RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

POST OFFICE BOX X • OAK RIDGE, TENNESSEE 37830

No. 145 *January 1977*

Anyone can complain, but to see precisely what is wrong is a gift; accurate diagnosis comes from a unique power of vision and indicates the likelihood of an equally unique capacity to remedy the fault. *William Ernest Hocking*

ANNUAL QUERY AND PURGE

A second mailing is being made to those persons who failed to return the RSIC User Evaluation within the deadline. Since this questionnaire is the only opportunity this fiscal year to renew the free subscription to the RSIC Newsletter we want to give another opportunity for you to do so. Failure to return this set of forms will be interpreted as a lack of interest and the persons involved will be purged from the distribution list in the month of February.

Since a quick response is in itself a value judgment, we are grateful to the many persons who responded immediately.

NUCLEAR STANDARDS NEWS

"High-priority" environmental safety and health standards are to be developed with help from voluntary standards-writing organizations. ANS and the Health Physics Society will be among the organizations to be asked for assistance, says E. J. Vallario, acting Group Leader for ERDA's Environmental Safety& Health (ES&H) Standards Office. The agency requests for assistance result from the completion of the "first round" of a standards identification program by Vallario's office. Over 200 standards have been identified as "needed" for the ERDA program-across all energy technologies. Approximately 50% of the standards represent the nuclear category. The ERDA ES&H standards identification program was an agency-wide effort undertaken to focus on the priority needs in the standards area.

ANOTHER COMMENT ON A QUOTE

We are pleased at the many people who commented favorably in the RSIC User Evaluation on the monthly quotation. We are also pleased when you take the time to comment on a specific quotation. Stephen E. Binney (Oregon State University) joins John Hubbell (December 1976 issue) on the quote attributed to Chaim Weizman.

"...I think this quote predates that (Weizman), written about ten centuries before Christ by Solomon, King of Israel. Verse 18 of chapter 29 of the Book of Proverbs says in whole, ' where there is no vision (i.e., revelation from God), the people perish; but he that keepeth the law, happy is he.' " ... Steve Binney.

Our comment: it's nice to know the RSIC user community does not restrict its reading to science books.

1977 IEEE ANNUAL CONFERENCE ON NUCLEAR AND SPACE RADIATION EFFECTS

Sponsored by the IEEE/NPSS Radiation Effects Committee in cooperation with the College of William and Mary, the 1977 IEEE Conference on Nuclear and Space Radiation Effects will be held on the campus of the College of William and Mary, within the colonial village of historic Williamsburg, Virginia, July 12-15, 1977. This conference is cosponsored by the Defense Nuclear Agency and JPL/NASA. The conference will cover theoretical and experimental studies of nuclear and space radiation effects on materials and components, circuits, and electronic systems. The program will consist of six to eight sessions of contributed papers, including a poster session, and a number of invited papers by recognized authorities in radiation effects and allied fields. Papers describing significant contributions in the following or related areas are solicited: Radiation Effects on LSI Circuits Including Microprocessors, Memories, and Peripherals; Space

Radiation Effects and Spacecraft Charging; Basic Mechanisms of Radiation Effects on Materials and Components; Surface and Interface Effects in MIS Structures (MOS, CCD, and Bipolar); Hardness Assurance Methodology and Process Controls; Circuit and Systems hardening Techniques; Electromagnetic Pulse Effects (i.e., Free Field, Internal and Systems Generated); Radiation Transport, Energy Deposition, and Dosimetry; and Simulators.

The Call for Papers suggests the following procedure. Prepare an informative two-to-four-page summary (including figures) appropriate for a ten- or fifteen-minute presentation. The summary must furnish sufficient details to permit a meaningful review and clearly state: 1) the purpose of the work; 2) the significant results; and 3) how it advances the state-of-the-art. Note that this is more than an abstract. Obtain all the necessary clearances for presenting and publishing the summary and paper at an unclassified meeting.

All summaries will be reviewed, and those accepted will be presented at the conference. A paper accepted for the conference also becomes a candidate for the conference issue of the IEEE Transactions on Nuclear Science, subject to an additional review. It is not necessary to be an IEEE member to present a paper.

