RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE U.S. DEPARTMENT OF ENERGY

POST OFFICE BOX X •
OAK RIDGE, TENNESSEE 37830

No. 187 *July 1980*

I believe that one of the characteristics of the human race possibly the one that is primarily responsible for its course of evolution is that it has grown by creatively responding to failure. . . .Glen T. Seaborg

MONTE CARLO SEMINAR-WORKSHOP PROCEEDINGS AVAILABLE SOON

The proceedings of the seminar-workshop on Monte Carlo Theory and Application, held in Oak Ridge on April 21–23, ORNL/RSIC-44, will be available within the next two months. It includes survey papers summarizing applications at Argonne National Laboratory (principally the use of VIM), Hanford Engineering Development Laboratory (KENO and MCNP), Los Alamos Scientific Laboratory (MCNP), and Oak Ridge National Laboratory (MORSE, KENO, and TRIPOLI II). Extensive presentations were made on SAM-CE (MAGI) and MCNP(LASL). Additional overviews were given on KENO V (ORNL), TRIMARAN and TRIPOLI II (CEA/CEN/Saclay), KIM (CNEN), and new MORSE modules (ORNL). Reports were given on perturbation theory to obtain sensitivities, on recursive Monte Carlo to develop importance functions, and applications of TRIPOLI II to sodium duct and integral experiment analysis. Other papers were given on analysis of LWR lattices, thermal reactor benchmarks, ex-core water level detectors, and biological organ dose estimates. Also included in the proceedings are two contributions of the Japanese Ship Research Institute.

If you wish to reserve a copy, please fill out and return the form attached to the back of this newsletter.

ANS ELECTS NEW BOARD MEMBERS

The American Nuclear Society (ANS) has announced the election of 10 new members to its Board of Directors, some of whom are well known in the research community served by RSIC. The new Board members are listed as follows.

Frank Bevilacqua, Vice President, Engineering, Nuclear Power Systems Division, Combustion Engineering, Inc., Windsor, CT, is responsible for the engineering, design, and design-related activities for pressurized water reactor steam supply systems.

William J. Cahill, Jr., Vice President, Nuclear Licensing, Quality Assurance, Research and Development, Consolidated Edison Company of NY.

Edward D. Fuller, Vice President, S. Levy Inc., Campbell, CA, is currently involved in the support of utility regulatory programs on TMI-related issues and other generic licensing issues such as ATWS, load combinations, and pipe cracks.

Angelo Giambusso, Vice President and Manager of Washington Operations, Stone & Webster Engineering Corporation.

Michael J. Lineberry, a nuclear engineer in the Applied Physics Division of Argonne National Laboratory, is currently Manager of Technical Programs at the Zero Power Plutonium Reactor (ZPPR) in Idaho Falls, ID.

Betty F. Maskewitz is Director of the Engineering Physics Information Centers (EPIC) at the Oak Ridge National Laboratory, an umbrella organization which covers the Radiation Shielding Information Center (RSIC), the NRC Reactor Safety Research Data Repository (RSRDR), and the NRC Technical Data Management Center (TDMC).

George H. Miley, Professor and Chairman of the Department of Nuclear Engineering, University of Illinois, Urbana.

Warren F. Miller, Jr. has recently returned to Los Alamos Scientific Laboratory, Los Alamos, NM from sabbatical leave as a Visiting Professor, Nuclear Engineering Program at Howard University. His prior LASL assignment was as Leader for the Transport and Reactor Theory Group in the Theoretical Division.

Jack E. Olhoeft is a research staff member in the Nuclear Safety Department, Nuclear Technology Division of the Westinghouse Electric Corporation, Pittsburgh, PA, with professional interests and experience in the development of methods, models and computer programs in reactor physics, engineering and safety analysis, probability and reliability analysis, accident analysis and risk assessment.

Joe C. Turnage, Director of Nuclear Engineering, Yankee Atomic Electric Company, Westboro, MA, is responsible for managing activities in the areas of reactor physics, safety analysis, fuel behavior modeling and research and engineering development.

