RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ATOMIC ENERGY COMMISSION

POST OFFICE BOX X •
OAK RIDGE, TENNESSEE 37831

No. 92 July 1972

TO CRITICS

I'll write, because I'll give
You critics means to live:
For should I not supply
The cause, the effect would die.

-- Robert Herrick
(1591-1674)

AIR TRANSPORT REPORT AND CODE NOW AVAILABLE

The report, "A Review of Calculations of Radiation Transport in Air - Theory, Techniques, and Computer Codes," ORNL-RSIC-33 (May 1972) is available for distribution. The report is a compilation of papers presented at a DNA-sponsored seminar-workshop held at Oak Ridge in November 1971. The ATR code, featured in the workshop, is currently being announced as RSIC code package CCC-179. Using parametric models, ATR provides neutron and gamma-ray transport data for the atmosphere and includes corrections for exponential density and the ground interface.

GROUP AIR-FARE TO THE PARIS SHIELDING CONFERENCE

Members of the American Nuclear Society may be able to secure a group-rate fare to the FOURTH INTERNATIONAL CONFERENCE ON REACTOR SHIELDING to be held in Paris, France 9-13 October 1972. The 40-passenger group fare from New York ($244) is about 1/2 of the regular fare and 60% of the 14/21 day excursion fare. Please contact RSIC if you are interested.

NEW 100-GROUP LIBRARY AVAILABLE (DLC-2D)

A new version of DLC-2, generated with SUPERTOG is available. This 100-group P_8 expansion neutron cross section library based on ENDF/B Version III is written in the format utilized by ANISN, DTF-IV, DOT, and MORSE. The top 99 groups of this version were generated by weighting with a fission spectrum joined by a "1/E" tail. Values of σ_a, $\nu\cdot\sigma_f$, σ_t and σ_s were inserted for group 100 to approximately represent the thermal energy region. Details of the library are found in the abstract, a copy of which is attached to this newsletter. Requesters should send five full reels of magnetic tape (to be written 7-track, unblocked) or one full reel (to be written 9-track, blocked) in order to obtain the entire library plus retrieval programs.

ADDITIONS TO THE COMPUTER CODE COLLECTION

The following code packages are announced as available:

CCC-127D/MORSE General Purpose Monte Carlo Multigroup Neutron and Gamma-Ray Transport Code with Combinatorial Geometry, contributed by Science Applications, Inc., La Jolla, Calif. Reference: DNA 2860T (SAI-72-511-LJ). FORTRAN IV, UNIVAC 1108. One reel of magnetic tape required for transmittal (13,668 records).

CCC-178/HETC Monte Carlo High-Energy Nucleon-Meson Transport Code, contributed by Neutron Physics Division, Oak Ridge National Laboratory. Reference: ORNL-4744. FORTRAN IV, IBM 360. One reel of magnetic tape (9-track) or 3 reels (7-track) are needed for transmittal (62,533 records).

CCC-179A/ATR Models of Radiation Transport in Air - the ATR Code, contributed by Science Applications, Inc., La Jolla, Calif. Reference: DNA 2803l (SAI-71-557-LJ). In FORTRAN, designed to be compatible with several computers, this packaged version is operable on the UNIVAC 1108. A reel of magnetic tape is required for transmittal.

NOTE ON PSR-20/LAPHANO

D. Dudziak, LASL, has called to RSIC attention the fact that the current version of LAPHANO will process all materials excepting lead. An updated version, expected in RSIC within a few weeks, will remedy this restriction. Versions of the code are available for the CDC 6600, the IBM 360, and the UNIVAC 1108.

OLD CODE DOCUMENTS, ANYONE?

A recent inventory revealed that RSIC has a surplus of hard copies of reports describing certain computer codes. In several instances the codes are obsolete. However, the technology discussed may still be of interest. Consult the following abstracts in ORNL-RSIC-13, Volume I. If the calculational method is of interest, write/call for the reports for your reference shelf. They are:

CCC-1	CCC-9	CCC-25
CCC-2	CCC-16	CCC-40
CCC-8	CCC-20	CCC-44
		CCC-45

CUMULATED INDEX TO A-CHAINS

The ORNL Nuclear Data Project maintains a current index of nuclear mass chain compilations and includes an updated version with each issue of Nuclear Data Sheets (published by Academic Press). By request, we publish the following copy from Nuclear Data Sheets B7, No. 6.