Summaries *must* be submitted by February 15, 1977 to the Technical Program Chairman: R. B. Oswald, Associate Technical Director (Actg.), Harry Diamond Laboratories, 2800 Powder Mill Road, Adelphi, MD 20783, Phone: 202/394-2208.

A limited number of post-deadline papers (for ten-minute presentation) reflecting *important new developments*, will be considered if six copies of the summaries are submitted for review by June 15, 1977. These papers will not be published in the program or summary.

Summaries of all scheduled papers will be published as a handout for conference attendees. The volume is published and reduced by photo-offset directly from typewritten copy submitted by the author. Therefore, special care should be given to the following instructions to insure legibility and reproducibility.

The summary should contain, to whatever extent practical, the significant data to be presented during oral delivery. Summaries are to be from two to four pages in total length, typed single spaced on 8 1/2 x 11 white bond with 1 1/4 inch margins on all sides. Title of paper should be in capital letters. Author(s) name and affiliation and address should be typed immediately below in capital and lower case letters. The name of the author presenting the paper should be underlined.

If figures, tables, or drawings are used, they should follow the body of the text. Submit only the important illustrations and avoid use of halftones. Lettering and symbols should be no smaller than 1/8 inch in size. Figure captions should be typed beneath the figure and be no wider than the figure. Table titles should be typed above, and the same width as the table. Mail original and five copies of the summary to the above chairman.

Acceptance letters will be mailed early in April. Registration forms, programs, and additional conference information will be distributed in June 1977. Conference Chairman: H. L. Hughes, Code 5216, Naval Research Laboratory, Washington, DC 20375, Phone: 202/767-2429.

PERSONAL ITEMS

We've noted that the incoming User Evaluation forms debate pro and con the usefulness of the *Personal Items* feature of the Newsletter. Once all the comments are in and weighed we will decide whether to retain or drop the feature. Our intention has been mainly to keep our readers informed of the whereabouts of their colleagues in a mobile society and, when possible, to note the kind of work in which they are involved. If this is not considered useful information to our readers there is no reason to retain the feature.

Joe D. Marshall, former Radiation Research Associates employee, is now with the Air Force Technical Applications Center (AFTAC/TFR), Patrick AFB, Florida.

Wade E. Selph, long involved in radiation transport, has been named Manager of Energy and Environmental Studies for IRT Corporation, San Diego, California. RSIC users may remember him as co-author of ORNL-RSIC-20: Wade E. Selph and H. Clyde Claiborne, "Methods for Calculating Effects of Ducts, Access Ways, and Holes in Radiation Shields," (DASA-1892-1; Ch. 5 of Weapons Radiation Shielding Handbook) (January 1968).

The following changes of address have been noted: *Thomas Botts* from UCLA to Brookhaven National Laboratory; *Te-Chang Chan* from Fluor Pioneer, Inc. to Westinghouse (WARD) Shielding Analysis Group at Waltz Mill, Pa.; *Joseph S. Miller* from NUS Corp. to EG&G Idaho, Inc.; *Ti-Ke Shen* from Bechtel, Norwalk, California to Bechtel, Monroeville, Pa.; and *Eric W. Jonassen* from Stone & Webster to Boston Edison Co., Boston, Ma.

CHANGES IN THE CODE COLLECTION

The following changes were made during December.

CCC-245/TIGER

This one-dimensional multilayer electron/photon Monte Carlo transport code package was updated to include a new version contributed by Sandia Laboratories, Albuquerque, New Mexico. This version, representing Sandia code development during the past 3 years, replaces the 1974 packaged version. It includes the following new provisions: calculation of the spatial and energy distribution of internal electron flux; forcing of photon collisions in selected zones; improved pair production and positron annihilation according to the method of M. J. Berger and S. M. Sletzer in the ETRAN 18B code; transfer of additional cross section data from central memory to fast access peripheral storage; extends photon transport down to 1.0 keV (10.0 keV standard); and for removal of unscattered primary photons from standard photon integral escape coefficients and standard energy and angular distributions of escaping photons. Integral escape coefficients for unscattered primary photons are now given separately. FORTRAN IV; CDC 6600.