ANS is a not-for-profit Society comprised of over 13,000 scientists, engineers, educators, and administrators dedicated to the peaceful application of nuclear energy. Members of the Board serve a three-year term. Their responsibilities include the management of the business of the Society and the formulation and implementation of Society policies. Society members should feel free to use any of the above and other members of the ANS Board of Directors as a channel for communications of ideas and suggestions for the management and direction of the Society.

PERSONAL ITEMS

Moshe Goldstein, of the Nuclear Research Center-Negev Physics Department, Beer Sheva, Israel, is presently on a one-year assignment in the Engineering Physics Division of the Oak Ridge National Laboratory.

Laurie Unger, a student at Heidelberg University in Tiffin, Ohio, has joined RSIC for the summer as an ORAU participant.

Jim West, of the UCCND Computer Sciences Division, is currently working on assignments related to modifications to RSIC code packages.

The following changes of address have been noted: **V. Sundararaman** *from* EURATOM, Ispra, Italy *to* Safety Research Laboratory, Reactor Research Centre, Kalpakkam, India; and **Jinchoon Kim** *from* Oak Ridge National Laboratory, Oak Ridge, TN *to* General Atomic Co., San Diego, CA.

VISITORS TO EPIC

The following persons came for an orientation visit and/or to use EPIC facilities during the month of June.

John Hansen, John Hancock Tower, Boston, MA; **Eishi Ibe,** Hitachi Energy Research Laboratory, Ibaraki, Japan; **T. Hyodo**, Kyoto University, Kyoto, Japan; **Craig A. Little**, Health & Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, TN; and **John Trimble,** Energy Division, Oak Ridge National Laboratory, Oak Ridge, TN.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in June.

CCC-245/TIGER 80

A newly frozen version of the TIGER code system (TIGER 80) has been furnished by the code contributor, Sandia Laboratories, Albuquerque, New Mexico. Cosmetic and other modifications (such as elimination of occurrence of certain errors when the code was run at low source energies) have been made. The code package is available in card image format (EBCDIC) or CDC Update format. Persons requesting TIGER 80 should send a reel of magnetic tape. Requesters should indicate which format they prefer. FORTRAN IV; CDC Update and CDC.

CCC-248/SWAN

SWAN, a code package for analysis and optimization of fusion reactor nucleonic characteristics, has been extended to include a CDC version. This extension has been designated **(B)** version and was contributed by Nuclear Research Centre-Negev, Beer-Sheva, Israel. The original code system was written for the IBM 360 computer and contributed by the NRC-Negev and the Plasma Physics Laboratory, Princeton University, Princeton, New Jersey. FORTRAN IV; IBM 360 and CDC.

CCC-280/CYLTRAN 80

A newly frozen version of the CYLTRAN code system (CYLTRAN 80) has been furnished by the contributor, Sandia Laboratories, Albuquerque, New Mexico. Cosmetic and other modifications (such as elimination of occurrence of certain errors when the code was run at low source energies) have been made. The code package is available in card image format (EBCDIC) or CDC Update format. Persons requesting CYLTRAN should send a reel of magnetic tape. Requesters should indicate which format they prefer. FORTRAN IV; CDC Update and CDC.

CCC-308/SPHERE 80

The cylindrical geometry multimaterial electron/photon Monte Carlo transport code package has been replaced by a newly frozen version (SPHERE 80). Both the original and this new version were contributed by Sandia Laboratories, Albuquerque, New Mexico. Cosmetic as well as more substantive modifications and corrections have been made, and persons requesting CYLTRAN should send a reel of magnetic tape. Two separate packages are available, the card image format package and the CDC Update format package. Requesters should specify which format they wish to receive. Reference: SAND-74-0030. FORTRAN IV; CDC Update and CDC.

CCC-372/TRIPOLI II

TRIPOLI II, a three-dimensional Monte Carlo radiation transport program, was contributed by the CEA/CEN/Saclay SERMA Shielding Laboratory, Saclay, France. A powerful general purpose particle transport code, TRIPOLI II treats neutrons and gamma rays for both core physics and shielding problems. The geometry treatment is general, and cross sections, in a very fine multigroup form, can be taken from ENDF, UKNDL, and other sources. The importance sampling is based on a highly-developed system using equal-weight surfaces which, when properly used, minimizes splitting and Russian Roulette. In its present form, the code does not treat secondary gamma rays from neutron interactions. Reference: OLS 80-110. FORTRAN IV; IBM 360.