NUCLEAR DATA SHEETS

CUMULATED INDEX TO A-CHAINS

A	NUCLEI	REFERENCE	DATE
1	H		
2	H		
3	He		*
4	He	NP A109,1	1968*
5		NP 78,5	1966
6	Li	NP 78,19	1966
7	Li	NP 78,36	1966
8	Be	NP 78,54	1966
9	Be	NP 78,79	1966
10	B	NP 78,104	1966
11	B	NP A114,2	1968
12	C	NP A114,36	1968
13	C	NP 152,3	1970
14	N	NP 152,42	1970
15	N	NP 152,93	1970
16	O	NP A166,1	1971
17	O	NP A166,61	1971
18	O	NP 11,235	1959
19	F	NP 11,250	1959
20	Ne	NP 11,265	1959
20	Ne	NP A105,11	1967
21	Ne	NP 11,288	1959
21	Ne	NP A105,11	1967
22	Ne	NP 11,295	1959
22	Ne	NP A105,17	1967
23	Na	NP 11,298	1959
23	Na	NP A105,26	1967
24	Mg	NP 11,300	1959
24	Mg	NP A105,40	1967
25	Mg	NP A105,65	1967
26	Mg	NP A105,84	1967
27	Al	NP A105,103	1967
28	Si	NP A105,124	1967
29	Si	NP A105,150	1967
30	Si	NP A105,167	1967
31	P	NP A105,180	1967
32	S	NP A105,196	1967
33	S	NP A105,213	1967
34	S	NP A105,226	1967
35	Cl	NP A105,238	1967
36	S,Ar	NP A105,248	1967
37	Cl	NP A105,261	1967
38	Ar	NP A105,275	1967
39	K	NP A105,290	1967
40	Ar,Ca	NP A105,302	1967
41	K	NP A105,322	1967
42	Ca	NP A105,344	1967
43	Ca	NP A105,357	1967
44	Ca	NP A105,368	1967
45	Sc	B4-237	1970
46	Ca,Ti	B4-269	1970
47	Ti	B4-313	1970
48	Ti	B4-351	1970
49	Ti	B4-397	1970
50	Ti,Cr	B3-5,6-1	1970
51	V	B3-5,6-37	1970
52	Cr	B3-5,6-85	1970
53	Cr	B3-5,6-127	1970
54	Cr,Fe	B3-5,6-161	1970
55	Mn	B3-3,4-1	1970
56	Fe	B3-3,4-43	1970
57	Fe	B3-3,4-103	1970
58	Fe,Ni	B3-3,4-145	1970
59	Co	B2-5-1	1968
60	Ni	B2-5-41	1968
61	Ni	B2-5-81	1968
62	Ni	B2-3-1	1967
63	Cu	B2-3-31	1967
64	Ni,Zn	B2-3-65	1967
65	Cu	B2-6-1	1968
66	Zn	B2-6-43	1968
67	Zn	B2-6-71	1968
68	Zn	B2-6-93	1968
69	Ga	B2-6-111	1968
70	Zn,Ge	B1-6-1	1966*
71	Ga	B1-6-13	1966*
72	Ge	B1-6-27	1966
73	Ge	B1-6-47	1966
74	Ge,Se	B1-6-59	1966
75	As	B1-6-79	1966
76	Ge,Se	B1-6-103	1966
77	Se	B1-4-1	1966*
78	Se,Kr	B1-4-33	1966*
79	Br	B1-4-49	1966
80	Se,Kr	B1-4-69	1966
81	Br	B1-4-85	1968
82	Se,Kr	B1-4-103	1966
83	Kr	B1-4-125	1966
84	Kr,Sr	B5-109	1971
85	Rb	B5-131	1971
86	Kr,Sr	B5-151	1971
87	Sr	B5-457	1971
88	Sr	A8-4-345	1970
89	Y	A8-4-373	1970
90	Zr	A8-4-407	1970
91	Zr	R-618	1960†*
92	Zr,Mo	B7-299	1972
93	Nb	R-644	1960†*
94	Zr,Mo	R-661	1960†
95	Mo	R-676	1960†*
96	Mo,Ru	R-694	1960†*
97	Mo	R-706	1960†*
98	Mo,Ru	R-719	1960†
99	Ru	R-729	1961†
100	Mo,Ru	R-745	1961†
101	Ru	R-755	1961†*
102	Ru,Pd	R-767	1961†*
103	Rh	R-779	1961†*
104	Ru,Pd	R-791	1961†
105	Pd	R-805	1961†
106	Pd,Cd	R-820	1960†
107	Ag	B7-1	1972
108	Pd,Cd	B7-33	1972
109	Ag	B6-1	1971
110	Pd,Cd	B5-487	1971
111	Cd	B6-39	1971
112	Cd,Sn	B7-69	1972
113	In	B5-181	1971
114	Cd,Sn	R-933	1960†*
115	Sn	R-951	1960†
116	Cd,Sn	R-967	1960†
117	Sn	R-983	1960†
118	Sn	R-994	1960§
119	Sn	R-1005	1960§
120	Sn,Te	R-1016	1960§
121	Sb	B6-75	1971
122	Sn,Te	B7-419	1972
123	Sb	B7-363	1972
124	Sn..Xe	R-1064	1960§*
125	Te	B7-465	1972
126	Te,Xe	R-1097	1960§*
127	I	R-1108	1961§*
128	Te,Xe	R-1121	1961§*
129	Xe	R-1135	1961§*
130	Te..Ba	R-1149	1961§
131	Xe	R-1158	1961§
132	Xe,Ba	R-1181	1961§
133	Cs	R-1197	1961§
134	Xe,Ba	R-1211	1961§
135	Ba	R-1229	1961§
136	Xe..Ce	R-1239	1961§
137	Ba	R-1248	1961§
138	Ba,Ce	R-1261	1961§*
139	La	R-1271	1961§
140	Ce	R-1284	1959*
141	Pr	R-1300	1961
142	Ce,Nd	B2-1-1	1967
143	Nd	B2-1-25	1967
144	Nd,Sm	B2-1-47	1967
145	Nd	B2-1-181	1967
146	Nd,Sm	B2-4-1	1967
147	Sm	B2-4-35	1967
148	Nd,Sm	B2-4-79	1967
149	Sm	R-1401	1962*
150	Nd..Gd	R-1415	1964
151	Eu	R-1445	1963
152	Sm,Gd	R-1471	1964
153	Eu	R-1503	1963*
154	Sm..Dy	R-1529	1964
155	Gd	R-1555	1963
156	Gd,Dy	R-1578	1964
157	Gd	R-1603	1963*
158	Gd,Dy	R-1612	1963*
159	Tb	R-1629	1962
160	Gd,Dy	R-1642	1964
161	Dy	R-1677	1963
162	Dy,Er	R-1694	1964
163	Dy	R-1707	1964*
164	Dy,Er	R-1719	1964
165	Ho	R-1733	1964*
166	Er	R-1769	1964
167	Er	R-1802	1964
168	Er,Yb	R-1818	1964
169	Tm	R-1836	1964*
170	Er,Yb	R-1863	1964
171	Yb	R-1877	1964
172	Yb	R-1897	1965
173	Yb	R-1927	1965
174	Yb	R-1947	1965*
175	Lu	R-1961	1965
176	Hf	R-1980	1965
177	Hf	R-1998	1965
178	Hf	R-2035	1965
179	Hf	R-2055	1965
180	Hf,W	R-2067	1965
181	Ta	R-2083	1965*
182	W	B1-1-1	1966
183	W	B1-1-37	1966*
184	W	B1-1-63	1966
185	Re	B1-1-83	1966
186	W,Os	B1-2-1	1966
187	Os	B1-2-23	1966
188	Os	B1-2-53	1966
189	Os	B1-2-85	1966
190	Os,Pt	R-2223	1963
191	Ir	R-2237	1963
192	Os,Pt	R-2255	1963*
193	Ir	R-2278	1961*
194	Pt	B7-95	1972
195	Pt	R-2322	1961*
196	Pt,Hg	B7-395	1972
197	Au	B7-129	1972
198	Pt,Hg	B6-319	1971
199	Hg	B6-355	1971
200	Hg	B6-387	1971
201	Hg	B6-661	1971
202	Hg	B5-581	1971
203	Tl	B5-531	1971
204	Hg,Pb	B5-601	1971
205	Tl	B6-425	1971
206	Pb	B7-161	1972
207	Pb	B5-207	1971
208	Pb	B5-243	1971
209	Bi	B5-287	1971
210	Po	B5-631	1971
211	Po	B5-319	1971
212	Po	R-2619	1963*
213	Po	B1-5-1	1966*
214	Po	B1-5-7	1966*
215	At	B1-5-25	1966*
216	Po,Rn	B1-5-29	1966
217	Rn	B1-5-33	1966
218	Rn	B1-5-37	1966
219	Fr	B1-5-41	1966
220	Rn,Ra	B1-5-45	1966
221	Ra	B1-5-49	1966
222	Rn	B1-5-55	1966
223	Ra	B1-5-61	1966
224	Ra,Th	B1-5-75	1966
225	Ac	B1-5-82	1966
226	Ra,Th	B1-5-91	1966
227	Th	B1-5-97	1966
228	Th	B1-5-107	1966
229	Th	B6-209	1971
230	Th,U	B4-543	1970
231	Pa	B6-225	1971
232	Th,U	B4-561	1970
233	U	B6-257	1971
234	U	B4-581	1970
235	U	B6-287	1971
236	U,Pu	B4-623	1970
237	Np	B6-539	1971
238	U,Pu	B4-635	1970
239	Pu	B6-577	1971
240	Pu	B4-661	1970
241	Am	B6-621	1971
242	Pu,Cm	B4-683	1970
243	Am	B3-2-1	1969
244	Pu,Cm	B3-2-13	1969
245	Cm	B3-2-23	1969
246	Cm	B3-2-37	1969
247	Bk	B3-2-51	1969
248	Cm,Cf	B3-2-57	1969
249	Cf	B3-2-61	1969
250	Cf	B3-2-71	1969
251	Cf	B3-2-77	1969
252	Cf,Fm	B3-2-85	1969
253	Es	B3-2-91	1969
254	Cf,Fm	B3-2-99	1969
255	Fm	B3-2-107	1969
256	Fm	B3-2-113	1969
257	Fm	B3-2-117	1969
258	Fm	B3-2-121	1969
259		B3-2-123	1969
260		B3-2-123	1969
261		B3-2-123	1969

