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. 45 August, 1968

If you have knowledge, let others light their candles at it---Fuller

PROCEEDINGS OF HARWELL CONFERENCE PUBLISHED

The proceedings of the Conference on *The Physics Problems of Reactor Shielding* held at the Atomic Energy Research Establishment, Harwell, England in September 1967, AERE-R 5773, has now been issued in 5 volumes. The set is available from H. M. Stationery Office, London, price £ 9-8-0.

CCC-48/QAD CORRECTIONS

R. E. Malenfant and D. M. Peterson of LASL, and C. Ponti of EURATOM (through the ENEA Computer Programme Library) have called to the attention of the RSIC staff the following:

(1) Subroutine SOURCE: in the IBM 360 version, the statements between cards SOUP 13 and SOUP 14 produced a zero source and hence a zero flux in the case of pointwise description of the source.

(2) Statement QADP 198 in MAIN should indeed be:

$$AN = 2.46 \times 3.3 \times 10^{10} \times A$$

to be consistent with LA-3573, p. 55. However, various users should tailor the constant terms to their own needs. The value 2.46 is ν, the number of neutrons per fission, and the 3.3×10^{10} is the number of fissions per second per watt and is a function of the reactor system as well as operating history.

(3) In agreement with the labels printed in the output, the statement LENP 147 should be:

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WRITE (6,6) I, KK, X, Y, Z SMIN.
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(4) In subroutine KERNEL, 360 version, a test for underflow would, in general, be desirable. 7094 and 6600 programs set the value to zero when exponential values become too small.

(5) The format for the M-cards, page 123 of LA-3573, should be specified as 5E 12.8.

(6) The limitation on the number of source points along the various degrees of freedom has not been explicitly identified. This limitation is 20 divisions (21 volume boundaries) along each degree of freedom as QAD is assembled and should be specified in the writeup, perhaps on p. 74. It should also be noted that the quantities are subject to modification by the relatively simple expedient of changing dimension statements on cards QAD P 09, QADP 10, SOUP 04, LENP 05, LENP 06, KERP 05, KERP 06, INPP 06, and INPP 07.

VISITORS TO RSIC

Visitors to RSIC during the month of July are: Allkofer Claus, University Kiel, Kiel Germany; Nigel Andrew Tubbs, CCDN/ENEA, Saclay, France.

AUGUST 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

AEEW-R 597

On the Thermal Neutron Capture Cross-Sections of Cobalt
J. S. Story
1968

AERE-R-5364

Measurements of Fast Neutron Spectra in Reactor Materials
M. S. Coates, D. B. Gayther, et al.
February 1968

AERE-R 5773 (Vol. 1-5)

Proceedings of the Conference on *The Physics Problems of Reactor Shielding*, September, 1967
Sponsored by the British Nuclear Energy Society, the Institute of Physics and the Physical Society
May , 1968

AI-Memo-64-152 (CONF-446-86)

A Simplified Monte Carlo Approach to Deep Penetration Problems
L. B. Levitt
July 1964

ARH-46

Dose Rates for Cylindrical Source Volumes from Process Encountered Fission Products through Lead, Iron and Concrete
H. A. Mouthrop, D. T. Vladimiroff
July 1968

CONF-660815

Proceedings for the Conference on Principles of Radiation Protection, August 24-26, 1966, Oak Ridge, Tennessee
Oak Ridge National Lab., Tenn., Oak Ridge Associated Universitities, Inc., Tenn.

