

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. 35

October 16, 1967

*"Such things and deeds as are not written down are covered with darkness,
and given over to the sepulchre of oblivion." Ivan Bunin*

ORNL NEUTRON PHYSICS DIVISION ISSUES ANNUAL REPORT

The Oak Ridge National Laboratory "Neutron Physics Division Annual Progress Report for Period Ending May 31, 1967," ORNL-4134 (August 1967) has recently been issued. The articles in the report are summaries and abstracts under the following headings: Nuclear and Reactor Physics, Critical Experiments, Reactor and Weapons Shielding, Radiation Shielding Information Center, Mathematics and Computer Programs, Radiation Detector Studies, Theoretical and Experimental Studies for High Energy Radiation Shielding.

RECENT VISITORS TO RSIC

The following people visited RSIC during the month of September 1967: Charles L. Holland, Babcock and Wilcox Co., Lynchburg, Virginia; Dean C. Kaul, USAF/SAMSO, Norton Air Force Base, California; Gene W. Ray, Aerospace Corp., San Bernardino, California; Major Kelly Robinson, Wendell A. Biggers, and John T. Pulos, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

INFORMAL SHIELDING SESSION -- BOSTON AREA

W. O. Chatfield of Stone and Webster Engineering Corporation, hosted a meeting on September 21 in which members of the RSIC staff and Boston area scientists exchanged shielding information. Fourteen people from ten different installations came together at the invitation of Eric Clarke, Technical Operations Research, Burlington, Massachusetts, who was unable to be present.

Attending the session were: R. H. Levy, Avco-Everett Research Laboratory, Everett; Helen R. Baker, USAF ESD, Bedford; W. Lanning, MAGI, Lexington; R. Baran, MITRE, Bedford; L. Nichols, Molecular Research Corp.,

Cambridge; J. G. Beckerley, Radioptics, Inc., Cambridge; L. S. Foster, U. S. Army Materials and Mechanics Research Center, Watertown; F. J. Casey, Chatfield, H. M. Fontecilla, S. M. Ingeneri, and R. E. Vanasse of Stone and Webster; and H. Clyde Claiborne and Betty F. Maskewitz of RSIC, ORNL, Oak Ridge.

STANDARDS GROUP MEETS

Preliminary work toward devising a code of good practices for the programming of digital computer programs got underway in a work session of Standards Subcommittee ANS-10-Mathematics and Computation at the Massachusetts Institute of Technology (MIT), Cambridge, Massachusetts, on September 22. Committee members present were: R. A. Blaine, chairman, Atomics International, Canoga Park, California; W. Cadwell, Westinghouse Bettis Atomic Power Laboratory, Pittsburgh, Pa.; K. Hansen, MIT; Betty Maskewitz, RSIC, ORNL; J. Olhoeft, Westinghouse Atomic Power Department, Pittsburgh, and M. Butler and A. Rago, Argonne National Laboratory.

Considerable thought was given to ways to place on file at RSIC and the Argonne Code Center environment reports for each installation computer configuration. The code centers can give a more efficient distribution service and can more easily check out codes if the hardware and software are known. Of particular importance is a knowledge of any changes made to the software at a given installation to make it different from the manufacturer-distributed software. RSIC will attempt to collect such information in the near future.

The ANS-10 subcommittee, formerly known as the STICE Committee, published as an ANS Nuclear Engineering Bulletin "A Code of Good Practices for the Documentation of Digital Computer Programs," in September 1966.

SEMINAR WORKSHOP STATISTICS

A check on the recent seminar-workshop on "The Discrete Ordinates Method for Radiation Transport Calculations" held at the Oak Ridge National Laboratory reveals the following information. There were 112 participants, representing 43 different installations in the USA, and five foreign installations.

