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. 68 July 1970

Ignorance is preferable to error;
and he is less remote from the truth
who believes nothing
than he who believes what is wrong.

- Thomas Jefferson

RSIC MONTE CARLO SEMINAR-WORKSHOP AT OAK RIDGE, OCTOBER 5-7, 1970

Plans are being made by RSIC for a seminar-workshop on "Monte Carlo Methods and Computer Codes for Radiation Transport in Shielding Applications" to be held October 5-7, 1970, in Oak Ridge. Approximately 1½ days will be devoted to contributed papers on recent Monte Carlo developments, especially in the areas of adjoint calculations, energy-group treatment, coupled neutron-gamma-ray calculations, time dependence, and 3-D geometry. If you wish to contribute a paper, please submit the title and abstract to RSIC by August 15. Contributors will be expected to provide a photo-ready manuscript summary on October 5 which should be about 300-500 words in length (not counting graphs, tables, or references). The papers will be published in the proceedings to be printed as soon as possible following the conference.

The remaining time will be devoted to a workshop featuring the ANTE 2 code, developed by Mathematical Applications Group, Inc. (MAGI), and the MORSE code, developed by Oak Ridge National Laboratory, Neutron Physics Division.

Information on the MORSE and ANTE 2 codes is given in the June Newsletter and is also available from RSIC upon request.

Those planning to attend the conference should notify RSIC by September 1, 1970. Further information will be sent to those planning to attend.

ACCELERATOR AND SPACE RADIATION CONFERENCE TO BE HELD IN GENEVA IN 1971

The Organizing Committee has announced the International Congress on Protection Against Accelerator and Space Radiation to take place April 26-30, 1971 at CERN-Meyrin, Geneva, Switzerland. The conference is organized jointly by the Société Francaise de Radioprotection and the Fachverband für Strahlenschutz in collaboration with CERN.

Subjects treated at the conference will include problems relevant to the design, installation, and operation of accelerators from the point of view of basic dosimetry, radiobiology, and radiation protection, applied to the evaluation of the danger of accelerator-produced radiations. Similar topics concerned with protection against space radiations will also be covered.

Inquiries or requests for further information should be sent to Scientific Conference Secretariat, (E.W.D. Steel), CERN, 1211 Geneva 23, Switzerland.

ADDITIONS TO THE COMPUTER CODE COLLECTION

CCC-131/ANTE 2 Monte Carlo Code for the Solution of the Adjoint Neutron Transport Equation. Contributor: MAGI, White Plains, N. Y. Reference: DASA 2396. A CDC 6600 version is packaged; programming language - FORTRAN IV. May be transmitted on one reel of magnetic tape.

CCC-132/ATTOW Multigroup, Two-Dimensional Spinney Removal-Diffusion Shielding Code, contributed by the UKAEA Reactor Group, HQ, Risley, Warrington, Lancs., England. This version is operable on the IBM 7090, was tested and packaged by the ENEA Computer Programme Library, Ispra, Italy. It may be transmitted on one reel of magnetic tape. Reference: TRG-1466 (R).

CCC-133/UNC-SAM 3 Monte Carlo Three-Dimensional Complex Geometry Shielding Code System with ENDT, contributed by United Nuclear Corporation, Elmsford, N. Y. The packaged version of UNC-SAM 3 and ENDT is written in FORTRAN IV and is operable only on CDC computers. One reel of magnetic tape is required for code transmittal. References: UNC-5157 and Supplement, and UNC-5243.

CCC-134/2DBS Two-Dimensional Multigroup Neutron Diffusion Shielding Code, contributed by Battelle Memorial Institute Pacific Northwest Laboratories, Richland, Washington. Programming is in FORTRAN IV and packaged version is operable on the UNIVAC 1108 computer. One reel of tape may be used for transmittal. Reference: BNWL-1291.

CCC-135/GAMMON Gamma Ray Moments Method Codes. Packaged: an elementary FORTRAN routine for evaluating coefficient-moments contributed by the Center for Radiation Research, National Bureau of Standards, Washington, D.C. and SPENCER, a FORTRAN program to approximately reconstitute a one-dimensional function for a finite number of its moments, contributed by Atomics International. References: informal notes and NAA-SR-MEMO-11653. FORTRAN IV for the IBM 360. SPENCER is operable also on the CDC 1604. One reel of tape required.

CCC-136/COLLIMATOR Monte Carlo Calculation of the Spectrum of Gamma Radiation from a Collimated Co-60 Source, contributed by the Nuclear Engineering Department, University of Illinois, Urbana, Illinois. FORTRAN IV and MAP for the IBM 7090. May be transmitted on one reel of tape.

