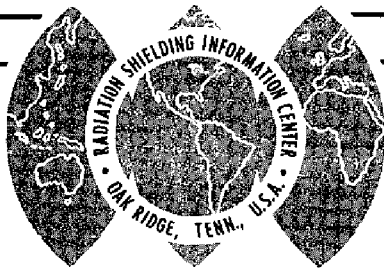


# RSIC Newsletter



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. 86

January 1972

A HAPPY NEW YEAR TO ALL!

*Know the true value of time;  
snatch, seize, and enjoy every moment of it.  
No idleness, no laziness, no procrastination:  
never put off till tomorrow what you can do today.*

....Chesterfield - LETTERS TO HIS SON

### CONFERENCE ON NEW DEVELOPMENTS IN REACTOR PHYSICS AND SHIELDING

Papers are solicited for a national topical meeting sponsored by the Reactor Physics Division, Shielding and Dosimetry Division, and Northeastern New York Section of the ANS, to be held at Kiamesha Lake, New York, September 12-15, 1972. Session titles are: Neutron and Reactor Physics in Thermal Energy Range; Neutron Physics in the Resolved and Unresolved Resonance Range; Physics of Fast Reactors; Reactor Theory; Fast Reactor Integral Experiments and Analyses; Reactor Shielding. Summaries should be submitted by May 1, 1972 to the program chairman, Norman C. Francis, KAPL, P. O. Box 1072, Schenectady, N. Y. 12301.

### RADIATION EFFECTS DESIGN HANDBOOK PUBLISHED AND AVAILABLE

The Radiation Effects Information Center (REIC) at Battelle Memorial Institute recently completed a series of reports which comprise the *RADIATION EFFECTS DESIGN HANDBOOK*. The handbook was published in seven separate sections, each with its own report number. They are available from the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, Virginia 22151, and may be requested as follows:

<u>Report Number</u>	<u>Publication Date</u>	<u>Section/Subject</u>
NASA CR-1785	July 1971	Section 1. Semiconductor Diodes
NASA CR-1786	August 1971	Section 2. Thermal Control Coatings
NASA CR-1787	July 1971	Section 3. Electrical Insulating Materials and Capacitors
NASA CR-1834	August 1971	Section 4. Transistors

(REIC Handbook, continued)

<u>Report Number</u>	<u>Publication Date</u>	<u>Section/Subject</u>
NASA CR-1871	September 1971	Section 5. The Radiation in Space and Their Interactions with Matter
NASA CR-1872	August 1971	Section 6. Solid State Photodevices
NASA CR-1873	October 1971	Section 7. Structural Alloys

CALL FOR PAPERS  
1972 IEEE ANNUAL CONFERENCE  
NUCLEAR AND SPACE RADIATION EFFECTS

The 1972 IEEE Conference on Nuclear and Space Radiation Effects, sponsored by the IEEE/G-NS Radiation Effect Committee in cooperation with the University of Washington, will be held on the campus of the University of Washington, Seattle, Washington, July 24-27, 1972. The conference will cover theoretical and experimental studies of nuclear and space radiation effects on materials, components, circuits, and electronic systems. The program will consist of six to eight sessions of contributed papers, and a number of invited papers to be presented by recognized authorities in radiation effects and allied fields. Papers describing significant contributions in the following or related areas are invited:

*Physical Properties of Irradiated and Ion Implanted Materials*

*Displacement Damage and Ionization Effects in Semiconductor Devices, Integrated Circuits, Transducers, Capacitors, Optoelectronic Devices, Lasers, etc.*

*Methods of Analyzing, Predicting, Simulating, and Hardening Against Radiation Effects in Components and Systems*

*Energy Deposition by Energetic Particles and Photons in Solids*

*Dosimetric Techniques and Radiation Measurement Standards*

*Radiation Effects Quality Assurance*

Summaries must be submitted by April 3 to the 1972 Technical Program Chairman:

B. L. Gregory  
Division 1933  
Sandia Laboratories  
Albuquerque, New Mexico 87115  
Phone: (505) 264-1912

Registration forms, programs, and additional conference information are available from:

Conference Chairman: R. S. Caldwell  
The Boeing Company  
2R-00  
P. O. Box 3999  
Seattle, Wash. 98124  
Phone: (206) 655-0734

#### DLC-2C DATA LIBRARY EXTENDED

Additional 99 group,  $P_8$ , neutron cross sections for Li-6 and Li-7 have been added to DLC-2C. These data are based on UKAEA evaluations DFN 214 and 215. They were translated to ENDF/B format with UKE-II and processed through SUPERTOG by R. Q. Wright of ORNL. The SUPERTOG code was modified to process LF=5 data and the reaction  $(n,2n)\alpha$ .