SEPTEMBER 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

ACNP-67520

Pathfinder Atomic Power Plant. Shielding and Radiation Survey Measurements

J. W. Lewellen, P. S. Lacy, and T. M. Raby - June 1967

AD-644613 (ARL-62-478)

On the Bethe-Heitler Formula for Bremsstrahlung

E. A. Hylleraas - September 1962

AE-279

Calculations of Neutron Flux Distributions by Means of Integral Transport Methods

I. Carlvik - May 1967

AEC-tr-6868

Use of the Gamma Backscattering Method in Mining for Ore Composition Determination in Bore Holes

D. Bonhoffer

AECL-2692 (IOI-309)

The NRX Reactor. A General Description

R. E. Manson, H. E. Smyth - Feb. 1967

AECL-2705

Calculations of the Thermal Scattering Law for Solids and Liquids

R. G. Larvis - June 1967

AECL-2877

Design for Radiation Protection at Douglas Point

R. B. V. Simmons May 1967

AECL-2915

The Experimental Scattering Law for Various Reactor Materials
I. M. Thorson - June 1967

AED-C-33-02

Bibliographies in Nuclear Science and Technology. Section 33.
Shielding Radioactive Radiation in Nuclear Physics
A. Schmidt - Dec. 1966

AERE-R-5347

The Determination of the Fast-Neutron Spectrum in Positions in
the Daphne Reflector
M. G. Silk - March 1967

AFRRI CR-67-1 (RRA-T71)

Calculated Gamma-Ray Dose Distributions in a Phantom Exposed to
Fallout and Simulated Fallout
R. L. French, K. W. Tompkins, and C. W. Garrett - Feb. 1967

ANL-7328

On the Structure of the Isotropic Transport Operations in Three
Independent Space Variables
E. G. Bareiss and I. K. Abu-Shumaya - May 1967

AFDA-203

Design of the Radiation Shield System for the Enrico Fermi
Atomic Power Plant
R. J. Beaudry, H. E. Hungerford, R. F. Mantey, and W. F. Chaltron

BNL-50061A

Neutron Cross Section Compilation Center, SCISCRS Newsletter,
Part A. Reference and Bibliography
June 1967

BNWL-436

Compilation of Doubly Differential Cross Sections and the Scattering
Law for H_2O and D_2O at $299^\circ K$ and for H_2O at $268^\circ K$.
O. K. Harling - June 1967

BNWL-tr-21

Irradiation Tests of Concretes
J. Rappeneau, M. F. Lagorio, P. Piron

DP-1096

Development of ^{60}Co Capsules for Heat Sources
C. P. Ross, C. L. Angerman, et al. - June 1967

EANDC-56

Three year Progress Report of the ENEA Neutron Data Compilation Center,
1964-1967
Douglas W. Colvin - May 1967

EUR-3454.e

Elastic Scattering of Neutrons from Li^6
H. H. Knitter and M. Coppola - 1967

Genshiryoku Kogyo 12, 9, 33-37, 47 (August 1966) (Japanese)

The Present State and the Problems of Shielding Studies in Japan
Y. Tanaka - August 1966

HASL-185

Legendre, Tschebyscheff, and Half-Range Legendre Polynomial Solutions
of the Gamma Ray Transport Equation in Infinite Homogeneous and Two
Media Plane Geometry
B. G. Bennett and H. L. Beck - August 1967

Health Physics 13, 6, 593 (June 1967)

Low Energy X-Ray Mass Absorption Coefficients from 1.49 to 15.77 keV
for Scandium, Titanium, Vanadium, Iron, Cobalt, Nickel and Zinc
R. W. Carter, R. H. Rohrer, W. R. Carlton, and G. R. Dyer

Health Physics 13, 1033 (1967)

Exposure Rates from Products of Fast Neutrons Fission of ^{235}U and
 ^{238}U at Selected Times After Fission
L. R. Bunney and D. Sam - 1967

IFA-FR-56

S. Carlson Approximation in Neutron Transport Theory
Teodor Rosescu - 1966

J. Nuclear Energy, 21, 5, 303 (May 1967)

An Investigation of Neutron Streaming Using the Pulsed Neutron
Source Technique
R. W. Page

