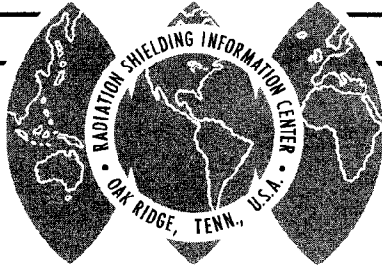


RSIC Newsletter



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. 51

February, 1969

Imparting knowledge is only lighting other men's candles at our lamp, without depriving ourselves of any flame. --- Jane Porter

RSIC TO VERIFY DISTRIBUTION LIST

Information services supported by the government are required to periodically verify their distribution lists. Therefore, we are sending each person on our distribution list a card which he must return to remain on the mailing list. Please do so promptly if you wish to continue receiving RSIC material.

We have tried to minimize the work for both you and for us so we have chosen this method. Your name is printed on the card and it is pre-addressed. All you need to do is stamp and mail to assure us of your continued interest.

We are using our SDI system and cards for this purpose (see article below); if you have not received these cards, please watch for them.

ELECTRON TRANSPORT THEORY SEMINAR - ETRAN WORKSHOP

Held in January

Fifty-three participants from 24 separate installations were in attendance at the Seminar-Workshop held at the Oak Ridge National Laboratory January 27-28. Co-sponsored by RSIC and the Center for Radiation Research, National Bureau of Standards, Dr. Martin J. Berger presented the theory and operation of the electron and photon transport program, RSIC Code Package CCC-107/ETRAN.

Dr. Thomas M. Jordan, ART Research Corporation, presented a paper entitled, "BETA, A Monte Carlo Computer Program for Bremsstrahlung and Electron Transport Analysis", describing a code which will soon be available.

The following code package versions are available from RSIC:

CCC-107A/DATAPAC-4 and ETRAN 15 for the UNIVAC 1108 Computer.

This version was packaged by NBS and has not been tested by RSIC. Coding is done in Fortran IV and Fortran V.

CCC-107B/DATAPAC-4 and ETRAN 16 for the IBM 360/75 Computer.

Written in Fortran IV.

CCC-107C/DATAPAC-4 and ETRAN 16B for the IBM 360/75 Computer.

This is a modified version of ETRAN 16 with modifications as follows:

- DATAPAC-4 - Subroutine X-RAY rewritten.
- ETRAN-16B - An additional input variable is included, NFCOS, the number of equal solid angles into which full space is divided for the classification of the electron directional flux distributions.

NOTE: The 3 files of library data is the same for all 3 versions.

RSIC SDI AND SPECIAL BIBLIOGRAPHY SERVICES

For several years the Radiation Shielding Information Center has operated a selective dissemination of information (SDI) service. This is an automatic computerized service designed to inform the working scientist or engineer of current publications likely to be of interest to him.

Briefly, the SDI works as follows. Each participant prepares an "interest-profile" consisting of subject categories in which the participant is interested. For example, if a person's interests are in space shielding, his profile might be:

<u>Category Number</u>	<u>Category</u>
311000	Space Shielding - General
312000	Space Shielding - Experiments
313000	Space Shielding - Van Allen Protons
314000	Space Shielding - Solar Flares
315000	Space Shielding - Cosmic Rays
316000	Space Shielding - Electrons
317000	Space Shielding - Magnetic

When a document is entered into the computer tape files, a comparison is made between the category numbers of the document and the numbers of each participant's profile. If a document has been indexed by 312000 and 313000, there will be a match with the above profile and the computer will print an abstract for the participant. When the category numbers of all the documents of the updating run have been compared with the profiles, the abstracts are printed on green 5 x 8 in. cards and addressed. They are then ready for mailing. A sample is shown below. Normally, there will be several abstracts printed for each participant with each update of the tape files.