The entire DLC-2 library, plus retrieval programs, can be obtained from RSIC. Written 7-track, unblocked, four full reels of magnetic tape are required. For 9-track, blocked, only one tape is required.

#### MSFC SEMINAR-WORKSHOP ON WANL CODES

Twenty-two participants from 7 different installations attended the Seminar-Workshop on the WANL-developed computer codes held at the George C. Marshall Space Flight Center, Huntsville, Alabama, on December 6-9, 1971. R. K. Disney, Mary Ann Capo, and Richard W. Hunt presented the theory, input and output of sample problems of the several codes described in WANL-PR-(LL)-034, Volumes 3 and 6, and in WANL-PRR-(LL)-40, Volume 2: GAMLEG-W, SATURN, ANISN-W, APPROPUS, DOT-IIW, DOQ, ADOQ, CHEAPER, NAGS, MAP, KAP-VI, SCAP, and LHAP. All of these codes have been or soon will be placed in the RSIC Computer Code Collection and will be announced as available as they are packaged.

#### PERSONAL ITEMS

*John D. Murphy*, formerly with ATCOR, Inc., Elmsford, New York, has formed a new corporation, ANEFCO, Inc., based in White Plains. The new company plans to provide fuel management and support services to utilities which develop products, and which are involved in the entire fuel cycle, including contamination, transportation, and disposal of radioactive wastes.

*T. G. Williamson* has returned to his teaching post in the Department of Nuclear Engineering at the University of Virginia at Charlottesville after having completed the term of his Ford Foundation grant at Combustion Engineering.

*E. Sefchovich* has left C. T. Main, Inc., Boston, Massachusetts, to join the Reactor Program of the National Commission of Nuclear Energy, Mexico City, Mexico.

*Kevin Rooney*, formerly with NAR Atomics International, Canoga Park, California, is now with Sargent and Lundy Engineers in Chicago, Illinois.

*Frank Tyson* has assumed responsibility for computer applications programs in the Advanced Power Engineering Department of United Engineers, Philadelphia, Pennsylvania.

*C. M. Kim* is now with Bechtel Corporation in Vernon, California, after leaving Sargent and Lundy Engineers on November 1.

*Arthur Reetz, Jr.* has a year's leave from NASA Headquarters for a research project in the Advanced Concepts Office of the OART, Advanced Concepts and Mission Division, NASA, Moffett Field, California. He notes that an interesting aspect of his job is the opportunity to investigate some of the promising speculative technologies for future space missions. A portion of the effort is also devoted to non-technical aspects such as socio, political, and economic prospects for the future. He is scheduled to return to Washington in September 1972.

*Jan Elkert* has left Aktiebolaget Atomenergi to work with ASEA-ATOM, the Swedish manufacturer of boiling water reactors. He is leading the shield design work and is also lecturing in Radiation Shielding Physics at Chalmers University of Technology in Gothenburg. Now responsible for the shielding calculations at Aktiebolaget Atomenergi is *R. Hakansson*.

#### VISITORS TO RSIC

Visitors to RSIC during the month of December were: B. M. Beeler, Jr., Laboratory Protection, ORNL; R. Handler, AEC, Oak Ridge, Tenn.; K. L. Rooney, Sargent & Lundy Engineers, Chicago, Ill.; G. G. Warner, Math Division, ORNL; I. Karp, NASA Lewis Research Center, Cleveland, O.; J. Ritts, WAPD, Pittsburgh, Pa.

#### DECEMBER ACCESSION OF LITERATURE

The following literature cited has been ordered for review, and that selected as suitable will be placed in the RSIC Information Storage and Retrieval Information System (SARIS). This early announcement is made as a service to the shielding community. Copies of the literature are not distributed by RSIC. They may generally be obtained from the author or from a documentation center such as the National Technical Information Service (NTIS), Department of Commerce, Springfield, Virginia 22151.

