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. 69 August 1970

No man ever reached to excellence
in any one art or profession
without having passed through
the slow and painful process
of study and preparation

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.

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 as soon as possible. Further information will be sent to those planning to attend. SEE REGISTRATION FORM ON LAST PAGE.

THIRD CONFERENCE ON NEUTRON CROSS SECTIONS AND TECHNOLOGY
March 15-17, 1971
University of Tennessee
Knoxville, Tennessee

The Third Conference in this series will be held on the campus of the University of Tennessee March 15-17, 1971. The purpose of the conference is to assess the present status of neutron cross sections and technology, to discuss the future needs, and to provide opportunities for the exchange of information among nuclear scientists and engineers.

Although contributions on all aspects of neutron cross sections are invited, the following topics will be emphasized:

Neutron Cross Sections in the Resonance Energy Region

Fast Neutron Cross Sections - *Theory and Experiment*

Advances in Flux and Neutron Cross Section Data Standards

Evaluating and Handling of Neutron Cross Section Data

Integral Tests of and Sensitivity to Microscopic Data

Present and Future Applications of Cross Section Technology

The conference is sponsored by:

American Nuclear Society, Reactor Physics Division
American Physical Society, Division of Nuclear Physics
Oak Ridge National Laboratory
U. S. Atomic Energy Commission
University of Tennessee

Abstracts must be received by December 7, 1970, and should be sent to:

Dr. J. A. Harvey, Chairman
Third Conference on Neutron Cross Sections and Technology
Oak Ridge National Laboratory
P. O. Box X
Oak Ridge, Tennessee 37830

ICRU Discusses Neutron Fluence, Spectra, and Kerma

In their recent report, ICRU Report 13, *Neutron Fluence, Neutron Spectra, and Kerma,* the International Commission on Radiation Units and Measurements discusses in detail the description and measurement of neutron radiation fields. In addition to valuable descriptions of measuring and calculating techniques, there are definitions, discussions of concepts, and recommendations. Among the recommendations are these: (1) Authors describing calculations of radiation fields should distinguish carefully between calculations of absorbed dose and kermas. (2) The use of kerma to replace "first collision dose" for neutrons should be encouraged. Neutron kerma is especially useful in radiation protection. (3) Experimental checks of kerma calculations are required.

The report is available for $3.00 from ICRU Publications, P. O. Box 4869, Washington, D. C. 20008.

PRELIMINARY ANNOUNCEMENT AND CALL FOR PAPERS
Symposium on Natural and Manmade Radiation in Space

An American Nuclear Society National Topical Meeting sponsored by the National Aeronautics and Space Administration and the U. S. Atomic Energy Commission, and co-sponsored by the Aerospace and Shielding and Dosimetry Divisions of the American Nuclear Society and the American Institute of Aeronautics and Astronautics.

Location: Frontier Hotel, Las Vegas, Nevada
Time: March 2-5, 1971
Papers: Contributed and Invited Papers (requiring approximately 20 Minutes for presentation) to be published in Symposium Proceedings after the symposium.

Tentative List of Topics:

- Natural Space Radiation Environment
  - Galactic Cosmic Radiation
  - Solar Flare Radiation
  - Geomagnetic Trapped Radiation
  - Atmospheric Radiation (Including Application to Supersonic Transport)
- Accelerator Radiation Measurements and Application to Space
- Nuclear Rocket Propulsion Systems
  - System Development Testing and Flight Environment
  - Nuclear Stage and Payload
- Space Electric Nuclear Power Systems
  - Reactor Power Sources
  - Isotopic Power Sources
- Radiobiology in Manned Spaceflight
- Radiation Shielding Analysis and Methods
- Radiation Effects on Materials and Components in Space Applications
- Dosimetry
- Operational Solutions to Radiation Problems

Three plenary sessions have been planned to cover the following subjects: Space Nuclear Power & Propulsion Systems and Applications, Space Radiation, and Radiobiological Implications. These sessions will include presentations by a number of nationally recognized authorities in each of these areas.

An optional tour of the Nuclear Rocket Development Station, Jackass Flats, Nevada, is planned for Friday, March 5, 1971.

