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. 72 November 1970

Knowledge is proud that he has learned so much;
Wisdom is humble that he knows no more.
- William Cowper (1785)

RSIC STAFF CHANGES

David K. Trubey left the Radiation Shielding Information Center management on November 1 to accept an appointment on the staff of the ORNL-NSF Environmental Program. The duties of Betty F. Maskewitz, Codes Coordinator since the inception of RSIC, have been enlarged to include coordination of all RSIC activities. H. Clyde Claiborne has joined Robert W. Roussin in being responsible for the on-going program of technical development within the Center.

Claiborne has been involved in radiation shielding and reactor engineering at ORNL for many years and is an editor of the DASA Weapons Radiation Shielding Handbook and co-author of several chapters. Roussin has been with RSIC for two years. In addition to routine technical support of RSIC operations, he has made significant contributions to the emerging data collection and to the recent state-of-the-art report on concrete (ORNL-RSIC-26).

An environmental study which began last summer at Oak Ridge National Laboratory is continuing with support by the National Science Foundation. The program, probably the most ambitious of its kind in the nation, will use the Tennessee Valley, including portions of northwest Georgia and Alabama, as a model. Information, regional modeling, materials resources and recycling, environmental indices, energy and communications are included in the program. The building of an information center as an integral part of the overall program is the responsibility of RSIC's ex-manager.

David K. Trubey, with S. Keith Penny and Betty F. Maskewitz, is a founder of RSIC and followed Penny as director from 1966 to the present. Trubey was largely responsible for the technical development of the information center and in shaping its current operating philosophy. His efforts were directed toward making of RSIC a technical institute rather than a technical library, in the sense of the Weinberg Report (Science, Government, and Information, a report of the President's Science Advisory Committee, The White House, January 10, 1963). The RSIC staff members share this vision and will continue his efforts in that direction.

The essence of a good technical information analysis center is that it not only be staffed by competent technical people - but that its activities be shared by all scientists and engineers working in its area. Not only should the shielding community profit by drawing on the RSIC "store" - it should also contribute to "stocking the store." Now, as always, RSIC looks to the members of the shielding community for participation in its activities. Contributing to the Newsletter, suggesting directions for technical development, sharing your work by placing RSIC on your direct distribution, calling attention to information which might be overlooked, indicating needs which might be served by RSIC, all are ways in which the members of the shielding community can be helpful.

RSIC SPACE ACTIVITIES CURTAILED

It is with extreme regret that we must announce that RSIC efforts in the space shielding area are being seriously curtailed at present and are to virtually stop at the end of the calendar year because of the cessation of financial support by the NASA Space Vehicle Research and Technology Division. An effort will be made to preserve the existing material in the information system, but no new work can be initiated.

Without additional funding the distribution of the September 1970 "Bibliography, Subject Index, and Author Index of the Literature Examined by the Radiation Shielding Information Center (Space and Accelerator Shielding)", ORNL-RSIC-11 (Rev. 2) by M. P. Guthrie, R. G. Alsmiller, Jr., Jane Gurney, and Ann B. Gustin, and additional abstracts for the ORNL-RSIC-12 binder, consistent with the bibliography, are the last RSIC publications in the space radiation shielding field.

SUMMARY OF ANS-6 SHIELDING STANDARDS

Donald J. Dudziak, Los Alamos Scientific Laboratory, as chairman of the Subcommittee on Cross Sections, has forwarded to Norman Schaeffer, Chairman of ANS-6 Standards Committee, a summary of the work of his subcommittee. Because of the importance of this summary to the shielding community, RSIC is pleased to publish it here.

ANS-6: Shielding Standards

At its meeting during the 1970 Los Angeles meeting of the ANS, the Shielding Subcommittee (ANS-6), ANS Standards Committee, made some recommendations regarding reference shielding data. As data reviews or compilations of interest to the Shielding and Dosimetry Division become available, ANS-6 will attempt to evaluate them as reference sets. Suitable data will then be recommended for serious consideration as reference sets, especially in calculations performed on benchmarks and for intercomparison purposes. A similar effort to provide reference data was

undertaken a few years ago by the British, resulting in British Standard 4094 : Part I : 1966, "Recommendation for Data on Shielding from Ionizing Radiation, Part 1, Shielding from gamma radiation, Metric Units." This British Standards Institution publication provides reference data for such quantities as absorption coefficients, broad-beam transmission curves, fluxes from regular geometric sources, buildup factors, etc.