CCC-137/RIBD Radio Isotope Buildup and Decay Code and Fast Reactor Library of Data, contributed by Battelle Memorial Institute Pacific Northwest Laboratories, Richland, Washington. References: BNWL-962, DUN-4136, and RL-NRD-610. FORTRAN IV for IBM and UNIVAC computers. May be transmitted on one reel of tape.

CCC-138/PIGG A Multigroup One-Dimensional P-1 Radiation Transport Code, contributed by AB Atomenergi, Kjeller, Norway, and the ENEA Computer Programme Library, Ispra, Italy. Packaged version is coded in FORTRAN 63 for the CDC 3600 computer. PIGG is similar to the P1MG with some significantly new features. It may be transmitted on one reel of tape.

CCC-139/CONSTRIP V Vertical Barrier - Finite Source Plane Gamma-Ray Penetration Code, contributed by the Research Triangle Institute, Research Triangle Park, N. C. References: RTI OU-266 and RTI OU-333. CONSTRIP V is an extensive modification of the NBS code, CONSTRIP, used in OCD programs. Written in FORTRAN IV for the IBM 360, May be transmitted on one reel of tape.

CCC-141/RAC Spinney Removal-Diffusion Code, Attenuation and Heat Generation in a Multiregion Shield, contributed by JAERI Shielding Codes Group through the ENEA Computer Programme Library, Ispra, Italy. The packaged version is written in FORTRAN IV and is operable on the IBM 360.

CCC-142/MERCURE 3 Kernel Integration Code - Straight-Line Attenuation in a Three-Dimensional Geometry, contributed by CEA/CEN Fontenay-aux-Roses Nuclear Research Center. Reference: CEA-R-3264, ORNL-tr-1812. The code was written in FORTRAN IV for the IBM 7094, and is also operable on the IBM 360. It may be transmitted on one reel of magnetic tape.

VISITORS TO RSIC

Visitors to RSIC during the month of June were: R. N. Chanda, Dow Chemical Co., Rocky Flats Div., Golden, Colo.; James S. Creswell, TVA, Chattanooga, Tenn.; Marvin E. Donaldson, Kaman Nuclear, Colorado Springs, Colo.; Manuel Feliciano, Jr., Math Div., ORNL; Ernest F. Plechaty, Lawrence Radiation Laboratory, Livermore, Calif.; Makoto Akanuma, ENEA Computer Programme Library, Ispra, Italy; F. A. R. Schmidt, Institut für Kernenergetik, Stuttgart, Germany.

JUNE 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 (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 the 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 available for the codes literature.

REACTOR AND WEAPONS SHIELDING

AAEC/TM-529 *January 1970*

The Application of Chandrasekhar's Method to Deep Penetration Problems
B. E. Clancy
Available: Australian Atomic Energy Commission, Research Establishment, Lucas Heights

AECL-3423 *September 1969*

Calculations of Flux Spectra and Energy Deposition for Fast Neutrons
K. K. Mehta, P. R. Kry
Available: Scientific Document Distribution Office, Atomic Energy of Canada Limited, Chalk River, Ontario $2.50 per copy

AERE-R-6115 *July 1969*

A Lead-Shielded Cell for the Analysis of Alpha, Beta, Gamma Active Materials
G. W. C. Milner, A. J. Wood, A. J. Fudge
Available: CFSTI as N70-19833

AFRRI TN68-2 February 1968

Neutron Activation of Portland Cements
F. E. Penaranda
Available: Armed Forces Radiobiology Research Institute, Defense Atomic Support Agency, Bethesda, Md.

AFWL-TR-69-116 (AD-701066) December 1969

Experimental Tests of Shielding Codes
A. E. Profio
Available: CFSTI

BNL-50186 April 1969

Radionuclide Generators: Past, Present, and Future
L. G. Stang, Jr.

