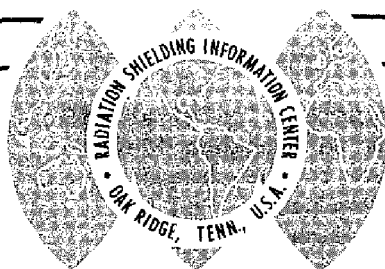


RSIC Newsletter



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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July 1971

*Get good counsel before you begin;
and when you have decided,
act promptly.*

Sallust - Catilina

INTERNATIONAL SHIELDING MEET TO BE HELD IN 1972

The European Nuclear Energy Agency (ENEA) and the International Atomic Energy Agency (IAEA) expect to sponsor a conference on reactor shielding on October 9-13, 1972 in Paris with the French Commissariat à l'Energie Atomique (CEA) providing host facilities. The agenda for the meeting will be arranged by an international program committee to be named by the sponsors.

Information concerning program content will be published by RSIC as it is forthcoming, as will the call for papers. F. C. Maienschein of the ORNL Neutron Physics Division has been asked by the European-American Committee on Reactor Physics (EACRP) to organize a special session on benchmark shielding data. In this connection, it is hoped that newly developed transport experiments and calculations which have been independently verified can be presented at the conference.

RADIATION TRANSPORT IN AIR SUBJECT OF SEMINAR-WORKSHOP

In response to inquiries and suggestions from several members of the shielding community, RSIC is planning a review of the transport in air of neutrons and gamma rays in the form of a Seminar-Workshop to be held in Oak Ridge this autumn. The review will consist of invited and contributed papers on theory and calculational methods. The computer program ATR (Air Transport of Radiation), developed by Science Applications, Inc. (SAI), will be explored in workshop sessions.

October 13-15 has been tentatively selected for the Seminar-Workshop. This will allow those traveling from a distance, who wish to do so, to continue on to the winter meeting of the ANS to be held in Miami, Florida, October 17-21. There is time to reconsider the dates if feedback to RSIC indicates that the timing is bad. We will be pleased to hear from those interested in the subject matter of the proposed Seminar-Workshop.

COORDINATORS MEET TO ADVISE RSIC

More than 25 people attended the RSIC Board of Volunteer Installation Coordinators meeting held during the Boston ANS meeting to exchange ideas and suggestions for improvement in the Center's services to the shielding community and to secure greater cooperation from the community. Led by Chairman G. P. Lahti, NASA Lewis Research Center, the agenda covered present operations, publications, benchmark problems, seminars, codes and distribution, and cross section distribution.

Several new ideas emerged which will be explored by the RSIC staff. One suggestion is transmitted here: *that the RSIC NEWSLETTER be used as a vehicle for communication between research scientists working in the same general area so that they might share problems and possible solutions. A researcher would pose a problem in a given area or express a need (anonymously, if he so wishes) in an issue of the Newsletter. The following issues would publish answers from volunteers who had similar experience and had found workable solutions.* RSIC will be pleased to cooperate in any way that will fill an expressed need from the shielding community. Obviously, the above suggestion can be explored ONLY IF there are those who wish to try it. We will welcome your communications and will cooperate in serving your needs.

CURRENT WORK AND PROBLEMS

With this issue, we report a contribution we have received in the past month. We solicit more contributions from the shielding community. For this reason we are including a final page to the Newsletter as a reminder and guide.

We hope that some of you will read this section not only to find what others are doing which may help you, but also to find where you might be able to give a little helpful advice. If you have any suggestions, especially concerning areas where a need for work is felt, send a note to RSIC and to the person who has expressed the need. It will be appreciated.

The name in parentheses below identifies the person who reported the work at the installation.

The Nuclear Energy Division, Breeder Reactor Development Operation, General Electric Company, Sunnyvale, Calif. (M. L. Weiss) has interests in shielding measurements and calculational methods applicable to the LMFBR. The specific need is for methods of calculating neutron transport through heterogeneous shields, generally consisting of stainless rods, tubes, etc., immersed in sodium. They would like to evaluate streaming paths through voided or sodium-filled ducts and annuli to an accuracy hopefully not exceeding a factor of 10.