The first reference data to be recommended by ANS-6 were the ENDF/B Version II photon interaction cross sections. These data include total, photoelectric, coherent scattering, incoherent (bound electron) scattering, and pair production (pair and triplet, i.e., nuclear and electron field). For further information or copies of the data, contact the National Neutron Cross Section Center, Brookhaven National Laboratory, Upton, New York 11973 or the Radiation Shielding Information Center, Post Office Box X, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830. In its function of serving the membership of the ANS Shielding and Dosimetry Division, ANS-6 (Dr. Norman M. Schaeffer, Chairman) solicits suggestions from the membership concerning desired reference sets in the shielding and dosimetry fields. Liaison has already been established with the Dosimetry Standards Subcommittee of ASTM Standards Committee E-10, in order to make their work more widely known among the Shielding and Dosimetry Division membership. For the same reason, the work of the Cross Section Evaluation Working Group Shielding Subcommittee will be followed closely to determine the current status of neutron-induced photon production data.

CORRECTION TO CCC-107/ETRAN CODE PACKAGE

A minor error in Subroutine SCREEN of the DATAPAC code in the CCC-107/ETRAN Code Package has been brought to RSIC attention by Martin J. Berger, NBS. A statement of the corrections has been mailed to those having received the code package from RSIC and is available on request from users who secured the program through other sources. The RSIC computer code package has been updated to reflect the changes in the subroutine.

CALL FOR PAPERS

1971 IEEE ANNUAL CONFERENCE

NUCLEAR AND SPACE RADIATION EFFECTS

JULY 20-23, 1971 DURHAM, NEW HAMPSHIRE

SPONSORED BY THE IEEE/G-NS RADIATION EFFECTS
COMMITTEE IN COOPERATION WITH THE NEW ENGLAND
CENTER FOR CONTINUING EDUCATION AND THE
UNIVERSITY OF NEW HAMPSHIRE

The 1971 IEEE Conference on Nuclear and Space Radiation Effects will be held at The New England Center for Continuing Education adjoining the campus of the University of New Hampshire, Durham, New Hampshire, on July 20-23, 1971. The conference will cover theoretical and experimental studies of nuclear and space radiation effects on materials, components, circuits, and electronic systems. The program will consist of six sessions of contributed papers and a number of invited papers to be presented by recognized authorities in radiation effects and allied fields. Papers describing significant contributions in the following or related areas are solicited:

- PHYSICAL PROPERTIES OF IRRADIATED SOLIDS
- DISPLACEMENT DAMAGE AND IONIZATION EFFECTS IN SEMICONDUCTOR DEVICES, INTEGRATED CIRCUITS, TRANSDUCERS, CAPACITORS, ETC.
- METHODS OF ANALYZING, PREDICTING, SIMULATING, AND HARDENING AGAINST RADIATION EFFECTS
- ENERGY DEPOSITION BY ENERGETIC PARTICLES AND PHOTONS IN SOLIDS: DOSIMETRY
- ION IMPLANTATION EFFECTS
- RADIATION EFFECTS QUALITY ASSURANCE

Procedure:

- Prepare an informative (not indicative) two- to four-page summary (including figures) appropriate to a ten- or fifteen-minute presentation. The summary must furnish sufficient detail to permit a meaningful review.
- Include authors' names, the name of the author presenting the paper, and the company affiliations on the first page of the text.
- Obtain all the necessary clearances for presenting and publishing the summary and paper at an unclassified meeting.
- Make sure to attach YOUR correct mailing address.
- Submit six copies, including one reproducible. THE SUMMARIES WILL BE PRINTED FOR PUBLICATION DIRECTLY FROM THE MATERIAL SENT.