BNWL-1339 April 1970

Activation and Shielding of FTR Sodium
C. A. Mansius
Available: CFSTI

BNWL-1333 April 1970

FFTF Shielding Program

DASA-1892-5 June 1970

Weapons Radiation Shielding Handbook. Chapter 2. Basic Concepts of Radiation Shielding Analysis
P. N. Stevens, H. C. Claiborne
Available: CFSTI

DESY-70/5 February 1970

Neutron Dosimetry in the Energy Range Between 10 and 100 MeV
K. Tesch
Available: DESY, Bibliothek, 2 Hamburg 52, Notkestieg 1, Germany

FTD-MT-24-243-69 (AD-703059) December 1969

Modern Trends in the Investigation of Nuclear Reactor Shielding.
S. G. Tsypin
Available: CFSTI

FSTC-HT-23-485-68 February 1970

Gamma Radiation Build-Up Factors for Finite Media
V. A. Klimanov, V. P. Mashkovich, Yu. N. Podsevalov
Available: CFSTI as AD-703399

FSTC-HT-400-68 (AD-852138) (Translation of Russian Book) 1967

Small Scale Reactor Shielding
D. L. Broder
Available: CFSTI

GA-9950 March 17, 1970

Neutron Scattering Kernels Calculations at Epithermal Energies
G. M. Borgonovi
Available: Dep., CFSTI

GEMP-742 December 1969

Analysis of EBR-II Neutron Spectra by Monte Carlo and Discrete Ordinates Methods
W. E. Edwards, W. B. Henderson, N. R. Baumgardt
Available: CFSTI

JUL-634-MA (In German) December 1969

Solution of the Stationary Neutron Transport Equation with Spherical Symmetry
W. Hanke, E. Horlitz, W. Petry
Available: Dep., CFSTI (U.S. Sales Only)

ORNL-TM-2564 June 12, 1970

Kerma Factors and Secondary Gamma-Ray Sources for Some Elements of Interest in Thermonuclear Blanket Assemblies
J. J. Ritts, M. Solomito, D. Steiner

ORNL-TM-2781 May 7, 1970

Time-Dependent Neutron and Secondary Gamma-Ray Transport in Infinite Air and in Air Over Ground
E. A. Straker

ORNL-TM-2822 May 1970

Preliminary Appraisal of the Hazards Problems of a D-T Fusion Reactor Power Plant
A. P. Fraas, H. Postma
Available: Dep., CFSTI

ORNL-TM-2958 April 15, 1970

A Monoenergetic 6130-keV Gamma-Ray Source for Detector Calibration
J. K. Dickens, R. D. Baybarz

ORNL-TM-2991 May 22, 1970

The Calculation of Neutron-Induced Physical Doses in Human Tissues
J. J. Ritts, M. Solomito, P. N. Stevens

ORNL-TR-2309 (CONF-691192-5 November 1969

Behavior of Concrete in the Presence of Thermal Stresses and Radiation. Report No. 7
E. Crispino, S. Granata, P. Risoluti
(Translated from the 2nd Conf. on Prestressed Concrete Reactor Vessels and their Thermal Insulation, Brussels, Belgium, Nov. 18-20, 1969)
Available: Dep., CFSTI

ORNL-TR-2319 (Kernenergie, 12, 390-394 (1969)
(In German)

Radiation Shielding of Cylindrical Self-Absorbing Source in the Axial Direction
F. W. Kruger, P. Seeligmann

RRA-M701 June 1970

Differential Measurements of Fast-Neutron Air-Ground Interface Effects
R. L. French, L. G. Mooney
Available: Radiation Research Associates, Inc., 3550 Hulen St., Fort Worth, Texas 76107

SC-DC-68-2229 May 13-17, 1968

Studies in Radiation Risk Criteria for SNAP Systems
R. J. Everett, M. A. Parsont
(Presented at the American Industrial Hygiene Conf., St. Louis, Mo.)
Available: CFSTI

TID-20893 (Rev. 3) December 1969

Standard Nuclear Instrument Modules
L. Costrell
Available: Supt. of Documents, U.S. GPO, Washington, D. C. 20402
Price $0.40

TID-25375 September 3, 1965

Oak Ridge Associated Universities Health Physics Manual
Oak Ridge Associated Universities, Inc., Oak Ridge, Tenn.

UCRL-50174 (Sec. 1) January 1970

Compilation of X-Ray Cross Sections. Section I.
W. H. McMaster, N. K. DelGrande, J. H. Mallett, J. H. Hubbell
Available: Dep., CFSTI

UCRL-50810 February 1970

Four-Parameter Measurements of Delayed Gamma Rays from Spontaneous Fission of Cf-252
F. W. Guy
(Thesis - Calif. Univ., Livermore, Lawrence Radiation Lab.)
Available: Dept., CFSTI

Analytica Chimica Acta, 49(3), 425-436 (1970)

Photon Self-Absorption Corrections for Minimization of Systematic Errors in 14-MeV Neutron Activation Analysis
S. S. Nargolwalla, M. R. Crambes, J. E. Suddueth

Health Phys., 18, 69-71 (Jan. 1970)