CCC-276/DOT 3.5

The two-dimensional discrete radiation transport code package was updated by the ORNL contributors to replace several subroutines in order to "improve performance on certain difficult problems, without any known disadvantages". Changed were: Subroutines MESAG and DOT in the DOT 3.5 source program, Subroutine WWESOL in both a FORTRAN and an Assembler language version. A listing of the updated files or the entire code package may be requested.

CCC-284/SHREDI

Package number incorrectly announced in November Newsletter. SHREDI is a multigroup 2-dimensional (x-y, r-θ) neutron removal-diffusion shielding code system contributed by CNEN/Bologna, Italy via OECD NEA Computer Programme Library.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in December.

DLC-35/EURLIB

This 100-group neutron cross section library for use in the European Shielding Benchmark Program was announced in October 1976. RSIC has been informed that credit for the contribution, attributed solely to the European Shielding Information Service (ESIS), is to be shared with the Institut fur Kernenergetik (IKE), Stuttgart Technical University, Federal Republic of Germany.

RSIC GRAB BAG

We offer the following extra copies of documents on a first-come basis. We will honor requests until the supply is exhausted. If you want to add to your reference shelf, please order by report number.

ORNL-TM-2559, *Calculation of the Energy Deposited in Thick Targets by High-Energy (l GeV) Electron-Photon Cascades and Comparison with Experiment*, R. G. Alsmiller, Jr., and H. S. Moran.

ORNL-TM-2560, *The Transport of Neutrons Produced by 3-GeV Proton-Lead Nucleus Collisions Through a Labyrinth and Comparison with Experiment*, R. G. Alsmiller, Jr., and E. Solomito.

ORNL-TM-2722, *Electromagnetic- and Nuclear-Cascade Calculations and their Application in Shielding and Dosimetry*, R. G. Alsmiller, Jr.

ORNL-TM-2751, *The Energy Distribution of Photoneutrons Produced by 150-MeV Electrons in Thick Be and Ta Targets*, R. G. Alsmiller, Jr., T. A. Gabriel, M. P. Guthrie.

ORNL-TM-2752, *Calculation of the Neutron Spectra from Proton-Nucleus and Nonelastic Collisions in the Energy Range 15-18 MeV and Comparison with Experiment*, R. G. Alsmiller, Jr., O. W. Hermann.

ORNL-TM-2844, *Calculation of the Radiation Hazard at Supersonic Aircraft Altitudes Produced by an Energetic Solar Flare - II*, T. W. Armstrong and H. S. Moran.

ORNL-TM-2879 , *The Adjoint Boltzmann Equation and its Simulation by Monte Carlo*, D. C. Irving.

ORNL-TM-2908, *Calculation of the Photon-Production Spectrum from Proton- Nucleus Collisions in the Energy Range 15 to 150 MeV and Comparison with Experiment*, Y. Shima and R. G. Alsmiller, Jr.

ORNL-TM-2924, REVISED, *The Absorbed Dose and Dose Equivalent from Neutrons in the Energy Range 60 to 3000 MeV and Protons in the Energy Range 400 to 3000 MeV*, R. G. Alsmiller, Jr., T. W. Armstrong, and W. A. Coleman.

ORNL-TM-3105, *The Absorbed Dose and Dose Equivalent from Negatively and Positively Charged Pions in the Energy Range 10 to 2000 MeV*, R. G. Alsmiller, Jr., T. W. Armstrong, Barbara L. Bishop.

ORNL-TM-3482, *The Testing of ^{238}U Secondary Gamma-Ray Production Data Sets from the POPOP4 Library*, W. E. Ford, III, J. S. Gillen.

ORNL-TM-3509, *Energies and Intensities of Gamma Rays Emitted by a ^{226} Ra Source*, J. K. Dickens.

ORNL-TM-3517, *Neutron and Gamma-Ray Fluence Transmitted Through a Slab of Borated Polyethylene - A Milestone Calculation*, C. E. Burgart.

ORNL-TM-3519, *Calculated Perturbations in Threshold Foil Measurements Due to Neutron Interactions in B_4C Shells*, W. E. Ford, III, and J. S. Gillen.