CURRENT REPORTS AVAILABLE FROM RSIC

The following reports have just been published and a limited number of copies are available from RSIC.

"PREPARATION OF DATA SETS IN ENDF FORMAT FOR Na, Mg, Cl, and K FOR USE IN SHIELDING CALCULATIONS," by R. W. Roussin, S. K. Penny, V. A. Singletary, and J. B. Wright, ORNL-TM-3429 (ENDF-151), May 1971.

"RECENT DEVELOPMENTS IN THE SHIELDING OF NEUTRON SOURCES," H. Clyde Claiborne, ORNL-RSIC-32, June 1971.

THIRD RADIATION SHIELDING ISSUE OFF THE PRESS

NUCLEAR ENGINEERING AND DESIGN

The third in a series of issues devoted to radiation shielding is now available in the April 1971, Vol. 15, No. 3 publication of the journal Nuclear Engineering and Design. The first of the series was announced in the September 1970 RSIC NEWSLETTER No. 70, and the second in December 1970 issue No. 73.

The following articles appear in the latest issue. Requests for reprints of any article should be addressed to the author concerned.

- (1) *Biased angle selection in Monte Carlo shielding calculations*
F.A.R. Schmidt
- (2) *Heat generation by neutrons in some moderating and shielding materials*
H. C. Claiborne, M. Solomito, J. J. Ritts
- (3) *On the theory of the gamma-ray transmission, dual-distance principle of determining thickness*
R. L. Ely, R. P. Gardner
- (4) *Shielding for advanced reactors in the United States*
F. C. Maienschein, C. E. Clifford, F. R. Mynatt, L. S. Abbott
- (5) *On a Gauss based integration formula for the secant integral function*
C. Farmer, D. S. Gooden, J. Hogarth
- (6) *The adjoint Boltzmann equation and its simulation by Monte Carlo*
D. C. Irving
- (7) *Today's approaches to reactor shielding problems*
R. Nicks, H. Penkuhn
- (8) *Reactor shielding in the "Commissariat à l'Energie Atomique"*
C. Devillers

- (9) *Adjoint S_n calculations of coupled neutron and gamma-ray transport through concrete slabs*
R. W. Roussin, F.A.R. Schmidt

RADIATION PROTECTION CONFERENCE TO BE HELD IN HUNGARY IN 1972

The International Radiation Protection Association (IRPA), the Hungarian Academy of Sciences, and the Hungarian Atomic Energy Commission will sponsor the Second European Congress on Radiation Protection to be held in Budapest, Hungary, May 3-5, 1972. All interested scientists are invited to attend. The agenda will cover invited papers on selected topics of internal dosimetry and short papers on new results attained in domains listed under the topics under consideration. The topics are:

- (1) Internal dosimetry. Mathematical procedures for the calculation of metabolic constants and dose equivalents. Fundamental problems and calculation of maximum permissible doses.
- (2) Mechanisms of intake by inhalation and ingestion, movement of radionuclides in man. Radio-detoxication procedures. Treatment of accidental contamination.
- (3) New techniques for the measurement of internal emitters: whole body counting, excretion analysis and other related measuring techniques.
- (4) Protection of occupational workers from internal irradiation - design of working areas, monitoring, decontamination procedures.
- (5) Protection of the general public from internal irradiation - nuclear plant siting, emergencies, movement of radionuclides in the biosphere in connection with man.

Those wishing to present papers are requested to send abstracts typed on A4 paper sheets (21 x 29.7 cm) with 2.5 cm margins on all 4 edges, not exceeding 25 lines, six copies written in English, with the number of the pertinent topic marked in the upper left corner. Deadline for abstracts: October 1, 1971. These should be mailed to Dr. L. Bozo'ky, National Oncological Institute, Budapest XII, Ra'th Gy. u. 7, Hungary. The accepted papers will be published in the Proceedings of the Conference.

ADDITIONS TO THE COMPUTER CODE COLLECTION

Operable, tested with a sample problem, and available for distribution are the following code packages: A reel of magnetic tape should accompany a request for a code package.