J. Nucl. Energy 21, 653 (1967)

Solution of (N, Gamma) Transport Problem in Carbon-Monte Carlo
B. L. Lawson, and C. F. Cook

J. Nucl. Sci. Technol., 4, 5, 213 (May 1967)

Contribution of Heavier Nucleus on Neutron Slowing Down in
Hydrogeneous Mixture
R. Tanaka, and K. Mori

KAPL-P-3335

Particular Solutions of the One-Speed Transport Equation
M. R. Mendelson and S. P. Congdom

KAPL-P-3340

Neutron Absorption Rate Predictions for Materials with Anisotropic
Effective Macroscopic Cross Sections
T. J. Kurey, H. J. Kopp

Kerntechnik, 9, 62-4 (Feb. 1967) (German)

Calculation of the Dose-Rate of Scattered Gamma Radiation
K. H. Waechter

N67-17181 (NASA-CR-72081)

Gamma and Neutron Dose Measurements for a Thermal Tungsten Nuclear
Rocket Critical Experiment
G. Houghton, et al. - 1966

NAA-SR-9400, Vol. IV (Confidential)

Lithium Hydride Technology: IV. A Novel Neutron Gamma Material for
SNAP Shielding Applications
F. H. Welch - May 25, 1967

NAA-SR-MEMO-12373, Vol. 1

Reactor/Shield Subsystems for Manned Orbiting Research Laboratories
(MORL)
J. D. Gylfe - June 15, 1967

NAA-SR-MEMO-12373, Vol. 2 (Confidential)

Reactor/Shield Subsystems for Manned Orbiting Research Laboratories
(MORL) Vol. 2, Appendix A
J. D. Gylfe - June 15, 1967

NASA-CR-72231

Neutron Flux Distributions: (Experiment vs. Theory) for a Water
Reflected Spherical Cavity System
F. Miraldi, G. W. Nelson, G. Holmberg, and G. Skoff

NASA-TM-X-1418

Calculation of Fast-Neutron Flux Emerging from a Reactor Beamhole and
Comparison with Experiment
H. S. Bloomfield - August 1967

NP-16792

Experimental Determination of Neutron Energy Spectra in Concrete Ducts
L. B. Gardner, A. J. Mettler, and B. Burdick - May 1967

NP-tr-1545

Back Scattering Experiments of High Resolutions with Neutrons
B. Alefeld

Nucl. Appl. 3, 548 (1967)

Mean Gamma-Ray Energy Absorption Coefficients
W. G. Unruh and M. Tomlinson

ORNL-NSIC-33

Indexed Bibliography on Transportation and Handling of Radioactive
Materials
L. B. Shappert and R. S. Burns - June 1967

ORNL-TM-1816

Monte Carlo Calculations of the Neutron Flux Within a $^{10}\text{B}_4\text{C}$ Shell
R. M. Freestone - June 9, 1967

ORNL-tr-1504 (Translated from CEA-N-571)

Tables of Neutron and Gamma Constants Straight-Line Attenuation
Between Source and Point of Measurement with Accumulation Factor
Jean-Pierre Barthe

PAEC(A)IN-661

Reactor Cross Sections. A Literature Search
Philippine Atomic Energy Commission, Manila
November 1966

R-OU-246 (DASA-1934)

Initial Radiation Spectra Definition. Final Report.
F. A. Bryan, Jr., M. D. Wright, A. B. Nichols, A. J. Benjamin, and
J. C. Wright

R-OU-266 (Vol. 1) (USNRDL-TRC-67-2)

Radiological Recovery Requirements, Structures, and Operations
Research. Vol. 1. Computational Technique for Determining Im-
portance of Limited Strip Decontamination Procedures
Final Report
W. O. Doggett and F. A. Bryan, Jr. - May 1967

RRA-M72

On the Buried-Source Model for Computing Fallout Ground Roughness
Effects
R. L. French - June 16, 1967