ORNL-TM-3584, *Ca(n,xγ) Reactions for 4.85 $\leq E_n \leq$ 8.05 MeV*, J. K. Dickens.

ORNL-TM-3585, *Collision Site Plotting Routines and Collision Density Fluence Estimates for the Morse Monte Carlo Code*, E. A. Straker and M. B. Emmett.

ORNL-TM-3591, *Elastic Scattering of 40-MeV Protons from ^{48}Ti, natCr, and ^{64}Zn: Tabulated Differential Cross Sections*, J. K. Dickens, E. E. Gross, F. G. Perey, A. Van der Woude, and A. Zucker.

ORNL-TM-3615, *A Calculational Method for Predicting Particle Spectra from High-Energy Nucleon and Pion Collisions ($\geq$ 3 GeV) with Protons*, T. A. Gabriel, R. T. Santoro, J. Barish.

ORNL-TM-3635, *A Calculation of Gamma-Ray Production and Transport in Liquid Nitrogen*, E. A. Straker and B. J. McGregor.

ORNL-TM-3659 (REV.), *Calculations of the Transport of Neutrons and Secondary Gamma Rays Through Concrete for Incident Neutrons in the Energy Range 15 to 75 MeV*, R. W. Roussin, R. G. Alsmiller, Jr., J. Barish.

ORNL-TM-3662, *Capabilities of the Morse Multigroup Monte Carlo Code in Solving Reactor Eigenvalue Problems*, C. E. Burgart.

ORNL-TM-3785, *The Validity of Using Only Primary Protons in Van Allen Belt and Solar-Flare Proton Shielding Studies*, R. T. Santoro, R. G. Alsmiller, Jr., J. Barish.

ORNL-TM-3961, *Calculations of Neutron Flux Spectra Induced in the Earth's Atmosphere by Galactic Cosmic Rays*, T. W. Armstrong, K. C. Chandler, J. Barish.

ORNL-TM-4029, *Shielding of Manned Space Vehicles Against Galactic Cosmic-Ray Protons and Alpha Particles*, R. T. Santoro, R. G. Alsmiller, Jr., K. C. Chandler.

ORNL/TM-5224, *Iterative Solution of the Diffusion and P_1 Finite Element Equations*, E. T. Tomlinson, J. C. Robinson, D. R. Vondy.

ORNL/TM-5612, *Measurement of the Neutron Total Cross Section of Fluorine from 5 eV to 20 MeV*, D. C. Larson, C. H. Johnson, J. A. Harvey, N. W. Hill.

ORNL/TM-5614, *Measurement of the Neutron Total Cross Section of Sodium from 32 keV to 37 MeV*, D. C. Larson, J. A. Harvey, N. W. Hill.

ORNL/TM-5618, *Measurement of the Neutron Total Cross Section of Silicon from 5 eV to 730 keV*, D. C. Larson, C. H. Johnson, J. A. Harvey, N. W. Hill.

NASA TM X-1397, *Qadhd Point-Kernel Radiation Shielding Computer Code to Evaluate Propellant Heating and Dose to Crew During Engine Operation*, Gerald P. Lahti.

ER-6643, *Computer Programs for Shielding Problems in Manned Space Vehicles*, NASA Contract No. NAS 8-5180.

VISITORS TO RSIC

The following persons came for an orientation visit and/or to use RSIC facilities during the month of December:

Wade E. Selph, Energy and Environmental Studies, IRT, San Diego, California; Kep Disney, W-ARD, Pittsburgh, Pennsylvania; Paul J. Babel, Burns & Roe, Inc., Oradell, New Jersey; L. T. Dillman, Ohio Wesleyan University, Delaware, Ohio; Arvind Kumar, University of Cincinnati, Cincinnati, Ohio; Michael Kai, Bechtel Power Corporation, Los Angeles, California; Alois Morhart, Gesellschaft F. Strahlen-und Umweltforschung MBH Muenchen, W-Germany; Susarla S. Murty, Science Applications Incorporated, LaJolla, California.

ACTION ALERT! DOES YOUR ADDRESS NEED CHANGING?