RSIC maintains a microfiche file of the literature entered into SARIS, and duplicate copies are available on request. Naturally, we cannot fill requests for literature which is copyrighted (such as books or journal articles) or whose distribution is restricted.

Special bibliographies and abstracts of the literature in the RSIC system may be requested through the Selective Dissemination of Information (SDI) Service, which is available to all.

#### REACTOR AND WEAPONS SHIELDING

AAEC/TM-539

*April 1970*

Approximation for Self-Shielding  
M. W. Bunder, A. Keane  
Avail.: NTIS (U.S. Sales only)

A/CONF .49/P-89

*September 1971*

Trends in Federal and State Legislation in the United States for the Protection of the Environment and the Regulation of Nuclear Power Plants  
H. K. Shaper  
Avail.: NTIS

AD-715459

*December 4, 1970*

Reactors and the Science of Materials  
(Naval Intelligence Command, Alexandria, Va., Translation Div.)  
D. M. Skorov, Yu. F. Bychkov, A. I. Dashkovskii, and V. V. Chepkunov  
(Trans. of mono. Reaktornoe Materialovedenie, Moscow, 1968)  
Avail.: NTIS

AD-715563

*September 1970*

Neutron Transport from a Point Source in a Slab: A Comparison Between Diffusion Theory and Transport Theory  
John Henry Shimerda  
Naval Postgraduate School, Monterey, Calif.

AD-717460

*October 1970*

Radiation Resistant Experimental Weld Metals for Advanced Reactor Vessel Steels  
J. R. Hawthorne, E. Fortner, and S. P. Grant  
Avail.: Pub. in Welding Jnl., October 1970

AD-722 403

*March 1971*

Free-Field Code Predictions Versus Field Measurements: A Comparative Analysis for the Prairie Flat Event  
Joseph S. Zelasko and George Y. Baladi  
Avail.: NTIS

AEEW-M-934

October 1969

WIMS Results for the Long-Term Irradiation Changes in the Calder Hall Reactors

C. J. Phillips

Avail.: NTIS (U.S. Sales only)

AERE-R-6702

1971

Lead-Shielded-Micro Handling Cell for Coated Fuel Particles

P. E. Brown, D. Campbell, J. H. Evans, F. J. May

ARH-SA-87

June 28, 1971

Determination of Radiation Dose to Portions of the Body by Using Thermoluminescent Dosimeters

R. D. Anderson, E. E. Oscarson

BRL-MR-2099 (AD-729313)

June 1971

A Note on the Small-Angle Elastic Scattering of Fast Neutrons from C, N, and O.

W. P. Bucher, C. E. Hollandsworth, R. D. Lamoreaux, R. R. Sankey, D. Eccleshall

Avail.: NTIS

CONF-710801 (Vol. 1), pp. 106-12

The Design and Testing of a Lithium Hydroxide-Shielded Cask for the Transportation of Fast Neutron-Emitting Heat Sources

R. D. Seagren

(In Proceedings of the Third International Symposium on Packaging and Transportation of Radioactive Materials, Richland, Wash. (16 Aug. 1970))

CONF-710801 (Vol. 1), pp. 113-24

Transportation Safety of Transplutonium Actinides

C. M. Copenhaver

(In Proceedings of the Third International Symposium on Packaging and Transportation of Radioactive Materials, Richland, Wash. (16 Aug. 1970))

CONF-710801 (Vol. 1), pp. 125-37

Shielded Neutron Shipping Cask

C. L. Hanson, M. S. Coops, E. D. Arnold

(In Proceedings of the Third International Symposium on Packaging and Transportation of Radioactive Materials, Richland, Wash. (16 Aug. 1970))

CONF-710801 (Vol. 1), pp. 195-208

Shielded Transport Containers for Intermediate and High-Level Radioactive Wastes

W. Bechthold, J. Heil, M. C. Schuchardt, R. Wolf

(In Proceedings of the Third International Symposium on Packaging and Transportation of Radioactive Materials, Richland, Wash. (16 Aug. 1970))

DP-1276 (ENDF-158)

October 1971

Testing of ENDF/B - Thermos Cross Sections for  $H_2O$ ,  $D_2O$ , C,  $ZrH_2$ ,  $(C_2H_4)_x$ , Be, BeO,  $C_6H_6$ , and  $UO_2$ .

