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

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CURRENT WORK AND PROBLEMS

The Cross Section Evaluation Working Group met at Brookhaven May 24-26. With minor changes the recommendations of the shielding committee dealing with formats and reaction data needed for shielding calculation were adopted. The first approved ENDF/B data tape will be released before long. On account of the late start of the shielding subcommittee, not all the materials on this tape will have been adequately prepared for reactions of special interest to shielding.

NEW STAFF MEMBER

Mr. H. Yamakoshi of the Ship Research Institute, Ministry of Transport, Tokyo, Japan, has joined the RSIC staff for a period of eleven months.

RECENT VISITORS TO RSIC

The following people visited RSIC during the month of May 1967: Dr. Hans Heinrich Weise, University of Kiel, Germany; Karin Offermanns, Landolt-Bernstein, Germany; R. L. Williams, Metcut Research, Cincinnati, Ohio; Darrell Schermerhorn, Aerospace Corporation, San Bernardino, California; Dean C. Kaul, AFSC (BSD/BSR-1), San Bernardino, California; Franz L. Alt, National Bureau of Standards, Washington, D. C.; W. E. Edwards, General Electric, Cincinnati, Ohio; Thomas P. Wilcox, Lawrence Radiation Laboratory, Livermore, California.

NEW CODE PACKAGES AVAILABLE

Operable, tested with a sample problem, and available for distribution are the following code packages:

CCC-73/ASTROS	Calculation of Primary and Secondary Proton Dose Rates in Spheres and Slabs of Tissue, contributed by Lawrence Radiation Laboratory, University of California, Berkeley, California. (UCRL-10980, UCRL-16154)
CCC-74/CAPS-2	Radiation Shielding Structures Analysis Code, contributed by Technical Services Directorate, Office of Civil Defense.
CCC-75/G33 A and B	Multigroup Gamma-Ray Scattering Kernel Integration Code, contributed by Los Alamos Scientific Laboratory, Los Alamos, New Mexico, and NASA Lewis Research Center, Cleveland, Ohio. (EAD-119 AN-COMP-196)
CCC-76/BPPC	Proton Penetration Code, contributed by Boeing Company, Aerospace Division, Nuclear and Space Physics, Seattle, Washington.
CCC-77/BEBC	Electron Bremsstrahlung Code, contributed by Boeing Company, Aerospace Division, Nuclear and Space Physics, Seattle, Washington.
CCC-78/BED	Electron Dose Code, contributed by Boeing Company, Aerospace Division, Nuclear and Space Physics, Seattle, Washington.
CCC-79-A/ISOSHLD	General Purpose Isotope Shielding Analysis Code, contributed by Battelle-Northwest Laboratory, Richland, Washington.(BNWL-236)
CCC-79-B/ISOSHLD II	ISOSHLD Modified to Include Bremsstrahlung, contributed by Battelle-Northwest Laboratory, Richland, Washington. (BNWL-236, SUP 1)
CCC-80/GASS	Monte Carlo Gamma Source Method Self Shielding Code, contributed by University of Illinois, Department of Civil Engineering and the Nuclear Engineering Program, Urbana, Illinois. (UI-NRSS-3).
CCC-81/AGN-SIGMA	Calculation of the Legendre Components of the Multigroup Transfer Matrices and the Group Cross Sections, contributed by Aerojet-General Nucleonics, San Ramon, California. (AN-1447)
CCC-82/ANISN	One-Dimensional Discrete Ordinates S_N Transport Code with Anisotropic Scattering, contributed by Union Carbide Corporation, Nuclear Division, Computing Technology Center, Oak Ridge, Tennessee. (K-1693)

CCC-83/RAID — Monte Carlo Procedure for Analysis of Radiation in Ducts (Revision of CCC-9/L-05), contributed by Nuclear Aerospace Research Facility (NARF), General Dynamics, Fort Worth, Texas, and Air Force Weapons Laboratory (AFWL), Albuquerque, New Mexico. (NARF-DC Memo-1.115)

CCC-84/SHADRAC — Shield Heating and Dose Rate Attenuation Calculation (Revision and Combination of CCC-5/C-17 and CCC-6/L-63), contributed by Nuclear Aerospace Research Facility (NARF), General Dynamics, Fort Worth, Texas, and Air Force Weapons Laboratory (AFWL), Albuquerque, New Mexico.

