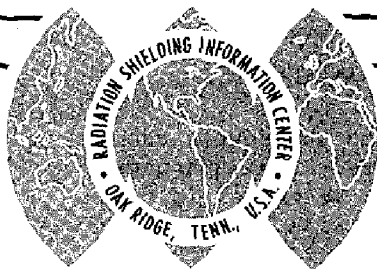


RSIC Newsletter



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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PROVERBS

*One pound of learning requires
ten pounds of common sense to apply it.*
- Persia

CHAPTER 6 of WEAPONS RADIATION SHIELDING HANDBOOK PUBLISHED

Chapter 6 of the handbook which Oak Ridge National Laboratory is preparing for the Defense Atomic Support Agency has recently been released. Titled *Methods for Predicting Radiation Fields Produced by Nuclear Weapons* and authored by Wade E. Selph and M. B. Wells of Radiation Research Associates, Inc., the abstract of the chapter is as follows:

This chapter of the Handbook describes the various sources of radiation produced by a nuclear weapons burst and presents techniques for calculating the transport of the radiations from the point of burst to the surface of a shield; that is, it presents methods for determining source terms for shield attenuation calculations. The emphasis is on initial radiation, defined as the radiation produced within the first minute following the detonation. The sources considered are the neutrons and (initial) gamma rays escaping from the weapon; the initial gamma rays produced by interactions of the escaping neutrons with environmental materials (air and ground); the initial and residual gamma rays given off by the fission products and activated materials incorporated in the cloud; and residual gamma rays emitted by activated environmental materials that have remained intact. Typical spectra of the various sources are presented, including weapons emission spectra. In addition, basic neutron gamma-ray transport data are presented which can be applied to given weapons emission spectra. Simplified techniques which will give estimated dose rates for certain classes of weapons are also included.

While the preceding abstract is unclassified, the chapter itself (330 pages) is classified "Secret-Restricted Data." With the proper clearances it can be obtained from the Defense Atomic Support Agency, Washington, D. C. 20305. The document number is DASA-1892-4. Handbook editors are Lorraine S. Abbott, H. Clyde Claiborne, and Charles E. Clifford, all of Oak Ridge National Laboratory.

STATUS REPORT OF WEAPONS RADIATION SHIELDING HANDBOOK

The recently published Chapter 6 of the *Handbook* is the fourth chapter to be released, Chapters 3, 4, and 5 having previously been announced in the *RSIC Newsletter*. Chapters 2 and 7 are currently being set in type and will be published within the next few months. They will be followed by Chapters 8 and 1 in that order. The titles of the first eight chapters are:

- Chapter 1. *Introduction*
- Chapter 2. *Basic Concepts of Radiation Shield Analysis*
- Chapter 3. *Methods for Calculating Neutron and Gamma-Ray Attenuation*
- Chapter 4. *Neutron and Gamma-Ray Albedos*
- Chapter 5. *Methods for Calculating Effects of Ducts, Access Ways, and Holes in Radiation Shields*
- Chapter 6. *Methods for Predicting Radiation Field Produced by Nuclear Weapons (Classified)*
- Chapter 7. *Engineering Method for Designing Initial Radiation Shields for Blast-Hardened Underground Structures (Classified)*
- Chapter 8. *Engineering Method for Designing Initial Radiation Shields for Above-Ground Structures (Classified)*

The first five chapters deal with basic information generally applicable to all neutron and gamma-ray shielding problems, while Chapters 6-8 deal with information specifically applicable to nuclear weapons radiation shielding problems. At least two other chapters are in the planning stage. (Note: All chapters are identified as DASA-1892 with subnumbers used for the individual chapters.)

RSIC CODE CENTER KEEPS BUSY

The following is a brief summary of the operations of the RSIC code center over a six-month period, July 1 - December 31, 1969. Area covered: the collection, packaging, updating, and the dissemination of computer codes, data, and miscellaneous services rendered to the general shielding community.