RSIC Abstract Number

1-27-69

1472. SEP 1965
ANALYTICAL ESTIMATION OF THE OPTIMAL SELECTION AND ARRANGEMENT OF SHIELDING MATERIALS IN REACTORS SHIELDS
SCHULTZ, H., SASSE, S.
ORNL-TR-1526 (TRANSL. FROM ABS-THH-1024)

AVAILABILITY- CFSTI, JCL \$.60, \$2.06

ON THE BASIS OF SIMPLE ATTENUATION MODELS, AN ANALYTICAL OPTIMIZATION MODEL IS CONSTRUCTED FOR ONE ENERGY GROUP AND SEVERAL ENERGY GROUPS. COUPLED ENERGY GROUPS ARE ALSO DISCUSSED. PREVIOUS WORK IN OPTIMIZATION IS BRIEFLY REVIEWED. (RSIC)

620000

Category Number

001 DIPL. PHYS. CH. SCHNIER

1-27-69

LISTED BELOW IS A SUMMARY OF THE DOCUMENTS SELECTED FOR YOU BY RSIC FROM THE REACTOR ABSTRACT FILES. PLEASE CIRCLE ONE OF THE INTEREST CODES FOLLOWING EACH CARD NUMBER AND RETURN THIS CARD TO RSIC. INTEREST CODE DEFINITIONS ARE - M - MUCH INTEREST, S - SOME INTEREST, N - NO INTEREST, P - HAVE SEEN PREVIOUSLY.

ABSTRACT NUMBER	DROP WEIGHT	INTEREST				ABSTRACT NUMBER	DROP WEIGHT	INTEREST			
678	01	M	S	N	P	740	01	M	S	N	P
812	01	M	S	N	P	917	01	M	S	N	P
987	01	M	S	N	P	1088	01	M	S	N	P
1212	01	M	S	N	P	1289	01	M	S	N	P
1293	01	M	S	N	P	1317	01	M	S	N	P
1362	01	M	S	N	P	1389	01	M	S	N	P
1432	01	M	S	N	P	1434	01	M	S	N	P
1472	01	M	S	N	P	1629	01	M	S	N	P
1694	01	M	S	N	P						

"Monte Carlo and { neutron penetration calculation } and { water }
 { or } { or }
 { gamma-ray penetration calculation } { concrete }

Recently the SDI program was modified to do retrospective searches and give abstracts in the SDI format of documents in one or more categories (logical or). For example, one might get abstracts for transmission in ducts:

neutrons { calculation } or gamma-rays { calculation }
 { or } { or }
 { experiment } { experiment }

Since the SDI is meant to be a selective service for the specialist, normally a profile of 10-15 category numbers should suffice. A larger profile set is generally not needed since retrospective searches are available, as noted above, and relatively broad coverage is obtained through the newsletter.

If you wish to become a participant, revise your profile, or desire further information, please call or write.

ADDITIONAL CROSS SECTION LIBRARIES

We have had a number of inquiries regarding additional elements needed in the available cross-section libraries. Data for many of the nuclides of greatest interest are now undergoing examination by the Cross-Section Evaluation Working Group and should eventually be in the released ENDF/B library. For example, much interesting data for shielding applications are in the report by M. K. Drake, "Neutron and Gamma-Ray Production Cross-Sections for Sodium, Magnesium, Chlorine, Potassium, and Calcium", NDL-TR-89, Vol. I-VI (1967), and M. K. Drake, "Neutron and Gamma-Ray Production Cross-Sections for Silicon", DASA-2099 (GA-8628)(1968).

A computer program, now being developed at Oak Ridge by D. C. Irving and R. Q. Wright, to translate UK evaluations to ENDF format will make additional data available.

SUMMER INSTITUTE ON FUNDAMENTAL RADIATION SHIELDING PROBLEMS AT KSU

The American Society for Engineering Education, the Dept. of Defense (Office of Civil Defense), and the Dept. of Nuclear Engineering, Kansas State University, will sponsor a *Summer Institute on Fundamental Radiation Shielding Problems* at Kansas State University, June 30 to August 1, 1969. The course will include theory, experimental work, and fallout shelter analysis. For further information, write to Prof. Richard E. Faw, Dept. of Nucl. Eng., Kansas State University, Manhattan, Kansas 66502.

PERSONAL ITEMS

We were saddened to learn of the untimely death of Dr. A. Tsuruo on December 24, 1968. Dr. Y. Kanemori is now the RSIC contact to replace Dr. Tsuruo at Japan Atomic Energy Research Institute (JAERI), Tokai Research Establishment.

VISITORS TO RSIC

Visitors to RSIC during the month of January are: Armost Hönig, BRNO Technical University, BRNO, Czechoslovakia; Michael J. Kolar, NASA-Lewis Research Center, Cleveland, Ohio; Capt. R. W.ENZ, DASA, Washington, D. C.; N. M. Schaeffer, M. B. Wells, Radiation Research Assoc., Ft. Worth, Texas; Rick Byrne, Ron Snow, Brown Engineering, Huntsville, Ala.; Frank Bouquet, Lockheed California Co., Burbank, California; Capt. George Radke, WLBB, Kirtland AFB, New Mexico; Samuel Bresticker, Grumman Aircraft Engr. Corp., Bethpage, L. I., N.Y.; Dorsey G. Abshier, North American Rockwell-Autonetics, Anaheim, Calif.; Henry E. Stern, NASA-George Marshall Space Flight Center, Huntsville, Alabama.