All summaries will be reviewed, and those accepted will be presented at the conference. A paper accepted for the conference also becomes a candidate for the conference issue of the IEEE Transactions on Nuclear Science, subject to another review. It is not necessary to be an IEEE member to present a paper.

Summaries must be submitted by February 15, 1971, to the 1971 Technical Program Chairman:

T. M. Flanagan
Gulf Radiation Technology
P.O. Box 608
San Diego, California 92112
Tel.: (714) 453-1000 x 528

Registration Forms, Programs, and additional Conference information will be distributed in May, 1971.

Conference Chairman: R. E. McCoskey
Harry Diamond Laboratories
Washington, D. C. 20438
Tel.: (202) 896-9128

ADDITIONS AND UPDATES TO COMPUTER CODE PACKAGES

CCC-72B/COMPRASH — REMOVAL DIFFUSION CODE, contributed by the UKAEA AEEW Shielding Group, Harwell, England, Version B, operable on the CDC 3600, has been sent to RSIC through the ENEA Computer Programme Library, Ispra, Italy. Version A is operable on the IBM 7090.

CCC-72C/COMPRASH — REMOVAL DIFFUSION CODE - Version C, operable on the IBM 360 computer, sent to RSIC by the ENEA Computer Programme Library, Ispra, Italy.

CCC-81D/UNCSAM
CCC-114D/SAM-C — GASP, AN AUXILIARY PROGRAM (GAMMA SOURCE PARTICLE GENERATOR) FOR USE WITH UNCSAM AND SAM-C CODE SYSTEMS, contributed by the Nuclear Effects Laboratory, U. S. Army Ballistics Research Laboratory, Edgewood Arsenal, Maryland. Two versions are packaged: FORTRAN IV for the CDC 6600 and FORTRAN 63 for the CDC 1604. The source for TRANSMIT is also included in the package. These programs are useful only to those using the UNCSAM series of programs.

CCC-114C/SAM-C — MONTE CARLO TIME DEPENDENT THREE-DIMENSION L COMPLEX GEOMETRY (COMBINATORIAL) SHIELDING CODE SYSTEM. CCC-114C is an IBM 360 version contributed to RSIC by the Scientific and Engineering Applications Division, DPSO, Picatinny Arsenal (U. S. Army), Dover, New Jersey. The code package includes the complete source decks, an 81-point neutron and an 81-point gamma-ray cross section library, and input and output for two sample problems. Version A and B of CCC-114 are operable on the CDC 6600 computer. One reel of tape is required for transmittal of the code package.
References: MAGI-6701, AMSAA-TR-10, -11, and -14.

CCC-146/UNAMIT — ONE DIMENSIONAL SPHERICAL MULTILAYER REACTOR-SHIELD-WEIGHT OPTIMIZATION CODE, contributed by NASA Lewis Research Center, Cleveland, Ohio. UNAMIT is written in FORTRAN IV and is operable on the IBM 7090 and the IBM 360 computers.
Reference: NASA TM X-2048.

CCC-147/EXDOSE — CALCULATION OF THE EXTERNAL GAMMA-RAY DOSE FROM AIRBORNE FISSION PRODUCTS, contributed by Battelle Memorial Institute, Pacific Northwest Laboratory, Richland, Washington. The packaged version was written in FORTRAN for the UNIVAC 1108.
Reference: BNWL-811

CCC-148/SPARES SPACE RADIATION ENVIRONMENT AND SHIELDING CODES, contributed by the Aerospace Group, Boeing Company, Seattle, Washington. Included in this package are the following programs: Electron Monte Carlo (ELMC), Electron Penetration (EPEN), Bremsstrahlung (BREMS), Heavy Particles (HEVPART), Secondary Proton (SECPRO), and Trajectory and Environment (TANDE).

CCC-149/GASOUT CALCULATION OF GASEOUS FISSION PRODUCT RELEASE FOR A ZPR-6 AND -9 DESIGN BASIS ACCIDENT, contributed by the Applied Physics Division of the Argonne National Laboratory. Written in FORTRAN IV, the code is operable on the IBM 360.
Reference: ANL-7534.