Improvements to the Computer Code Collection

- 13 Major new shielding codes were packaged, bringing the collection to 126 CCC packages.
- 8 Additional codes were packaged - considered to be of peripheral interest to the shielding community - bringing this category to 14 PSR packages.
- 18 Code packages in the collection were updated, several of which included major modifications and extensions to the programs.
- 11 New hardware versions of existing code packages were fed back into RSIC by installations where conversions were made.
- 3 Data Library Collection (DLC) sets were updated and one data set was added. Improvements were made to the documentation in each of the data sets.

Services to the shielding community by the Code Center

- 605 Letters of request were logged into the Center - over 100/month, resulting in more than 1400 separate actions required to satisfy the requests:
- 202 Separate CCC code packages were shipped, including full documentation.
- 113 Separate PSR code packages, peripheral to shielding, were shipped.
- 86 Separate shipments of DLC data sets.
- 36 Abstracts of code packages, or computer lists of programs were mailed.
- 32 Instances in which only the updated material was sent.
- 497 Document packages were mailed separately from the code package.
- 23 Instances in which RSIC staff members did the necessary research and assisted arrangements for nuclear codes to be made available to requesters.
- 124 Instances in which staff members spent considerable time in trouble shooting specific codes as a requester was learning how to use the codes.
- 69 Instances in which time was spent in assisting the requester to solve his problems - general counsel.
- 113 Instances in which assistance was given in the selection of the computer code to fit the requester's problem, his computer, and his capabilities.
- 90 Separate miscellaneous service requests that were filled.

Data of interest to shielding

- 20 Separate transactions in which RSIC staff members assisted in data handling processes - running CHECKER, etc.

Seminar-Workshops sponsored by RSIC

One Seminar-Workshop was organized by RSIC in the six months. A dual topic was selected: multigroup cross sections and discrete ordinates calculation. Attendees: 124 from 57 separate installations, including 7 foreign countries. The proceedings will be published as ORNL-RSIC-27.

PERSONAL ITEMS

Vic Bell has returned to Ispra, Italy, from the ENEA Neutron Data Compilation Center (CCDN) to head the ENEA Computer Programme Library (CPL). *Reg Prescott*, former head of the CPL, is now with the Applied Mathematics Division (ESTEC) European Space Research Organization, Noordwijk, Holland. *Johnny Rosen*, also a former director of the CPL, has been confirmed as Head of ENEA Scientific Division.

* * * * *

Don Dudziak has returned to Los Alamos after having spent a year at the University of Virginia.

* * * * *

Lee Hagmark, formerly with the Naval Radiological Defense Laboratory, is now with Sandia Corporation, Livermore, California.

* * * * *

Carl A. Benz, formerly with United Engineers and Constructors, Boston, Mass., is now Shielding Design Coordinator in the Washington office of Bechtel Corporation, Gaithersburg, Md.

* * * * *

Arthur H. Maute, formerly with the Institut für Kernenergetik der Universität Stuttgart, is now with Siemens.

VISITORS TO RSIC

Visitors to RSIC during the month of December were: Peter G. Aline, General Electric APED, San Jose, Calif.; Frank Bly and Charles Hill, Lockheed-Georgia Co., Marietta, Ga.; John L. Lobdell, TVA, Florence, Ala.; John G. Picarelli, Air Force Weapons Laboratory, Kirtland AFB, New Mexico; Robert M. Beihn and Max H. Lombardi, Oak Ridge Associated Universities, Oak Ridge, Tenn.; W. D. Arnold, David J. Crouse, and Fred Hurst, Chemical Technology Division, Douglas Jenkins, Reactor Division, and Ben H. Walker, Central Library, all of ORNL.