F. J. McCrosson, D. R. Finch, E. C. Olson

Avail.: NTIS

LA-tt-71-42

1963

Tensor of Pulsed Energy of Radiation in a Moving Medium Under Conditions Close to Equilibrium

V. S. Imshennik, I. U. I. Morozov

Avail.: NTIS

NASA-CR-1786

June 1971

Radiation Effects Design Handbook. Section 2. Thermal-Control Coatings

N. J. Broadway

Avail.: NTIS

NASA-CR-102509 (N70-20649)

September 23, 1969

Ruggedized Gamma Radiation Detector. Final Report.

T. E. Carrell

Avail.: NTIS

NASA-TM-X-2414

November 1971

Effect on Shield Weight of Adding a Fixed-Position Containment Vessel in the Unit Shield of a 250-Megawatt Mobile Reactor

M. L. Wohl, D. Spielberg

Avail.: NTIS

NASA-TM-X-2435

November 1971

Application of the Method of Steepest Descent to Laminated Shield Weight Optimization with Several Constraints - Theory

G. P. Lahti

Avail.: NTIS

ORNL-3834

October 1971

Mathematical Resolution of Complex Overlapping Spectra with Nonlinear Least-Squares Computer Techniques

R. E. Biggers, J. T. Bell, et al.

ORNL-TM-3585

October 4, 1971

Collision Site Plotting Routines and Collision Density Fluence Estimates for the MORSE Monte Carlo Code

E. A. Straker, M. B. Emmett

ORNL-TM-3606

October 18, 1971

Fast Reactor Shielding Activity No. 40 01 61 189A No. 10028.  
Monthly Progress Report Sept. 1971  
F. R. Mynatt, C. E. Clifford, M. L. Gritzner, R. E. Maerker  
Avail.: Dep., NTIS

ORNL-TM-3631

November 16, 1971

Some Tests Related to the Use of Proton Recoil Proportional Counters  
for Neutron-Flux Measurements  
E. A. Straker, T. A. Love, C. E. Burgart, R. M. Freestone, Jr., G. L.  
Morgan

TID-25651 (THESIS)

March 1969

Variational Approach for the Determination of Neutron Flux Spectra  
from Detector Activation  
William Robert Brandon (University of Tennessee, Knoxville)  
Avail.: NTIS

UARAEE-86

1969

Neutron Transmission Through Ducts Perpendicular to Neutron Beam Axis  
in Water Shields  
F. M. Sayed Ahmed, S. Belov, R. Megahid, I. Hamounda  
Avail.: NTIS

UCRL-50007-70-3

Hazards Control Progress Report No. 38, September - December 1970  
Lawrence Radiation Lab., California Univ., Livermore  
Avail.: NTIS

UIIU-ENG 71 5302

August 1971

Application of the ILLIAC IV Computer to Monte Carlo Radiation Trans-  
port  
K. L. Peddicord, H. G. Stoll, G. C. Cavanaugh, A. B. Chilton  
(Nuclear Engineering Program, Univ. of Ill., Urbana)

Atomkernenergie, 17(4), 241-4 (July 1971)

Transmission and Reflection Coefficients for Slab Geometry  
S. A. E. Wakil

Amer. J. Roentgenol., Radium Ther. Nucl. Med., 112(4), 797-802 (Aug. 1971)

Tissue Maximum-Dose Ratio (Tmr) for 8 Mv X-Rays  
S. K. Agarwal, R. V. Scheele, J. Wakley

At. Energy Rev., 9(2), 441-9 (June 1971)

What Should be Reported as Fast Neutron Fluence?  
W. Koehler



*Health Physics*, 21(2), 317-21 (Aug. 1971)

What is Energy Imparted  
J. Neufeld

*Health Phys.*, 21(3), 471-3 (Sept. 1971)

Notes on Buildup Factors and Utilization of a Power Function Analytical  
Representation of the Buildup Factor  
G. E. Chabot, K. W. Skrabble, H. L. Wedlick

*IEEE Trans. Nucl. Sci.*, 17(6), 301-4 (Dec. 1970)

Monte Carlo Analysis of Gamma Scattering in Silicon and Germanium  
M. E. McLain, D. M. Walker, Jr., H. E. Carr

*IEEE Trans. Nucl. Sci.*, 17(6), 305-9 (Dec. 1970)