S_N SEMINAR WORKSHOP

Enthusiasm engendered by recent computer code seminar-workshops sponsored by RSIC has brought forth a number of requests for additional ones. Therefore, RSIC will assist in promoting a seminar to explore the S_N Method as a tool to design shields, special applications of the S_N Method in shielding problems; and a workshop where specific codes may be examined in depth.

The Computing Technology Center, Union Carbide Nuclear Division, Oak Ridge, developer of the ANISN Code (work supported by the Oak Ridge National Laboratory) has agreed to co-sponsor the seminar-workshop, and ANISN will be considered in depth in the workshop. As before, the invitees will be those who express interest. Dates being considered are mid-August or early September. Specific information will be sent to RSIC Codes Distribution and to those who respond to this announcement. A response from those who have made specific application of the S_N method would be particularly appreciated. Ideas and suggestions for an agenda are solicited.

MAY 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

ORNL-TR-1523 (Translated from ABS-THH-1018)

Measurement of Gamma-Radiation in the Mockup of a Power Reactor Shield in the Geesthacht Research Reactor (FRG)
W. Futtermenger

ORNL-TR-1524 (Translated from ABS-THH-1021)

Experimental Determination of Geometry Effects in the Measurement of Build-up Factors for Gamma-Radiation in Concrete
K. Heinze

ORNL-TR-1527 (Translated from ABS-THH-1025)

Calculation of Gamma-Radiation Build-up Factors in Layered Shields
H. Schubart

ORNL-TR-1666 (Translated from Jaderna Energie 12, 296-98 (1966)

Equivalent Thicknesses of Materials for the Attenuation of Gamma-Radiation
A. Honig

Nucl. Sci. Eng., 28(3), 376-383 (June 1967)

Multitable Treatments of Anisotropic Scattering in S_N Multigroup Transport Calculations
G. I. Bell, G. E. Hansen, H. A. Sandmeier

Nucl. Sci. Eng., 28(3), 415-425 (June 1967)

An Approximate Theory for the Slowing Down of Neutrons in a Nonmultiplying Medium
H. G. Kaper

ORNL-TR-1670 (Translated from Nippon Genshiryoku, 8(7), 371-81 (July 1966)

Backscattering of Gamma Rays
T. Hyodo

AWRE-O-79/65

A 12 Group Set of Photon Cross Sections for Use in Anisotropic S_N Calculations of Photon Transport
W. M. Kerr, K. Parker, D. V. Williams and Patricia Wilton

UCRL-50174 - Section II

Compilation of X-Ray Cross Sections
W. H. McMaster, N. Kerr DelGrande, J. H. Mallett, N. E. Scofield, R. Cahill, and J. H. Hubbelle - January 1967

BOOK

The Monte Carlo Method (The Method of Statistical Trials)
N. P. Buslenko, D. I. Golenko, Yu. A. Schreider, I. M. Sobol' and V. G. Sragovich
(Publisher: Pergamon Press)

Nucl. Sci. Eng., 28(2), 259-269 (May 1967)

Neutron Thermalization in Light Water
J. C. Young, G. D. Trimble, J. M. Neill, G. K. Houghton, D. H. Houston, and J. R. Beyster

Nucl. Sci. Eng., 28(2), 177-189 (May 1967)

Applications of the Invariant Imbedding Method to Monoenergetic Neutron Transport Theory in Slab Geometry
J. O. Mingle

LA-3617

Biorthogonal Angular Polynomial Expansions of the Boltzmann Transport Equation
K. D. Lathrop and N. S. Demuth - October 1, 1966

BOOK

Radiation Physics in Radiology
Raymond Oliver
(Publisher: Blackwell (Oxford) 1966)