DECEMBER 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/E-200

October 1969

Compilation of keV Neutron Capture Gamma Rays in the Mass Range
A Equals 40-70
B. J. Allen, J. R. Bird, M. J. Kenny
Available: AEC Depository Libraries; CFSTI (U.S. Sales Only)

AAEC/TM-460

June 1968

Radiographic Exposure Charts for Radioisotope Sources
P. A. Gillespie
Available: CFSTI as N69-22189

AAEC/TM-512

July 1969

Measurement of Thermal Neutron Capture Gamma Rays in Iron, Cobalt,
and Scandium
B. B. V. Raju, R. B. Taylor, J. R. Bird
Available: AEC Depository Libraries; CFSTI (U.S. Sales Only)

- AEEW-M-933 September 1969
The Thermal Neutron Absorption Cross-Sections, Resonance Integrals
and Resonance Parameters of Silicon and Its Stable Isotopes
J. S. Story
Available: HMSO, Three Shillings Net; CFSTI
- AE-374 October 1969
Gamma Radiation from Fission Fragments
J. Higbie
Available: AEC Depository Libraries; CFSTI (U.S. Sales Only)
- AI-69-8 (USNRDL-TRC-69-11) January 1969
Finite Difference Methods for the Solution of Gamma-Ray Transport
Problems
B. D. O'Reilly
Available: North American Rockwell Corp., Atomics International Div.,
Canoga Park, California 91304
- ARH-220 September 15, 1969
Radiation Protection Standard
(Atlantic Richfield Hanford Co., Richland, Wash.)
Available: AEC Depository Libraries; CFSTI
- BNWL-1197 October 1969
FTR Shield Design Cross Sections: A Partial Evaluation
D. R. Marr, M. G. Zimmerman
Available: AEC Depository Libraries; CFSTI
- CEX-65.60 November 1969
Neutron Spectrometry - Operation Henre (Program 6)
R. S. Sanna, J. E. McLaughlin, A. Lazanoff, K. O'Brien
Available: CFSTI
- CNM-R-2 (Vol. 1)
The j_N Method for Time-Dependent Neutron Transport Problems (pp.1059-
T. Asaoka 1085)
- CNM-R-2 (Vol. 2)
Optimum Reactor Shielding (pp. 726-39)
T. B. Enginol
- CNM-R-2 (Vol. 2)
Discrete Ordinates Representations of the Scattering Kernel
B. D. O'Reilly, R. C. Lewis (pp. 1086-98)

GA-9480 (NASA-CR-72598)

August 4, 1969

Final Report - Reevaluation and Analysis of Neutron Spectra in Liquid Hydrogen

G. D. Trimble, W. E. Selph

Available: NASA, Office of Scientific and Technical Information

Attention: AFSS-A, Washington, D.C. 20546

GA-9429 (DASA-2331)

May 30, 1969

Gamma-Ray Transport in Liquid Nitrogen

G. M. Reynolds, B. P. Benham, J. L. Russell, Jr., W. E. Selph, S. M. Sperling

Available: CFSTI as AD-693618

IEA-171

August 1968

Monte Carlo Calculation of Monochromatic Gamma-Rays Energy Loss: Application for NaI(Tl) Crystals

H. R. Granzen, O. Y. Mafra, F. G. Bianchini

Available: AEC Depository Libraries; CFSTI (U.S. Sales Only)

K-TL-37

May 23, 1969

Supplemental Radiation Shield for 1100-Curie Cobalt Shipment

C. E. Newlon, J. G. Bailey

Available: AEC Depository Libraries; CFSTI

LA-3747-MS

November 12, 1969

Gamma Dose-Rate Measurements on the Phoebus 1B Reactor

A. J. Ahlquist

LA-4166

October 20, 1969

Fissioning Neutron Fluence Distributions in the Phoebus 1B Facility Shield

C. W. Watson

Available: AEC Depository Libraries; CFSTI

ICRU Report 14

September 15, 1969

Radiation Dosimetry: X-Rays and Gamma Rays with Maximum Photon Energies Between 0.6 and 50 MeV

International Commission on Radiation Units and Measurements

Available: ICRU Publications, P.O. Box 4869, Washington, D.C. 20008
\$2.50

JPRS-48331

1967

Effective Methods of Calculating the Neutron Field in a Nuclear Reactor (pp. 106-22)