Address 200-400 word abstracts (no figures) by November 2, 1970, to:

E. A. Warman, General Chairman
Symposium on Natural and Manmade
Radiation in Space
Aerojet Nuclear Systems Company
Post Office Box 13070
Sacramento, California 95813

SUMMARY OF RSIC DATA LIBRARIES AVAILABLE

Data libraries on magnetic tape or in other form continue to be packaged, maintained, and distributed in a manner analogous to the computer code distribution. Each data set carries a Data Library Collection (DLC) number and is packaged as a unit. The package usually includes a suitable handling program, which is sent with each DLC data set for editing and/or otherwise manipulating the data, and documentation which includes an RSIC-prepared abstract. Additions to and revisions of the data libraries are announced in the RSIC Newsletter.

Both cross section data, especially energy group cross sections, and voluminous results of calculations of radiation environment are typical examples of data in the collection. A summary of the DLC data sets is given in Table 1.

PERSONAL ITEMS

Wade Selph, formerly with Gulf General Atomic, is now Manager of Project Development, Radiation Technology Division, of Gulf Energy and Environment Systems, Inc. In June, the Gulf Oil Corporation announced a reorganization of its San Diego-based nuclear subsidiary in which Gulf Energy and Environmental Systems was formed. Nuclear power activities remain with GGA.

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W. H. Harless, Jr., formerly with Lockheed, Palo Alto, California, is now with the Physics Subsection, Breeder Reactor Development Operation, General Electric Company, at Sunnyvale, California. He is engaged in the application of Monte Carlo methods to shielding and radiation streaming problems in the design of the LMFBR.

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Dr. Zolin G. Burson has returned to E.G.& G. in Las Vegas, Nevada, after spending several months at ORNL Health Physics Division.

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Noel (Rick) Byrn has returned to Teledyne Brown Engineering. He has been studying at Georgia Institute of Technology.

Brown Engineering Co. at Huntsville, Alabama, is now known as Teledyne Brown Engineering Co.

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I. M. Thorson, formerly of AECL at Chalk River, Ontario, Canada, is now professor in the physics department of Simon Fraser University at Burnaby, B. C.

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Richard Reinecke, formerly with Autonetics at Anaheim, California, is now with Honeywell, Inc., at St. Petersburg, Florida.

TABLE 1.

DATA LIBRARY DESIGNATION	CONTRIBUTOR	FORM	DATA TYPE/COMPUTER CODE/COMMENT
DLC-1/LEP	ORNL-N	16 mm microfilm Magnetic tape Machine listings	Bertini low-energy intranuclear cascade results. Output from ANALYSIS Codes I and II and from EVAP. (ORNL-3433).
DLC-2/99G	ORNL-N	Magnetic tape	99-group, $\leq P_8$ expansion, neutron cross sections for input to ANISN/DOT/DTF-IV/MORSE. Produced from ENDF/B Category I, Version I, data by SUPERTOG (1969). Energy range 14.92 MeV to 0.414 eV.
DLC-4/HPIC	ORNL-N	Magnetic tape	Gamma-ray photoelectric and pair-production data in OGRE format. (ORNL-3805). Data same as in DLC-7.
DLC-5/HALLMARK	ORNL-N	Magnetic tape	Output from DOT, 05R-ACTIFK and OGRE. Straker's time-dependent air-over-ground results for point isotropic sources. Handling routines also combine results for arbitrary source neutron energy spectrum. Sources: Neutron energy range 15 MeV to 3.3 keV. Results include neutron and secondary gamma-ray fluxes. (ORNL-4289 Vol. II).
DLC-7/HPIC	LRL	Magnetic tape	Livermore gamma-ray interaction data in ENDF/B format. Elements Z = 1-83, 86, 90, 92, 94. Energy range: 1 keV to 100 MeV. (UCRL-50400, Vol. VI; UCRL-50174 Sect. II, May 1969).
DLC-8A/BP-3	ORNL-N	Cards	22-group, P_5 expansion, cross sections for air in the ANISN/DOT/MORSE format. Data used by Straker for Benchmark Problem No. 3, Neutron Spectrum from Point Sources in Infinite Air (ORNL-RSIC-25) Energy range: 15 MeV to thermal.
DLC-9/FARS	ORNL-N, CTC	Magnetic tape	104-group neutron, 18-group gamma-ray, P_8 expansion, coupled cross sections for H, C, N, O, Mg, Al, Si, Ca, and Fe. Data format for ANISN/DOT/DTF-IV/MORSE. Compiled by F. Schmidt for concrete calculations (ORNL-RSIC-26). Energy range: neutron: 15 MeV to thermal, gamma ray: 10-0.02 MeV.