EXPLANATION

The cumulated index gives, for each mass value A, the most recent compilation of experimental information on levels of nuclei with that A-value. For A=20-24, the 1967 compilation only partly supersedes the 1959 compilation.

NUCLEI — The β-stable member(s) of this A-chain

REFERENCE — NP = Nuclear Physics
R-779 = Reprint of Nuclear Data Sheets (1959-1965), p.779
B4-269 = Nuclear Data Sheets B4, 269
B1-4-85 = Nuclear Data B1-4-85
A8-4-345 = Nuclear Data Tables A8-4-345
† = ORNL-4627,December 1970
§ = ORNL-4730,September 1971

DATE — The year in which the compilation was published. An asterisk(*) indicates that a revision is in progress. Current Nuclear Level Schemes in print are indicated by (†) or (§).

VISITOR DEVELOPS CODE

Mohamed Abdou, University of Wisconsin, has concluded an 8-week visit to RSIC, during which he worked on the development of a computer code to read the ENDF/B data library and calculate neutron fluence-to-Kerma conversion factors. The project, including documentation, is expected to be completed during the summer. The computer code MACK (Mohamed Abdou Computes Kerma), will be made available as a PSR package. A library of Kerma factors, along with a suitable retrieval program, will be packaged as a DLC. Mr. Abdou is currently a graduate student in the University's Nuclear Engineering Department, working on controlled thermonuclear reactor research.

PERSONAL ITEMS

Dr. Sûmer Şahin, staff member of the Karadenis Technical University, Trabzon, Turkey, is a current visitor to RSIC. He expects to pursue post-doctoral research for a 6-months period on the exchange visitor program. Dr. Şahin received his undergraduate and graduate degrees from Stuttgart Technical University, West Germany.

Dr. Marvin K. Drake, staff member of the National Neutron Cross Section Center (NNCSC), leaves Brookhaven National Laboratory this month to return to work in Gulf General Atomic, San Diego, California.

Ralph N. Fullwood has given a change of address from the Los Alamos Scientific Laboratory, New Mexico, to Science Applications, Inc., Arlington, Virginia.

Marvin Donaldson, formerly with Kaman Sciences, has gone into business with Cibar, Inc., a software development company in Colorado Springs, Colo.

Hisao Yamakoshi, Nuclear Ship Division, Ship Research Institute Tokyo, Japan, writes that he is currently a member of a working group within the shielding committee of Japan. The group is collecting experimental data of duct streaming problems for neutrons and gamma rays. Particular attention is paid to that which has been compared with other experimental results or with theoretical results. Mr. Yamakoshi spent a year working in RSIC 1967-1968 completing work published in ORNL-TM-2520, "An Examination of Several Calculational Models for Use in Computing Gamma-Ray Penetration of Structures."

VISITORS TO RSIC

Visitors to RSIC during the month of June were: G. P. Cavanaugh, University of Illinois, Urbana; M. A. Razek, AEC, Cairo, Egypt (presently, Health Physics Division, ORNL); R. LaBauve and P. A. Seeger, Los Alamos Scientific Laboratory, Los Alamos, New Mexico; Richard Trinko, EBASCO Services, Inc., New York, N. Y.

REACTOR AND WEAPONS SHIELDING

AEC-TR-7175; TT-70-50155
Radiation Transmission Through Inhomogeneities in Shields.
Zolotukhin, V.G.; Klimanov, V.A.; Leipunski, O.I.; Mashkovich, V.P.; Sakharov, V.K.; Sinitsyn, B.L.; Tsypin, S.G.
1968
NTIS

AECL-4133
Dependence of the Integrated Intensity of a Scattered Neutron Group on the Experimental Conditions.
Sears, V.F.; Dolling, G.
January,1972
Dep., NTIS (U.S.Sales Only)

AEEW-M-997
Spectrum Measurements in Fast Reactor Assemblies.
Broomfield, A.M.; Paterson, W.J.; Sanders, J.E.
October,1970
Atomic Energy Establishment, Winfrith, Dorchester, Dorset

AERE-R-7009
A.E.R.E. Measurements for a Simulated Criticality Accident Dosimetry Experiment Organised by N.R.P.B., June 1971.
Delafield, H.J.; Boot, S.J.; Dennis, J.A.
March,1972
Dep., NTIS (U.S.Sales Only)

ANCR-1057
Reactor Gamma Heat Measurements with Thermoluminescent Phosphors.
Tappendorf, J.C.
March,1972

ANL-7875
Chemical Engineering Division Reactor Safety and Physical Properties Studies Semiannual Report, July-December 1971.
Chasanov, M.G.; Fischer, J.; Fredrickson, D.R.; Gabelnick, S.D.; Leibowitz, L.; Tevebaugh, A.D.; Vogel, R.C.
March,1972
Dep., NTIS

ANL-7904
Empirical Representation of Photoelectric Cross Sections.
Smith, D.L.
January,1972
NTIS

ANL-7908
Measurement of Fast-Neutron Flux with a Lithium-Drifted Germanium Detector.
Smith, D.L.
February,1972
Dep., NTIS

BNL-16255
Standards, Statistics and Sternglass-Guilt by Association.
Hull, A.P.; Shore, F.J.
1971
NTIS

BRL-R-1577
Transport of Photons Through Air Using Source-Energy Band Structure from 300 keV to 2 keV.
Banks, N.E.; Coleman, W.A.
April,1972
Defense Documentation Center, Cameron Station, Alexandria, Virginia 22314

COM-72-50104
Fission-Neutron Spectra: Macroscopic and Integral Results.
Grundl, J.A.
1971
Pub. in Symposium Argonne National Lab., Argonne, Ill., 21-23 August 1970, p.417-451.