V. V. Khromov, I. S. Slesarev, A. M. Kuz'min

LA-4257

September 1969

Short-Lived Delayed Gamma-Ray Emission from Fast Fission of
Plutonium

B. M. Moore

Available: AEC Depository Libraries; CFSTI

MITNE-85, SR-2 (AFCRL-69-0071, N69-36718, AD-688955) January 1969

Thermal Neutron Capture Gamma-Ray Spectra of the Elements

N. C. Rasmussen, Y. Hukai, T. Inouye, V. J. Orphan

Available: CFSTI

NP-tr-1864

Calculating the Passage of Neutrons in Spherical Geometry by the
Monte Carlo Method

A. A. Van'kov, F. F. Mikhailus

ORNL-4464

December 1969

Neutron and Secondary Gamma-Ray Transport in Infinite Homogeneous
Air

E. A. Straker, M. L. Gritzner

Available: CFSTI

ORNL-TM-2524

June 1969

An X-Ray Technique for Measuring Thickness of Tungsten on Copper

B. E. Foster, S. D. Snyder

Available: CFSTI

ORNL-TM-2565

May 1969

Experimental Determination of the Differential Fast Neutron Flux
in the High Flux Isotope Reactor Using Threshold Detectors

H. L. Dodds, Jr.

Available: CFSTI as N69-38380

ORNL-TM-2707

November 1969

The Development of a Spectrometer and the Measurement of the
Neutron Spectrum from the Health Physics Research Reactor Between
50 keV and 450 keV

D. R. Stone, J. H. Thorngate, K. W. Crase, M. D. Brown, D. W. Carver

PB-185 737

1969

Design of a Special Shielded Container for the Transport and Storage
of Radium Sources

ATCOR, Inc., Hawthorne, N.Y.

Available: CFSTI

RD/B/N-1445

October 1969

Survey of Experimental Data on Dose-Response Relationships
J. K. Wright
Available: AEC Depository Libraries; CFSTI (U. S. Sales Only)

RM-6033

June 1969

Transport Calculations Pertinent to Satellite Detection of X-Rays
from Near Earth Nuclear Explosions
H. W. Hubbard
Available: CFSTI as AD 692699

UCRL-19234 (Thesis)

August 1969

The Thermal Neutron Flux Produced in a Spherical and a Cubical
Cavity by Slowing Down of Fast Neutrons in the Cavity Walls, for
Walls of Water and Concrete, as a Function of Cavity Size, Using
the Discrete S_N Method
C. B. Lim
AEC Depository Libraries; CFSTI

UCRL-50174 (Sect. 4)

August 1969

Compilation of X-Ray Cross Sections. Section IV.
W. H. McMaster, N. K. Del Grande, J. H. Mallett, J. H. Hubbell
Available: AEC Depository Libraries; CFSTI

UCRL-50755

September 1969

Incident Energy Dependence of Fission Spectra
R. J. Doyas, R. J. Howerton
Available: AEC Depository Libraries; CFSTI

UCRL-Trans-10393

1966

Gamma Rays from the Radiative Capture of Resonance and Fast Neutrons
A. T. Bakov, Yu. A. Kazanskii
Available: AEC Depository Libraries; CFSTI

USNRDL-TRC-68-46

November 1968

Fallout Model Analysis
C. J. Seery
Available: CFSTI as AD-686830

USNRDL-TRC-68-25

March 15, 1968

Calculation of Gamma Exposure Rates in an Open or Covered Basement
in Fallout Fields Using the Gadget Code
S. Preiser, M. Kalos, A. Stathopoulos, J. G. Beckerley, E. R. Friedman
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September 1969

Monte Carlo Eigenfunction Iteration Strategies that Are and Are Not
Fair Games (LWBR Development Program)

R. C. Gast

Available: AEC Depository Libraries; CFSTI

Annu. Rep. Res. Reactor Inst., Kyoto Univ., 1, 203-38 (Oct. 1968)

Biological Shielding Test of Kyoto University Reactor

K. Katsurayama, M. Ishida, T. Tsujimoto, M. Mizuma

Aust. J. Phys., 22, 317-26 (June 1969)

Chandrasekhar's X- and Y-Functions for Isotropic Scattering in Thick
Slabs

B. E. Clancy

Health Phys., 17, 516-18 (Sept. 1969)