Gamma Dose Distributions At and Near the Interface of Different  
Materials  
J. A. Wall, E. A. Burke

*Isotopes Rad. Tech.*, 9(1), 105-112 (Fall, 1971)

Section V. Source Development. Isotopic Neutron Sources from the  
Los Alamos Meson Physics Facility (LAMPF)  
H. A. O'Brien, M. E. Schillaci

*Jaderna Energ.*, 17(7), 241-5(1971) (In Czech)

Methods of Determination of Fast Neutron Spectra from Threshold-Foil  
Activation Data  
A. Hrabovcova, D. Nikodemova

*Jad. Energ.*, 17(4), 109-13 (April 1971) (In Czech)

Investigation of a Hydrogen-Free Shield for Heavy-Water Power Reactors  
M. Holman, K. Kovarik, P. Marik

*J. Food Sci.*, 36(5), 747-9 (July-Aug. 1971)

Computer Evaluation of Irradiation Processes in Cylindrical Containers  
with Gamma Sources  
K. S. Purohit, J. E. Manson, J. W. Zahradnik

*J. Korean Nucl. Soc.*, 3(2), 65-75 (June 1971)

Shielding Effectiveness of Magnetite Heavy Concrete on  $^{60}\text{Co}$  Gamma Rays  
Y. K. Lim

*J. Nucl. Sci. Technol. (Tokyo)*, 8(5), 277-84 (May 1971)

Analytical Study of the Effect of Anisotropic Scattering in CMS on Fast  
Neutron Spectrum  
Y. Yamamura, T. Sekiya

*J. Res. NBS B*, B75(N1-2), 1-16 (1971)

Bounds to Truncation Errors in Biorthogonal Polynomial Approximations,  
with Illustrative Applications to Gamma-Ray Transport Distributions  
L. V. Spencer

*J. Quant. Spectrosc. Radiative Transfer*, 11(6) 851-868 (1971)

Some Analytical Methods in Neutron-Transport Theory  
N. Corngold

*J. Quant. Spectrosc. Radiative Transfer*, 11(6) 905-919 (1971)

Numerical Methods Applied to Problems of Neutron-Transport  
J. R. Askew

*J. Quant. Spectrosc. Radiative Transfer*, 11(6) 963-72 (June 1971)

A Method for Combining the Lower and Higher Order Discrete Ordinate  
Approximation to the Transport Equation.  
H. Takahashi

*Meas. Tech. (USSR) (Engl. Transl.)*, 11, 1755-9 (Nov. 1970)

Standard Photoneutron Source at the All-Union Scientific-Research  
Institute of Metrology  
V. I. Fominykh, I. A. Yaritsyna

*Non-Destructive Testing*, 4(5), 330 (1971)

Low-Voltage Particle Accelerators for Neutron Generation  
L. Holland, M. R. Hawkesworth

*Nucl. Eng. Design*, 15(3), 241-64 (April, 1971)

Shielding for Advanced Reactors in the United States  
F. C. Maienschein, C. E. Clifford, F. R. Mynatt, L. S. Abbott

*Nucl. Eng. Design*, 15(3), 294-308 (April 1971)

Today's Approaches to Reactor Shielding Problems  
R. Nicks, H. Penkuhn

*Nucl. Eng. Design*, 15(3), 309-18, (April 1971)

Reactor Shielding in the Commissariat a l'Energie Atomique  
C. Devillers

*Nucl. Instr. Methods*, 91(1), 37-43 (Jan. 1, 1971)

A Single-Difference Bremsstrahlung Unfolding Technique for the  
Measurement of High Energy Photonuclear Cross Sections  
J. L. Matthews, R. O. Owens

*Nucl. Instrum. Methods*, 92(2), 277-85 (March 15, 1971)

Two Different Technique Measurements of the Neutron Spectrum of an Am-Be Source  
F. De Guarrini, R. Malaroda

*Nucl. Instrum. Methods*, 94(1), 53-9 (1971)

Gamma-Backscatter Density Gauge with Differential-Mode Counting  
O. Ciftcioglu, D. Taylor

*Nucl. Instrum. Methods*, 94(3), 421-7 (July 15, 1971)

Production of Medium-Energy Neutrons from Proton Bombardment of Light Elements  
J. A. Jungerman, F. P. Brady, W. J. Knox, T. Montgomery, M. R. McGie, J. L. Romero, Y. Ishizaki

