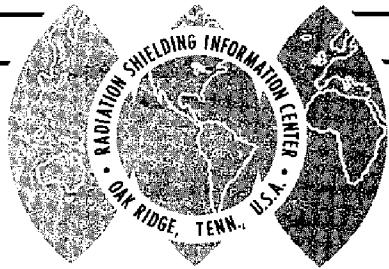


RSIC Newsletter



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 37830

No. 83

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*Knowledge is of two kinds.
We know a subject ourselves,
or we know where we can find information upon it.
... Samuel Johnson - Boswell's Life of Johnson*

SEMINAR-WORKSHOP NEWS

Interest in the Radiation Transport in Air Seminar-Workshop to be held in Oak Ridge on November 15-17, 1971, continues to grow. In addition to the agenda published in the September Newsletter, the Seminar program will include the following papers.

MAGI-SGD, A Monte Carlo Program to Calculate Neutron Flux and Secondary Gamma-Ray Dose Rate from a Nuclear Weapon Detonation and the Auxiliary Routine, NUDATA - Herbert A. Steinberg and M. O. Cohen, Mathematical Applications Group, Inc., White Plains, New York.

Development of an Improved Point Source Moments Method Technique - Austin O'Dell, EG&G, Goleta, California.

Modifications and Applications of the SORS-G Monte Carlo Code - Norman A. Harris and Austin O'Dell, EG&G, Goleta, California

Nitrogen Gamma Rays - Glenn Reynolds and Martin Sperling - Science Applications, Inc., La Jolla, California.

A Last-Collision Model of the Air-Ground Interface Effect on Fast-Neutron Angle Distributions - L. G. Mooney and R. L. French, Radiation Research Associates, Fort Worth, Texas.

Time-Dependent, Two-Dimensional Energy Deposition in Air Due to a Prompt Neutron Source - W. H. Roach, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

Two-Dimensional Transport from a 14 MeV Source in Air-Over-Ground Using the LASL TWOTRAN-FC Program - Henry Sandmeier, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

The Simulation of Low Energy Photon Transport and the Simulation of the Adjoint Neutron Transport Equation with Monte Carlo - L. L. Carter, E. D. Cashwell, and R. G. Schrandt, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

Multigroup Monte Carlo and S_n Methods for Air Transport - D. R. Harris, D. R. Koenig, and W. Preeg, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

Two Dimensional Air Transport from an Anisotropic Point Source - Kaye D. Lathrop, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

Neutron Dose Relative to Delivery of Air to Air Rockets - J. Malik, Los Alamos Scientific Laboratory, Los Alamos, New Mexico.

To RSIC Public Utilities Customers:

We note that as a group you are conspicuously missing from the distribution lists of the RSIC Selective Dissemination of Information Service (SDI). Can it be that we have not provided categories that serve your interests? Please let us know if there are classes of information which interest you but which do not appear to be covered by our existing category set.

- The Scribble Editor

READERS RESPOND TO NEWSLETTER INQUIRIES

NON-IBM TO IBM FORTRAN CONVERSION CODES WANTED:

We are grateful:

To Carla Messina, Physicist, Data Systems Design Group, Office of Standard Reference Data, National Bureau of Standards, Washington, D. C., for calling our attention to SCRAMBLE and SUBSTITUTE, NBS Technical Note 470, which she says will transform eight character variable names to six character names, asterisks to apostrophes, invalid variable names and functions to valid ones and foreign card codes to BCD or EBCDIC;

And to Charles A. Crummer, Technical Staff Member, Applied Computing Technology, Mathematics and Computation Center, The Aerospace Corporation, San Bernardino, California, for calling our attention to the FORTRAN Conversion Aid Program, IBM Document No. PRPQ FA 1287, to be used in conjunction with a special compiler for the conversion of codes designed for the IBM 7094, the UNIVAC 1108, and CDC 6000-series FORTRAN to that for the IBM 360/370 compilers.

We will look into the possibilities suggested above - and will be pleased to receive additional comments on the subject of hardware-to-hardware conversion.

BOY-WANTS-GIRL, OR DECAY CHAIN COMPUTER CODE NEEDED:

Several letters and telephone calls were referred to the requester, Dr. George G. Biro, Gibbs and Hill, Inc., who conceived of the idea of the Newsletter as an exchange medium between shielding scientists. It is interesting to note that in more than one case the caller/letter-writer called attention to computer code packages in the RSIC collection. In more instances, however, RSIC received leads to interesting code development in this area, some of which will soon be made available. Dr. Biro joins us in expressing appreciation to all those who responded to the ad.