COM-72-50117
The NBS Reactor as a Source of Neutrons.
Carter, R. S.
1971
Pub. in Proceedings of the American Nuclear Society Topical Meeting on Neutron Sources and Applications Held at Augusta, Ga., 19-21 April 1971, v2p1-10-1-17 Apr 71.

CONF-710402-(Vol.1), pp.I.53-64
Review of Measurements of Absolute Neutron Emission Rates and Spectra from Neutron Sources.
Caswell, R.S.
August,1971
NTIS

CONF-711112-5
Criteria for Concrete Nuclear Containments.
Bender, M.
1971
NTIS

COO-2060-16
Applications of the Transmission Matrix to Radiation Shielding. Final Report.
Rohach, A. E.
February,1972
Dep., NTIS

COO-3060-1; MITNE-127
Neutronics of an LMFBR Blanket Mock-Up.
Leung, T.C.; Driscoll, M.J.; Kaplan, I.; Lanning, D.D.
January,1972
Dep., NTIS

COO-3060-2; MITNE-130
Use of Gamma Spectroscopy for Neutronic Analysis of LMFBR Blankets.
Kang, C.; Rasmussen, N.C.; Driscoll, M.J.
November,1971
Dep., NTIS

DPST-59-205, declassified Oct.27,1971
Shipping Containers for 238-Pu.
Proctor, J.F.
February 17,1959
Dep., NTIS

EERO-TR-22; AD-736852
Fallout Prediction Procedure for Subsurface ADM's.
Snell, C.; Burton, D.; O'Connor, J.
September,1971
NTIS

EUR-4744
Albedo Techniques for Calculating the Radiation Transport Through Voids.
Chinaglia, B.
March,1972
Dep., NTIS (U.S.Sales Only)

GEAP-13738
Fast Neutron Damage in Type-304 Stainless Steel and High-Nickel Alloys.
Sandusky, D.W.; Ring, P.J.; Penrose, R.T.
December,1971
Dep., NTIS

HASL-TM-66-17
Uniqueness of Inferred Spectra.
Alberg, M.
December,1966
Health and Safety Lab., New York Operations Office (AEC), N.Y.

HEDL-TME-71-143
Cross Section Evaluations of Twenty-Seven Fission Product Isotopes for ENDF/B-III, Mat 1201-1231.
Schenter, R.E.; Schmittroth, F.A.
October,1971

HEDL-TME-71-184
FTR Set 300-S, Multigroup Cross Sections for FTR Shielding Calculations.
Kidman, R.B.; Schenter, R.E.
December,1971
Dep., NTIS

HW-66675, declassified November 3,1971
Predicted Z Plant Radiation Exposure Levels vs. Plutonium Isotopic Concentration of Products.
General Electric Co., Richland, Washington
August 19,1960
Dep., NTIS

IAE-1983
MONTE CARLO Calculations of Neutron Slowing Down in Targets of Electron Accelerators.
Knizhnikov, Yu.N.
1970
NTIS (U.S.Sales Only)

INR-1330/21 (Errata)
Box Explicit Method in Neutron Transport Theory.
Arkuszewski, J.; Kulikowska, T.; Mika, J.
August,1971
INIS

JEN-219-DQ/I-78(In Spanish)
Elementary Computation of Radiation Doses and Shieldings for Radiochemical Laboratories.
Jimeno de Ossa, F.
1971
Dep., NTIS (U.S.Sales Only)

JINR-P16-6057 (In Russian)
Neutron Spectra Behind the Shield of the JINR Synchrophasotron.
Zaitsev, L.N.; Kimel, L.R.; Rastsvetalov, Ya. N.; Sidorin, V.P.
1971
NTIS (U.S.Sales Only)

JPRS-54305, pp.171-182
Allowance for Influence of Resonance Structure of Differential Cross Sections of Elastic Scattering of Fast Neutrons by Iron Nuclei on Their Shield Penetration.
Guseynov, A.G.; Orlov, V.V.; Popov, V.I.; Silen, I. N.; Suvorov, A.P.; Trykova, V.I.; Morozov, V.N.; Kodozev, M.G.; Martem'yanov, I.N.; Chernyayev, S.V.
October 22,1971
NTIS

KEES-SR-100
Gamma Ray Attenuation in Basement Ceilings.
Reynolds, R.S.
August 31,1971
Dept. Of Nucl. Eng., Radiation Shielding Facility, Kansas State University, Manhattan, Kansas 66502

KFKI-72-17
Energy Spectra of Neutrons from (n,n') and (n,2n) Reactions.
Kluge, Gy.; Jeki, L.
February,1972
Dep., NTIS (U.S.Sales Only)

LA-2407, declassified October 27,1971
Calorimeter Measurement of the KIWI-A Gamma Radiation.
Storm, E.; Bemis, E.
January,1960
Dep.,NTIS

LA-DC-13269; ORNL-RSIC-33,pp.209-227; CONF-711125, pp.209-227
Multigroup MONTE CARLO and S sub n Methods for Air Transport.
Harris, D.R.; Koenig, D.R.; Preeg, W.
November 15,1971
Dep., NTIS

LA-DC-13270; CONF-711125-6; ORNL-RSIC-33, pp.7-48
Evaluation of the Neutron and Gamma-Ray Production Cross Sections for Nitrogen.
Young, P.G.; Foster, D.G.,Jr.
1971
Dep., NTIS

LA-DC-13271; CONF-711125-2; ORNL-RSIC-33,pp.49-83
A Preliminary Evaluation of the Neutron and Photon-Production Cross Sections of Oxygen.
Foster, D.G.,Jr.; Young, P.G.
1971
Dep., NTIS

LIB/TRANS-388
Study of the Neutron Emission of 252-Cf Fission Fragments as a Function of Their Charge.
Nifenecker, H.; Frehaut, J.; Soleilhac, M.
No Date
NTIS (U.S.Sales Only)

NASA-CR-2042
Evaluation of Insulation Materials and Composites for Use in a Nuclear Radiation Environment. Phase II Final Report.
Westerheide, D.E.; Carter, H.G.; Erickson, R.C.; Kerlin, E.E.
May,1972
NTIS

NASA-CR-114364; N72-17762
Radiation Effects on Electronic Parts. Revision A.
Johnson, W.S.
June 18,1971
NTIS

NASA-TM-X-2503; N72-17734
Optimized 4 pi Spherical Shell Depleted Uranium-Water Shield Weights for 200 to 550-Megawatt Reactors.
Wohl, M.L.; Celnik, J.; Schamberger, R.D.
February,1972
NTIS

NP-19051
Experiments on the Interaction of Ionizing Radiation and Tissues in Diagnostics, Therapy and Protection.
Rytilae, A.
1971
NTIS (U.S.Sales Only)

NP-19091 (In German)
Investigation of the Neutron Energy Spectrum in Lower eV Region by a Scatter Peel-Off Method.
Bayer, A.
May,1971
NTIS (U.S.Sales Only)