*Nucl. Instrum. Methods*, 95(3), 545-50 (1971)

Monte Carlo Simulation of an Organic Scintillator Response of Gamma-Ray Spectra  
I. M. Martin, A. Bui-van, G. Vedrenne

*Nucl. Phys. A*, A159(2), 555-60 (Dec. 28, 1970)

Gamma-Ray Spectra from the Radiative Capture of 14 MeV Neutrons in  $^{28}\text{Si}$  and  $^{40}\text{Ca}$ .  
F. Cvelbar, A. Hudoklin

*Nucl. Phys. A*, A159(2), 561-76 (Dec. 28, 1970)

Photoneutron Cross Sections of  $^{208}\text{Pb}$  and  $^{197}\text{Au}$   
A. Veyssiere, H. Beil, R. Bergere, P. Carlos, A. Leprete

*Nucl. Phys. A*, A161(2), 593-609 (Feb. 1, 1971)

Scattering of Fast Neutrons by  $^{12}\text{C}$ ,  $^{54}\text{Fe}$ ,  $^{56}\text{Fe}$ ,  $^{58}\text{Ni}$  and  $^{60}\text{Ni}$   
P. Boschung, J. T. Lindow, E. F. Shrader

*Nuclear Safety*, 12(5), 456-460 (1971)

Outcry Over Exposure Guidelines  
J. A. Auxier

*Nucl. Sci. Eng.*, 44(2), 194-204 (May 1971)

Effect of Anisotropic Scattering Upon the Elastic Moderation of Fast Neutrons  
W. M. Stacey, Jr.

*Nucl. Sci. Eng.* 44(3), 447-9 (June 1971)

Adjoint Spectra for Calculating Thermal Group Constants  
D. S. Selengut

*Nucl. Technol.*, 11(2), 268-9 (June 1971)

Note on the Use of the Tchebycheff Criterion for Determination of  
Parameters in Empirical Approximations to Gamma-Ray Buildup Factor  
Data

A. F. Vetter, A. B. Chilton

*Nucl. Technology*, 12(4), 375-380 (December 1971)

Semiempirical Formulas for Gamma-Ray Dose Rates Through Two-Layer  
Slab Shields

D. A. Sharp, A. Carnesale

*Phys. Med. Biol.*, 16(3), 439-50 (July 1971)

Neutron Radiography and Dosimetry in Human Beings: Theoretical Studies  
T. F. Budinger, E. F. Plechaty, R. J. Howerton

*Phys. Med. Biol.* 16(3), 461-6 (July 1971)

Recoil Proton Dose Across a Bone-Tissue Interface Due to Fast Neutrons  
M. A. Prasad, Sundararaman, G. Venkataraman

*Phys. Med. Biol.*, 16(3), 467-78 (July 1971)

Distribution of the Dose from Neutrons in a Thin Sample of Wet Tissue  
as a Function of Linear Energy Transfer (LET)

M. H. Dousset, J. Hamard, A. Ricourt

*Phys. Rev. B*, 3, 2929-33 (May 1, 1971)

Semiclassical Estimation of Neutron Stopping Power

R. B. Vora, V. N. Neelavathi, J. E. Turner, T. S. Subramanian, M. A.  
Prasad

*Radiobiology* 11(2), 228-231 (Mar.-April, 1971)

Calculation of the Bulk Buildup Factor of Extensive Gamma Sources  
with Energy  $E \leq 0.5$  MeV

V. E. Drozdov, L. M. Dunaev, N. O. Orlenko

*Soviet Astronomy Aj.*, USSR, 15(2), 266- (1971)

Radiation Transport with Rayleigh-Scattering .1. Semi-Infinite  
Atmosphere

H. Domke

*Soviet J. At. Energy (Engl. Transl.)*, 24(5), 570 (May 1968)

Calculation of Absorbed Dose Rates in a Hollow Cylindrical Radiator  
Having a Nonuniform Distribution of Activity

V. E. Drozdov, Yu. S. Ryabukhin

*Soviet J. At. Energy (Engl. Transl.)*, 26(5), 516-517 (May 1969)

Method for the Calculation of Field Dose of a Uranium Radiation Loop  
Linear Source of  $\gamma$ -Radiation