Low-Energy X-Ray Shielding with Common Materials

M. C. O'Riordan, B. R. Catt

Nucl. Appl. Tech., 7 (6), 576-583 (Dec. 1969)

Distribution of Neutrons from a ^{252}Cf Source in Soil at Depth and Just
Below the Air-Ground Interface

F. E. Senftle, P. W. Philbin, P. Sarigianis

Nucl. Sci. Eng., 38 (3), 253-264 (Dec. 1969)

Reflection and Transmission Functions in Reactor Physics

W. Pfeiffer, J. L. Shapiro

BOOK (MSF-1445 in Russian)

Scintillation Spectra of Scattered Gamma-Radiation from Point Sources

V. A. Artsybashev, G. A. Ivanyukovich

Moscow, Atomizdat, 1968 (108 pages)

BOOK (In Russian)

Problems on Reactor Shielding Physics. Collection of Articles.

Issue 3. (*Voprosy Fiziki Zashchity Reaktorov. Sbornik Statei.*

Vypusk 3.)

D. L. Broder, A. P. Suvorov, S. G. Tsypin (eds.)

Moscow, Atomizdat, 1969 (248 pages)

BOOK

Monte Carlo Principles and Neutron Transport Problems

J. Spanier, E. M. Gelbard

Reading, Mass., Addison-Wesley Pub. Co. (1969) \$14.95

SPACE AND ACCELERATOR SHIELDING

AFCRL-69-148

April 1969

Flare Occurrence Tomorrow as a Function of Area and Flariness of Sunspot Today

A. E. Reilly, I. Enger, A. Pavlowitz

Available: CFSTI as AD-687745

A69-24854 (In French)

1969

Calculation of Radiation Doses in Space (Calcul Des Doses de Radiations Dans L'Espace)

Eds. - C. Elbaz, J. Faugere, A. Lebeau

BNL-14106 (CONF-691101-5)

1967

Beam Stop for 28 GeV/c Protons

G. S. Levin, W. H. Moore

(From 2nd International Conf. on Accelerator Dosimetry and Experience, Stanford, Calif.)

Available: AEC Depository Libraries; CFSTI

CERN-69-17

June 25, 1969

Loss of Protons by Nuclear Interactions in Various Materials

D. F. Measday, C. Richard-Serre

Available: AEC Depository Libraries

IFVE-SEF-69-18 (In Russian)

1969

The Formation of Negative Particles by Protons with Energies up to 70 GeV

Yu. B. Bushnin, Yu. P. Gorin, S. P. Denisov, et al

Available AEC Depository Libraries; CFSTI

JINR-E2-4607 (CONF-690914-3)

1969

Inelastic Interactions of Pions and Nucleons with Nuclei at High and Superhigh Energies (Intranuclear Cascades, Multiple-Particle Interactions)

V. S. Barashenkov, K. K. Gudima, S. M. Eliseev, A. S. Iljinov, V. D. Toneev

(3rd International Conf. on High Energy Physics and Nuclear Structure, New York)

Available: AEC Depository Libraries; CFSTI (U.S. Sales Only)

JINR-P2-4661 (In Russian)

1969

Cascade Model of Photo-Nuclear Reactions

K. K. Gudima, A. D. Iljinov, V. D. Toneev

JINR-P16-4727 (In Russian)