CCC-150/MAP KERNEL INTEGRATION CODE IN COMPLEX GEOMETRY WITH SPECIAL APPLICATION TO SURFACE SOURCES DETERMINED BY DISCRETE ORDINATES CALCULATIONS, contributed by Experiment Analysis Group, Nuclear and Radiation Design Department, Westinghouse Astronuclear Laboratory, Pittsburgh, Pa. The code was designed to be operable on the CDC 6600, the UNIVAC 1108, and the IBM 360. The packaged version includes a sample problem using surface leakage data from a DOT-IIW discrete ordinate transport solution in r,z geometry. A full reel of magnetic tape is required for transmittal.
Reference: WANL-TME-2706.

DATA USERS: PLEASE TAKE NOTE

Cooperation between RSIC and data users is urgently needed for the following reasons. Since many of the data sets in the Data Library Collection (DLC) contain an enormous number of data points, some 'bugs' are almost inevitable. We will appreciate any comments you may have on any data received from RSIC. In particular, if any errors or discrepancies are noted, please contact us. With your cooperation and assistance, the quality of the data collection will improve.

RETRIEVAL PROGRAMS FOR DLC-5/HALLMARK DATA

The DLC-5/HALLMARK results of discrete ordinates and Monte Carlo calculations of time dependent neutron and secondary gamma-ray transport in air-over-ground geometry were first announced as available in the January 1969 RSIC Newsletter. Recently the special programs for manipulating these data have become available. They are documented in ORNL-TM-3129, "User's Manual for Programs to Edit and Combine DLC-5/HALLMARK Calculational Results of Neutron and Secondary Gamma-Ray Transport in Air-Over-Ground

Geometry," by C. L. Thompson, I. J. Brown, and R. W. Roussin.

An important function of the programs is the capability to combine the data to produce results for a neutron source of arbitrary energy spectrum. The data and programs can be obtained by sending magnetic tapes (2 if written with 9 tracks; 4 if written with 7 tracks).

SECONDARY GAMMA-RAY PRODUCTION DATA

A compendium of neutron induced secondary gamma-ray yield and cross section data is available from RSIC under the designation DLC-12/POPLIB. The library was compiled by W. E. Ford, III and others at ORNL. The format is such that PSR-11/POPOP4 will convert the data into neutron to gamma-ray multigroup transfer matrices.

The library has recently been updated (September 29, 1970) so that a total of 223 data sets are now available. Requests should be accompanied by a full reel of magnetic tape.

MULTIGROUP RESONANCE REGION CROSS SECTIONS

Multigroup capture and scattering cross sections for the resolved resonance region for moderated tungsten and depleted uranium slabs are available as DLC-13/GARLIB. This library was provided by G. P. Lahti and R. M. Westfall of NASA Lewis Research Center and is documented in "Multigroup Resonance Region Cross Sections of Tungsten and Depleted Uranium for Use in Shielding Calculations," NASA TM X-1909.

The cross sections were generated with the program GAROL which preserves the total capture rate in detailed multigroup calculations.

Capture and scatter cross sections were obtained for fully dense tungsten and depleted uranium slabs of thickness 1, 2, 2.54, 4, and 8 centimeters; the slabs were surrounded by either hydrogen or lithium hydride. Group cross sections were calculated for a group split of 0.25 lethargy units extending from 0.414 to 1234.1 eV. This group structure is identical to that of the last 32 groups in the GAM-II 99-group structure; thus, the presently reported group cross section sets may be readily merged with 1 keV to 15 MeV cross-section data of GAM-II. All cross sections are microscopic and in units of barns. Because it may not be generally convenient to run with 32 energy groups in the 1 eV to 1 keV region, the group fluxes which were calculated with GAROL are also presented; further group collapsing either by hand calculations or with included retrieval programs is thus permitted.

Requests for the data and retrieval programs should be accompanied by a full reel of magnetic tape.

40 GROUP COUPLED CROSS SECTIONS FOR AIR

E. A. Straker and M. L. Gritzner, of ORNL, have provided 40-group coupled cross sections for air. The data are designated as DLC-14/AIR and are available on cards. The purpose of the data is to allow the recalculation of the ANISN results published in ORNL-4464, "Neutron and Secondary Gamma-Ray Transport in Infinite Homogeneous Air." It is felt that for these one-dimensional results a recalculation is more economical than storing, handling, and distributing the results in a manner analagous to DLC-5.