FEBRUARY ACCESSION LIST OF LITERATURE

The RSIC is now aware of the literature cited in the following list. This literature has either been obtained by RSIC or has been placed on order. When received, this material will be examined and assigned to various files if suitable for our information system. The accession list is divided into three fields of (1) reactor and weapons shielding, (2) space and accelerator shielding, and (3) shielding computer codes. These titles are announced before processing and indexing so that there will be no delay and can serve as a prompt announcement of current literature.

RSIC is not a documentation center. Copies of the literature cited must generally be obtained from the author or from a documentation center such as the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

RSIC maintains a microfiche file of literature entered into its information system. Computer searches of this system (which produces a special bibliography) and duplicate microfiche copies of literature in our file are available upon request. Naturally we cannot supply copies of literature which is copyrighted (such as books or journal articles) or whose distribution is restricted. Neither service is yet available for the codes literature.

REACTOR AND WEAPONS SHIELDING

BLG-421

An Evaluation of Nuclear Data for Some Activation Detectors Useful
in Thermal and Epithermal Spectral Indices Measurements
P. T. Dambe, A. Fabry, H. Van den Broeck
September, 1967

CONF-469 (759-72)

Influence of Anisotropy of Elastic Scattering on the Propagation of
the Fast Flux Near the Shield
F. Adamoli, L. Brusa
1966

DP-1171

A System for the Analysis of Gamma-Ray Spectra by the Method of
Simultaneous Equations
F. D. Knight
November 1968

EURFNR-533 (KFK-770 in German)

Group Constants for Steam-and Sodium-Cooled Fast Reactors (26-
Group Representation)
H. Huschke

GA-8628 (DASA-2099)

Neutron and Gamma Ray Production Cross Sections for Silicon
M. K. Drake
May 1, 1968

GA-8741

Gamma Buildup in Heterogeneous Media
B. A. Engholm
September 16, 1968

KFK-730 (In German)

Methods of Analysis of Gamma Spectra
V. Haase
April, 1968

LA-3528

Neutron Cross Sections for Pu-239 and Pu-240 in the Energy Range
1 keV to 14 MeV
R. E. Hunter, J. J. Berlijn, C. C. Cremer
July 1968

ORNL-TM-2404

The Application of a Gamma-Ray Cascade Model to the Calculation of
Neutron Energy-Dependent Capture Gamma-Ray Production Cross
Sections
K. J. Yost, S. M. Kremer
November 6, 1968

PB-180031

The Numerical Solution of the Steady-State Transport Problem by the
Discrete S_n Method on Illiac IV
Vitalius Benokraitis
May 8, 1968

PEL-180

High Resolution Fast Neutron Cross-Sections of Iron
E. Barnard, J. Devilliers, et al.
July, 1968

UCRL-50400, Vol VI

An Integrated System for Production of Neutronics and Photonics
Calculational Constants, Vol. VI - Photon Cross Sections 1 keV
to 100 MeV
E. F. Plechaty, J. R. Terrall
October 22, 1968

UCRL-50443

Transport-Corrected Boundary Conditions for Neutron Diffusion
Calculations
R.J. Doyas, N. J. McCormick
June 7, 1968

UCRL-50484

Semiempirical Neutron-Induced Reaction Cross Sections
W. E. Alley, R. W. Gell, R. M. Lessler
August 1968

UCRL-Trans-10293 (CEA-R-2991 *in French*)

Processing of Data from a Gamma Spectrometer
J. P. Boulanger

USNRDL-TRC-58-50 (AI-68-51)

A Variational Synthesis Method for Calculating Structure
Shielding Data
B. D. O'Reilly
June 1968

Atompraxis, 14 (*In German*) (*July 1968*)

Shielding of Fast Neutrons by Normal Concrete
P. F. Sauermann, W. Schaefer

Atti Accad. Naz. Lincei, Rend., Cl. Sci. Fis., Mat. Natur., 43,
509-13 (1967) (*In Italian*)