1969

Radiation Escape Beyond the Shielding of the JINR Synchrocyclotron

V. E. Aleinikov, L. P. Kimel, M. M. Komochkov, V. P. Sidorin

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- NASA-CR-1469 December 1969
Study of Radiation Hazards to Man on Extended Near Earth Missions
S. B. Curtis, W. R. Doherty, M. C. Wilkinson
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- NASA-CR-100645 (NAMI-1060) February 13, 1969
Nuclear Emulsion Measurements of the Astronauts Radiation Exposure
on Apollo 7
H. J. Schaefer, J. J. Sullivan
Available: CFSTI as N69-23198
- NASA-CR-100647 (NAMI-1054) December 13, 1968
Comparative Evaluation of the Radiation Environment in the Biosphere
and in Space
H. J. Schaefer
Available: CFSTI as N69-22966
- NASA-CR-105827 (ST-PF-GM-10869, N69-37380) September 23, 1969
Investigations of the Spectrum of Protons in the Inner Radiation Belt
with the Aid of AES COSMOS-137
I. A. Savenko
- NBS-TN-489 August 1969
Tables of Response Functions for Silicon Electron Detectors
M. J. Berger, S. M. Seltzer, J. C. Chappell, J. C. Humphreys,
J. W. Motz
Available: CFSTI; Supt. of Documents, GPO, Washington, D.C. 20402,60¢
- NYO-910-131 1969
Spectra of High-Energy Electron Beams in Water
N. D. Kessarlis
Available: AEC Depository Libraries; CFSTI
- ORNL-TM-2768 November 10, 1969
Calculations Evaluating Several Methods for Reducing the Residual
Photon Dose Rate Around High-Energy Proton Accelerators
T. W. Armstrong, J. Barish
- ORNL-TR-2235 (JINR-P2-4509 *in Russian*) 1969
Interaction Cross Sections of High Energy Particles with Atomic Nuclei
S. M. Eliseev
- ORNL-TR-2236 (JINR-P2-4520 *in Russian*) 1969
Energy Dependence of the Interaction Cross Sections of π -Mesons
with Atomic Nuclei at Energies Higher than 50 MeV
V. S. Barashenkov, K. K. Gudima, A. S. Il'inov, V. D. Toneev

- ORNL-TR-2239 (*Health Phys.*, 14 (3), 267-69 [March 1968 in German])
Activation Half-Times in Accelerators
E. Freytag
- ORNL-TR-2243 (JINR-P2-4568 in Russian) 1969
Intranuclear Cascades with the Account of α -Clusters
V. S. Barashenkov, O. B. Abdinov
- ORNL-TR-2248 (*Raumfahrtforschung*, 13, 54-61 [1969 in German]) 1969
Radiation Effects on Earth Satellites and Solar Probes During Solar
Flares
K. Wohlleben
- ORNL-TR-2253 (*Astron. Raumfahrt*, 5 (2), 57-64 (1967) in German)
Some Problems of Radiation Protection in Space Flights. Part III.
H. Swart
- Ann. IQSY (Int. Years Quiet Sun)*, 4, 281-301 (1969)
The Earth's Radiation Belts
S. N. Vernov
(From IQSY/COSPAR Symposium, London, England. See CONF-670729-Vol.4)
- Annu. Rev. Astron. Astrophys.*, 7, 1-38 (1969)
Cosmic Rays in the Galaxy
Peter Meyer
- Nucl. Instrum. Methods*, 72, 213-16 (1969)
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Shielding Against Neutrons in the Energy Range 50 to 400 MeV
R. G. Alsmiller, Jr. F. R. Mynatt, J. Barish, W. W. Engle, Jr.
- Nucl. Instrum. Methods*, 73, 280-4 (1969)
(ORNL-TM-2560)
The Transport of Neutrons Produced by 3-GeV Proton-Lead Nucleus
Collisions Through a Labyrinth and Comparison with Experiment
R. G. Alsmiller, Jr., E. Solomito
- Nucl. Sci. Eng.*, 38 (3), 265-270 (Dec. 1969)
(ORNL-TM-2630)
Calculation of the Residual Photon Dose Rate Due to the Activation
of Concrete by Neutrons from a 3-GeV Proton Beam in Iron
T. W. Armstrong, J. Barish
- Nucl. Sci. Eng.*, 38 (3), 271-272 (December 1969)
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Tech. Note - Calculation of the Residual Photon Dose Rate Induced
in Iron by 200-MeV Protons
T. W. Armstrong, J. Barish

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Pavel Levit (ed.)
Prague, Charles University, 1967

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Some Problems of Aviation and Space Medicine (pp. 163-78)
C. J. Clemenson

Radiobiological Aspects of Radiation Safety of Cosmic Flight
(In Russian) (pp. 207-11)
Yu. G. Grigor'ev, E. E. Kovalev

