22
157	1.068+1	9.46-22	8.96-22	8.17-22	7.20-22	6.16-22	5.13-22	4.14-22	3.20-22
158	8.315+0	8.79-22	8.33-22	7.59-22	6.69-22	5.72-22	4.77-22	3.85-22	2.97-22
159	6.476+0	8.17-22	7.75-22	7.06-22	6.22-22	5.32-22	4.43-22	3.58-22	2.76-22
160	5.043+0	7.60-22	7.20-22	6.57-22	5.78-22	4.95-22	4.12-22	3.33-22	2.56-22
161	3.928+0	7.07-22	6.70-22	6.10-22	5.38-22	4.60-22	3.83-22	3.09-22	2.38-22
162	3.059+0	6.58-22	6.23-22	5.68-22	5.00-22	4.28-22	3.56-22	2.87-22	2.21-22
163	2.372+0	6.12-22	5.79-22	5.28-22	4.65-22	3.98-22	3.31-22	2.67-22	2.06-22
164	1.855+0	5.70-22	5.40-22	4.92-22	4.33-22	3.70-22	3.08-22	2.48-22	1.91-22
165	1.445+0	5.30-22	5.02-22	4.58-22	4.03-22	3.44-22	2.86-22	2.31-22	1.78-22
166	1.125+0	4.93-22	4.67-22	4.26-22	3.75-22	3.20-22	2.66-22	2.14-22	1.65-22
167	8.764-1	4.58-22	4.34-22	3.96-22	3.48-22	2.98-22	2.47-22	1.99-22	1.53-22
168	6.826-1	4.25-22	4.02-22	3.67-22	3.23-22	2.76-22	2.29-22	1.84-22	1.41-22
169	5.316-1	3.92-22	3.72-22	3.39-22	2.98-22	2.54-22	2.11-22	1.69-22	1.29-22
170	4.140-1	3.22-22	3.07-22	2.82-22	2.51-22	2.17-22	1.82-22	1.48-22	1.15-22
171	1.000-1 1.00-5	1.36-22	1.31-22	1.23-22	1.12-22	9.95-23	8.60-23	7.19-23	5.73-23

Table C-10b. Total Dose Rate Transmission Factors for 2.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.733+7	8.72-11	7.48-11	5.78-11	4.11-11	2.76-11	1.78-11	1.12-11	6.91-12
2	1.649+7	7.58-11	6.51-11	5.06-11	3.63-11	2.46-11	1.62-11	1.04-11	6.54-12
3	1.568+7	6.55-11	5.69-11	4.49-11	3.28-11	2.27-11	1.51-11	9.83-12	6.19-12
4	1.492+7	6.31-11	5.48-11	4.33-11	3.17-11	2.20-11	1.47-11	9.65-12	6.13-12
5	1.455+7	6.14-11	5.32-11	4.19-11	3.07-11	2.13-11	1.43-11	9.42-12	6.04-12
6	1.419+7	6.00-11	5.20-11	4.10-11	3.00-11	2.09-11	1.40-11	9.28-12	5.97-12
7	1.384+7	5.86-11	5.09-11	4.02-11	2.94-11	2.05-11	1.38-11	9.14-12	5.88-12
8	1.350+7	5.90-11	5.11-11	4.01-11	2.93-11	2.03-11	1.36-11	8.91-12	5.70-12
9	1.284+7	5.33-11	4.62-11	3.63-11	2.66-11	1.85-11	1.25-11	8.29-12	5.37-12
10	1.221+7	3.80-11	3.36-11	2.73-11	2.09-11	1.53-11	1.10-11	7.74-12	5.29-12
11	1.162+7	3.64-11	3.22-11	2.63-11	2.02-11	1.49-11	1.07-11	7.65-12	5.30-12
12	1.105+7	5.29-11	4.52-11	3.49-11	2.50-11	1.72-11	1.16-11	7.75-12	5.15-12