Each month, several newsletters are returned to us as having insufficient address or is otherwise undeliverable. We note on your returning User Evaluation Forms that we do not always have the exact Mail Stop Number, Building Number, or Division/Department name, etc., as you have listed. If your mail is late in arriving, please check the printed address we have for you. If it is incorrect, or confusing enought to cause a delay in delivery, **please write to us and give us a correct address.**

JULY 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 of out-of-print reports may be 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 selected computer-printed abstracts of the literature in the RSIC system are available upon request. The Selective Dissemination of Information (SDI) Service is available by submitting a list of subject categories defining the recipient's interests.

THIS LITERATURE IS ON ORDER. IT IS NOT IN OUR SYSTEM. PLEASE ORDER FROM NTIS OR OTHER AVAILABLE SOURCE AS INDICATED.

REACTOR AND WEAPONS RADIATION SHIELDING LITERATURE

ANCR-1322
ETOP 14, A FORTRAN Code to Process ENDF/B Data into the 68-Group PHROG Library Format.
Grimesey, R.A.; Singer, G.L.; Millsap, D.A.
July 1976
NTIS $9.75

ANL/EIS-1
Evaluation of Environmental Data Relating to Selected Nuclear Plower Plant Sites. Kewaunee Nuclear Power Plant Site.
Murarka, I.P.; Ferrante, J.G.; Policastro, A.J.; Daniels, E.W.
August 1976
Dep., NTIS $8.00

BNWL-SA-5816; CONF-760652-3
Probabilistic Approach to External Cloud Dose Calculations Using Onsite Meteorological Data.
Strenge, D.L.; Watson, E.C.; Bander, T.J.; Kennedy, W.E.
1976
Dep., NTIS $3.50

CEA-CONF-3375 (In French)
Integral Experiments of Neutron Propagation in Sodium-Steel Mediums.
Bouteau, F.; Calamand, D.; Oceraies, Y.; Vienot, R.
1975
INIS

CEA-CONF-3387
New Developments in the C_n Method.
Grandjean, P.; Kavenoky, A.
1975
INIS

CEA-N-1831 (In French)
Generalization of Asaoka Method to Linearly Anisotropic Scattering: Benchmark Data in Cylindrical Geometry.
Sanchez, R.
November 1975
INIS

CONF-740841, pp.28-30
Neutron Flux Measurements with Thin Uranium Dioxide Films.
Feintuch, K.D.
1974
In Conference on Research, Test and Training Reactors. Published in Summary Form Only.
University of Virginia, Charlottesville, Va.

CONF-751063
Proceedings of the Specialists' Meeting on Sensitivity Studies and Shielding Benchmarks.
NEA, OECD, IAEA
1976
OECD

CONF-751063, pp.15-16
Methodology of Sensitivity Analysis.
Oblow, E.M.
1976
OECD

CONF-751063, pp.17-18
Sensitivity Studies on Practical Shield Designs.
Avery, A.F.
1976
OECD

CONF-751063, pp.19-22
Shielding Benchmark Progress Report.
Nicks, R.
1976
OECD

CONF-751063, pp.23-24
The Analysis of Benchmark Experiments.
McCracken, A.K.
1976
OECD

CONF-751063, pp.25-29
The Role of Integral and Differential Measurements Improving Nuclear Data for Shielding.
Farinelli, U.
1976
OECD

CONF-751063, pp.30-31
Experience with the Group Cross Section Library EURLIB and Updating to ENDF/B-IV.
Hehn, G.
1976
OECD

CONF-751063, pp.32-35 (In French)
The Interaction Between Reactor Physics and Shielding Calculations.
Barre, J.
1976
OECD

CONF-751063, p.36
Common Interest Identified by Fission and Fusion Applications of Sensitivity Analysis.
Gerstl, S.A.W.
1976
OECD

CONF-751063, pp.38-47
The Sensitivity Analysis Development and Applications Program at ORNL.
Oblow, E.M.
1976
OECD

CONF-751063, pp.48-67
Transport Calculation of the Generalized Importance Functions for Sensitivity Studies.
Palmiotti, G.; Salvatores, M.
1976
OECD

CONF-751063, pp.68-74
An Attempt of Sensitivity Calculations in 3D Geometries by Monte Carlo Techniques.
Rief, H.
1976
OECD