TABLE 1.
(continued)

DATA LIBRARY DESIGNATION	CONTRIBUTOR	FORM	DATA TYPE/COMPUTER CODE/COMMENT
DLC-10/AVKER	ORNL-N	Magnetic tape	Data library of neutron fluence-to-kerma factors for many elements. The retrieval program will compute energy group values for any composition for use with group fluence to calculate dose or heating (ORNL-TM-2558). Energy range: 19.2 MeV to 0.023 eV.
DLC-11/RITTS	ORNL-R, ORNL-N, CTC	Magnetic tape	100-group neutron, 21-group gamma-ray, P_3 expansion, coupled cross sections for H, C, O, N, Na, Mg, P, S, Cl, K, and Ca. The 100-group neutron set is also provided. Also, 121 group coupled, P_3, macroscopic data for standard man, skin, bone, tissue, brain, lung, red marrow, and muscle. Data format ANISN/DOT/MORSE. Energy range: neutron; 15 MeV to thermal, gamma-ray: 14 MeV to 0.01 MeV. (ORNL-TM-2991).
DLC-12/POPLIB	CTC, ORNL-N	Magnetic tape	A compendium of neutron-induced secondary gamma-ray yield and production cross-section data. Data library for PSR-11/POPOP4 code. Original library has 139 data sets (CTC-INF-1004).
DLC-13/GARLIB	LRC	Magnetic tape	32 group resonance region neutron capture and scattering cross sections for moderated tungsten and uranium slabs. Produced by the GAROL code. Group fluxes calculated by GAROL are also included for further collapsing of the group structure. Energy range: 1.234 keV to 0.414 eV. (NASA TM X-1909).
DLC-14/AIR	ORNL-N CTC	Cards	22-group neutron, 18-group gamma-ray P_5 expansion, coupled cross sections for air. Data format for ANISN/DOT/DTF-IV/MORSE. Compiled by E. Straker and M. L. Gritzner for calculation of neutron and secondary gamma-ray transport in infinite homogeneous air. (ORNL-4464).

LIBRARY CONTRIBUTORS

CTC	Computing Technology Center, Union Carbide Corporation, Oak Ridge, Tenn.
NASA-LE	NASA Lewis Research Center, Cleveland, Ohio.
ORNL-N	Oak Ridge National Laboratory, Neutron Physics Div., Oak Ridge, Tenn.
ORNL-R	Oak Ridge National Laboratory, Reactor Div., Oak Ridge, Tenn.
LRL	Lawrence Radiation Laboratory, Livermore, Calif.

VISITORS TO RSIC

Visitors to RSIC during the month of July were: Kenneth Adams, Sandia Laboratory, Albuquerque, N. M.; W. L. Alford, John R. Cooper, and Doug Moore, Auburn University, Auburn, Ala.; J. W. Allison, Defence Standards Laboratories, Melbourne, Victoria, Australia; Robert H. Bryan, Reactor Division, and F. F. Dyer, Analytical Chemistry Division, ORNL; Bruno Guerrini, University of Pisa, Pisa, Italy; John B. Kahle and Alvin Shapiro, Mound Laboratories, Monsanto Research Corp., Miamisburg, O.; Giovanni Petrangeeli, Safety and Control Division, CNEN, Rome, Italy; Charles O. Slater, University of Tennessee, Knoxville, Tenn.; Robert G. Stevenson, Jr. and Darrol H. Timmons, University of Missouri, Columbia, Mo.