STORM-ISRAEL PHOTON INTERACTION DATA

The Storm-Israel photon interaction data, designated as DLC-15 in the September 1970 RSIC Newsletter contains a large volume of data. Because of this, requesters desiring 7-track-written tape should send 2 full reels of magnetic tape to obtain the complete library. A single 9-track tape is sufficient to hold all the data.

LAST CALL FOR RSIC DISTRIBUTION LIST REVIEW CARDS

Have you returned the 5 x 8 green card asking you to confirm your continued desire for RSIC material and informing us if you have changed your address? We must receive a card from each person who wishes to remain on our Distribution List. If you have not yet returned your card, please do not delay sending it to us. The names of those for whom no cards are received by December 1 will be removed from our distribution. We are required to make this review periodically.

PERSONAL ITEM

William O. Chatfield of Stone and Webster, Boston, Mass., is now carrying the title: Manager of Licensing, Nuclear Division. He will continue to be responsible for radiation protection and, in addition, will be concerned with engineering safeguards and licensing problems for his company.

VISITORS TO RSIC

Visitors to RSIC during the month of October were: A. B. Brill, Vanderbilt University School of Medicine, Nashville, Tenn;Joseph Cardito and R. K. Disney, Westinghouse Astronuclear Laboratory, Pittsburgh, Pa.; F. H. Clark, I&C Division, ORNL; C. Devillers, Centre d'Etudes Nucleaires, Fontenay-aux-Roses, France; R. W. Enz and J. G. Picarelli, AFWL, Kirtland Air Force Base, N. M.; A. Falk, H. G. Vogt, and C. D. Wüneke, Technische Universität Hannover, Germany; J. R. Genser, Redstone Arsenal, Huntsville, Ala.; K. Grimm and E. J. McGrath, TRW, Redondo Beach, Calif.; W. H. Harless, General Electric Co., Sunnyvale, Calif.; J. A. Lonergan and W. H. Scott, Science Applications, Inc., La Jolla, Calif.; C. Ponti, CCR-EURATOM, Ispra, Italy, J. P. Roberts, Harry Diamond Labs, U. S. Army, Washington, D. C.; A. Shapiro and J. P. Windham, University of Cincinnati, Cincinnati, Ohio; H. E. Sills, Atomic Energy of Canada Limited, Chalk River, Canada; Victor Staggs, Physics International Co., San Leandro, Calif.; W. L. Thompson, University of Virginia, Charlottesville, Va.

OCTOBER 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 two fields (1) reactor and weapons shielding and (2) 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 National Technical Information Service, 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 the literature in our files 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 available for the codes literature.

REACTOR AND WEAPONS SHIELDING

AECL-3519 *1970*

Calculated Neutron Flux Spectra in Samples Irradiated in a Tray Rod Facility of the NRU Reactor
S. A. Kushneriuk

AEET/HP/Th-17 1964

Gamma Energy Release Rates from Fission Products at Short Times After Fission
M. R. Iyer, A. K. Ganguly
Avail.: NTIS (U.S. Sales Only);Dep.

AERE-R-6060 July 1970

Neutron Spectrum Measurements Over a Wide Energy Range Using a Single Semi-Conductor Spectrometer
M. G. Silk, S. R. Wright
Avail.: Dep.; NTIS (U.S. Sales only); UK 2s. 6d.

AI-AEC-Memo-12708 (Suppl. A) January 15, 1969

PNPF Retirement Safety Analysis Reevaluation of Residual Nuclides
R. A. Hewson
Avail.: Dep.; NTIS

ANL-7629 May 1970

Flux-Characterization and Neutron-Cross-Section Studies in EBR-II
N. D. Dudey, R. R. Heinrich

ANS-SD-8 March 1970

Proceedings of Invited Papers Shielding and Dosimetry Division, American Nuclear Society, Washington, D.C., 1968
C. M. Huddleston (ed.) American Nuclear Society

BNWL-1487 August 1970

Determination of the Absolute Neutron Flux Spectrum in the PCTR Fast Neutron Cavity from Multiple Foil Activation Measurements
D. F. Newman
Avail.: Dep.; NTIS

BRH NERHL-70-1 May 1970

An Estimate of Radiation Doses Received by Individuals Living in the Vicinity of a Nuclear Fuel Reprocessing Plant in 1968
B. Shleien
(Bureau of Radiological Health, Winchester, Mass.)