CURRENT WORK AND PROBLEMS

We continue with this issue of the Newsletter, the *CURRENT WORK AND PROBLEMS* feature which reports in brief on work in progress at various installations. The name in parentheses below identifies the person who reported the work at his installation.

To assist you in reporting your current work and problems, we include as the last page of this issue a copy of the questionnaire designed for that purpose.

Research and Technical Department, Bellaire Research Laboratories, Texaco, Inc., Bellaire, Texas (Harry Smith) will utilize SAM-C and MORSE to assist in the development of geophysical logging instruments. Typical problems simulated may be of the types using Californium-252 neutron sources as outlined in the Texaco contributions as published in the first eight AEC issues of Californium-252 Progress.

RSIC STAFF NEWS

We are pleased to report that David K. Trubey is rejoining the RSIC technical team following a year with the ORNL-NSF Environmental Program where he assisted in the development of the Environmental Information System (EIS). In support of basic RSIC functions, he will bring new 'know-how' in the computer technology of information handling to apply to the improvement of the RSIC systems. In addition, he will add strength to RSIC technical development functions which will allow us to better serve the industry.

Miss Mary Nicholson, a graduate of the University of Tennessee, with a Master's Degree from the University of Michigan, has joined RSIC as an information specialist. She assists in the many tasks associated with information collection, analysis, packaging, and distribution.

ADDITIONS TO THE COMPUTER CODE COLLECTION

Operable, tested with a sample problem, and available for distribution are the following code packages.

- CCC-167/ELF Monte Carlo Neutron Transport Code for Cylinders and Spheres, contributed by CEA/CEN, Fontenay-aux-Roses Nuclear Research Center, France, through the ENEA Computer Programme Library, Ispra, Italy. Reference: CEA-Note N-1361. FORTRAN IV, IBM 360.
- CCC-168/FASTER III Monte Carlo Neutron and Gamma-Ray Transport Code in Generalized Geometry, contributed by A. R. T. Research Corporation, Los Angeles, California. Reference: ART-45, Volumes I and II. FORTRAN IV; CCC-168A, UNIVAC 1108; CCC-168B, IBM 360.
- PSR-31/SWIFT Monte Carlo Neutron Spectra Unfolding Code, contributed by the USAEC Health and Safety Laboratory, New York, N. Y. Written in FORTRAN IV, CDC 6600. References: HASL-244 and Nucl. Instr. Meth. 91, 573-577 (1971.)
- PSR-33/GAROL Calculation of Resonance Neutron Absorption in Two-Region Problems, contributed by General Atomic, San Diego, California, through the Argonne Code Center. Written in FORTRAN IV for the IBM 7090/7094, one reel of tape is needed for transmittal. The Data Library is available as DLC-13/GARLIB. Reference: GA-6637.
- PSR-34/EVP XIX Analytical Model of the Evaporation Step in Spallation Reactions, contributed by The Swedish Research Councils' Laboratory, Studsvik, Nykoping, Sweden, and the CERN Computer Science Library, Geneva, Switzerland. FORTRAN IV, CDC 6600.
- PSR-35/EDITOR ENDF Format Data Processor, contributed by the Oak Ridge National Laboratory. FORTRAN IV, IBM 360. Reference: ORNL-TM-3266 (ENDF-142).

UPDATES TO EXISTING CODE PACKAGES

The following code packages have been recently updated.

PSR-13C/SUPERTOG (SUPERTOG II MOD 2)

The following modifications are required to process the Li-6 and Li-7 data (MAT = 8073 and 8074). The (n,2n) Alpha reaction is now processed and added into the total cross section and into the scattering matrix. There have also been some revisions to the LF = 1 treatment, and the LF = 5 treatment has been added. Also, the total cross section is now printed out. An additional input card is now required in subroutine SNOUT. The purpose of this card is to read in σ_A , $v \times \sigma_F$, σ_T , and σ_{g+g} for the thermal group. This card follows all other input data and is required only if IPUN = 2.