13	1.051+7	4.40-11	3.80-11	2.99-11	2.20-11	1.55-11	1.08-11	7.39-12	4.99-12
14	1.000+7	4.97-11	4.26-11	3.31-11	2.39-11	1.65-11	1.12-11	7.54-12	5.00-12
15	9.512+6	5.12-11	4.36-11	3.35-11	2.40-11	1.64-11	1.11-11	7.42-12	4.90-12
16	9.048+6	3.94-11	3.43-11	2.73-11	2.04-11	1.47-11	1.04-11	7.25-12	4.95-12
17	8.607+6	3.80-11	3.31-11	2.63-11	1.97-11	1.42-11	1.00-11	7.05-12	4.87-12
18	8.187+6	4.24-11	3.66-11	2.87-11	2.12-11	1.50-11	1.06-11	7.42-12	5.15-12
19	7.788+6	3.53-11	3.10-11	2.51-11	1.93-11	1.44-11	1.06-11	7.83-12	5.67-12
20	7.408+6	3.30-11	2.94-11	2.43-11	1.91-11	1.45-11	1.09-11	8.10-12	5.88-12
21	7.047+6	5.13-11	4.40-11	3.42-11	2.48-11	1.73-11	1.18-11	7.95-12	5.29-12
22	6.703+6	5.96-11	5.08-11	3.90-11	2.77-11	1.88-11	1.24-11	8.07-12	5.19-12
23	6.592+6	7.02-11	5.81-11	4.28-11	2.90-11	1.88-11	1.19-11	7.53-12	4.73-12
24	6.376+6	4.83-11	4.13-11	3.20-11	2.32-11	1.61-11	1.09-11	7.34-12	4.83-12
25	6.065+6	3.06-11	2.72-11	2.22-11	1.72-11	1.28-11	9.23-12	6.55-12	4.46-12
26	5.770+6	2.71-11	2.44-11	2.05-11	1.63-11	1.24-11	9.17-12	6.58-12	4.48-12
27	5.488+6	3.78-11	3.25-11	2.53-11	1.85-11	1.29-11	8.84-12	5.93-12	3.83-12
28	5.221+6	1.56-11	1.43-11	1.23-11	1.02-11	8.11-12	6.28-12	4.73-12	3.38-12
29	4.966+6	1.95-11	1.77-11	1.49-11	1.19-11	9.16-12	6.83-12	4.94-12	3.38-12
30	4.724+6	1.71-11	1.56-11	1.32-11	1.07-11	8.27-12	6.22-12	4.53-12	3.11-12
31	4.493+6	1.24-11	1.15-11	1.01-11	8.47-12	6.85-12	5.36-12	4.02-12	2.82-12
32	4.066+6	9.17-12	8.65-12	7.83-12	6.82-12	5.75-12	4.69-12	3.68-12	2.69-12
33	3.679+6	7.70-12	7.35-12	6.77-12	6.04-12	5.24-12	4.42-12	3.61-12	2.78-12
34	3.329+6	8.39-12	7.96-12	7.25-12	6.39-12	5.47-12	4.57-12	3.70-12	2.84-12
35	3.166+6	1.18-11	1.09-11	9.62-12	8.12-12	6.64-12	5.27-12	4.06-12	2.96-12
36	3.012+6	1.37-11	1.25-11	1.07-11	8.79-12	6.97-12	5.40-12	4.08-12	2.94-12
37	2.865+6	1.22-11	1.12-11	9.74-12	8.11-12	6.55-12	5.17-12	3.98-12	2.92-12
38	2.725+6	1.12-11	1.04-11	9.14-12	7.72-12	6.32-12	5.05-12	3.92-12	2.89-12
39	2.592+6	1.06-11	9.96-12	8.90-12	7.64-12	6.33-12	5.08-12	3.92-12	2.86-12
40	2.466+6	1.82-11	1.61-11	1.31-11	1.02-11	7.55-12	5.43-12	3.77-12	2.46-12
41	2.385+6	3.25-11	2.64-11	1.90-11	1.28-11	8.30-12	5.25-12	3.25-12	1.92-12