CEA-N-825 (In French)

Some Applications of a Weighting System in Monte Carlo Calculations
J. M. Lanore

CEA-Note N - 1096

Study of the Variance of a Monte Carlo Calculation
J. M. Lanore

CEA-N-1331 (In French) August 1970

Gamma Radiation Attenuation Study: ^{16}Ni Loop, Comparison of Experimental Results with Calculation
C. Dupont, A. Jean, Y. Oceraies
Avail.: Dep.; NTIS (U. S. Sales only)

CEA-N-1349 (In French) April 1969

Study of the Neutron Upper Shielding of Phenix
G. Brandicourt, J. Culambourg, J. C. LeRalle

CEA-N-1351 (In French) May 1970

Study of the Upper Shielding of the PHENIX Reactor; Comparison Between S_n and Monte Carlo Methods
J. M. Lanore
Avail.: Dep.; NTIS (U.S. Sales only)

CEA-CONF-1554 (Conf-700505-12)

Dose Distribution of Primary Neutron Collision in Tissue as a Function of Linear Energy Transfer
M. H. Dousset, J. Hamard, A. Ricourt
Avail.: Dep.; NTIS (U.S. Sales only)
(From 2nd Congress of the International Radiation Protection Association, Brighton, England)

CGS-TR-30 July 1970

Effects of Finite Source Fields on Radiation Doses in a Structure
J. Velletri, R. Spring
(Datametrics Div., CGS Scientific Corporation, Watertown, Mass.)

CONF-700211-2 Feb. 12-13, 1970

Shielding in Nuclear Ships
I. Kataoka
(Translated from Japan Atomic Energy Society Meeting, Tokyo)
Avail.: Dep.; NTIS

GA-10140 May 20, 1970

Gamma-Ray Production Cross Sections for the ^{16}O(n,xγ) Reaction from 6.35- to 16.52-MeV Neutron Energy
V. J. Orphan, C. G. Hoot, J. John

IJS-R-572 (N70-29898) November 1969

Tables of Total Absorption Cross Sections for Photons of Energy Between 10 and 30 MeV in Be, C, N2H4, H2O, Hf, Si and Ca
N. Bezic, D. Brajnik, D. Jamnik, G. Kernel, U. Miklavzic
Avail.: NTIS

JAERI-1189 July 1970

Graphic Aid in the Assessment of Gamma-Exposure Due to a Radioactive Cloud Released from a Point Source
I. Kazuhiko, T. Iijima, M. Kakuka

JUL-603-ST, pp. 209-212 (In German)

Activity and Shielding: Shielding from X-Rays by Various Types of Concrete
P. F. Sauermann, E. Voelkel, W. Voss

JUL-603-ST, pp. 213-222 (In German)

Activity and Shielding: Shielding Against Fast Neutrons
P. F. Sauermann, W. Schaefer

MIT-4105 -2 (MITNE-110; N70-31354) February 1970

Design, Construction, and Evaluation of a Facility for the Simulation of Fast Reactor Blankets
I. A. Forbes, M. J. Driscoll, T. J. Thompson, I. Kaplan, D. D. Lanning

NASA-TM-X-2019 (E-5587; N70-29887) May 1970

Calorimetric Determination of Relative Gamma Heating in Materials of Various Thicknesses and Atomic Numbers
H. J. Reilly, L. E. Peters, Jr.
Avail.: NTIS

ORNL-4556 September 1970

Tables of Classical Scattering Integrals
M. T. Robinson

ORNL-4580 (Thesis) August 1970

An Investigation of Fast Neutron Radiation Damage in an Austenitic Stainless Steel
E. E. Bloom
Avail.: Dep.; NTIS