CCC-17H/05R

F. A. R. Schmidt, Stuttgart Technical University (IKE), Germany, has returned to RSIC his working version of 05R. It is operable on the CDC 6600, and contains modifications and extensions and special sample problems contributed by the IKE Research Group. One reel of tape is needed for transmittal, and the CCC-17H version should be requested.

CCC-144/TIMOC

Monte Carlo Three-Dimensional Neutron Transport Code Package has been extended to include the auxiliary cross section handling code and data library, CODAC. The program processes a TIMOC library from the ENDF/B Version I Data File. CODAC Reference: EUR 4521 e. A reel of tape is required for the above addition to TIMOC.

CCC-150B/MAP

An IBM 360 version has been made operable and is available as CCC-150B in this Kernel Integration Code Package. This version includes a sample problem using surface leakage data from a CCC-169/DOT-IIW discrete ordinate transport solution in r,z geometry. It is contributed by the Westinghouse Astronuclear Laboratory, Pittsburgh, Pa.

TEXTBOOK ON INTERACTION THEORY PUBLISHED

A textbook designed for use in the teaching of interaction theory has been published by The MIT Press. Entitled *THE ELEMENTS OF NEUTRON INTERACTION THEORY*, the book is authored by Anthony Foderaro, Professor of Nuclear Engineering, Pennsylvania State University.

In his Preface the author writes: *"This book consists of material pertinent to the understanding of neutron interactions in the energy range below 20 MeV, the range of interest in nuclear reactors. The first four chapters present those topics in classical and quantum mechanics which are fundamental to an understanding of the kinematics and dynamics of any non-relativistic two-body collision between spinless particles. Chapter 5 covers the properties of neutrons and nuclei that influence their interactions. Chapter 6 generalizes the theory of the first five chapters to include interactions between particles with spin and culminates in the general theory of nuclear interactions. Each of the next five chapters is devoted to one of the principal neutron interactions of interest to nuclear engineers, from elastic scattering to fission. The final chapter deals with neutron interactions in which the motion and the bindings of the target atoms are significant."*

CHECK YOUR REFERENCES

RSIC requests each author to check his references listed in ORNL-RSIC-5, 6, 11, and 12. Please call to our attention any glaring errors or inconsistencies.

CORRECTION FOR ORNL-RSIC-6, Vol. II, Accession #1231, which was formerly a Russian article by Blinov et al and which had been duplicated in the system, has been replaced by an article by Gerald P. Lahti and P. F. Hermann. Pages 23 and 24 of this newsletter replace pages 57 and 58 and should be inserted in your copy to make this correction.

CORRECTION TO ORNL-RSIC-5, Vol. II. Please strike the old Russian Accession #1231 from category 111110. Add the following reference as Accession #1231 to categories

Category	Method	Emphasis	Category	Method	Emphasis
111110	0	1	863000	0	3
521130	0	3	870003	0	3
620000	0	3	870092	0	3
795082	0	3	881000	0	3
795103	0	3			

Comparison of tungsten and depleted uranium in minimum-weight layered shields for a space power reactor

Lahti, G. P. & Hermann, P. F.

NASA-TM-X-1874

N69-35817

NTIS

PERSONAL ITEMS

A.R.T. Research Corporation has opened an office in the Washington, D. C. area headed by *Tom Jordan*. They are temporarily located in Germantown, Maryland.

Roger S. Reynolds, formerly on the staff of Kansas State University, has accepted a position in the Nuclear Engineering Department of Mississippi State University.

John Weiler, formerly with Ingalls Nuclear Shipbuilding, Pascagoula, Mississippi, has accepted a position with the Essex Corporation as Director, Radiation Safety.

John R. Fleming recently joined the Los Angeles office of Science Applications, Inc. (SAI). He was formerly employed in the Vulnerability and Hardness Laboratory of TRW.

A. C. Whittier has transferred from General Electric of Canada to the Sheridan Park office of Atomic Energy of Canada, Ltd.

Westinghouse Atomic Power Division has changed its name to *Westinghouse Nuclear Energy Systems Division*, but still has the same address: P. O. Box 355, Pittsburgh, Pa., 15230.

N. R. Byrn is currently associated with the Huntsville, Alabama, office of Science Applications, Inc.

Gary L. Bennett has transferred from the nuclear rocket program at NASA Lewis Research Center, Cleveland, to the space (nuclear) electric power program, Safety Branch, USAEC Space Nuclear Systems Division, Washington, D. C.