CONF-661060

Problems of Structural Engineering in Radiation Protection. II. Lectures presented at a Meeting of the Third Professional Committee on Radiation Protection, October 13-14, 1966.
H. Schultz, E. Bagge, G. Boehnecke

GA-8485 (UCRL-13336)

Neutron Penetration Measurement Program
J. L. Pigg, J. L. Russell, Jr.
January 19, 1968

GEMP-620

Forty-Group Cross Section for Monte Carlo Calculations
J. W. Zwick
January 30, 1968

IN-1141

Slow Neutron Scattering From Water
R. M. Brugger and J. P. Plummer
May, 1968

KAPL-P-3434

An Iterative Solution Method for the Neutron Transport Equation with Anisotropic Scattering
Bruce W. Crawford, P. L. Chambre
May, 1968

KAPL-P-3435

Estimators for Shielding Monte Carlo Calculations: A Review
D. B. MacMillan
May, 1968

NBS-TN-283

Nuclear and Radiation Standards of Importance to the National Atomic Energy Program
H. W. Koch, H. J. Donnert, W. W. Havens, Jr., G. L. Rogosa, L. Rosen
March 31, 1966

NP-27460

Discussion of the Radiation Transport Equation in Different Coordinate Systems. Report No. 1-26 (In German)
F. Moser, G. Froehlich
December 1967

ORNL-TM-1284

Spectrum of Gamma Rays Emitted by a Stainless-Steel-Clad-Pool-Type Reactor (BSR-II)
G. T. Chapman, W. R. Burrus
May 17, 1968

ORNL-TM-2209

Sensitivity of Gamma-Ray Dose Calculations to the Energy Dependence of Gamma-Ray Production Cross Sections
K. J. Yost, M. Solomito
May 24, 1968

ORNL-TM-2242

Experimental Evaluation of Minima in the Total Neutron Cross Sections of Several Shielding Materials
E. A. Straker
June 6, 1968

ORNL-TM-2267

The $^{14}N(n, n'\gamma)$ Reaction for $5.8 \leq E_n \leq 8.6$ MeV
J. K. Dickens, E. Eichler, F. G. Perey, P. H. Stelson, John Ashe, and D. O. Nellis
June 21, 1968

ORNL-TR-1860, (Translated from Atomkenergie, 12, No. 7/8, 267-278,)

Determination of the Radiation Field in Nuclear Reactor Shields on the Basis of Measurements with a Restricted Collimated Beam. (Part I)
G. Thuro and H. Patzelt
1967

ORO-3443-13

On the Spectrum of an Operator Associated with the Neutron Transport Equation. Technical note Be-546.
R. B. Kellogg
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M. R. Trammell, W. A. Henninger
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An Iterative Method for Solving the Neutron Transport in X-y Geometry
J. A. Davis, L. A. Hageman
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Angular Radiation Characteristics of Rough Surfaces Contaminated with Fallout Simulant
B. W. Shumway, A. L. Frank
February 29, 1968

Beton Zhelezobeton, No. 7, 32-4, 1966 (In Russian)

Role of Boron-Containing Concretes as Nuclear Reactor Shields
L. N. Zaitsev, P. A. Lavdanskii, V. V. Malkov, B. S. Sychev

Bull., No. 72, Kansas State Univ., Eng. Exp. Sta., 1-168

Scattering of Fallout Radiation from Ceilings of Protective Structures
W. R. Kimel, R. E. Faw
July, 1966

Kernenergie, 11, 3-10, January 1968 (In German)

Contribution to the Albedo Problem of Neutron Transport for a Slab
H. Kiesewetter, R. Kruse

J. Nucl. Sci. Technol., 4, 607-13, December 1967

Backscattering of Gamma Rays from Polyethylene, Aluminum, and Lead Slabs
Koichi Mizukami, Takaaki Matsumoto, Tomonori Hyodo

Nucl. Appl., 5, 1, 24-25, July 1968

Advantages and Applications of ^{252}Cf as a Neutron Source
W. C. Reinig

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Gamma-Ray Shielding Studies with Monoenergetic Gamma Rays from Positron Annihilation
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A Contribution to Skyshine Study
M. Ladu, M. Pelliccioni, P. Picchi, G. Verri

Nucl. Instr. Methods, 62, (1), 113-114, 1968

Recursion Formulae for Semi-Analytical Multiple Scattering Calculations in Slab Geometry
F. H. Frohner