JULY 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 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

AAEC/TM-531 — March 1970

Monte Carlo Shielding Calculations
B. McGregor
Available: Dep.; CFSTI (U. S. Sales only)

AECL-3423 — September 1969

Calculations of Flux Spectra and Energy Deposition for Fast Neutrons
K. K. Mehta, P. R. Kry
Available: Dep.; CFSTI (U. S. Sales only); AECL $2.50

AI-AEC-MEMO-12915 *January 15, 1970*

The Evaluation of Several ENDF/B Nuclide Cross-Sections by a Monte Carlo Technique
C. L. Dunford, H. Alter
Available: Dep.; CFSTI

AI-AEC-Memo-12916 *January 20, 1970*

An Evaluation of 235-U Neutron Cross Section Data for Energies Above 15 keV
H. Alter, C. L. Dunford
Available: Dep.; CFSTI

BNWL-1312 *May 1970*

Evaluated Reference Cross Section Library
R. L. Simons, W. N. McElroy
Available: Dep.; CFSTI

BNWL-MA-3 *March 25, 1970*

Radiological Design Criteria
Pacific Northwest Lab. (Battelle-Northwest, Richland, Wash.)
Available: Dep.; CFSTI

BRH/CFS-70 2 (PB-190994) *May 1970*

Application of Small Accelerators: Proceedings of a Symposium Sponsored by the New York Metropolitan Section of the American Nuclear Society, New York, N. Y. (April 8 and 9, 1969)
Available: CFSTI U. S. Dept. of Health, Education and Welfare
Public Health Service, Environmental Health Ser.
Bureau of Radiological Health
Rockville, Md. 20852

CEA-N-1209 (In French) *February 1970*

Diagrams for Rapid Calculation of Gamma Protections. Attenuation of the Gamma Radiations from Fission Products
R. Fourcade-Cancelle
(Supplement to report CEA-N-470)
Available: Dep.; CFSTI (U.S. Sales only)

CEA-N-1269 (In French) *April 1970*

Catalogue of Beta and Gamma Activities of Fission Products
B. Barre, R. de Tourreil
Available: Dep.; CFSTI (U.S. Sales only)

CEA-R-3994 (In French) *April 1970*

Dose Absorbed in Biological Tissue Irradiated by Fast Monoenergetic Neutrons
H. Sklavenitis, C. Devillers
Available: Dep.; CFSTI (U.S. Sales only)

CTC-20 July 1, 1970

The Use and "Testing" of Al, Fe, Ni, Cu, and Pb Secondary Gamma-Ray Production Data Sets from the POPOP4 Library
W. E. Ford, III, D. H. Wallace
Available: CFSTI

DASA-2421 (AD-705150) April 1970

A Numerical Study of Transport Phenomena in Spherical Geometry by the Method of Invariant Imbedding
R. C. Allen, Jr., L. F. Shampine, G. M. Wing
Available: CFSTI

EUR-4415 (EUR-FF-6.65) October 10, 1969

Method for Determination of Convertible Nuclear Heating Data
H. Kroeckel (European Atomic Energy Community, Petten, Netherlands)
Available: Dep.; CFSTI (U. S. Sales only)

GEMP-742 December 1969

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

HASL-230 June 1970

Nuclear Emulsion Spectrometry at Low and Intermediate Neutron Energies (An Updating of HASL-162)
R. S. Sanna, J. E. McLaughlin, K. O'Brien
Available: CFSTI

HASL-231 June 1970

Broad Beam Cs-137 and Co-60 γ-Ray Transmission Through Laminated Lead-Concrete Barriers
H. L. Beck
Available: Dep.; CFSTI

K-DP-2961 (CONF-680601-35) February 1968

Adjoint Biasing in Monte Carlo Criticality Calculations
G. E. Whitesides

KFKI-70-6-HP March 31, 1970

Neutron Average Energies: Calculations and Theory of Measurements
S. Makra
Available: Dep.; CFSTI (U. S. Sales only); Central Research Institute for Physics, Budapest, Hungary