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C. A. Randall, Jr. (ed.)
DeKalb, Ill., Northern Illinois University Press, 1969

Article:

Neutron Exposure in Supersonic Transport (pp. 238-64)
S. Korff

THESIS

Stopping Power and Range for any Nucleus in the Specific Energy
Interval 0.01-to 500-MeV/amu in any Nongaseous Material
P. G. Steward
Berkeley, Calif., Univ. of California, 1968 (173 pages)

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Calculation of the Growth Factor and Albedo Factor with the Monte Carlo Program GAMMONE by C. D. Wuneke		
BE-TN-SE-290	August 1969	CAVEAT
CAVEAT - A Revised Version of the General Purpose Monte Carlo Program COHORT. Volume II - Users Manual by N. R. Byrn FORTRAN IV for IBM 7094, 360 and UNIVAC 1108		
BNL-50126	August 1968	FUDGE 4A
A Computer Program for Gamma Dose Rate Distribution From Rectangu- lar Sources by Leonard Galanter & Krishnaswamy Krishnamurthy FORTRAN IV for CDC 6600		

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Parametric Study of the NIOBE Program on Harmonic
by B. Barre

GA-7598 (mg) January 1967 CSDCFPA
A Computational Model for Condensed State Diffusion Controlled
Fission Product Absorption During Fallout Formation
by R. F. Korts and J. H. Norman
FORTRAN IV for UNIVAC 1108

GA-9021 October 1968 GGC-4
Theory of Methods Used in the GGC-4 Multigroup Cross Section Code
by J. Adir and K. D. Lathrop
FORTRAN IV for UNIVAC 1108

GAMD-7629 January 1967 FRELIM
FRELIM Code for Estimating Release of Less Volatile Metallic
Fission Product Elements
by L. R. Zumwalt and V. H. Pierce
FORTRAN for IBM 7090

IA-1193 May 1969 GLDT
GLDT - An Improved FORTRAN IV Computer Program for the Least
Squares Analysis of Gamma Ray Spectra
by A. Gavron
FORTRAN IV for GOLEM

NASA CR-72598 (GA-9480) August 1969 05R - KINNY
Reevaluation and Analysis of Neutron Spectra in Liquid Hydrogen -
Appendix B - Program Listing
by G. D. Trimble and W. E. Selph

NASA CR-72598 (GA-9480) August 1969 05R - SOURCE
Reevaluation and Analysis of Neutron Spectra in Liquid Hydrogen -
Appendix C - Subroutine SOURCE Listing
by G. D. Trimble and W. E. Selph

NASA CR-72598 (GA-9480) August 1969 05R - ACTIFK
Reevaluation and Analysis of Neutron Spectra in Liquid Hydrogen -
Appendix D - ACTIFK User Routines
by G. D. Trimble and W. E. Selph

ORNL-CF-69-8-36 August 1969 06R
06R - ACTIFK, Monte Carlo Neutron Transport Code
by C. L. Thompson and E. A. Straker
FORTRAN IV for IBM 360

- ORNL-TM-2172 July-1968 SEGO
A Computer Code for Unfolding Experimental Pulse-Height Distributions
by W. R. Burrus and M. H. Young
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- ORNL-TM-2285 September 1968 CAPS-2
PF-COMP
A Comparison of the Building Protection Factor Codes CAPS-2 and
PF-COMP
by M. L. Gritzner and P. N. Stevens
FORTRAN for the CDC 1604 and 3600
- ORNL-TM-2579 June 1969 MORN
SKETCH
A Revised Zerby-Moran Code for Calculating the Response of Sodium
Iodide Crystals to Gamma Rays
by John L. Rodda, II
CDC-1604 and IBM 360/75
- ORNL-TM-2594 November 1969 RESPMG
RESPMG, A Response Matrix Generation Code Package
by W. R. Burrus and R. M. Freestone, Jr.
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- ORNL-TM-4289 (Vol. 2) September 1968 HALLMARK
Time-Dependent Neutron and Secondary Gamma-Ray Transport in an
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