ORNL-TM-2896 July 31, 1970

LMFBR Shielding Development Program. Interim Report. Preliminary Evaluation of Techniques for Predicting the Spectra of Neutrons Transmitted by Grid Plate Shields
C. E. Clifford, F. R. Mynatt, H. C. Claiborne
Avail.: Dep ; NTIS

ORNL-TM-3157 September 25, 1970

Heat Generation by Neutrons in Some Moderating and Shielding Materials
H. C. Claiborne, M. Solomito, J. J. Ritts

PB-189127 (N70-29875) (JILA-IC-6) January 10, 1969

Compilation of Low Energy Electron Collision Cross Section Data. Part 1: Ionization, Dissociative Processes, and Vibrational and Rotational Excitation
L. J. Keiffer
Avail.: NTIS
(Joint Inst. for Lab. Astrophysics, Boulder, Colo., Information Center)

RPI-328-184 (N70-29919) March 10, 1970

Continuous Slowing Down Theory Extended to Inelastic Region
M. Becker, E. T. Burns
Avail.: NTIS

RT/FI(69)38 (N70-30084) September 20, 1969

Calculated Photoefficiencies and Energy Loss Spectra for 3 Inches x 3 Inches, 5 Inches x 5 Inches, and 8 Inches x 8 Inches NaI(Tl) Crystals and for Gamma Rays up to 15 MeV.
M. Giannini, P. R. Oliva, M. C. Ramorino
Avail.: NTIS

RT/FI-(69)45 October 1969

Numerical Applications of a New Approach to the Solution of the Neutron Transport Equation
E. Cupini, A. de Matteis, F. Premuda, T. Trombetti
Avail.: Dep.; NTIS (U.S. Sales only)

RT/FI(70)6 (N70-29872) December 11, 1969

Endomophism of a Lebesque Space and Lp(p73) in a Three-Dimensional Problem of Neutron Transport Theory
V. C. Boffi, V. G. Molinari
Avail.: NTIS

UCRL-50790 January 23, 1970

Calculating Exposures at Long Distances from Nuclear-Cratering Applications
T. V. Crawford
Avail.: Dep.; NTIS

UCRL-50856 April 17, 1970

Calculations of the Transport of Neutrons from A (d,t) Source Through Many Mean Free Paths in Liquid Nitrogen
G. D. Sauter, P. S. Robinson
Avail.: Dep.; NTIS

UCRL-50895 July 21, 1970

Lead
A. H. du Rose, W. Blum

WAPD-TM-915 (N70-29531) February 1970

A Measurement of Neutron Spatial Distribution in a Water Moderated, Thorium Oxide Rod Lattice (LWBR Development Program)
P. B. Beilin
Avail.: NTIS

Atomkernenergie, 16, 64-70 (1970) (In German)

Investigation of the Energy Distribution of Singly Scattered and Multiply Scattered Gamma Radiation. I. Backscattered and Attenuated Radiation
E. Wechselberger

Atomwirt., Atomtech., 15, 341 (July 1970)

Solution of the Boltzmann-Neutron Transport-Equation in Plane Geometry with Anisotropic Scattering by the Double-P_n-Method
U. Schumann

J. Nucl. Energy, 24(1), 53-56 (Feb. 1970)

Resonance Self-Shielding Factors for Heavy Actinides
R. M. Patterson, R. P. Christman, E. J. Hennelly

J. Nucl. Sci. Technol. (Tokyo), 7(8), 407-417 (August 1970)

Analysis of Transmitted Gamma Rays by Multiple Scattering Method, (I) - Gamma Rays Transmitted Through Slabs of One Material
Y. Harima, Y. Nishiwaki

Nucl. Appl. Tech., 8(3), 302-309 (March 1970)

Reactor Neutron Measurements with Fission Foil-Lexan Detectors
P. F. Rago, N. Goldstein, E. Tochilin

Nucl. Appl. Tech., 9(5), 762-766 (Nov. 1970)

Estimation Techniques for Far-Field Exposure Contributions
R. S. Reynolds, N. D. Eckhoff