- CCC-164/NAC (A & B) Neutron Activation Analysis and Product Isotope Inventory Code - A Subset of NAP (CCC-101), contributed by NASA Lewis Research Center, Cleveland, Ohio. Reference: NASA TM-X-52460. FORTRAN IV. Packaged for the IBM 360 (A version) and IBM 7090 (B version).
- CCC-112D/SAND II A new version of SAND II (CCC-112) modified for the IBM 7094/7044 Direct Couple System using FORTRAN IV, version 13 compiler. SAND II is a program designed for neutron flux spectra determination by multiple foil activation - iterative method. This version is contributed by NASA Lewis Research Center, Plum Brook Station, Ohio. Written as 29,952 records at 800 bpi, the code package can be transmitted on one full reel of magnetic tape. References: AFWL-TR 67-41, Vol. 1, and BNWL-855.
- CCC-81C/UNC-SAM 2 A new version of UNC-SAM 2 (CCC-81) modified for the IBM 360/44 has been contributed by Physics International Company, San Leandro, California. UNC-SAM 2 is a Monte Carlo three-dimensional complex geometry shielding code system. Written as 5,501 records, the code package can be transmitted on one small reel of magnetic tape. Reference: UNC-5157, UNC-5093, and informal notes.
- CCC-89E/DOT-DUCT A new auxiliary program called DUCT has been added to CCC-89/DOT code package. DUCT is designed to calculate the perturbation to scalar fluxes caused by the presence of ducts filled with coolant. It is programmed in FORTRAN V and uses the angular flux tape from a DOT run as part of its input. DUCT was contributed by Gulf Radiation Technology, San Diego, California, and requires one reel of magnetic tape for transmittal. Reference: GRT-10654.
- CCC-60E/SDC Kernel Integration Shield Design Code for Radioactive Fuel Handling Facilities - version E, operable on the UNIVAC 1108, has been sent to RSIC by Mississippi State University, State College, Mississippi. References: ORNL-3041, ORNL 3931.
- CCC-99B/PLUME Gamma-Ray Dose Rate from a Radioactive Cloud - PLUME - A Kernel Integration Code, has been made compatible with the CDC 6600 by Pickard, Lowe and Associates,

Washington, D.C. Requesters may ask for the deck.
Reference: ORNL-4086.

CCC-163B/FISSP-CLOUD Fission Product Inventory, Release, Transport and
Dose Calculation has been converted to the IBM
360/75/91. One reel of magnetic tape is needed for
transmittal. Reference: SC-RR-70-338.

NON-STANDARD LIBRARY ROUTINES IN CCC-123/XSDRN

The CCC-123/XSDRN computer code package has been distributed with
calls to two function subroutines, ICLOCK and MODEL, which are not on
standard software libraries. A description of each of the routines is
available from RSIC and will be sent out with the documentation package.
The routines may be supplied by the user, or a dummy may be inserted as
below:

```
SUBROUTINE ICLOCK      (or SUBROUTINE MODEL)
RETURN
END
```

PERSONAL ITEMS

Marshall Grotenhuis, who has been associated for many years with the
Argonne National Laboratory, has transferred to the USAEC at Bethesda,
Maryland. He will be writing environmental statements on reactors with
the Radiation and Environmental Protection Division.

* * * * *

Edward A. Straker, program leader for the weapons radiation shielding
area of ORNL's Neutron Physics Division, has left the Laboratory to work
in Huntsville, Alabama. He and *N. R. Byrn* will be associated with Science
Applications, Inc. (SAI) and will continue working on radiation transport.

* * * * *

J. Robert Streetman of LASL has notified RSIC that he is taking an
excursion from the shielding work with which he has been involved for
several years to work on orbit optimization for space vehicles. Bob
returned to RSIC several volumes of RSIC publications which he thought
would be useful to those now working in shielding, a gesture much appreci-
ated by the RSIC staff.

VISITORS TO RSIC

Visitors to RSIC during the month of June were: N. E. Banks, Ballistics Research Laboratories, Aberdeen Proving Ground, Md.; V. Bell, European Nuclear Energy Agency Computer Programme Library, Ispira, Italy; J. R. Fisher and W. F. Kane, Nuclear Associates International Corp., Rockville, Md.; T. J. Hoffman, University of Tennessee, Knoxville, Tenn.; D. C. Kaul, DASA, Washington, D. C.; F. J. Kreysa, Science Information Exchange, Smithsonian Institute, Washington, D. C.; S. Pearlstein, National Neutron Cross Section Center, Brookhaven National Laboratory, New York; H. F. Soard, Chemical Technology Division, ORNL

JUNE 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 National Technical Information Service (NTIS), Department of Commerce, 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.