Arthur B. Chilton has returned to the University of Illinois following a six-months leave spent at the National Bureau of Standards in Washington, D. C., at the conclusion of which he published "Effect of Material Composition on Neutron Penetration of Concrete Slabs," NBS-10425.

Having completed graduate study and work in Europe, *Dr. Sumer Sahin* has returned to Trabzon, Turkey, where he is assisting in the establishment of the new Nuclear Energy Institute at the Karadeniz Technical University (KTU). Dr. Sahin is interested in developing a shielding capability within the research activities of the Institute.

VISITORS TO RSIC

Visitors to RSIC during the month of September were: J. A. Bachman, Wright-Patterson AFB, Ohio; D. K. Baker, TVA, Chattanooga, Tenn.; N. E. Banks and Janet Lacetera, Aberdeen Proving Ground, Md.; G. P. Cavanaugh, University of Illinois, Urbana, Ill.; L. T. Dillman, Ohio Wesleyan University, Delaware, O.; S. A. W. Gerstl, Westinghouse Advanced Reactors Div., Madison, Pa.; J. G. Gratton and P. Jacques, USAEC Division of Technical Information, Washington, D.C.; T. M. Jordan, A.R.T. Research Corp., Los Angeles, Calif.; J. E. Mott, University of Tennessee, Knoxville, Tenn.; A. Onodera, Hitachi Shipbuilding & Engineering Co., Ltd., Tokyo, Japan; D. G. Stenstrom, Argonne National Laboratory, Argonne, Ill.; G. U. Ulrickson, Environmental Information Systems, ORNL.

SEPTEMBER 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.

REACTORS AND WEAPONS SHIELDING

- AAEC-TM-585 February 1971
Table of Gamma Rays from (n, gamma) Produced Nuclides
R. A. Greig, R. E. Porritt, S. J. Bone
- ACI Monograph No. 6 1971
Hardened Concrete: Physical and Mechanical Aspects
Adam M. Neville
Avail.: American Concrete Institute, P. O. Box 4754, Redford Station,
Detroit, Mich. 48219
- AERE-R-6622 March 1971
Specific II. A Monte Carlo Program for High Energy Neutron Spectrum
Estimation
D. W. Holbrough, B. A. Lipscombe
- AERE-R-6658 March 1971
COSMIC: A Monte Carlo Program for Thermal Neutron Re-Thermalisation
Studies
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- ANSI N 5.3 1964 1965
American Standard: Guide for Design and Operation of Shipping Con-
tainers for Irradiated Solid Fuel from Nuclear Reactors
American Institute of Chemical Engineers
Avail.: American National Standards Institute, New York
- ANSI N 7.2 1963 1964
American Standard: Radiation Protection in Nuclear Reactor Fuel
Fabrication Plants. Natural (or Normal) and Enriched Uranium,
Thorium, and Plutonium
American Standards Association
Avail.: American National Standards Institute, New York
- ASTM E 170-63 1965
Standard Definitions of Terms Relating to Dosimetry
American Society for Testing and Materials
Avail.: American Society for Testing and Materials, Philadelphia
- AWRE-0-3 71 February 1971
Elastic and Inelastic Scattering of 5.0 MeV Neutrons by Sodium
R. E. Coles

- BAW-1365 May 1971
1000-MWe LMFBR Accident Analysis and Safety Design Study, Final Report
Babcock and Wilcox, Lynchburg, Va.
- BAW-3647-21 August 1971
Physics Verification Program Part III, Tasks 5 and 6 - Quarterly
Technical Report January-March 1971
M. N. Baldwin, G. T. Fairburn
Babcock and Wilcox, Research and Development Div., Lynchburg Research
Center, Lynchburg, Va.
- BMI-1913 August 1971
FRCL 2 - A Computer Code for Calculating Fission-Product Release in
Reactor Accident Analysis, Topical Report, Task 18
R. L. Ritzman, D. L. Morrison
- BNL-50,203 August 1970
Time and Dose Relationships in Radiation Biology as Applied to Radio-
therapy, NCI-AEC Conference, Carmel, California, September 15-18, 1969
- CEA-CONF-1672 (In French) 1970
Harmful Effects Due to the Use of Fluorine in Nuclear Installations
R. Bittel, B. Vaubert
Avail.: NTIS
- CEA-N-1408(1) (In French) February 1971
Radioactive Contamination in Workshops and Laboratories - Techniques
for Detection and Measurements
B. Werderer
Avail.: NTIS
- CEA-N-1413 (In French) February 1971
Study of Clothes Providing Effective Tritium Protection
P. Marteau
Avail.: NTIS
- CEA-N-1424 (In French) March 1971
Development of a Multigroup Photon Cross Section Library: BIP/G1
C. Devillers, C. Dupont
- CEA-R-4110 (In French) January 1971
A Study of the Radioprotective Power of Imidazole, Benzimidazole, and
Naphazoline on Mice Placed in a Pure Oxygen Atmosphere
A. Mourret, R. Rinaldi
Avail.: NTIS