42	2.365+6	4.64-11	3.41-11	2.14-11	1.28-11	7.78-12	4.77-12	2.92-12	1.71-12
43	2.346+6	1.69-11	1.40-11	1.05-11	7.63-12	5.41-12	3.77-12	2.56-12	1.63-12
44	2.307+6	7.20-12	6.60-12	5.71-12	4.72-12	3.76-12	2.91-12	2.16-12	1.49-12
45	2.231+6	5.45-12	5.10-12	4.54-12	3.88-12	3.20-12	2.55-12	1.95-12	1.39-12
46	2.123+6	4.72-12	4.45-12	4.01-12	3.47-12	2.90-12	2.34-12	1.81-12	1.30-12
47	2.019+6	3.98-12	3.79-12	3.46-12	3.06-12	2.61-12	2.15-12	1.69-12	1.24-12
48	1.921+6	3.25-12	3.11-12	2.89-12	2.60-12	2.27-12	1.91-12	1.55-12	1.18-12
49	1.827+6	4.25-12	4.00-12	3.60-12	3.11-12	2.60-12	2.09-12	1.62-12	1.16-12
50	1.738+6	3.30-12	3.14-12	2.88-12	2.55-12	2.19-12	1.81-12	1.44-12	1.07-12
51	1.653+6	2.77-12	2.66-12	2.47-12	2.22-12	1.94-12	1.64-12	1.34-12	1.02-12
52	1.572+6	3.21-12	3.06-12	2.80-12	2.47-12	2.12-12	1.75-12	1.38-12	1.02-1[illegible]
53	1.496+6	3.05-12	2.90-12	2.67-12	2.36-12	2.03-12	1.68-12	1.33-12	9.81-13
54	1.423+6	2.91-12	2.78-12	2.56-12	2.28-12	1.96-12	1.63-12	1.29-12	9.42-13
55	1.353+6	2.35-12	2.26-12	2.12-12	1.93-12	1.69-12	1.44-12	1.17-12	8.85-13
56	1.287+6	2.54-12	2.44-12	2.26-12	2.02-12	1.75-12	1.46-12	1.16-12	8.48-13
57	1.225+6	2.54-12	2.42-12	2.24-12	1.99-12	1.72-12	1.42-12	1.12-12	8.11-13

Table C-10b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$ cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
58	1.165+6	2.23-12	2.14-12	1.98-12	1.78-12	1.55-12	1.29-12	1.03-12	7.59-13
59	1.108+6	1.55-12	1.50-12	1.43-12	1.32-12	1.19-12	1.05-12	8.86-13	7.08-13
60	1.003+6	1.40-12	1.36-12	1.30-12	1.22-12	1.12-12	1.00-12	8.72-13	7.25-13
61	9.616+5	1.81-12	1.75-12	1.66-12	1.52-12	1.37-12	1.19-12	1.00-12	7.97-13
62	9.072+5	2.14-12	2.06-12	1.92-12	1.74-12	1.53-12	1.31-12	1.07-12	8.24-13
63	8.629+5	2.07-12	2.00-12	1.87-12	1.70-12	1.50-12	1.29-12	1.06-12	8.18-13
64	8.209+5	1.94-12	1.87-12	1.76-12	1.61-12	1.43-12	1.24-12	1.03-12	8.09-13
65	7.808+5	2.11-12	2.03-12	1.90-12	1.72-12	1.51-12	1.29-12	1.05-12	8.13-13
66	7.427+5	2.16-12	2.07-12	1.93-12	1.74-12	1.53-12	1.29-12	1.05-12	8.02-13
67	7.065+5	2.14-12	2.05-12	1.91-12	1.72-12	1.51-12	1.27-12	1.03-12	7.81-13
68	6.721+5	2.12-12	2.04-12	1.89-12	1.71-12	1.49-12	1.25-12	1.01-12	7.59-13