Nucl. Sci. Eng., 23, 1, 128-138, July 1968

A Three-Dimensional P_N Spherical Harmonics Theory in Cylindrical Geometry
C. Maeder

Nucl. Sci. Eng., 33, 2, 249-251, August 1968

Description of Anisotropic Scattering in the Double P_1 Method by Means of Anisotropy Functions
S. A. W. Gerstl, W. Kofink

Nucl. Sci. Eng., 33, 2, 251-254, August 1968

A Variational Approach to the Selection of the Direction Sets in the Discrete S_n Approximation to Neutron Transport Theory
Pekka Jauho, Heikki Kalli

THESIS (Ph. D.)

Reflection of Cobalt-60 Gamma Rays from Concrete
James Andrew Baran , Kansas State University
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Shielding from Ionizing Radiation
L. R. Kimel, V. P. Mashkovich
Moscow, 1966

SPACE AND ACCELERATOR SHIELDING

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Construction of Probability Envelopes of Flux-Energy Spectrum for Solar Proton Events
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Fluctuations of Energy Loss by Heavy Charged Particles in Matter
H. D. Maccabee
July 20, 1966

NASA-SP-169 (ANS-SD-5)

Protection Against Space Radiation
Arthur Reetz, Jr. , Keran O'Brien , Editors
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Solar Neutron Transport in the Earth's Atmosphere
R. G. Alsmiller, Jr., R. T. Boughner
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Calculation of the Energy Distribution of High Energy Neutrons in a Shield
B. B. Sychev
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ORNL-TR-1912 (JINR-P9-3269)(In Russian)

Buildup of the Charged Radiation Component in a Shield
B. S. Sychev
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Backward Neutron Yield from a Shield Under the Influence of Protons of 660 MeV Energy
L. R. Kimel, M. M. Komochkov, V. P. Sidorin, B. S. Sychev, A. P. Cherevatenko
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September 1966

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R. D. Fortune, W. S. Gilbert, R. H. Thomas
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Calculation of Stopping Power and Range-Energy Values for Any Heavy Ion in Nongaseous Media
Palmer G. Steward , Roger Wallace
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J. Comp. Phys. 1, 1, 145-7 (August 1966)

A Fortran Subroutine for Calculating the Range-Energy Relation of Charge Particles in Chemical Elements
W. P. Trower

Phys. Rev., 2nd Series, Vol. 162, 976-982 (October 20, 1967)

Secondary Particle Spectra from the Interactions of 30- to 340 MeV Protons on Complex Nuclei: Experimental Data and Comparison with Theory
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V. N. Lebedev

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B. S. Sychev, V. V. Mal'kov, M. M. Komochkov, and L. N. Zaitsev

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Energetic Particles from the Sun
C. E. Fichtel and F. B. McDonald
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Radiation and Shielding in Space
James W. Haffner
New York Academic Press
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Handbuch der Physik (Encyclopedia of Physics), Vol. 46/2, 181-264, (A67-27963)
W. R. Webber (The Spectrum and Charge Composition of the Primary Cosmic Radiation)
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IKE-3-391 (ORNL-tr-1952 *December 1966* *PLE*

A Program for the Numerical Solution of the Multigroup P/sub L-Equations with Arbitrary Anisotropic Scattering for Plane Layers
Dr. Ing, H. J. Siegert
ALGOL

ORNL-4086 *February 1968* *PLUME*

Estimation of Radiation Doses Following a Reactor Accident
R. T. Binford, J. Barish, F. B. K. Kam
FORTRAN IV for IBM 360/75

ORNL-3931 *July 1966* *PHOEBE*

PHOEBE - A Code for Calculating Beta and Gamma Activity and Spectra for U-235 Fission Products
E. D. Arnold
FORTRAN for IBM 7090, 360, and CDC 1604

DUN-4136 *June 1968* *RIBD*

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R. O. Gumprecht
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