Energy Spectra of Neutrons Emitted by a RaD-Be Source
A. De Marco, R. Garfagnini, G. Piragino

Battelle Techn. Rev., 17, 9-15 (*August 1968*)

Shipping Containers for Irradiated Reactor Fuels
J. D. Rollins, E. G. Lusk

Energ. Nucl. (Milan), 15, 654-60 (*October 1968*)

Gamma Ray Penetration Through and Back Scattering from Concrete
Yung Sung Su, Kuh Chou Wu

J. Appl. Phys., 39, 4781-3 (*September 1968*)

Electron Momenta in Monte Carlo X-Ray Transport
W. J. Veigele

J. Radioanal. Chem., 1, 313-23 (*July 1968*)

Neutron Flux Distribution Around the Disk-Shaped Source of
Accelerator Type Neutron Generators
J. de Beeck

Kernenergie, 11, 197-203 (*July 1968*) (*In German*)

The Shielding of Gamma Radiation by Ordinary Concrete
F. W. Krüger

Meccanica, 3, 69-80 (June 1968)

The Problem of the Neutron Diffusion: A Survey
Antonio Pignedoli

Nucl. Data, A5(1-2), 1-242 (Nov. 1968)

Tables - Compendium of Thermal-Neutron-Capture Gamma-Ray Measurements. Part II Z-47 to Z-67 (Ag to Ho)
L. V. Groshev, A. M. Demidov, V. I. Pelekhov, L. L. Sokolovskii,
G. A. Bartholomew, A. Doveika, K.M. Eastwood, S. Monaro

Nucl. Sci. Eng., 35 (1), 91-103 (January 1969)

The Neutron Spectrum from a Fission Source in Graphite
A. E. Profio, H. M. Antunez, D. L. Huffman

Nucl. Sci. Eng., 35(1), 113-117 (January 1969)

Gamma-Ray Transmission Through Inhomogeneous Layers
G. W. Hinman

Nucl. Sci. Eng., 35(1), 139-141 (January 1969)

S_n Calculation of Highly Forward Peaked Neutron Angular Fluxes
Using Asymmetrical Quadrature Sets (Tech. Notes)
R. J. Cerbone, K. D. Lathrop

Nukleonik, 11, 182-7 (July 1968)

Comparison of the Exact Solution According to the Spherical
Function Method and the Case Method for Linear Anisotropic
Scattering Laws for Monoenergetic Half Space Problems
J. Mehner

Phys. Rev., 175, 218-21 (Nov. 5, 1968)

Multiple Scattering and the Inverse Albedo Problem
S. Pahor

Soviet At. Energy, English Transl. 24(2), 236-37 (February 1968)

Measurements of the Dose Field Outside Steel Shielding for
Mixed Radiation
M. O. Zel'chinskii, M. M. Komochkov, B. S. Sychev, A. P.
Cherevatenko

Z. Angew. Math. Mech., 47, T60-1 (1967) (In German)

Calculation of the Time-Dependent Neutron Flux with the Monte Carlo Method

H. Kschwendt, H. Reif

Soviet J. At. Energy, English Transl. 23 (4), 1079- (Oct. 1967)

Use of Angular Distributions of Scattered Gamma-Radiation Intensity to Calculate Composite Shields

L. M. Shirkin

Soviet J. At. Energy, English Transl., 23(4), 1072- (October 1967)

Prompt Fission Neutrons and Gamma-Rays and Level Density Parameters of Fragment Nuclei from the Spontaneous Fission of Cf-252

V. P. Zommer, A. E. Savel'ev, S. V. Zhikareva

Soviet J. At. Energy, English Transl., 23(4), 1053 (Oct. 1967)

Radiation Damage in Ordinary Concrete

V. B. Dubrovskii, Sh. Sh. Ibragimov, M. Ya. Kulakovskii, A. Ya. Ladygin, B. K. Pergamenshchik

BOOK

Engineering Compendium on Radiation Shielding. Vol. I - Shielding Fundamentals and Methods

Edited by: R. G. Jaeger, E. P. Blizard, A. B. Chilton, M. Grotenhuis, A. Honig, Th. A. Jaeger, H. H. Eisenlohr
1968

Springer-Verlag, New York, Inc.