BOOK

The Theory of Neutron Slowing Down in Nuclear Reactors
J. H. Ferziger and P. F. Zweifel
(Publisher: MIT Press 1966)

AEC-TR-6709

Handbook of Recording Instruments for Ionizing Radiation
I. M. Egorov, A. F. Lazarev, N. L. Perov, A. A. Timofeev, V. S. Zherov

EUR-3262.e

Some Numerical Schemes for Neutron Diffusion Problems
J. P. Roos - Nov. 21, 1966

NP-16664 (GE-63-RL-(3253M))

Use of MICA as a Convenient and Simple Dosimeter for Both Slow and Fast Neutrons
P. B. Price and R. M. Walker - Feb. 1963

GA-7480

Integral Neutron Thermalization
J. R. Beyster, H. Antunez, G. Borgonovi, et al.

AD-646630 (NDL-TR-84)

Measurement of Neutron Spectrum, Age, and Diffusion Length in Concrete
G. M. Lim, T. G. Williamson, and W. R. Johnson - Jan. 1967

BLG-405

Flux Depression by Thermal Neutron Detectors
L. DeCorte- December 1964

ISS-66/42

Dose Distribution of High Activity 60-Co Source through Glass Dosimetry
A. Grisanti and P. Tori - November 10, 1966

IN-1045

Multiple Scattering of Thermal Neutron
J. P. Plummer - Feb. 1967

NP-16585

Operation CENIZA-ARENA: Techniques for the Measurement of Deposition and Distribution of Fallout Around Structures
D. E. Clark, Jr., J. D. Sartor - Dec. 1966

UCID-2887L

Various Data and Assumptions Used for Calculating Radiation Levels and Stay Times in Target Areas
R. Krevitt
April 1966

UCRL-70298

Systematics of Fission Product X-Ray Intensities
W. John, R. Massey and B. G. Saunders

JPRS-39787

Spatial Distribution of Reactor Radiation Around the Horizontal Channel of the RA Reactor at Vinca
M. Ninjovic, D. Paligoric, B. Vujisic

USNCEL-TR-529

A Critical Evaluation of the Markov Matrix Treatment of Neutron Diffusion in Slabs
M. L. Eaton and C. M. Huddleston
May 1967

JAERI-1120 (Japanese)

Characteristic Tests of Experimental Facilities for Shielding Research Using Reactor JRR-4
M. Shindo (Editor - August 1966)

Space and Accelerator Shielding

RPP/R-3

Neutron Studies in Shields and Tunnels at the Rutherford Laboratory
K. B. Shaw - 1967

SLAC-Trans-60

Shielding for the Frascati Linear Accelerator Quench Tanks
M. Ladu, M. Pelliccioni, and M. Rocella - Sept. 19, 1966

NIRL/M/82

Radiation Measurements around the NIMROD 7 GeV Extracted Beam
K. B. Shaw, D. Laws, and D. R. Perry - March 1965

UCRL-16000

200 BeV Accelerator Design Study I - Section XII - Radiation Problems
June 1965

LTV Report No. O-71000/6R-18

Investigation of Electron Interactions with Matter
D. H. Rester and W. E. Dance - September 1966

SID-64-1295 (N66-16495, AD-459260)

Shielding Analysis of 1956-1961 Solar Proton Event Data
J. W. Haffner - July 15, 1964

Proceedings of International Conference on Cosmic Rays, September 6-17, 1965 - Volume I, pp. 40-49

Earth's Radiation Belt
S. N. Vernov, S. N. Kuznetsov, E. V. Gortchakov, Yu. I. Logatchev, et al.

CONF-660632-9 (AIAA Paper 66-511)

Transmission of Isotropically Incident Electrons through Spacecraft Hull Materials
W. K. Stromquist, H. P. Sleeper, Jr., and O. L. McDermed

RPP/R 1

Radiation Levels in and Around Nimrod
D. R. Perry and K. B. Shaw - November 1965

ORNL-TR-1558 (Translated from LNF-64/54)

Average Radiation Levels Around the Linear Accelerator and the Storage Ring
M. Bernardini - October 27, 1964