CONF-751063, pp.78-86 (In French)
Experiences Integrales de Propagation de Neutrons dans des Milieux Acier-Sodium.
Bouteau, F.; Calamand, D.; Oceraies, Y.; Vienot, R.
1976
OECD

CONF-751063, pp.87-97
Progress Report on Shielding Benchmark Experiments at CNEN and Their Analysis.
Farinelli, U.; Martini, M.; Moioli, P.; Salvatores, M.; D'Angelo, A.; Oliva, A.: Palmiotti, G.
1976
OECD

CONF-751063, pp.98-103
Neutron Leakage Spectra from Iron Spheres with a 252-Cf Neutron Source in the Centre.
Werle, H.; Bluhm, H.; Fieg, G.; Kappler, F.; Kuhn, D.; Lalovic, M.
1976
OECD

CONF-751063, pp.104-110
Iron Shielding Benchmark Experiments at "Yayoi".
An, S.; Oka, Y.; Akiyama, M.; Hyodo, T.; Nishibe, T.; Shin, K.; Fuse, T.; Takeuchi, K.; Yamaji, A.; Miura, T.; Miyasaka, S.; Iwasaki, S.
1976
OECD

CONF-751063, pp.111-119
The Winfrith Benchmark Experiment in Iron - Experimental Results.
Carter, M.D.; Packwood, A.
1976
OECD

CONF-751063, pp.120-126
Preliminary Studies of Neutron Benchmark Experiments for One-Dimensional Transport Calculation with an Iron Sphere.
Furuta, Y.; Sasamoto, N.; Tanaka, S.
1976
OECD

CONF-751063, pp.130-147
Calculations for Iron Benchmark Experiments with Californium and 14 MeV Neutron Sources.
Hehn, G.; Schriewer, J.; Mattes, M.; Canali, U.; Nicks, R.
1976
OECD

CONF-751063, pp.148-157 (In French)
Formulaire de Propagation de Neutrons dans les Milieux Acier-Sodium pour les Protections de la Filiere Rapide.
Bouteau, F.; Caumette, P.; Devillers, C.; Khairallah, A.; Oceraies, Y.
1976
OECD

CONF-751063, pp.158-174
The Experimental Data Processing Program RADAK.
McCracken, A.K.; Grimstone, M.J.
1976
OECD

CONF-751063, pp.175-208
Preliminary Analysis of the Winfrith Iron Benchmark Experiment.
McCracken, A.K.; Grimstone, M.J.
1976
OECD

CONF-751063, pp.209-214
Multigroup Cross-Section Adjustment by Linear Regression.
Matthes, W.
1976
OECD

CONF-751063, pp.215-221
Sensitivity and Uncertainty Analysis for Iron Cross Sections.
Miyasaka, S.; Minami, K.; Kuroi, H.; Hirota, J.
1976
OECD

CONF-751063, pp.224-231
Required Target Accuracies.
Herrnberger, V.; Hehn, G.; Nicks, R.
1976
OECD

CONF-751063, pp.232-247
Application of Sensitivity Theory to Energy Group Structure Definition.
Herrnberger, V.
1976
OECD

CONF-751063, pp.248-263
Target Accuracies and Sensitivity Studies in the Assessment of Data Requirements for Practical Shield Design.
Avery, A.F.; Lympany, S.D.
1976
OECD

CONF-751063, pp.264-276
The Application of Sensitivity Analysis to Nuclear Data Assessment.
Gerstl, S.A.W.; Dudziak, D.J.; Muir, D.W.
1976
OECD

CONF-761103-1
Inferring PWR Barrel Motion from Ex-Core Neutron Detector Signals.
Robinson, J.C.; Kryter, R.C.
1976
Dep., NTIS $3.50

COO-1105-227
Fast Neutron Activation Dosimetry with TLDS.
Pearson, D.W.; Moran, P.R.
1975
Dep., NTIS $5.50

COO-1545-92
Monte Carlo Program for Calculating Neutron Detection Efficiencies in Plastic Scintillator.
Stanton, N.R.
February 1971
Dep., NTIS $5.00