CEX-65.92

July 1971

Differential Measurements of Fast-Neutron Air-Ground Interface Effects,
Project 9.2 - Operation Henre
R. L. French, L. G. Mooney

CONF-690454, pages 301-8

1969

Nuclear Environment Against Which Equipment Must Be Hardened
C. N. Davidson, W. P. Schneider
Avail.: Mt. Prospect, Ill.; Institute of Environmental Sciences
665 p. \$18.00

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1969

Analytical Descriptions of the Nuclear Weapon Environment and Effects
R. T. Castle
Avail.: Mt. Prospect, Ill.; Institute of Environmental Sciences
665 p. \$18.00

CONF-710211-1

1970

Computer Calculation of Bone Doses Following Acute Exposure to 90Sr
Aerosols
P. G. Voilleque
Avail.: Dep., NTIS

CONF-710301 (Vol. 1)

August 1971

Proceedings of the Third Conference Neutron Cross Sections and
Technology, March 15-17, 1971, Parts 1 - 3.
University of Tennessee, ORNL, ANS, AEC, and APS

CONF-710301 (Vol. 2)

August 1971

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Technology, March 15-17, 1971. Parts 4 - 6.
University of Tennessee, ORNL, ANS, AEC, and APS

COO-1105-120

Characteristics of Some TLD Solid Systems
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Avail.: Dep., NTIS

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1970

The Iron Dog in Eskimo Culture
W. C. Hanson, Colorado State University, Fort Collins, Colo.

CRC Crit. Rev. Radiol. Sci., 1, 363-433

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Solid-State Dosimetry
K. Becker

DASA-2618 (AD-725162)

November 1970

A User's Guide to the FSCATT Code
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Avail.: NTIS

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July 1966

Safety of Operations in the Dragon Fuel Element Laboratory During 1965.
Project Dragon.
E. R. Batchelor, C. R. Brooks, A. J. Eycott, M. S. T. Price, R. P.
Stinden, J. S. Sneddon, B. Gardham, J. Holliday, R. Lewis
Avail.: NTIS

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R. J. Cerbone, W. E. Selph et al.

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March 16, 1971

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February 1, 1970 - January 31, 1971
J. C. Young, G. M. Borgonovi, J. M. Neill et al.

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Neutron Cross-Section Research. Final Report.
A. D. Carlson, M. P. Fricke
Avail.: Dep.; NTIS

HEDL-TME-71-42

April 1971

Displacement Cross Sections for Stainless Steel and Tantalum Based
on a Lindhard Model
D. G. Doran

JUL-751-PC (In German)

April 1971

Shielding of Fast Neutrons from the Cyclotron for Medical-Biological
Research
P. F. Sauermann
Avail.: Dep.; NTIS (U.S. Sales only)

KAPL-Trans-4 (IAE-1954 in Russian)

Neutron Thermalization in H₂O at 318°K and 77°K
S. N. Ishmaev, I. P. Sadikov, A. A. Chernyshov
Avail.: Dep.; NTIS