69	6.393+5	2.10-12	2.02-12	1.87-12	1.68-12	1.46-12	1.23-12	9.81-13	7.30-13
70	6.081+5	1.99-12	1.91-12	1.78-12	1.60-12	1.40-12	1.17-12	9.37-13	6.95-13
71	5.784+5	1.68-12	1.62-12	1.52-12	1.39-12	1.23-12	1.05-12	8.53-13	6.51-13
72	5.502+5	1.84-12	1.77-12	1.65-12	1.49-12	1.29-12	1.08-12	8.54-13	6.22-13
73	5.234+5	1.68-12	1.62-12	1.51-12	1.37-12	1.19-12	1.00-12	7.93-13	5.74-13
74	4.979+5	1.22-12	1.18-12	1.12-12	1.03-12	9.24-13	7.99-13	6.59-13	5.05-13
75	4.505+5	8.82-13	8.63-13	8.30-13	7.84-13	7.26-13	6.58-13	5.79-13	4.89-13
76	4.076+5	1.08-12	1.05-12	1.00-12	9.35-13	8.52-13	7.58-13	6.52-13	5.35-13
77	3.877+5	1.20-12	1.17-12	1.11-12	1.03-12	9.27-13	8.13-13	6.89-13	5.53-13
78	3.688+5	1.28-12	1.24-12	1.18-12	1.08-12	9.73-13	8.47-13	7.10-13	5.62-13
79	3.337+5	1.32-12	1.28-12	1.21-12	1.11-12	9.91-13	8.59-13	7.17-13	5.62-13
80	3.020+5	1.34-12	1.30-12	1.22-12	1.12-12	1.00-12	8.66-13	7.19-13	5.60-13
81	2.985+5	1.34-12	1.30-12	1.22-12	1.12-12	1.00-12	8.66-13	7.19-13	5.60-13
82	2.972+5	1.33-12	1.29-12	1.22-12	1.12-12	9.98-13	8.63-13	7.17-13	5.59-13
83	2.945+5	1.31-12	1.27-12	1.19-12	1.10-12	9.82-13	8.52-13	7.09-13	5.55-13
84	2.873+5	1.28-12	1.24-12	1.17-12	1.08-12	9.68-13	8.41-13	7.02-13	5.51-13
85	2.732+5	1.30-12	1.26-12	1.18-12	1.09-12	9.73-13	8.41-13	6.99-13	5.43-13
86	2.472+5	1.25-12	1.21-12	1.14-12	1.05-12	9.42-13	8.17-13	6.80-13	5.30-13
87	2.352+5	1.22-12	1.18-12	1.12-12	1.03-12	9.22-13	8.01-13	6.68-13	5.22-13
88	2.237+5	1.13-12	1.10-12	1.04-12	9.67-13	8.73-13	7.65-13	6.46-13	5.14-13
89	2.128+5	1.08-12	1.05-12	9.98-13	9.29-13	8.44-13	7.45-13	6.36-13	5.14-13
90	2.024+5	1.02-12	9.91-13	9.48-13	8.87-13	8.13-13	7.26-13	6.30-13	5.21-13
91	1.926+5	1.04-12	1.01-12	9.68-13	9.06-13	8.31-13	7.44-13	6.47-13	5.38-13
92	1.832+5	1.22-12	1.19-12	1.13-12	1.04-12	9.43-13	8.28-13	7.02-13	5.64-13
93	1.742+5	1.31-12	1.27-12	1.20-12	1.10-12	9.88-13	8.60-13	7.21-13	5.71-13
94	1.657+5	1.44-12	1.39-12	1.31-12	1.19-12	1.06-12	9.08-13	7.48-13	5.77-13
95	1.576+5	1.41-12	1.37-12	1.28-12	1.17-12	1.04-12	8.97-13	7.41-13	5.74-13
96	1.500+5	1.32-12	1.28-12	1.20-12	1.11-12	9.92-13	8.62-13	7.21-13	5.69-13
97	1.426+5	1.29-12	1.25-12	1.18-12	1.09-12	9.78-13	8.52-13	7.16-13	5.69-13