RRA-M74

A Comparison of Monte Carlo Calculated and Experimentally Determined
Energy and Angle Spectra for ^{137}Cs
J. D. Marshall and M. B. Wells - June 11, 1967

RRA-T75

Monte Carlo Calculations of Fast-Neutron Transmission and Reflection by
Iron Slabs
J. J. Long and M. B. Wells - September 1, 1967

UCRL-50239

Transmission of 14-MeV Neutrons in Liquid Nitrogen
M. Heusinkveld - June 9, 1967

UJV-1755 (Czech)

Calculation of Gamma Dose Rates and Gamma Heat Source in Shielding
of Nuclear Reactor
J. Rataj - Feb. 1967

USNRDL-TR-67-39

Feasibility and Potential Effectiveness of Partial-body Shielding
for Personnel Protection Against Ionizing Radiation
E. S. Shapiro - April 11, 1967

USNRDL-TR-67-57

Neutron Energy Spectrum - A Classical Derivation
D. Hoffman - May 23, 1967

Z. Ang. Phys. 22, 507-10 (1967) (German)

Determination of the Total Mass Absorption Coefficients for Gamma
and X Rays in the Region of 30 to 200 keV.
R. P. Knerr, and H. Vonach

BOOK

Physics of Radiological, 2nd Edition, Rev. 2nd Printing
H. E. Johns and C. C. Thomas

Space and Accelerator Shielding

ORNL-3854 (N67-24157)

The Effect of Charged-Particle Slowing Down on the Nuclear Cascade
in Steel Initiated by 19.2-GeV/c Protons
R. G. Alsmiller, Jr., F. S. Alsmiller, and J. B. Barish - Jan. 1967

ORNL-3884

Literature Survey of Radio-chemical Cross-Section Data Below 425 MeV
H. W. Bertini, M. P. Guthrie, E. H. Pickell, B. L. Bishop
Oct. 1966

Nucl. Instr. Methods, 51, 156-158 (1967)

The Influence on Relaxation Lengths for High Energy Neutron of the
Angular Distribution of the Incident Flux
K. O'Brien and J. E. McLaughlin

- Nucl. Instr. Methods, 51, 56-60 (1967)
Shielding of High-Energy Electrons: The Neutron and Muon Components
G. Bathow, E. Freytag and K. Tesch
- Nucl. Instr. Methods, 51, 93-101 (1967)
Multiple Scattering of Charged Particles
J. B. Marion and B. A. Zimmerman
- Nucl. Instru. Methods, 48, 109-16 (Feb. 11, 1967)
Electron-Photon Cascade Calculations and Neutron Yields from
Electrons in Thick Targets
R. G. Alsmiller, Jr., and H. S. Moran
- Phys. Rev. 153, 2, 338-42 (Jan. 1967)
Stopping Power of Be, Al, Cu, Ag, Pt, and Au for 5-12 MeV Protons
and Deuterons
H. H. Andersen, C. C. Hanke, H. Sorensen, and P. Vajda
- ORNL-TR-1212 (Transl. from DESY 65/6) (SLAC-TRANS-41)
Electron-Photon-Cascade in Lead due to Primary Particles of 6 GeV
U. Volkel - July 1965
- AFWL-TR-65-149 (AD-651969)
Measurements of Spacecraft Cabin Radiation Distributions for the
Fourth and Sixth Gemini Flights
J. F. Janni - March 1967
- UNC-5049
Synthesis of Minimum-Weight Proton Shields
A. D. Krumbein, J. Celnik, F. R. Nakache, and E. S. Troubetzkoy
Feb. 25, 1963
- Sov. J. Atomic Energy, 21, 1, 684-686 (July 1966)
Moderation of a High-Energy Neutron Flux by Heterogeneous Shielding
L. N. Zaitsev, M. M. Komochkov, V. V. Mal'kov, B. S. Sychev, E. P.
Cherevatenko
- Proc. Int. Conf. Cosmic Rays, 2, 967-969, 1965
Investigation of the Electromagnetic Cascades in Iron and Lead at
an Energy of 100 GeV
Z. S. Takbaev, Y. T. Lukin, and Y. A. Emelyanov
- ORNL-TR-1650 (Transl. from Prac. Lek, 18, 1, 21-9 (Jan. 1966)
Betatron and the Problem of Protection in its Use
A. Hrabovcova