KFKI-70-5-HP March 31, 1970

A Biological Irradiating Facility at the Hungarian WWR-SM Reactor.
S. Makra, P. Zarand, L. Sztanyik, L. Muzsnay
Available: Central Research Institute for Physics, Budapest, Hungary

LA-4097-MS December 1969

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

LA-4264 May 1970

Energy Distributions Calculated by a Hard-Sphere Model Computer Program Compared with Boltzmann Distribution Law Predictions
D. R. Conant

LA-4346 April 16, 1970

Development and Testing of LEMP 1
H. J. Longley, C. L. Longmire
Available: CFSTI

LA-4348 April 15, 1970

Compton Current in Presence of Fields for LEMP 1
H. J. Longley
Available: CFSTI

LA-4429 April 1970

Tests of Neutron Cross Sections
C. B. Mills
Available: Dep.; CFSTI

LA-4448 May 1970

Approximation for the Inverse of the Klein-Nishina Probability Distribution
C. J. Everett, E. D. Cashwell
Available: Dep.; CFSTI

RD/B/N-1416 March 1970

Neutron Flux Spectrometer with Nearly Constant Sensitivity over the Energy Range Thermal to 14 MeV
J. P. Longworth
Available: Dept.; CFSTI (U. S. Sales only)

RF/FIMA-(69)2 (*In Italian*) 1969

Comparison Between Several Stationary Multigroup Diffusion Codes
E. Bittoni, S. Giambuzzi
Available: Dep.; CFSTI (U.S. Sales only)

RT/FIMA-(69)6 1969

Digitizing Planar Regions for Monte Carlo Transport Problems
A. De Matteis
Available: Dep.; CFSTI (U.S. Sales only)

RT/ING-(69)20 (*In Italian*) *May 21, 1969*

Hot Cells for Post-Irradiation Examination of Samples of Low Activity
C. Cesarano, M. Lauro, C. Lepscky, G. Pugnetti, S. Sartori
Available: Dep.; CFSTI (U.S. Sales only)

STI/DOC-10/107 *1970*

Neutron Fluence Measurements
Available: International Atomic Energy Agency, Vienna, Austria $5.00

U. S. Patent 3, 471,414 *October 7, 1969*

Castable Neutron Shield
Kenneth T. Faler

U.S. Patent 3,486,976 *August 8, 1966*

Graphite Moderated Nuclear Reactor
N. Prince, G. Coast
(Issued to United Kingdom Atomic Energy Authority)

WAPD-TM-959 *April 1970*

On the Use of Space-Synthesis with Energy Group Collapsing
J. B. Yasinsky
Available: Dep.; CFSTI

WSUNRC-97 *October 1969*

Gamma Ray Energy Tables for Neutron Activation Analysis
R. H. Filby, A. I. Davis, G. G. Wainscott, W. A. Haller

Amer. Ind. Hyg. Ass. J., 31, 109-112 (Jan.-Feb. 1970)

Flash X-Ray Machines
Frank L. Paschal, Jr.

Health Phys., 17(3), 459- (Sept. 1969)

Evaluation of Dose Equivalent from Neutron Energy Spectra
K. B. Shaw, G. R. Stevenson, R. H. Thomas

Health Phys., 17(6), 773-779 (Dec. 1969)

The Possibility of Studying "Skyshine" Phenomena of Gamma Radiation on Laboratory Scale
A. Bottino, A. Cardinale, G. Dell Anna

Health Phys., 18(1), 69-71 (Jan. 1970)

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

Nucl. Appl. Tech., 7(6), 561-571 (December 1969)

Damage Functions and Data Correlation
W. N. McElroy, R. E. Dahl, Jr., C. Z. Serpan, Jr.