Calculated and Experimentally Determined Neutron Dose Conversion Factor for Californium
D. R. Stone, E. B. Wagner, T. D. Jones, W. H. Shinpaugh

Health Phys., 18, 507- (1970)

Simulating Energy and Angle Distributions Above Infinite Plane Co-60 Sources
Z. G. Burson, R. L. French

J. Applied Phys., 41, 468-71 (Feb. 1970)

Radiation Transport Calculations: Fore and Aft Approximation
J. T. Daley

Nucl. Instr. Methods, 80(2), 325-332 (1970)

A Monte Carlo Technique for Correcting Experimental Fast-Neutron Polarization Data
T. G. Miller, F. P. Gibson, G. W. Morrison

Nucl. Sci. Eng., 40(3), 478-483 (June 1970)

Use of Gauss-Laguerre Numerical Integration for Point Kernel Shielding Calculations. (Tech. Notes)
P. C. Cochrane, D. W. Mesh

Nucl. Sci. Eng., 40(3), 487-488 (June 1970)

Photon Cross Sections of Uranium and Plutonium. (Tech. Notes)
H. F. Atwater

Nucl. Sci. Eng., 40(3), 485-486 (June 1970)
(ORNL-4457)

The Absolute Spectrum of Photons Emitted in Coincidence with Thermal-Neutron Fission of Uranium-235.
R. W. Peelle, F. C. Maienschein

Phys. Med. Biol., 14, 615-26 (Oct. 1969)

Specific Absorbed Fractions for Photon Point Sources Within a Scattering Medium
W. H. Ellett

Rev. Roumaine Phys., 14(10), 1135- *(1969)*

Evaluation of Total Absolute Efficiencies for NaI(Tl) Cylindrical and Well-Type Crystals
C. Ionescu

BOOK

BASIC RADIATION PROTECTION, PRINCIPLES AND ORGANIZATION
C. W. Easley
New York, Gordon and Breach Science Publishers (1969)

BOOK (In Russian)

SHIELDING OF IONIZING RADIATION. Vol. 1. Physical Bases of Radiation Shielding
N. G. Gusev, L. R. Kimel', V. P. Mashkovich, B. G. Pologikh, A. P. Suvorov
Atomizdat, Moscow, 1969

SPACE AND ACCELERATOR SHIELDING

CERN-70-5 *February 1970*

Effects of Radiation on Materials and Components. I. Radiation Effects on Polymeric Materials. II. Radiation Problems Relating To High-Energy Accelerators.
M. H. Van de Voorde
Available: Dep., CFSTI (U.S. Sales Only)

CU-282 (NEVIS-178) *1969*

Tests of the One Photon Exchange Model for High Energy Muon-Proton Elastic Scattering
M. A. Kramer
Available: CFSTI as N70-24272

DNPL/P-30 *March 1970*

Radiation "Skyshine" Problems Associated with GeV Electron Beams Extracted into Open-Topped Experimental Areas
F. J. Coleman, D. C. Thomas

HASL-228 *May 1970*

Calculation of Dose and Dose-Equivalent Rates to Man in the Atmosphere from Galactic Cosmic-Rays
K. O'Brien, J. E. McLaughlin
Available: CFSTI

LA-4097-MS December 1969

Thick Target Bremsstrahlung Theory
C. R. Emigh
Available: CFSTI

MDAC Paper WD 1320 June 1970

Statistical Analysis of Solar Cosmic Ray Proton Fluence
W. R. Yucker
(McDonnell Douglas Corporation, 5301 Bolsa Ave., Huntington Beach, California 92647)

NASA-SP-3054 1970

World Maps of Constant B, L, and Flux Contrours
E. G. Stassinopoulos

ORNL-4542 May 1970

An Extrapolation Method for Predicting Nucleon and Pion Differential Production Cross Sections from High-Energy (>3 GeV) Nucleon-Nucleus Collisions
T. A. Gabriel, R. G. Alsmiller, Jr., M. P. Guthrie
Available: CFSTI

Soviet J. Nucl. Phys. 10(4), 436- (1970) (Engl. Transl.)