98	1.357+5	1.43-12	1.38-12	1.30-12	1.19-12	1.05-12	9.04-13	7.45-13	5.76-13
99	1.291+5	1.51-12	1.46-12	1.36-12	1.24-12	1.09-12	9.29-13	7.56-13	5.74-13
100	1.228+5	1.43-12	1.38-12	1.29-12	1.18-12	1.05-12	8.95-13	7.34-13	5.63-13
101	1.168+5	1.43-12	1.38-12	1.30-12	1.18-12	1.05-12	8.93-13	7.29-13	5.56-13
102	1.111+5	1.37-12	1.33-12	1.25-12	1.14-12	1.01-12	8.63-13	7.07-13	5.40-13
103	9.804+4	1.22-12	1.19-12	1.12-12	1.03-12	9.22-13	7.99-13	6.66-13	5.21-13
104	8.652+4	1.06-12	1.03-12	9.83-13	9.15-13	8.31-13	7.35-13	6.29-13	5.13-13
105	8.250+4	1.31-12	1.26-12	1.19-12	1.09-12	9.68-13	8.33-13	6.87-13	5.31-13
106	7.950+4	1.22-12	1.18-12	1.12-12	1.03-12	9.22-13	8.01-13	6.68-13	5.26-13
107	7.200+4	1.30-12	1.26-12	1.19-12	1.09-12	9.67-13	8.31-13	6.84-13	5.28-13
108	6.738+4	1.27-12	1.22-12	1.15-12	1.06-12	9.41-13	8.11-13	6.69-13	5.18-13
109	5.656+4	1.20-12	1.16-12	1.10-12	1.01-12	9.02-13	7.81-13	6.49-13	5.07-13
110	5.248+4	1.22-12	1.18-12	1.11-12	1.02-12	9.10-13	7.85-13	6.49-13	5.03-13
111	4.631+4	1.20-12	1.16-12	1.09-12	1.00-12	8.93-13	7.69-13	6.35-13	4.90-13
112	4.087+4	1.10-12	1.07-12	1.01-12	9.29-13	8.32-13	7.22-13	6.01-13	4.69-13
113	3.431+4	1.05-12	1.02-12	9.69-13	8.94-13	8.02-13	6.97-13	5.80-13	4.53-13
114	3.183+4	8.93-13	8.70-13	8.31-13	7.76-13	7.07-13	6.28-13	5.39-13	4.39-13

Table C-10b. (Continued)

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
115	2.850+4	7.16-13	7.03-13	6.80-13	6.48-13	6.08-13	5.61-13	5.06-13	4.43-13
116	2.700+4	1.10-12	1.07-12	1.02-12	9.39-13	8.46-13	7.40-13	6.25-13	5.00-13
117	2.606+4	1.27-12	1.23-12	1.16-12	1.06-12	9.40-13	8.06-13	6.62-13	5.09-13
118	2.479+4	1.29-12	1.25-12	1.17-12	1.07-12	9.47-13	8.10-13	6.63-13	5.07-13
119	2.418+4	1.28-12	1.24-12	1.16-12	1.06-12	9.42-13	8.06-13	6.60-13	5.05-13
120	2.358+4	1.26-12	1.22-12	1.15-12	1.05-12	9.31-13	7.98-13	6.54-13	5.01-13
121	2.188+4	1.24-12	1.20-12	1.13-12	1.03-12	9.16-13	7.85-13	6.44-13	4.94-13
122	1.931+4	1.20-12	1.16-12	1.10-12	1.00-12	8.92-13	7.66-13	6.29-13	4.83-13
123	1.503+4	1.15-12	1.11-12	1.05-12	9.60-13	8.55-13	7.36-13	6.06-13	4.67-13
124	1.171+4	1.08-12	1.05-12	9.88-13	9.08-13	8.11-13	7.00-13	5.78-13	4.47-13
125	9.119+3	9.39-13	9.13-13	8.67-13	8.04-13	7.26-13	6.36-13	5.36-13	4.27-13