NPS-61RK71111A; AD-739362
Predicted Parameter Uncertainties for Least Squares Analysis of a Single Exponential Decay with a Constant Background Rate.
Rodeback, G.W.
November 25,1971
NTIS

NWEF-1090; LA-DC-13293; CONF-711125-7; ORNL-RSIC-33, pp.411-428
Air Transport Calculations Using the LASL-NWEF Neutron-Gamma Air Flux Tape and the NWEF Computer Program CDR.
Campbell, J.E.; Sandmeier, H.A.
November 12,1971
Dep., NTIS

ORNL-TM-3701
Investigation of the Temperature Distribution in the Lithium Blanket of a Fusion Reactor.
Leverette, S.J.
May,1972
Dep., NTIS

ORNL-TM-3787
Measurement of Dose Rates from Radiation Activated Light Sources.
Niemeyer, R.G.
May,1972
Dep., NTIS

ORNL-RSIC-33; CONF-711125
A Review of Calculations of Radiation Transport in Air - Theory, Techniques, and Computer Codes. (Proceedings of a Seminar, November 15-17,1971)
Trubey, D.K.; Comolander, H.E. (Compiled by)
May,1972
RSIC

RRA-T706; DNA-2767T; AD-739339
System of Ship-Shielding Codes.
Newell, J.M.; French, R.L.; Kimmell, R.; Mooney, L.G.
March 20,1972
NTIS

SC-DR-720250
Exact and Approximate Solutions for Radiation Between Infinite Parallel Plates with Directional Properties.
Moreno, J.B.
April,1972
Dep., NTIS

SC-RR-720212
Absorbed Gamma Dose Rates in the North Cell of the Gamma Irradiation Facility (GIF).
Huston, J.E.
March,1972
Dep., NTIS

TRG-2143(R)
Fission Product Yield Data Extrapolated for Some Actinides.
Sidebotham, E.W.
1972
UKAEA, Reactor Group, Risley, Great Britain

TRG-2152(D)
Recommended Iron Atomic Displacement Cross Sections and Displacement Rates for Use In Fast Reactors.
Nelson, R.S.; Etherington, E.W.; Smith, M.F.
1972
HMSO

UCID-15944
Estimate of Radiation Fluxes Expected to Hit First Wall of DT and D super 3 He Mirror Reactors.
Lee, J.D.
November 11,1971
Dep., NTIS

UCRL-51144(Rev.1)
Livermore Pulsed Sphere Program: Program Summary Through July,1971.
Wong, C.; Anderson, J.D.; Brown, P.; Hansen, L.F.; Kammerdiener, J.L.; Logan, C.; Pohl, B.
February 10,1972
Dep., NTIS

UCRL-Trans-10591
Results of Mathematical Modeling of Gamma-Gamma Logging Under Oil-Well Conditions.
Gulin, Yu.A.; Ponyatov, G.I.
1969
Dep., NTIS

UCRL-Trans-10592
Detailed Study of the Cement Collar Behind an Oil-Well Casing by the Scattered-Gamma-Radiation Method.
Bernshtein, D.A.
1969
Dep., NTIS

WARD-4210-T-4-1
Evaluation and Integral Testing of Modifications to ENDF/B Version II Data.
Pitterle, T.A.; Paik, N.C.; Durston, C.
December,1971

Amer. J. Public Health, 61(11), 2294-2299
New Look at Basic Radiation Standards.
Snow, D.L.
November,1971

Annu. Rep. Res. Reactor Inst. Kyoto Univ., 4, 17-24
Production of an Sb-Be Neutron Source of Plane Type and Measurement of the Neutron Age in Water.
Kanda, K.; Hayashi, M.; Okumura, K.
1971

Annu. Rep. Res. Reactor Inst. Kyoto Univ., 4, 25-33
Measurement of Neutron Spectrum in an Anhydrous Sodium Carbonate Pile.
Kanda, K.; Nakagome, Y.; Kimura, I.
1971

Annu. Rep. Res. Reactor Inst. Kyoto Univ., 4, 99-106
Measurement of Neutron Spectra in a Spherical Alumina Pile.
Kimura, I.; Hayashi, S.A.; Kobayashi, K.; Yamamoto, S.; Nishihara, H.
1971

Annu. Rep. Res. Reactor Inst. Kyoto Univ., 4, 107-112
Measurements of Neutron Spectra in a Barytes Concrete Pile.
Hayashi, S.A.; Kobayashi, K.; Yamamoto, S.; Kimura, I.
1971

Astrophys. and Space Sci., 13(1), 56-69
Induced Compton Scattering by Relativistic Particles.
Melrose, D.B.
September,1971

Atomkernenergie, 18(2), 158-164
Particular Solutions in Multigroup Transport Theory.
Leuthauser, K.D.
October,1971

Atomkernenergie, 18(3), 215-218
Transmission and Reflection Coefficient with Anisotropic Scattering.
El-Wakil, S.A.
November,1971

Atomkernenergie, 19(1), 14-16
Two-Dimensional Shielding Calculations Using a Combination of Diffusion Theory and Line-of-Sight Method.
Vossebrecker, H.
1972

Aust. J. Phys., 24(6), 821-833
Prompt Neutrons from 236-U Fission Fragments.
Boldeman, J.W.; Musgrove, A.R.de L.; Walsh,RR.L.
December,1971

Brit. J. Radiol., 44(527), 895-896
Manufacture of Lead Shields.
Parfitt, R.
November,1971

Comput. Phys. Commun., 2(7), 449-454
Gamma-Radiation Dosimetry for Arbitrary Source and Target Geometry (Computer Program).
Hubbard, L.B.
December,1971

CRC Crit. Rev. Environ. Contr., 2(2), 147-205
Radiation Protection Standards. Part 2.
Taylor, L.S.
August,1971

Health Phys., 22(1), 98-99
Shielding Ability of Safety Glasses in Fluoroscopic Examinations.
Maille, H.D.; Jaspers, J.G.; Mermagen, H.
January,1972

IEEE Trans. Nucl. Sci., NS-18(6), 200-205
Considerations in Establishing a Standard for Neutron Displacement Energy Effects in Semiconductors.
Conrad, E.E.
December,1971

Instrum. and Exp. Tech., 14(3), Pt.1, 709-711
Neutron Alpha, n-Sources Based on 241-Am and 9-Be.
Aleksandrov, B.M.; Bak, M.A.; Krivokhatskii, A.S.; Petrov, Yu.G.; Shlyamin, E.A.
May-June,1971

J. Brit. Nucl. Energy Soc., 11(1), 43-48
An Application of Modal Analysis to the Approximate Solution of the Fermi-Age Equation.
Al-Ammar, M.A.; Obradovic, D.; Tudhope, R.G.
January,1972

J. Brit. Nucl. Energy Soc., 11(2), 141-
Graphical Assistance to Reactor Shield Design.
Goddard, A.J.H.; Keillor, S.A.; Wrigley, M.F.
1972