Change of Mechanism of Inelastic Interactions Between Particles and Nuclei in Energy Region 1-5 GeV
V. S. Barashenkov, K. K. Gudima

COMPUTER CODES LITERATURE

AAEC/TM 520 November 1969 GUNYA

GUNYA - A Code for Generating Neutron Cross Sections
by H. D. Ferguson
FORTRAN IV for IBM 360

AECL-3423 September 1969 NEVEMOR

Calculations of Flux Spectra and Energy Deposition for Fast Neutrons
by K. K. Mehta and P. R. Kry
FORTRAN IV

AECL-3476 August 1969 RANDOM NUMBER GENERATORS

Random Number Generators
by Janet Nicholls
Compass Assembly Language for CDC 6600

AFWL-TR-69-161 *January 1970* AM MAN

Computerized Anatomical Model Man
by Paul G. Kase
CDC 6600

ANL-7534 *January 1970* GASOUT

GASOUT - The Code Used to Calculate Gaseous Fission Product Release for a ZPR-6 and -9 Design Basis Accident
by C. D. Swanson and E. M. Bohn
FORTRAN for IBM 360/50/75

BNL-50147 (T-518) *April 1969* GOLF P2

Tabulated Dose Distribution Data for Gamma Irradiator Design
by F. X. Rizzo, L. Galanter, and K. Krishnamurthy
CDC 6600

BNL-50199 (T-549) *July 1969* MOGUS

MOGUS - A Code for Evaluating the Mott Scattering Cross Section and the Goudsmit-Saunderson Angular Multiple-Scattering Distribution for Use in Electron Transport Calculations
by R. M. Felder
FORTRAN IV for CDC 6600 and IBM 7094

BNWL-1203 *November 1969* EGGNIT

EGGNIT - A Multigroup Cross Section Code
by C. R. Richey
FORTRAN IV for UNIVAC 1108

BNWL-1259 *January 1970* PUSHLD

Calculation of Gamma Dose Rates at the Surface of Plutonium Oxide Sources
by H. H. Van Tuyl
UNIVAC 1108

BNWL-1312 *May 1970* SAND II

Evaluated Reference Cross Section Library
by R. L. Simons and W. N. McElroy

EURATOM Unpublished Memo *1965* TIMOC

A Monte Carlo Approach to the Calculation of Characteristic Reactor Parameters in Three Dimensional Assemblies
by H. Rief and H. Kschwendt
FORTRAN II and FAP for IBM 7090/95

FOA 4 C 4374-29 *October 1968* *SALOMON IV*

A User's Manual for a Computer Code Calculating Densities and Velocities of Compton Electrons Generated by Gammas
by G. Engstrom
FORTRAN IV for IBM 7090

GEMP-742 *December 1969* *2DF 18-1*

Analysis of EBR-II Neutron Spectra by Monte Carlo and Discrete Ordinate Method
by W. E. Edwards, W. B. Henderson, N. R. Baumgardt
GE 635

Health Physics Vol. 16, 383-391 1969 *RADS and ARADS*

Some Examples and Limitations of the RADS and ARADS Computer Programs
by Philip A. Plate, Donald F. Menker and Maxwell Dauer
FORTRAN IV for IBM 1401/7040

LA-4346 *April 1970* *LEMP 1*

Development and Testing of LEMP 1
by H. J. Longley and C. L. Longmire
CDC 6600

LA-4347 *April 1970* *LEMP 1*

Sources, Parameter Study, and the Output Library for LEMP 1
by H. J. Longley
CDC 6600

LA-4348 *April 1970* *LEMP 1*

Compton Current in Presence of Fields for LEMP 1
by H. J. Longley
CDC 6600

LA-4432 *May 1970* *TWOTRAN*

Theory and Use of the General-Geometry TWOTRAN Program
by K. D. Lathrop and F. W. Brinkley
FORTRAN IV for CDC 6600

MR-7002 (Project 6710) *April 1970* *TERF*

TERF Monte Carlo Fallout Code Calculations
by M. O. Cohen
FORTRAN

NVO-268 *1969* *MOMENTS*

A New Moments Solution of the Neutron Transport Equation
by Charles Richard Weisbin
FORTRAN IV for IBM 360

SC-M-70-157 *January 1970* *HRS017*

Announcement of Computer Code HRS017 - A Code for the Computation of the Trajectory and Reentry Environment for Nuclear Systems Decaying from Multiple Revolution Elliptical Orbits
by H. R. Spahr

SRT-TRM01-W393-4C *May 1970* *DASH*

DASH - FORTRAN IV Void Tracing and S_n Monte Carlo Bridging Code, NERVA Program
by Duaine Lindstrom
FORTRAN IV for IBM 360

WLOA-TN-70-1 *March 1970* *BMD03S*

A Computer Code for Statistical Analysis of Radiation Data
by Jerry A. Jouret
FORTRAN IV for CDC 6600

LA-4342 *April 1970* *DAC1*

DAC1 - A One-Dimensional S_n Perturbation Code
by B. M. Carmichael
FORTRAN IV