REACTOR AND WEAPONS SHIELDING

AAEC LIB B4b-270

February 1971

Proton-Recoil Counters for the Measurement of Fast Neutrons.
A Bibliography.
J. Geue
Avail.: NTIS

AAEC/TM-565 (CONF-700102-4)

September 1970

Review of Gamma-Ray Transitions from keV Neutron Capture
B. J. Allen
Avail.: Dep.; NTIS (U.S. Sales only)

AEC-TR-7187

Nuclear Power Plants
B. B. Baturov
Avail.: Dep.; NTIS

AERE-M-1887

May 1967

Calculated Quality Factors for Protons in Body and Eye-Lens Tissues
J. A. Dennis
Avail.: Dep.; NTIS (U.S. Sales only)

AERE-Trans-1134

February 1971

Radiation Safety Standards, 1969.
J. E. Baker
(From Normy Radiatsionnoi Bezopasnosti (NRB-69), Atomizdat, Moscow,
1970)
Avail.: NTIS

ANL-7760 (Pt. 1), pp. 33-5

^{244}Cm and ^{145}Sm - ^{145}Pm X-Ray Sources
J. Kastner, A. M. Friedman, B. G. Oltman, K. F. Eckerman
(From Radiological Physics Div. Annual Report)

ANL-7779

April 1971

A Survey of Approximation Procedures for the Numerical Solution of
the Neutron Transport Equation
H. G. Kaper, G. K. Leaf
Avail.: NTIS

ANL-7796

March 1971

Empirical Formula for Interpolation of Tabulated Photon Photoelectric
Cross Sections
D. L. Smith
Avail.: NTIS

ANS-SD-11 (CONF-691133)

1969

Proceedings of Special Sessions on Nuclear Data for Shielding and
Multidimensional Shielding Calculations
American Nuclear Society 1969 Winter Meeting
C. M. Huddleston (comp.)
(American Nuclear Society, Hinsdale, Ill.)

ANU-P-487(2)

1970

Computer Reduction of Complex Spectra
T. R. Ophel
(Australian National Univ., Canberra Research School of Physical
Sciences)

ARH-1819

September 1970

Vibration Testing of L-3 and L-10 Shipping Containers
E. F. Curren
Avail.: NTIS

AWRE-NR-4-64

September 1964

Measurement of Neutron Reaction Rates Produced by a 14-MeV Neutron
Source at the Centre of a Cylindrical Lithium Pile
P. W. Benjamin, H. Goodfellow, J. Gray, J. W. Weale
(Atomic Weapons Research Establishment, Aldermaston, England)

BNWL-SA-3093 (Vol. 1), pp.V.1-33

Shielding Fundamentals
W. L. Bunch
From Lecture Series, Fast Reactor Safety Technology and Practices.
Volume 1. Safety and Background Information.

BNWL-SA-3665 (CONF-701205-2)

December 1970

Nuclear Power as a Source of Contamination on a Global Scale
C. M. Unruh
Avail.: Dep.; NTIS

BRH-DBE-70-6

December 1970

Radiation Incidents Registry Report, 1970
L. F. S. Mills

BRH-DBE-70-8

December 1970

Diagnostic Radiation Utilization in Selected Short-Term General
Hospitals
Fay M. Hemphill, F. B. Locke, R. D. Hesselgren

BRH/OCS-70-1

January 1970
Reprinted August 1970

Radiation Exposure Overview: Nuclear Power Reactors and the
Population

W. H. Oates, Jr.

(Bureau of Radiological Health, Rockville, Md.)

BRL R 1537

February 1971

Calculations on the Sensitivity of the X-Ray Field Backscattered
from Soil Due to Subterranean Material Differences

W. A. Coleman

(U.S. Army Aberdeen Research and Development Center, Ballistic Research
Laboratories, Aberdeen Proving Ground, Md.)