Nucl. Instr. Methods, 78(7), 13-18 (Feb. 1, 1970)

A Compton Scatterer as a Source of Mono-Energetic Gamma Rays
G. P. de Beer

Nucl. Instr. Methods, 78(7), 86-92 (February 1, 1970)

Fluence Measurement for 14.7 MeV Neutrons
C. E. Bliss, N. D. Eckhoff, H. J. Donnert

Nucl. Instr. Methods, 79(1), 19-28 (March 1, 1970)

Monte Carlo Calculations of Gamma Ray Response Characteristics of Cylindrical Ge(Li) Detectors
B. Lal, K. V. K. Iyengar

Nucl. Sci. Eng., 41(1), 14-21 (July 1970)

A Numerical Method for the Solution of Three-Dimensional Neutron-Transport Problems
M. R. Wagner, D. A. Sargis, S. C. Cohen

Nucl. Sci. Eng., 41(1), 37-46 (July 1970)

Estimation of Spatial Distributions of Neutron Captures in Resonance Absorbers
D. Bogart

Nucl. Sci. Eng., 41(1), 147-148 (July 1970)

Sensitivity of Secondary Gamma-Ray Dose to Angular Distribution of Gamma Rays from Neutron Inelastic Scattering
E. A. Straker

Nukleonik, 12(6), 269-75 (Oct. 1969)

On Neutron Transport in Two Adjacent Half-Spaces with Anisotropic Scattering
R. I. Bowden, B. W. McConnell

Nukl. Energ.; 5, No. 3-5, 33-4 (1968-69) (In Serbo-Croatian)

Calculation of Biological Protection and Dose Fields in Nuclear Power Plant Ancillary Systems
V. Mandic, V. Vuletic

Nukl. Energ.; 5(6), 12-14 (1968-9) (In Serbo-Croatian)

Graphic Determination of the Parameters of the Temperature Distribution in the Concrete of the Reactor Biological Shield
Milan Gavrilovic

ORNL-TM-3022 June 17, 1970

The Energy Spectrum of Photoneutrons Produced by 140-MeV Electrons Incident on Tantalum
C. E. Burgart, E. A. Straker, T. A. Love, R. M. Freestone, Jr.

Phys. Rev. 184(5), 1303-4 (August 25, 1969)

Experimental Test of the Equivalence Principle for Photons
J. Shamir, R. Fox

Physical Rev. A, 1(3), 539-544 (March 1970)

Gamma-Ray Attenuation-Coefficient Measurements
A. L. Conner, H. F. Atwater, E. H. Plassmann, J. H. McCrary

Reactor Mater.; 13, 43-43 (Spring 1970)

Concrete
D. R. Lankard

Soviet J. At. Energy (English Transl.), 27(3), 935-939 (Sept. 1969)

On Optimizing the Shape of the Medium in the Presence of Radiation
A. A. Abgyan, E. E. Petrov, V. Ya. Pupko

Stud. J., 7, 185-187 (Oct. 1969) (CONF-680467-1)

Shield Mass Optimization of a Nuclear Space Vehicle
J. W. Pepper

THESIS 1969

Analysis and Measurements of Neutron Streaming in Ducts
Matthew Joseph Barrett
University of Maryland, College Park, Md.

THESIS

Coupled Sampling with Monte Carlo Method in Neutron Transport Calculations
Leland LaVelle Carter
University of Washington, Seattle, Wash.

BOOK (In Russian) 1969

BIOLOGICAL PROTECTION OF PORTABLE REACTOR INSTALLATIONS. (BIOLOGICHESKAYA ZASHCHITA TRANSPORTNYKH REAKTORNYKH USTANOVOK)
D. L. Broder, S. A. Kozlovskii, V. S. Kyzyurov, K. K. Popkov, S. M. Rubanov
Moscow, Atomizdat

SPACE AND ACCELERATOR SHIELDING

AAEC/TM-531 — March 1970

Monte Carlo Shielding Calculations
B. McGregor

AGARD-CP-49 (N70-23112) — January 1970

Ionospheric Forecasting
Vaughan Agy

ART-29 — April 1969

Monte Carlo Electron Energy Deposition Calculations
G. H. Anno, T. M. Jordan
(A.R.T. Research Corporation, 1100 Glendon Ave., Los Angeles, Calif.)

ART-30 — April 1969

Beta Particle Dose in Polystyrene - Comparison of Monte Carlo Calculations with Experiment
G. H. Anno, T. M. Jordan
(A.R.T. Research Corporation, 1100 Glendon Ave., Los Angeles, Calif.)