E. Stariznyi, A. Kh. Breger

Soviet J. At. Energy (Engl. Transl.) 29(6), 1222 (Dec. 1970)

Calculation of Photoneutron Distribution by Monte Carlo Method  
A. A. Morozov, A. I. Khisamutdinov

BOOK

1969

*TECHNICAL PROBLEMS OF FAST REACTORS*

Iu. E. Bagdasarov

Atomic Energy Publ. House, Moscow

(Translated for Div. of Reactor Dev. and Tech., USAEC, Washington,  
U.S. GPO, 1971)

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1969

*APPLIED RADIATION PROTECTION AND CONTROL. VOL. 1.*

J. J. Fitzgerald (Ed.)

New York; Gordon and Breach, Science Publishers, Inc.

BOOK, pp. 114-132

1968

*BASIC NUCLEAR ENGINEERING*

A. R. Foster, R. L. Wright, Jr.

ARTICLE: Health Physics and Biological Radiation Protection  
Allyn and Bacon, Inc., 470 Atlantic Ave., Boston, Mass.

BOOK

1970

*INTRODUCTION TO INFORMATION SCIENCE*

Tefko Saracevic (Ed.)

New York, R. R. Bowker Co.

BOOK, pp. 1-38

1970

*ANNUAL REVIEW OF NUCLEAR SCIENCE*

E. Segre, J. R. Grover, H. P. Noyes (Ed.)

ARTICLE: Neutron Capture Gamma-Ray Spectroscopy

H. T. Motz

(Palo Alto, Calif.; Annual Reviews, Inc.)

BOOK

1966

*FAST REACTOR TECHNOLOGY: PLANT DESIGN*

John G. Yevick (Ed.)

Cambridge, Mass. and London, Eng. MIT Press (pp. 772) \$35.00

THESIS

1970

Fast Neutron Pulse Propagation in Iron

C. M. Napolitano

(University of Florida, Gainesville)

Avail.: Univ. Microfilms Order No. 71-13, 442

- U.S. Patent 3,524,062 11 Aug. 1970  
Apparatus for Measuring the Moisture Content and Density of the Soil  
Jean Rocoplan, Bernard Wack
- U.S. Patent 3,524,063 11 Aug. 1970  
Multirange Radiation Thickness Gauge  
Edmund L. Mangan
- U.S. Patent 3,529,153 15 Sept. 1970  
Methods and Apparatus for Measuring Slurry Density with Gamma Rays  
Carl W. Zimmerman, Robert O. Wilson
- U.S. Patent 3,567,935 2 Mar. 1971  
Measuring Apparatus and Method  
Walter A. Nagel

#### SPACE AND ACCELERATOR SHIELDING

- AERE-M-2346 February 1971  
Energy Loss Characteristics of Heavy Ions in Nitrogen, Carbon Dioxide,  
Argon, Hydrocarbon Gases and Tradescantia Tissue  
J. A. Dennis  
Avail.: Dep.; NTIS (U.S. Sales only)
- CONF-691208 (Vol. 2) pp. 363-8 December 1969  
Empirical Relation for Average Energy Loss of Positrons and Electrons  
R. K. Batra, D. K. Gupta, M. L. Sehgal  
(From Nuclear Physics and Solid State Physics Symposium, Roorkee,  
India)
- CONF-710402 (Vol. 2), pp. I.128-35 April 18, 1971  
Isotopic Neutron Sources from the Los Alamos Meson Physics Facility  
H. A. O'Brien, Jr.; M. E. Schillaci  
(From Meeting on Neutron Sources and Applications, August, Ga.)
- ICRP Publication 4 1962  
Report of Committee IV on Protection Against Electromagnetic Radiation  
Above 3 MeV and Electrons, Neutrons, and Protons. Recommendations of  
the International Commission on Radiological Protection. Radiation  
Protection.  
ICRP  
Avail.: Pergamon Press, Inc., Elmsford, N. Y. (1964)

*ICRP Publication 10 1968*

Report of Committee IV on Evaluation of Radiation Doses to Body Tissues from Internal Contamination Due to Occupational Exposure. Recommendations of the International Commission on Radiological Protection. Radiation Protection.

ICRP

Avail.: Pergamon Press, Inc., Elmsford, N. Y. (1968)

*ICRP Publication 14*

Radiosensitivity and Spatial Distribution of Dose. Radiation Protection.

ICRP

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