Price \$60.00

SPACE AND ACCELERATOR SHIELDING

AEC-TR-6936 (p.188-202) (N68-38192)

Calculation of Protection Against Ionizing Radiation

B. A. Dolgosheina, Yu. P. Nikitina, V. V. Frolova
June 1968

NASA-CR-1194 (Rept. -0-7100/8R-2; N68-37708)

Investigation of Electron Interaction in Matter
(Final Report, 9 Feb. 1967-9, Feb. 1968)
October 1968

NASA-CR-90542 (N68-11826)

The Artificial Electron Belt, October 1963 to October 1966
D. S. Beall
July 14, 1967

N68-37246 (Translation) (BMWF-FB-W-67-40 in German)

Meteoroid Shielding and Radiation Shielding for Jupiter Probes
W. Kokott
1967

N68-37694 (JINR-P1-3919) (In Russian)

Investigation of Electron-Photon Showers Induced by Gamma-
Quanta at 100, 200, 500, and 2000 MeV in Liquid Xenon
B. Slovinskii, Z. S. Strugal'skii, B. Yanovskaya
1968

ORNL-TM-2253

Neutron and Proton Spectra from Targets Bombarded by 450-MeV
Protons
J. W. Wachter, W. A. Gibson, W. R. Burrus
11-18-68

ORNL-TM-2420

High Energy (<400 MeV) Neutron Transport Using the Method of
Discrete Ordinates
R. G. Alsmiller, Jr., F. R. Mynatt, J. Barish, W. W. Engle, Jr.
November 1, 1968

ORNL-TR-2030 (JINR-P9-3435 in Russian)

Attenuation of Synchro-cyclotron Stray Radiation in Shielding
L. N. Zaitsev, L. R. Kimel, M. M. Komochkov, V. P. Sidorin,
B. S. Sychev, O. A. Ulitin, E. P. Cherevatenko
1967

UCRL-504442 (N68-38499)

Calculation of Forward Bremsstrahlung Spectra from Thick Targets
W. C. Dickinson, E. M. Lent
June 6, 1968

United Nations-Paper 68-95260 (A69-10477)

On Protection from the Cosmic Rays and Internal Radiation Belt
in Space Flights
P. Velinov

*Bull. Acad. Sci. USSR, Phys. Ser. (English Transl.), 31(9), 1583-85
(Sept. 1967)*

Equilibrium Angular Distribution Functions for Cascade Electrons
in Iron and Lead
I. P. Ivananko, B. E. Samosudov

*Bull. Acad. Sci. USSR, Phys. Ser. (English Transl.), 31(9), 1580-82,
(September 1967)*

Angular Distribution of Electrons at Different Depths in Cascade
Showers
V. V. Guzhavin, I. P. Ivanenko, L. N. Potapova, B. E. Samosudov

*Bull. Acad. Sci. USSR, Phys. Ser. (English Transl.), 31(9) 1574-75
(September 1967)*

Investigation of Electromagnetic Shower Development in Lead
Yu. A. Emel'yanov, Yu. T. Lukin, K. A. Amanov, K. S. Kharitonova

*Bull. Acad. Sci. USSR, Phys. Ser. (English Transl.), 31(9), 1571-73,
(September 1967)*

Investigation of Electron-Photon Cascades in Iron in the 10^{12} eV
Energy Region
V. V. Borog, V. G. Kirillov-Ugryumov, A. A. Petrukhin, V. V.
Shestakov

Bull. Acad. Sci. USSR, 31(9), 1505 (September 1967)

Investigation of Nuclear Cascade Showers in Iron
E. V. Denisov, V. M. Kim, A. E. Morozov, S. A. Slavatinskii

Nucl. Instr. Methods, 64, 173-80 (September 15, 1968)

Radiation Shielding for High Energy Muons: The Case of a
Cylindrically Symmetrical Shield and no Magnetic Fields
D. Keefe, C. M. Noble

THESIS 68-3493 (N68-37465)

Rocket Probe Measurement of Electron Energy Spectra in the Earth's
Radiation Belts
D. S. Robb
New Mexico Univ., Albuquerque
1967

BOOK (A69-10945)

Handbook of Soviet Space-Science Research (p. 215-302) "Solar and
Cosmic Electromagnetic and Charged Particle Radiations"
Edited by: G. E. Wukelic
New York, Gordon and Breach, Science Publishers, Inc.

CEA-N-933 (ORNL-tt-2045)

May 1968

ZEUS 4

Variant of the ZEUS Program Applied to Tunnel Programs -
ZEUS Alb. 5 Program and Auxiliary Programs
by Francois Gervaise and Marguerite-Marie d'Hombres