Nucl. Instr. Methods, 84(2), 269-274 (1970)

Spectrum Measurements of Intermediate Energy Neutrons by an Organic Scintillator
Y. Furuta, S. Kinbara, K. Kaieda

Physical Rev. C, 2(2), 621 (1970)

Bremsstrahlung and Photoneutrons from Thick Tungsten and Tantalum Targets
M. J. Berger, S. M. Seltzer

Przegl. Budowlany; 40, 571-577 (1968) (In Polish)

Dense Concrete as a Material for Making Protections Against Ionizing Radiation
L. Lipowski

Radiochem. Radioanalyt. Letters (Internat.), 2(5), 313-319 (Dec. 27, 1969)

Measurement of 14 MeV Neutron Flux Density by Fission Track Method
T. Nakanishi, M. Sakanoue

Soviet J. At. Energy (English Transl.), 22(6), 624- (June 1969)

Intermediate Neutron Dose Distribution in Certain Materials
S. V. Starodubtsev, G. M. Vainshtein, V. B. Stryapunin

Water Resources Res., 6(3), 989- (1970)

Measurement of Soil Moisture with a Portable Gamma-Ray Scintillation Spectrometer
J. R. McHenry, A. C. Gill

SPACE AND ACCELERATOR SHIELDING

MDC G0363 *June 1970*

Statistical Analysis of Solar Cosmic Ray Proton Dose
W. R. Yucker
McDonnell Douglas Astronautics Co., Western Div., Huntington Beach, California 92647

NASA-TT-F-588, p. 94-111 (N70-30764) *May 1970*

Cosmic Gamma-Radiation
A. M. Galper
(Transl.of Russ.Book: Elementary Particles and Cosmic Rays, V. A. Bezus et al (Eds.))
Avail.: NTIS

ORNL-4599 *October 1970*

Calculation of the Long-Lived Induced Activity in the Soil Around High-Energy Accelerator Target Areas - II.
T. A. Gabriel, R. G. Alsmiller, Jr., J. Barish
Avail NTIS

ORNL-TM-3105 *August 24, 1970*

The Absorbed Dose and Dose Equivalent from Negatively and Positively Charged Pions in the Energy Range 10 to 2000 MeV
R. G. Alsmiller, Jr., T. W. Armstrong, B. L. Bishop

COMPUTER CODES LITERATURE

LA-4506-MS (ENDF-140 *September 1970* *PHOXE (PSR-21)*

PHOXE: A FORTRAN IV Code to Check Format Syntax, Consistency, and Physical Realism of ENDF/B Photon Production Data
Donald J. Dudziak (LASL)
FORTRAN IV, CDC 6600 and IBM 360

ORNL-TM-3129 *September 1970* *HALLMARK (DLC-5)*

User's Manual for Programs to Edit and Combine DLC-5/HALLMARK Calculational Results of Neutron and Secondary Gamma-Ray Transport in Air-Over-Ground Geometry
C. L. Thompson, I. J. Brown, and R. W. Roussin (ORNL)
FORTRAN IV, IBM 360

TRW-4332.2.69-140 *November 1969* *PARTI*

PARTI: A Code for Optimal Partitioning of One and Two Variable Piecewise-Continuous Functions in Reactor Calculations
A. A. Harms (Dept. of Engineering Physics, McMaster University, Hamilton, Ontario, Canada) and J. A. Stoddard (TRW Systems Group, Redondo Beach, Calif.)
FORTRAN IV, CDC 6500

WANL-TME-2706 *August 1970* *MAP (CCC-150)*

Code Description and User's Manual for the MAP Radiation Transport Computer Code
R. K. Disney, R. G. Soltesz, J. Jedruch, and S. L. Ziegler
FORTRAN IV, CDC 6600, IBM 360, UNIVAC 1108

ORNL-TM-3203 *September 1970* *SAMBO*

SAMBO, A Collision Analysis Package for Monte Carlo Codes
by V. R. Cain
FORTRAN IV, IBM 360
(Appeared in October Newsletter under ORNL-CF-70-9-1).