J. Nucl. Sci. Technol.(Tokyo), 8(8), 465-468
Validity of Constant Collision Density Assumption in Intermediate Energy Region.
Nakamura, K.; Nishihara, H.
August,1971

J. Nucl. Sci. Technol.(Tokyo), 8(9), 503-512
Improvement to the Calculation of Collision Probabilities in Annular System and its Application to Cluster Geometry.
Takeda, T.; Sekiya, T.
September,1971

J. Phys. D, 4(12), 1843-1855
The Application of Space-Dependent Multigroup Theory to the Analysis of Neutron Slowing Down Time Experiments. I. Light and Heavy Water Moderators.
Beynon, T.D.; Mondal, M.A.W.
December,1971

J. Phys. D, 5(1), 6-11
Neutron Flux Perturbations Due to Absorbing Foils.
Morsy, S.; Williams, M.M.R.
January,1972

New Sci. and Sci. J., 52(774), 168-171
The Radiological Impact of Fusion.
Steiner, D.
December 16,1971

Nucl. Instrum. Methods, 98(3), 451-454
Self-Absorption of Gamma Rays Produced in Large Cylindrical Samples.
Dickens, J.K.
February,1972

Nucl. Instrum. Methods, 98(3), 485-491
Aspects in the Use of the Inverse Neutron Kinetics Technique.
Anselmi, L.; Hage, W.; Hettinger, H.; Hohmann, H.; Kumpf, S.
February 1,1972

Nucl. Instrum. Methods, 99(1), 29-34
Production of Monoenergetic X-Ray Sources of Known Absolute Intensity.
Ebert, P.J.; Gaines, J.L.; Leipelt, G.R.
February 15,1972

Nucl. Instrum. Methods, 100(3), 445-
Attenuation of Fast-Neutrons in Shielding Materials.
Gujrathi, S.C.; Dauria, J.M.
1972

Nucl. Phys. B, 336(1), 241-252
Kinematic Cuts and Backward Photoproduction.
Pond, P.; Kumar, A.
January,1972

Nucl. Technology, 15(1), 14-24
The Potential of a Lase-Induced Fusion Device as a Thermal-Neutron Source.
Brugger, R.M.
July,1972

Phys. Lett. A, 38A(3), 177-178
The Production of Very Cold Neutrons.
Golub, R.
January 31,1972

Phys. Lett. B, 37B(3), 217-220
On the Emission of Prompt Fission Neutrons.
Kluge, G.
November 29,1971

Phys. Lett. B, 38B(4), 218-219
Measurement of the Reaction Time for the 27-Al (p,Alpha) 24-Mg Reaction by the Use of the Blocking. Effect.
Komald, K.; Fujimoto, F.; Nakayama, H.; Ishii, M.; Hisatake, K.
February 21,1972

Radiochem. and Radioanal. Lett., 9(2), 143-145
On the Neutron Flux Density Distribution Around the Neutron Generator Target.
Janczyszyn, J.; Taczanoswkii, S.
January 30,1972

Sov. Astron. AJ(Engl. Transl.), 15(4), 616-623
Radiation Transport with Rayleigh Scattering. II. Finite Atmosphere.
Domke, H.
January-February,1972

Transp. Theory and Stat. Phys., 1(4), 263-270
Multigroup Transport Equation with a Degenerate Kernel.
Silvennoinen, P.
1971

Transp. Theory and Stat. Phys., 1(4), 271-285
Application of Noether's Theorem to the Transport Equation.
Tavel, M.
1971

Transp. Theory and Stat. Phys., 1(4), 313-328
Solution to the Monoenergetic Neutron Boltzmann Equation for a Finite Parallelepiped.
Boffi, V.C.; Molinari, V.G.
1971

Transp. Theory and Stat. Phys., 1(4), 329-349
On the Solution of the Monoenergetic Neutron Boltzmann. Equation in Cylindrical Geometry.
Premuda, T.
1971

BOOK (In Russian)
Hot and Isotope Laboratories. Second Edition, Revised and Enlarged.
Reformatskii, I.A.
1971
Moscow, Atomizdat

SPACE AND ACCELERATOR SHIELDING

AERE-M-2474
NERMA: A Programme for Evaluating Neutron Induced Energy Release in Materials.
Blow, S.
November,1971
Dep., NTIS (U.S.Sales Only)

EGG-1183-1519
MONTE CARLO Calculation of Electron Production by a Gamma Beam Incident on a Thick Foil.
Wecksung, G.W.; Walker, J.J.; Brown, R.T.
May 20,1971
Dep., NTIS

FRNC-TH-127 (In French)
Mechanisms of Alpha-Particle and Be-8 Transfer in Reactions Induced by Carbon Ions on Heavy Nuclei (Bi,Au).
Rivet, M.-F.
October,1971

HASL-TM-67-9
Propagation of the Neutron Component of the Nucleonic Cascade at Energies Less Than 500 MeV: Theory and a Solution to the Accelerator Transverse Shielding Program.
O'Brien, K.; McLaughlin, J. E.
September,1967
Health and Safety Lab., New York Operations Office, (AEC), N.Y.

JINR-P2-6195 (In Russian)
Inelastic Interactions of High-Energy Helium Ions with Atomic Nuclei.
Barashenkov, V.S.; Guidma, K.K.; Zheregy, F.G.; Iljinov, A.S.; Toneev, V.D.
1971
Dep., NTIS (U.S.Sales Only)

JINR-P2-6225 (In Russian)
Accumulation of Cosmogenic Isotopes in Iron Meteorites.
Barashenkov, V.S.; Sobolevsky, N.M.; Toneev, V.D.
1972
Joint Institute for Nuclear Research, Dubna

LA-DC-72-611
Spectrum of Neutron Produced by 800-MeV Protons on Uranium.
Veeser, L.R.; Fullwood, R.R.; Shunk, E.R.; Robba, A.A.
1972
From 18th Annual Meeting of the American Nuclear Society, June 19-22,1972.

MDAC WD 1865
Distribution Effectiveness Factors for the Human Bone Marrow System Exposed to Space Protons.
Billings, M.P,; Langley, R.W.
June,1972
McDonnell Douglas Astronautics Company, Huntington Beach, California.