126	7.102+3	9.97-13	9.68-13	9.17-13	8.47-13	7.61-13	6.62-13	5.54-13	4.35-13
127	5.531+3	1.02-12	9.89-13	9.35-13	8.62-13	7.72-13	6.69-13	5.55-13	4.32-13
128	4.307+3	9.71-13	9.43-13	8.93-13	8.24-13	7.39-13	6.41-13	5.34-13	4.16-13
129	3.707+3	9.16-13	8.90-13	8.44-13	7.80-13	7.01-13	6.10-13	5.10-13	3.99-13
130	3.355+3	8.38-13	8.15-13	7.76-13	7.20-13	6.52-13	5.72-13	4.83-13	3.84-13
131	3.035+3	6.87-13	6.72-13	6.45-13	6.08-13	5.62-13	5.08-13	4.46-13	3.76-13
132	2.747+3	7.64-13	7.46-13	7.14-13	6.70-13	6.14-13	5.50-13	4.77-13	3.97-13
133	2.613+3	8.51-13	8.29-13	7.90-13	7.36-13	6.69-13	5.92-13	5.05-13	4.10-13
134	2.485+3	9.06-13	8.81-13	8.38-13	7.78-13	7.03-13	6.18-13	5.23-13	4.19-13
135	2.249+3	9.56-13	9.29-13	8.81-13	8.15-13	7.34-13	6.41-13	5.38-13	4.26-13
136	2.035+3	9.80-13	9.51-13	9.01-13	8.32-13	7.47-13	6.50-13	5.44-13	4.27-13
137	1.585+3	9.77-13	9.48-13	8.98-13	8.29-13	7.45-13	6.48-13	5.41-13	4.25-13
138	1.234+3	9.51-13	9.24-13	8.77-13	8.12-13	7.32-13	6.40-13	5.38-13	4.27-13
139	9.611+2	9.53-13	9.25-13	8.76-13	8.09-13	7.27-13	6.32-13	5.28-13	4.15-13
140	7.485+2	9.39-13	9.11-13	8.64-13	7.98-13	7.17-13	6.24-13	5.22-13	4.10-13
141	5.829+2	9.26-13	8.99-13	8.52-13	7.87-13	7.08-13	6.17-13	5.16-13	4.06-13
142	4.540+2	9.06-13	8.80-13	8.35-13	7.72-13	6.95-13	6.06-13	5.07-13	3.99-13
143	3.536+2	8.54-13	8.31-13	7.90-13	7.33-13	6.63-13	5.82-13	4.92-13	3.93-13
144	2.754+2	9.04-13	8.78-13	8.33-13	7.71-13	6.94-13	6.05-13	5.07-13	4.00-13
145	2.144+2	9.00-13	8.74-13	8.29-13	7.66-13	6.90-13	6.02-13	5.04-13	3.98-13
146	1.670+2	8.94-13	8.68-13	8.23-13	7.62-13	6.86-13	5.98-13	5.02-13	3.96-13
147	1.301+2	8.88-13	8.63-13	8.18-13	7.57-13	6.82-13	5.95-13	4.99-13	3.94-13
148	1.013+2	8.83-13	8.58-13	8.14-13	7.53-13	6.78-13	5.92-13	4.96-13	3.91-13
149	7.889+1	8.78-13	8.53-13	8.09-13	7.49-13	6.74-13	5.89-13	4.94-13	3.90-13
150	6.144+1	8.73-13	8.48-13	8.05-13	7.45-13	6.71-13	5.86-13	4.91-13	3.88-13
151	4.785+1	8.69-13	8.44-13	8.01-13	7.41-13	6.68-13	5.83-13	4.89-13	3.86-13
152	3.727+1	8.63-13	8.39-13	7.96-13	7.37-13	6.64-13	5.80-13	4.86-13	3.84-13
153	2.920+1	8.59-13	8.35-13	7.92-13	7.33-13	6.61-13	5.77-13	4.84-13	3.82-13