CEA-CONF-1523

March 9, 1970

Irradiation Damage from Pile Neutrons

M. Cance and J. P. Genthon

From Working Group of the AIEA on the Measurement of Reactor
Radiations, Grenoble, France.

NTIS (U.S. Sales only) PC \$3.00, MF \$.95

CEA-CONF-1683

1970

Reactor Shielding in the Commissariat a l'Energie Atomique

C. Devillers

Avail.: NTIS

CEA-R-4008 (In French)

September 1970

Accidental Release of I-131 at the UP 2 Plant on October 2nd and
3rd 1968

J. Scheidhauer, G. Cassabois, R. Gandon

Avail.: NTIS

CLOR-81/D (In Polish)

1970

Origin and Evolution of the Radioactive Clouds

L. Kownacka

Avail.: Nuclear Energy Information Center of the Polish Government
Commissioner for Use of Nuclear Energy Palace of Culture and Science,
Warsaw, Poland

CLOR-82/D (In Polish)

1970

X and Gamma Thermoluminescent Dosimeter for Accidental Personnel
Dosimetry Purposes

A. Koczynski, T. Musialowicz, M. Wolska-Witer, J. Wysopolski

Avail.: Nuclear Energy Information Center of the Polish Government
Commissioner for Use of Nuclear Energy Palace of Culture and Science,
Warsaw, Poland

CONF-691106, pp. 46-72

November 1969

Current Research on Radiation Damage Processes by Low Energy Heavy Particles

D. E. Watts, S. Hughes

(From Symposium on Neutrons in Radiobiology, Oak Ridge, Tenn.)

Avail.: Dep.; NTIS \$10.00

CONF-680108, pp. 234-48

1970

Comparison of Calculated and Measured Long Term Gamma Doses from a Stack Effluent of Radioactive Gases

M. J. May, I. F. Stuart

(In: Environmental Surveillance in the Vicinity of Nuclear Facilities,

W. C. Reinig (ed.), Springfield, Ill.; Charles C. Thomas, Publisher

(1970))

CONF-710402, Vol. II

April 1971

Neutron Sources and Applications. Proceedings of the American Nuclear Society National Topical Meeting, April 19-21, 1971, Augusta, Georgia.

Session I: Neutron Sources, Session II: Medical and Forensic Uses of Neutrons

Avail.: NTIS

CONF-710402, Vol. III

April 1971

Neutron Sources and Applications. Proceedings of the American Nuclear Society National Topical Meeting, April 19-21, 1971, Augusta, Georgia.

Session III - Exploration and Protection of Natural Resources,

Session IV - Industrial Uses of Neutron Sources

Avail.: NTIS

C00-1105-155 (N71-13976)

1969

Suggestions for Fast Neutron Dosimeter Techniques

P. R. Moran, E. B. Podgorsak

Avail.: NTIS

C00-2060-10 (CONF-710304-10; ERI-97600)

February 1971

Application of the Matrix Exponential Kernel

Alfred F. Rohach

(From Symposium on Natural and Manmade Radiation in Space, Las Vegas, Nev., Mar. 1, 1971)