NASA-TM-X-65850; X-661-72-66; N72-19862
Cosmic Ray Proton and Helium Spectra Above 50 GeV.
Ryan, M.J.; Ormes, J.F.; Balasubrahmanyan, V.F.
March,1972
NTIS

ORNL-TM-3148
Nonelastic Interactions of Nucleons and Pi-Mesons with Complex Nuclei at Energies Below 3 GeV.
Bertini, H.W.; Guthrie, M.P.; Culkowski, A.H.
March 28,1972

ORNL-TM-3785
The Validity of Using Only Primary Protons in Van Allen Belt and Solar-Flare Proton Shielding Studies.
Santoro, R.T.; Alsmiller, R.G.,Jr.; Barish, J.
June,1972
NTIS

Acta Radiol., Ther., Phys., Biol., 10(4), 443-453
Influence of Scattering Foils, Transmission Monitors, and Collimating System on the Absorbed Dose Distribution from 10 to 25 MeV Electron Radiation.
Svensson, H.
1971

Bull. Acad. Sci. USSR Phys. Ser., 34(9), 1667-1676
The Development of Electron-Photon Showers.
Ivanenko, I.N.
1971

Bull. Acad. Sci. USSR Phys. Ser., 34(9), 1763-67
Calculation of the Energy Spectra and Angular Distributions of Bremsstrahlung Photons, Generated by Cosmic Ray Muons in Lead and Iron at Sea Level.
Voikova, L.V.
1971

IEEE Trans. Nucl. Sci., NS-18(6), 443-453
Natural Nuclear Radiation Environments for the Grand Tour Missions.
Haffner, J.W.
December,1971

Physical Rev. C, 5(3), 728-738
Theoretical Aspects of Quadrupole Perturbations of Time-Integrated Angular Correlations.
Alonso, C.T.; Grodzins, L.
March,1972

Radiology, 102(1), 171-172
Effect of Air Gap on Absorbed Dose in Tissue.
Scrimger, J.W.
January,1972

Yadern Fiz., 14(6), 1214-1218 (In Russian)
Measurements of the Hadron Interaction Cross Sections in Cosmic Rays.
Bashindzhagyan, G.L.; Belokopytov, V.M.; Dem'yanov, A.I.; et. al.
December,1971
Translated in Soviet J. of Nuclear Physics

THESIS
Fast Neutrons in the Atmosphere During Periods of Solar Activity.
Light, E. S.
1971
Univ. Microfilms Order No. 72-3094

COMPUTER CODES LITERATURE

ANL-7406 December 1971 TESS
TESS: A One-Dimensional Ssub n Transport-Theory Code for the CDC 3600
by Goin, R. W.; Plummer, J. P.
Argonne National Laboratory, Argonne, Illinois
FORTRAN; CDC 3600
AVAIL: NTIS

ANL-7411 March 1972 ABSTRACTS
Argonne Code Center: Compilation of Program Abstracts
by Butler, M. K.; Henline, P.; Legan, M.; Ranzini, L.; Snow, W. J.
Argonne Code Center, Argonne, Illinois
AVAIL: NTIS

Atomkernenergie, 19(1), 14-16 1972 DLS
Two-Dimensional Shielding Calculations Using a Combination of Diffusion Theory and Line-of-Sight Method
by Vossebrecker, H.
INTERATOM, Bensberg, Germany

BOOK, pp 118-41 December 1971 EDIP
"Method of Characteristic Calculation of Energy Deposition and Impact Problems,"
in APPLIED MACHANICS ASPECTS OF NUCLEAR EFFECTS IN MATERIALS, Wan, C. C. (ed.)
by Chou, P. C.; Tuckmantel, D.
Drexel University, Philadelphia, Pa.
AVAIL: American Society of Mechanical Engineers, New York

CONF-711009; Trans. Amer. Nucl. Soc., 14(2), 670-671
October 1971 UFINV
UFINV: A Computer System for Invariant Imbedding Neutron Transport Calculations
by Mockel, A. J.
University of Florida, Gainesville, Florida

Electromedica, 3, 219-26 1970 IPHET
Computer Programs for Irradiation Planning in High-Energy Therapy
by Dobry, H.; Benedetti, G.R.
Siemens AG, Erlangen, Germany

NBS Technical Note 725 May 1972 MOMENT 1
A Neutron Moments Computer Code, MOMENT 1
by Eisenhauer, C. M.; Simmons, G. L.; Spencer, L. V.
National Bureau of Standards, Washington, D. C.
FORTRAN IV; UNIVAC 1107/1108; CDC 3600; IBM 360/91
AVAIL: NTIS

NWEF-1090 April 1972 CDR
Air Transport Calculations Using the LASL-NWEF Air Flux Tape and the NWEF Computer Program-- CDR
by Campbell, J. E.; Sandmeier, H. A.
Naval Weapons Evaluation Facility, Albuquerque, N. Mex.
FORTRAN; CDC 6600
AVAIL: NTIS

SS/01/71(Internal Report) March 1971 ESDORA
ESDORA: A Program to Estimate Radiological Doses for Hazard Evaluation in Nuclear Power Plants and Radioactive Installations
by Diaz de la Cruz, F.
Junta de Energia Nuclear, Nuclear Safety Section, Madrid, Spain
FORTRAN IV; IBM 7090

Y-1802 October 1971 BACK-SCAT
Monte Carlo Modeling and FORTRAN Simulation of a Compton Back-Scatter Thickness Gage
by Davenport, C. M.
Union Carbide, Y-12 Plant, Oak Ridge, Tennessee
FORTRAN IV; IBM 360/75
AVAIL: NTIS

RSIC DATA LIBRARY DLC-2/100G

1. NAME AND TITLE OF DATA LIBRARY

   100G: 100-Group Neutron Transport Code Cross Section Data Generated by SUPERTOG from ENDF/B.

2. NAME AND TITLE OF DATA RETRIEVAL PROGRAMS

   DLC2RP: A Program to Edit or Convert SUPERTOG Output to Forms Suitable for Input to ANISN or DTF-IV (see item 6).

   APRFX-I: A Program to Collapse and Combine DLC-2 Cross-Section Data.

3. HISTORICAL BACKGROUND INFORMATION

   The DLC-2 data was produced to provide users of multigroup transport codes with a library based on the current ENDF/B category I point cross section data. The philosophy is to provide a fine-group set which is based on data that is reasonably well-documented and which has undergone recent evaluation. The ENDF/B data meets both these requirements. The data was generated by R. Q. Wright of the ORNL Mathematics Division. See Section 13 for identification of the latest version of DLC-2.

4. APPLICATIONS OF THE DATA

   Neutron transport calculations can be performed with DLC-2 data. Since the data are intended for use in multigroup discrete-ordinates or Monte Carlo transport codes which treat anisotropic scattering, possible cross section angular expansion is limited only by the options available in the particular code used. Specifically, the retrieval program manipulates DLC-2 such that it conforms to input requirements of the CCC-82/ANISN,[9] CCC-89/DOT,[10] or CCC-42/DTF-IV[11] codes, or any computer code using data in the ANISN or DTF-IV format.

5. SOURCE AND SCOPE OF THE DATA

DLC-2 was generated by PSR-13/SUPERTOG[12] from nuclear data in either point-by-point or parametric representation as specified by ENDF/B.[13] This data is averaged over each specified group width. The explicit assumption was made that the flux (weighting function) has the shape of a fission spectrum joined at 0.0674 MeV by a 1/E tail. When resonance data were available, resolved and unresolved resonance contributions were calculated, using the infinite dilution approximation. DLC-2 consists of fine group constants such as one-dimensional reaction arrays (absorption, fission, etc.), P_n elastic scattering matrices, and inelastic and (n,2n) scattering matrices which were generated, combined and written on tape as card images in the ANISN format. The units are barns rather than cm^2.