154	2.260+1	8.54-13	8.30-13	7.88-13	7.30-13	6.58-13	5.74-13	4.82-13	3.81-13
155	1.760+1	8.50-13	8.26-13	7.84-13	7.26-13	6.55-13	5.72-13	4.80-13	3.79-13
156	1.371+1	8.46-13	8.22-13	7.80-13	7.23-13	6.52-13	5.69-13	4.78-13	3.78-13
157	1.068+1	8.41-13	8.18-13	7.76-13	7.19-13	6.49-13	5.67-13	4.76-13	3.76-13
158	8.315+0	8.37-13	8.13-13	7.72-13	7.16-13	6.46-13	5.64-13	4.74-13	3.75-13
159	6.476+0	8.33-13	8.09-13	7.69-13	7.12-13	6.43-13	5.62-13	4.72-13	3.73-13
160	5.043+0	8.29-13	8.06-13	7.65-13	7.09-13	6.40-13	5.60-13	4.70-13	3.72-13
161	3.928+0	8.24-13	8.01-13	7.61-13	7.06-13	6.37-13	5.57-13	4.68-13	3.70-13
162	3.059+0	8.21-13	7.98-13	7.58-13	7.03-13	6.35-13	5.55-13	4.67-13	3.69-13
163	2.372+0	8.16-13	7.94-13	7.54-13	7.00-13	6.32-13	5.53-13	4.65-13	3.67-13
164	1.855+0	8.12-13	7.90-13	7.51-13	6.96-13	6.29-13	5.51-13	4.63-13	3.66-13
165	1.445+0	8.08-13	7.85-13	7.47-13	6.93-13	6.26-13	5.48-13	4.61-13	3.65-13
166	1.125+0	8.03-13	7.81-13	7.43-13	6.89-13	6.23-13	5.46-13	4.59-13	3.63-13
167	8.764-1	7.98-13	7.76-13	7.38-13	6.85-13	6.20-13	5.43-13	4.57-13	3.62-13
168	6.826-1	7.92-13	7.70-13	7.33-13	6.81-13	6.16-13	5.40-13	4.55-13	3.60-13
169	5.316-1	7.87-13	7.65-13	7.28-13	6.77-13	6.13-13	5.37-13	4.52-13	3.56-13
170	4.140-1	7.33-13	7.15-13	6.82-13	6.37-13	5.80-13	5.12-13	4.36-13	3.49-13
171	1.000-1	6.12-13	5.99-13	5.76-13	5.44-13	5.02-13	4.52-13	3.95-13	3.28-13
	1.00-5								

Table C-10c. Gamma-ray Dose Rate Transmission Factors for 2.00-m-thick Rebar Slab

Group No.	Upper Energy Boundary (eV)	$\tau_{gj}(T)$							
		cos 1 = 0.989401	cos 2 = 0.944574	cos 3 = 0.865631	cos 4 = 0.755404	cos 5 = 0.617876	cos 6 = 0.458017	cos 7 = 0.281603	cos 8 = 0.00950124
1	1.400+7	9.39-11	6.07-11	2.71-11	8.57-12	1.99-12	3.16-14	5.34-13	4.51-13
2	1.200+7	6.84-11	4.41-11	1.97-11	6.26-12	1.47-12	2.81-14	4.00-13	3.37-13
3	1.000+7	4.41-11	2.82-11	1.24-11	3.94-12	9.22-13	2.48-14	2.59-13	2.16-13
4	8.000+6	2.90-11	1.83-11	7.86-12	2.42-12	5.54-13	1.79-14	1.56-13	1.29-13
5	7.500+6	2.29-11	1.43-11	6.11-12	1.87-12	4.27-13	1.46-14	1.21-13	9.97-14
6	7.000+6	1.72-11	1.07-11	4.51-12	1.37-12	3.14-13	1.13-14	8.93-14	7.36-14
7	6.500+6	1.22-11	7.51-12	3.14-12	9.51-13	2.18-13	8.19-15	6.25-14	5.15-14