CEA-CONF-1433 (CONF-691101-13)

Gas and Dust Activation in the Target Room of the Saclay Electron LINAC, Identification of the Produced Radioactive Nuclei and Determination of the Rejected Activities
H. Vialettes
Available: Dep.; CFSTI (U.S. Sales only)

CERN-70-16 — May 27, 1970

Radiation Measurements Around a Beam Stopper Irradiated by 19.2 GeV/c Protons, and Neutron Energy Spectra from Monte Carlo Nucleon-Meson Cascade Calculations
K. Goebel, J. Ranft
Available: Dep.; CFSTI (U.S. Sales only)

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

LNF-69/27 — April 15, 1969

Measurements on 1-GeV Electromagnetic Cascade and Cascade-Produced Neutrons in Shielding Materials
F. Lucci, M. Pelliccioni, M. Roccella
Available: Dep.; CFSTI (U.S. Sales only)

NASA-TM-X-63797 (N70-16961) January 1970

Trapped Protons Greater than 100 KeV and Possible Sources
D. J. Williams

NASA-TN-D-5724 (L-6776) April 1970

Transmission and Backscatter Coefficients of 1.0 to 3.0-MeV Electrons Incident on Some Metals and Alloys
W. E. Miller
Available: CFSTI as N70-25499

ORNL-RSIC-28 March 1970

Comparisons of the Results Obtained with Several Electron-Penetration Codes
W. W. Scott
Available: Dep.; CFSTI

ORNL-TM-3022 June 17, 1970

The Energy Spectrum of Photoneutrons Produced by 140-M eV Electrons Incident on Tantalum
C. E. Burgart, E. A. Straker, T. A. Love, R. M. Freestone, Jr.

ORNL-TR-2328 (IHEP 69-76 in Russian) 1969

Induced Radioactivity at the IHEP Proton Synchrotron
G. I. Golovachik, G. I. Britvich, V. N. Lebedev

ORNL-TR-2331 (CEA-R-3942 - In French)

Energy Losses, Range, and Bremsstrahlung Yield for 10-keV to 100-MeV Electrons in Some Simple Elements and Some Chemical Compounds
L. Pages, E. Bertel, H. Joffre, L. Sklavenitis

RHEL/M-149 September 1968

Depth Dose and Depth Dose Equivalent Data as Functions of Neutron Energy
K. B. Shaw, G. R. Stevenson, R. H. Thomas
Available: Dep.; CFSTI (U.S. Sales only)

TID-25310 May 1968

Neutron Transport Theory with a Completely Degenerate Energy Transfer Kernel
J. F. Watts
(Virginia Polytechnic Institute, Blacksburg, Va.)

Aerospace Med., 41, 159-165 (Feb. 1970)

Radiobiological Concepts for Manned Space Missions
J. E. Pickering

Health Phys., 18(1), 80-81 (Jan. 1970)

New Model for Calculation of High-Energy Nucleon Penetration Through Matter
J. E. Turner, H. A. Wright, J. H. Grossen

Nucl. Sci. Eng., 40, 129-32 (April 1970)

Reduction of the Residual Photon Dose Rate Around High-Energy Proton Accelerators
T. W. Armstrong, J. Barish

Nuovo Cimento, 65A, 205-228 (January 1970)

Electron-Induced Cascade Showers in Lead, Copper, and Aluminum
T. Yuda, A. Masaike, A. Kusumegi, Y. Murata, I. Ohta, J. Nishimura

THESIS *1968*

Electron Energy Deposition in Multi-Layered Slabs and Cylinders
Marcel John Kniedler
Univ. of Maryland, College Park, Md.

BOOK *1969*

RADIATION DOSIMETRY. VOL. 3 - SOURCES, FIELDS, MEASUREMENTS, AND APPLICATIONS
H. Attix, E. Tochilin (Eds.)
(Second Edition, New York, Academic Press, Price $37.00)

COMPUTER CODES LITERATURE

AECL-CONF-680307-16 (mf) *1966* *FISSPROD*

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