DLC-2 represents a P_8 approximation to elastic scattering angular distributions. The data have a 100-group structure with energy group boundaries identical to those in the GAM-II[14] library, with a group 1 upper boundary energy of 14.92 MeV and a group 99 lower energy of 0.414 eV. The group-to-group transfer matrices reflect only down-scatter in energy, and group 100 serves as a thermal group. Cross-section values for the thermal group were selected as described in Ref. 3. As noted therein, the user should exercise caution in interpreting results for the thermal group.

The nuclides in DLC-2 are those which have been released as Category I ENDF/B by the National Neutron Cross Section Center, Brookhaven National Laboratory. The library contains data for H, D, He, 3-He, 6-Li, 7-Li, 9-Be, 10-B, 11-B, 12-C, 14-N, 16-O, 23-Na, Mg, 27-Al, Si, Cl, K, Ca, V, Cr, 55-Mn, Fe, 59-Co, Ni, Cu, 63-Cu, 65-Cu, Nb, Mo, 107-Ag, 109-Ag, 135-Xe, Cs-133, 149-Sm, 151-Eu, 153-Eu, Gd, 164-Dy, 175-Lu, 176-Lu, 181-Ta, 182-Ta, 182-W, 183-W, 184-W, 186-W, 185-Re, 187-Re, 197-Au, Pb, 232-Th, 233-Pa, 234-U, 235-U, 238-U, 238-Pu, 239-Pu, 240-Pu, 241-Pu, 242-Pu, 241-Am, 243-Am, and 244-Cm.

6. DISCUSSION OF THE DATA RETRIEVAL PROGRAMS

There are two retrieval programs packaged with DLC-2, DLC2RP and APRFX-I.

DLC2RP will retrieve DLC-2 data from a maximum of 46 data sets and merge these data into one data set. The program will then, by input option, edit the data, punch cards in either the ANISN or DTF IV format, or write an unformatted tape for use by ANISN. The program was written by the authors of the SUPERTOG program.

APRFX-I collapses the fine group cross sections to a broad group structure according to a flux spectrum either input by the user or calculated by the code. The code will average the fine group cross sections to form either macroscopic or microscopic isotope cross sections and any combination of macroscopic mixtures of these cross sections on the same problem. It also determines the broad group input source and generates averaged neutron velocities for use with transport calculations. The program was written at the Nuclear Effects Laboratory, Ballistics Research Laboratory, Aberdeen Proving Ground.

7. CONTRIBUTORS

Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Nuclear Effects Laboratory, Ballistics Research Laboratory, Aberdeen Proving Ground, Maryland.

8. DATA FORMAT AND COMPUTER

BCD card image; IBM 360/65/75/91.

9. TYPICAL RUNNING TIME

Using the DLC2RP retrieval program to produce an unformatted tape, for use by ANISN, containing elements hydrogen and oxygen for P_8 expansion requires approximately 2 minutes on the IBM 360/65.

To compile APRFX-I and collapse 100 group P_1 cross sections to 7 groups using generated spectra requires 35 seconds on the IBM 360/91.

10. REFERENCES

a. Documentation available with library

(1) R. Q. Wright, "User's Manual for DLC-2 DATA RETRIEVAL Program," informal notes July 1972.

(2) R. W. Roussin, "Comments on ANISN and DTF-IV Format," informal notes (1969).

(3) R. Q. Wright, "Values of Thermal Cross Sections Used for DLC-2D," informal notes (1972).

(4) "99-Group Energy Structure and Fission Sources for Use in Discrete Ordinates Codes," taken from Ref. 12 below.

(5) R. W. Roussin, "Using ANISN to Reduce the DLC-2 100-Group Cross-Section Data to a Smaller Number of Groups," ORNL-TM-3049 (May 1969).

(6) J. B. Wright and R. W. Roussin, "Comments on Reactions Included in the SUPERTOG Procedure and a Compilation of File 1 Information Listing References for the ENDF/B Data," informal notes (1972).

(7) P. S. Pickard and D. O. Williams, "Calculated Neutron Energy Spectra for the APRF Reactor," Memo for Record AMXRD-BNL (September 1970).

(8) P. S. Pickard, "APRFX-I, Neutron Cross Section Collapsing Code," Memo for Record, AMXRD-BNL (December 1970).

b. Other documentation helpful in defining library

(9) W. W. Engle, Jr., "A User's Manual for ANISN," K-1693 (March 1967).

(10) F. R. Mynatt, "A User's Manual for DOT," K-1694 (January 1967).

(11) K. D. Lathrop, "DTF-IV, A FORTRAN-IV Program for Solving the Multigroup Transport Equation with Anisotropic Scattering," LA-3373 (November 1965).

(12) R. Q. Wright, N. M. Greene, J. L. Lucius, and C. W. Craven, Jr.," SUPERTOG: A Program to Generate Fine Group Constants and P_n Scattering Matrices from ENDF/B," ORNL-TM-2679 (Sept. 1969).

(13) M. K. Drake, Editor, "Data Formats and Procedures for the ENDF Neutron Cross Section Library," BNL-50274 (T-601) (ENDF 102, Vol. 1) (October 1970).

(14) G. D. Joanou and J. S. Dudek, "GAM-II: A B_3 Code for the Calculation of Fast-Neutron Spectra and Associated Multigroup Constants," GA-4265 (1963).

11. CONTENTS OF THE LIBRARY

The library package contains the following items:

a. the documentation listed in section 10a above,

b. depending on the user's needs, a reel of magnetic tape or tapes with contents as listed below:

(1) 7-track, 556 bpi (unblocked)

1 tape for 17 nuclides,
1 tape for 15 nuclides,
1 tape for 14 nuclides,
1 tape for 10 nuclides
1 tape for 8 nuclides, retrieval programs, sample input and output

(2) 9-track, 800 bpi (blocked)

1 tape for entire library plus retrieval programs.

Persons requesting the library should send the appropriate number of full (2400 ft) reels of magnetic tape to the address listed below.

12. HOW TO OBTAIN LIBRARY

Inquiries or requests for the library may be mailed to

DATA COORDINATOR
Radiation Shielding Information Center
Oak Ridge National Laboratory
P. O. Box X
Oak Ridge, Tennessee 37830

or telephoned to

Area Code 615; 483-8611, extension 3-6944, or to

FTS xx-615-483-6944.

13. DATE OF ABSTRACT AND CURRENT VERSION

July 1972.

DLC-2D is the library based on ENDF/B Version III Data. This ENDF release included data for nuclides listed in section 5 above.