Avail: Dep., NTIS

EGG-1183-1467

February 6, 1970

Attenuation of 5.9 keV Photons by Helium and Hydrogen

J. H. McCrary, L. D. Looney, H. F. Atwater

Avail.: NTIS

- EUR-4612 (CONF-700930) (In several languages) February 1971
Radiation Protection Problems Relating to Transuranium Elements
(Seminar held at Karlsruhe, W. Germany, September 21-25, 1970)
(European Communities, Luxembourg, Commission)
EUR \$20.00
- GULF-RT-10469 December 1970
Integral Neutron Thermalization. Final Report
J. M. Neill, G. M. Borgonovi, D. H. Houston, E. L. Slaggie
Avail.: Dep.; NTIS
- HMI-B-87 (In German) October 1969
Contamination of the River Water by the Fallout After Extreme
Reactor Accidents
W. Jacobi, N. Stolterfoht
Avail.: NTIS
- IKE (Annual Report - In German) April 5, 1971
Rechenschaftsbericht 1970 des Instituts für Kernenergetik der
Universität Stuttgart
- IN-1363 November 1970
Silver Zeolite: Iodine Adsorption Studies. (Project Report for
July 1 - December 31, 1969)
D. T. Pence, W. J. Maeck
Avail.: NTIS
- INP-715 (CONF-700947-1) July 1970
Calibration of Radiometric Probes for Soil Density Measurements
J. A. Czubek
Avail.: Dep.; NTIS (U.S. Sales only)
- IPP-1/107 (N71-18388) March 1970
Neutron Yields and Energy Spectra for Hot Deuterium-Tritium Plasmas
G. Lehner, F. Pohl
Avail.: Dep.
- IPP-4/78 (In German) June 1970
Comparison of Different Concepts of Fusion Reactor Blankets and
Thermodynamic Circuits
W. Daenner
Avail.: Dep.; NTIS (U.S. Sales only)
- JAERI-4052 (In Japanese) November 1969
Nuclear Accidents in Nuclear Installations. Survey Report
T. Onishi, K. Minami, H. Yamagishi, et al.
Avail.: NTIS

JPRS-52622

March 15, 1971

Protection from the Effect of Radio Waves
Ye. L. Kulikovskaya
Avail.: NTIS

LA-4385-TR (N71-16258)

July 1970

Photofission of Th 232, U 238, Pu 238, Pu 240 and Pu 242 and Structure
of the Fission Barrier
N. S. Rabotnov, et al.
Avail.: NTIS
(Translated from Russian Report Sponsored by AEC)

LA-4557 (ORNL-4662; SAI-70-125)

May 1971

Time-Dependent Neutron and Photon Transport Calculations Using the
Method of Discrete Ordinates
S. A. Dupree, H. A. Sandmeier, G. E. Hansen, W. W. Engle, Jr., F. R.
Mynatt
Avail.: NTIS

LA-4553-MS

May 1971

The Direct Solution of the Discrete Poisson Equation on Irregular
Regions
B. L. Buzbee, F. W. Dorr, A. George, G. H. Golub
Avail.: NTIS

LA-4615

November 1970

Measured ²³⁵U and ²³⁸U Fissioning Neutron Fluence Distributions in
the Phoebus 2A Shields: Comparisons with Monte Carlo Calculations.
C. W. Watson
Avail.: NTIS

LA-4624

April 1971

Bremsstrahlung Emission Measurement from Thick Tungsten Targets in
the Energy Range 12 to 300 kV
E. Storm, H. I. Israel, D. W. Lier
Avail.: NTIS

LA-4655

May 1971

A Generating Operator for Solutions of Certain Partial Difference and
Differential Equations
J. R. Hundhausen
Avail.: NTIS

LA-4663

May 1970

A New Method of Sampling the Klein-Nishina Probability Distribution
for All Incident Photon Energies Above 1 keV
C. J. Everett, E. D. Cashwell, G. D. Turner
Avail.: NTIS

NAA-SR-9364

February 12, 1964

Experimental Studies of Neutron Attenuation in Natural Lithium Hydride Shields

S. D. Wogulis, K. L. Rooney

Avail.: USAEC-DTIE, P.O. Box 1001, Oak Ridge, Tenn. 37830

NBS-10550 (AD-721368)

March 1971

Radiation Transport Studies Carried Out at the National Bureau of Standards with the Support of the Office of Naval Research

S. M. Seltzer, G. L. Simmons, M. J. Berger, C. M. Eisenhauer,

L. V. Spencer

Avail.: NTIS

NP-18359 (INR-4/70-25; N71-13550) (In German; English Summary) Feb. 1970

Spectral Measurements on Radioactive Neutron Sources in the Energy Range of 10 keV to 10 MeV with Proton Recoil Proportional Counters

H. Werle

Avail.: Dep.