COO-3001-138
Nuclear Reaction Matrix.
Krenciglowa, E.M.; Kung, C.L.; Kuo, T.T.S.; Osnes, E.
1975
Dep., NTIS $4.50

DHEW(FDA)76-8030
Organ Doses in Diagnostic Radiology.
Rosenstein, M.
May 1976
Bureau of Radiological Health, Rockville, Maryland

DHEW(FDA)76-8031
Handbook of Selected Organ Doses for Projections Common in Diagnostic Radiology.
Rosenstein, M.
May 1976
Bureau of Radiological Health, Rockville, Maryland

EPRI-NP-155
Survey of Radiation Protection, Radiation Transport, and Shielding Information Needs of the Nuclear Power Industry.
Maskewitz, B.F.; Trubey, D.K.; Roussin, R.W.; McGill, B.L.
April 1976
Limited Number Available in RSIC

EPRI-ER-216
Applications of Low Atomic Number Ceramic Materials to Fusion Reactor First Walls. Final Report. Task B.
Rovner, L.H.; Bourque, R.F.; Chen, K.Y.
August 1976
General Atomic Company

GA-A-14008; CONF-760733-1
Mirror Hybrid Reactor and Power Conversion System Conceptual Design.
Schultz, K.R.; Backus, G.A.; Baxi, C.B.; Dee, J.B.; Estrine, E.A.; Rao, R.; Veca, A.R.
June 29, 1976
Dep., NTIS $4.00

GA-A-14051
First Wall Conceptual Designs Using Low Atomic Number Materials.
Bourque, R.F.
September 1976
NTIS

GA-A-14072
Design, Performance, and Remote Handling Characteristics of the Blanket and Shield for a Noncircular Tokamak Experimental Power Reactor.
Graumann, D.W.; Hager, E.R.
August 1976
NTIS

IAEA-R-1256-F
New Methods in Transport Theory. Part of a Coordinated Programme on Methods in Neutron Transport Theory. Final Report for the Period 1 August 1972 - 31 July 1975.
Stefanovic, D.
September 1975
INIS

INR-1519/IX/PR/B (In Polish)
Main Biological Shields of Research Reactor MARIA - Numerical Analysis.
Szymendera, L.; Kamenow, G.; Kordyasz, D.; Sobolewska, I.; Wincel, K.
1974
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1528/IX/PR/B (In Polish)
Water-Concrete Shield Systems for PWR Type Power Reactors.
Szymendera, L.; Kamenow, G.; Kordyasz, D.; Sobolewska, I.; Wincel, K.; Blociszewski, S.
1974
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1532/IX/PR/B (In Polish)
Homogeneous Concrete Shield Systems for PWR Type Power Reactors.
Szymendera, L.; Kamenow, G.; Kordyasz, D.; Sobolewska, I.; Wincel, K.; Blociszewski, S.
1974
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1533/IX/PR/B (In Polish)
Two-Layer Concrete Shield Systems for PWR Type Power Reactors.
Szymendera, L.; Kamenow, G.; Kordyasz, D.; Sobolewska, I.; Wincel, K.; Blociszewski, S.
1974
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1548/IX/PR/B (In Polish)
Numerical Analysis of Bulk Shield System for University Reactor UR-100.
Szymendera, L.; Kamenow, G.; Wincel, K.; Kordyasz, D.; Sobolewska, I.
1975
Nuclear Energy Information Center of the Polish Govenment Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1549/IX/PR/B (In Polish)
An Analysis of the Propriety of Applying Highly Hydrated Layer in a Primary Shield of the PWR Type Power Reactor.
Szymendera, L.; Wincel, K.; Blociszewski, S.; Kordyasz, I.; Sobolewska, I.
1975
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw, Poland

INR-1562/IX/PR/B (In Polish)
Concrete Effectiveness on the Attenuation of Gamma Rays from Volumetric Sources in Nuclear Power Plants.
Szymendera, L.; Blociszewski, S.; Kordyasz, D.; Sobolewska, I.; Wincel, K.
1975
Nuclear Energy Information Center of the Polish Government Commissioner for Use of Nuclear Energy, Palace of Culture and Science, Warsaw,

Poland

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