UCRL-11647

FORTRAN--Subroutine Range: Calculating the Range-Energy Relation for
Charged Particles in Chemical Elements
W. Peter Trower - September 3, 1964

UCRL-2426 (IV)

High-Energy Particle Data. Vol. IV. Range-Momentum and dP/dx
Plots of Charged Particles in Matter
W. Peter Trower - July 1, 1966

J. Phys. Soc. Japan, 22, 2, 355-360 (Feb. 1967)

Spectrum of Cosmic Ray Produced Neutrons
E. Tajima, M. Adachi, T. Doke, S. Kubota, and M. Tsukuda

Sov. J. Atomic Energy, 20, 5, 439 (May 1966)

Experimental Determination of the Radiation Quality Factor
Near High-Energy Accelerators
V. N. Lebedev, M. Zel-chinskii, and M. I. Salatskaya

ANL-7273

On the Shielding of the External Proton Tunnel Area of Argonne's
Zero Gradient Synchrotron
H. J. How, Jr., G. V. Oldfield, D. J. Streniawski, R. V. Wheeler
November 1966

AERE-BIB-149

Nucleon-Nucleon Scattering (Experimental Aspects) A Bibliography
1961-1966
J. L. Hall - August 1966

Health Phys. 13, 5, 501-507 (May 1967)

Dose-equivalent Rate from Cosmic Ray Neutrons
D. E. Watt

AD-641509

Comprehensive Map of the Space Radiation Environment
A. Rosen, C. A. Eberhard, T. A. Farley, and J. L. Vogl - 1966

ORNL-TR-1536 (NP-tr-1393) (Transl. from JINR-P-2177)

Distribution of the Penetrating Radiation Field Over the Protection
Zone of the 10-GeV Synchrophasotron)
V. N. Lebedev, L. S. Zolin, M. I. Salatskaya

ORNL-TR-1672 (Transl. from JINR-P1-2990)

Showers in Lead Produced by 0.1 to 1 GeV Gamma-QUANTIA
O. A. Zaimidoroga, Y. D. Prokoshkin, and V. M. Tsupko-Sitnikov

UCRL-17141

Radiation Problems with High-Energy Proton Accelerators
W. S. Gilbert - Feb. 21, 1967

Shielding Computer Codes

AFWL-TR-67-11	May 1967	PHOTRAN
Updated Master Library Tape for PHOTRAN by C. R. Marotta		
DAC-60659	May 1967	SOBER
SOBER, A Monte Carlo Program for Neutron and Gamma Ray Transport in Complex Geometries by T. M. Jordan FORTRAN IV for IBM 7094		
DP-1098	June 1967	RADOS
RADOS, A Code to Estimate Gamma Dose from a Cloud of Radioactive Gases by R. E. Cooper FORTRAN IV for IBM 360-65		
ER-7777 Vol. IV	February 1967	LSVDC4
LSVDC4 Program System by C. W. Hill, W. B. Ritchie, and K. M. Simpson, Jr. FORTRAN IV for IBM 7094		
IITRI-A6088-21 Vol. I	January 1966	NAP
Prediction of Neutron Induced Activation, Vol. I -- NAP Code Manual by David A. Klopp FORTRAN IV for IBM 7094		
IITRI-A6088-22 Vol. II	January 1966	NAP
Prediction of Neutron Induced Activation, Volume II - NAP: Physical Models and Experimental Validation by David A. Klopp FORTRAN IV for IBM 7094		
IITRI-A6088-23 Vol. III	January 1966	NAP
Prediction of Neutron Induced Activation, Volume III - NAP Cross Section Library by David A. Klopp FORTRAN IV for IBM 7094		