NP-18791

September 1970

Health Physics Practices and Experiences of Isotope Producers and Distributors

Atomic Industrial Forum, Inc., New York, \$5.00

ORNL-RSIC-32

June 1971

Recent Developments in the Shielding of Neutron Sources

H. C. Claiborne

Avail.: NTIS

ORNL-TM-2960

January 1971

Reference Design for an Isotope Power Unit Employing an Organic Rankine Cycle

G. Samuels, R. S. Holcomb

Avail.: Dep.; NTIS

ORNL-TM-3269 (CTC-40)

June 9, 1971

A Study of the Overlap Conditions Required in Sequential Discrete Ordinates Transport Calculations for a 14-MeV Neutron Source in a 5000-m Radius Cylinder of Air

J. V. Pace, III, F. R. Mynatt, L. S. Abbott

ORNL-TM-3398

April 29, 1971

A FORTRAN Program for Gamma-Radiation Dosimetry for Arbitrary Source and Target Geometry

L. B. Hubbard

ORNL-TM-3436

June 7, 1971

Neutron Energy-Dependent Capture Gamma-Ray Yields in Tantalum and Tungsten

K. J. Yost, J. E. White, C. Y. Fu, W. E. Ford, III

ORNL-TM-3449

June 15, 1971

Optimization of a Shield for a Heat-Pipe-Cooled Fast Reactor Designed as a Nuclear Electric Space Power Plant

W. W. Engle, Jr., R. L. Childs, F. R. Mynatt, L. S. Abbott

ORNL-TM-3462

June 11, 1971

Bracketing the Peak Primary Gamma-Ray Dose Rate from Nuclear Devices by Steady-State Transport Calculations

H. C. Claiborne, W. W. Engle, Jr.

ORNL-TR-2359 (From French Report)

Nuclear Shielding Calculation. Note No. 2. Energy Flux in Air Due to a Plane, Infinite, Isotropic Gamma-Ray Source of Uniform Density

Ministere des Armees, Paris

Direction Technique des Armements Terrestres

Avail.: Dep.; NTIS

ORNL-TR-2360 (From French Report)

Nuclear Shielding Calculations. Note No. 6. ALTRAN Code:

Calculation of Neutron Transmission and Reflection in Shields by the Monte Carlo Method

Ministere des Armees, Paris

Direction Technique des Armements Terrestres

Avail.: Dep.; NTIS

ORNL-TR-2366 (From French Report)

Nuclear Shielding Calculations. Note No. 50. Neutron Reflection and Transmission in Shields Monte Carlo Method

Ministere des Armees, Paris

Direction Technique des Armements Terrestres

Avail.: Dep.; NTIS

SWRHL-72-R

October 1970

Final Report of Environmental Surveillance for Phoebus 2A Reactor Test Series, May-July 1968

Public Health Service, Las Vegas, Nev.

Avail.: NTIS

SZS-6/70 (In German)

March 1970

Methods of Application of Gamma Emitters in Contact Therapy with Regard to Radiation Protection

W. Moebius, F. H. Glaser, et al.

Avail.: NTIS

TID-25644

August 1968

Multi-Group Neutron Transport Theory in Plane Geometry
F. J. McCrosson
Virginia Polytechnic Institute, Blacksburg, Va.

TPR-0145

January 1971

Suboptimal Methods for Solving Constrained Estimation Problems
B. W. Rust, W. R. Burrus
Avail.: NTIS

UCRL-50007-70-2

1970

Hazards Control Progress Report No. 37, May-August 1970
California University, Livermore. Lawrence Radiation Lab.
Avail.: NTIS

UCRL-50990

January 11, 1971

Methodology for Computing Potential Radiation Dose to Man from
Nuclear Excavation Projects
Edward H. Fleming
Avail.: Dep.; NTIS

UCRL-72329

March 18, 1970

Heat Pipes for Recovery of Tritium in Thermonuclear Reactor Blankets
R. W. Werner
Avail.: Dep.; NTIS

Atomkernenergie, 15, 227-30 (1970) (In German)

Measurements and Calculations of γ -Spectra in a Bent Concrete Duct
H. Domann, F. Frisius, H. J. Lahann, P. Wille

Defektoskopiya, No. 3, 118-21 (1970) (In Russian)

Density Measurement by Means of Backscattering of Gamma Radiations
D. B. Pozdneev, N. V. Krasnoshchekov

Des. Eng. Mater. Components (GB), 115-17 (Dec. 1970)

Radiation Shielding: High-Duty Iron Casting Design
E. G. Donaldson

Health Phys., 19, 813-24 (Dec. 1970)

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