8	6.000+6	8.04-12	4.91-12	2.03-12	6.15-13	1.42-13	5.51-15	4.10-14	3.38-14
9	5.500+6	4.88-12	2.95-12	1.21-12	3.68-13	8.58-14	3.44-15	2.51-14	2.07-14
10	5.000+6	2.75-12	1.64-12	6.65-13	2.03-13	4.78-14	1.98-15	1.41-14	1.16-14
11	4.500+6	1.38-12	8.16-13	3.26-13	9.97-14	2.37-14	1.01-15	7.07-15	5.83-15
12	4.000+6	5.90-13	3.43-13	1.35-13	4.16-14	1.00-14	4.24-16	3.02-15	2.49-15
13	3.500+6	1.99-13	1.14-13	4.45-14	1.39-14	3.43-15	1.34-16	1.03-15	8.60-16
14	3.000+6	4.89-14	2.76-14	1.08-14	3.47-15	8.83-16	2.82-17	2.64-16	2.22-16
15	2.500+6	7.31-15	4.09-15	1.63-15	5.55-16	1.47-16	3.15-18	4.37-17	3.73-17
16	2.000+6	7.03-16	3.80-16	1.47-16	4.98-17	1.32-17	3.33-19	3.94-18	3.35-18
17	1.660+6	1.02-16	5.22-17	1.90-17	6.18-18	1.62-18	1.30-20	4.46-19	3.82-19
18	1.500+6	2.54-17	1.31-17	4.89-18	1.67-18	4.70-19	2.30-20	1.05-19	9.63-20
19	1.330+6	2.84-18	1.64-18	7.47-19	3.01-19	9.72-20	1.12-20	1.69-20	1.78-20
20	1.000+6	4.79-20	2.64-20	1.15-20	4.54-21	1.44-21	1.51-22	2.60-22	2.67-22
21	8.000+5	1.72-21	8.65-22	3.43-22	1.26-22	3.76-23	2.77-24	7.71-24	7.42-24
22	7.000+5	1.69-22	8.75-23	3.64-23	1.40-23	4.39-24	4.82-25	7.55-25	7.82-25
23	6.000+5	1.08-23	5.69-24	2.43-24	9.60-25	3.12-25	4.28-26	4.54-26	5.06-26
24	5.120+5	1.28-24	5.94-25	2.27-25	8.57-26	2.88-26	5.73-27	2.14-27	3.21-27
25	5.100+5	5.55-25	2.83-25	1.19-25	4.70-26	1.56-26	2.61-27	1.75-27	2.15-27
26	4.500+5	5.30-26	2.85-26	1.29-26	5.55-27	2.17-27	6.55-28	6.14-29	9.01-29
27	4.000+5	5.32-27	3.55-27	2.00-27	1.03-27	4.83-28	1.99-28	6.44-29	1.11-29
28	3.000+5	3.56-30	2.69-30	1.78-30	1.10-30	6.51-31	3.73-31	2.07-31	1.10-31
29	2.000+5	1.28-35	9.12-36	5.65-36	3.31-36	1.89-36	1.05-36	5.61-37	2.89-37
30	1.500+5	6.73-43	5.04-43	3.38-43	2.19-43	1.42-43	9.24-44	6.09-44	4.02-44
31	1.000+5	7.70-64	4.55-64	2.50-64	1.42-64	8.44-65	5.17-65	3.25-65	2.08-65
32	7.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
33	6.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	4.500+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	3.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	2.000+4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	1.000+4								

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