- KFK-1214 (CONF-700701-5, SM-133/33, N71-27144) *July 1970*
Studies of Radiative Neutron Capture and Delayed Fission Gamma-Ray Spectra from Uranium and Plutonium as a Basis for New Nondestructive Safeguards Techniques
P. Matussek, W. Michaelis, C. Weitkamp, H. Woda
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- MATT-846 *May 1971*
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G. D. Martin, J. W. Willard
Princeton University, N. J. (Plasma Physics Lab.)
- MR-7002 (AD-706853) *April 1970*
TERF Monte Carlo Fallout Code Calculations
M. O. Cohen
Avail.: NTIS
- NASA-CR-1834 *August 1971*
Radiation Effects Design Handbook. Section 4. Transistors
J. E. Drennan, D. J. Hamman
Available: NTIS
- NASA-CR-1871 *September 1971*
Radiation Effects Design Handbook. Section 5. The Radiations in Space and Their Interactions with Matter
M. L. Green, D. J. Hamman
Avail.: NTIS
- NASA-CR-1872 *August 1971*
Radiation Effects Design Handbook - Section 6. Solid-State Photo-devices
J. E. Drennan
Avail.: NTIS
- NASA-TN-D-6464 *August 1971*
Energy Dependence of Electron-Induced Radiation Damage in Tungsten
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- NCRP A-1 1968 1968
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Washington, D. C., National Council on Radiation Protection and Measurements

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- NP-18727 1970
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Gamma-Ray Leakage Through a Junction Between Lead and Concrete Walls
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KeV Neutron Capture Gamma Ray Spectra
J. R. Bird, I. Bergqvist et al.
- ORNL-TM-3442 August 30, 1971
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Energies and Intensities of Gamma Rays Emitted by a ^{226}Ra Source
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Calculated Perturbations in Threshold Foil Measurements Due to Neutron Interactions in B_4C Shells
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- ORNL-TM-3521 August 1, 1971
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Compilation of Cross Sections and Angular Distributions of Gamma Rays Produced by Neutron Bombardment
P. S. Buchanan, D. O. Nellis, W. E. Tucker
- PB-189506 (UVA-TRM-1; CONF-691059) October 28, 1969
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Experimental Study of the Neutron Attenuation in Concrete Shields for Fast and Thermal Reactors, with the Aid of Simulated Concrete Configurations
K. A. Verschuur, W. H. J. Quaadvliet
Patten, the Netherlands, Reactor Centrum Nederland
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Radiological Aspects of Nuclear Power and the Aquatic Environment
A. H. Seymour, Washington University
- RRA-T701 February 26, 1971
A Last-Collision Model of the Air-Ground Interface Effect on Fast-Neutron Angle Distributions
L. G. Mooney, R. L. French

RT/FI(71)10

April 6, 1971

Solutions to the Third Form of the Boltzmann Equation in the Study
of Neutron Penetration in a Multilayer Shield
F. Premuda

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L. A. Harrah
NTIS

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UARAEE-103

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A. M. Hassan, H. M. Abu-Zeid, I. Hamouda

UCRL-50,936, REV. 2

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T. V. Crawford, K. R. Peterson et al.

UCRL-51,054

May 24, 1971

Comparison of U.S. and U.S.S.R. Methods of Calculating the Transport,
Diffusion, and Deposition of Radioactivity
J. B. Knox, T. V. Crawford et al.

UCRL-72445 (Rev. 1) (CONF-710801-2)

August 16, 1971

Shielded Neutron Shipping Cask
C. L. Hanson, M. S. Coops, E. D. Arnold
Dep.; NTIS

WANL-TME-1895

January 1969

Determination of the Shielding Requirements for the NPTR Fuel Handling
System
J. M. Ravets, J. S. Stefanko
Dep.; NTIS

ZJE-67

1970

Thermal Stresses in Reactor Outlet Piping Transition Part Under Thermal
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J. Kunes, V. Svigler, O. Vavroch
(Skoda-Concern, Nuclear Power Plants Div., Information Centre, Plzen-
Czechoslovakia)

Defektoskopiya, No. 1, 124-8 (1971) (In Russian)

Radiation Defectoscopy of Concrete and Reinforced Concrete by Means
of Betatron Bremsstrahlung
V. A. Vorob'ev, Yu. D. Gavkalov

Isotopenpraxis, 6, 390-6 (Nov. 1970) (In German)

Two Special Gamma-Ray Irradiation Plants to Produce Mean and Elevated
Exposure Rates Within the ^{60}Co Gamma-Radiation Energy Range.
H. Rothe, O. Hecker

J. Inst. Nucl. Eng., 12, 31-5 (Mar.-Apr. 1971)

Technology of Reactor Thermal Shields. Part 1.
G. C. Burman, J. R. A. Lakey

J. Nucl. Sci. Technol. (Tokyo), 8(5), 294- (1971)

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