CCC-373/TIGERP

The one-dimensional multilayer electron/photon Monte Carlo transport code with detailed modeling of atomic shell ionization and relaxation was contributed by Sandia Laboratories, Albuquerque, New Mexico. It is essentially a generalization of the TIGER code package (CCC-245), differing in that TIGERP includes a more general description of ionization and relaxation phenomena which is essentially equivalent to that employed in the three-dimensional SANDYL code package (CCC-361). Persons requesting TIGER **MUST SPECIFY "CARD IMAGE"** or **"CDC UPDATE"** format. References: SLA-73-1026 and SAND-78-0580. FORTRAN IV; CDC Update and CDC.

CCC-374/ACCEPT

ACCEPT, a three-dimensional multilayer electron/photon Monte Carlo transport code with combinatorial geometry, was contributed by Sandia Laboratories, Albuquerque, New Mexico. This code combines condensed-history electron Monte Carlo with conventional single-scattering photon Monte Carlo in order to describe the transport of all generations of particles from several MeV down to 1.0 and 10.0 keV for electrons and photons, respectively. Both card image format (EBCDIC) and CDC Update format packages are available. Requesters should specify which format is desired. Reference: SAND79-0415. FORTRAN IV; CDC Update and CDC.

CCC-378/MURLI

MURLI, an integral transport theory code package for thermal reactor lattice cell calculations, was contributed by Bhabha Atomic Research Center, Trombay, Bombay, India. The code uses multigroup integral transport theory to obtain space and energy-dependent neutron flux distribution in the cylindrical cell of a thermal reactor lattice. Data preparation is discussed in the documentation, and a library of data is included in the package. Reference: Unpublished Report by H. C. Huria. DEC FORTRAN; PDP-11.

PSR-118/NJOY

The NJOY code package, a system for producing pointwise and multigroup neutron and photon cross sections from ENDF/B-IV and -V evaluated nuclear data, was updated to correct an error called to RSIC attention by Don Craig of Atomic Energy of Canada Limited, Chalk River, and Bob MacFarlane, Los Alamos Scientific Laboratory, Los Alamos, New Mexico. The error existed in the Adler-Adler treatment in subroutine CSAA where the processing of ENDF/B-V, U-233, led to the code's trying to read past an end-of-file. Current users may contact RSIC and request details of the update. FORTRAN IV; CDC.

PSR-153/LOOM-P

The finite element mesh generation program was contributed by Japan Atomic Energy Research Institute (JAERI), Tokyo, Japan. It was developed to produce a mesh network for a reactor core geometry with the help of an automatic mesh generation routine built in. It contains techniques to improve the pattern of mesh elements by means of on-line conversational mode. Reference: JAERI-M 7119. FORTRAN IV; FACOM 230-75.

SCA-0/SCALE (CSAS1, CSAS2)

A modular code system for performing standardized computer analyses for licensing evaluation (criticality safety analytical sequences 1 and 2 (CSAS1, CSAS2)) was contributed by UCCND Computer Sciences Division at the Oak Ridge National Laboratory. This initial version of the criticality package of the SCALE system consists of a system driver, functional modules, cross-section library, materials information processor, and system control modules. It is expected that future versions of the SCALE system will include shielding, heat transfer analysis, more sophisticated control modules, and CRT interactive input capabilities. It is also expected that, in the long term, a compilation of the card image input and retrieval code for all the critical experiment analyses used to validate the data libraries in the system will also be made available. Reference: NUREG/CR-0200, ORNL/NUREG/CSD-2. FORTRAN IV and assembler language; IBM 360. (A CDC version will be available at a later date).

CHANGES IN THE DATA LIBRARY COLLECTION

The following change was made in June.

DLC-75/BUGLE-80

The 47-neutron, 20-gamma-ray group, P_3, cross-section library was developed at Oak Ridge National Laboratory for LWR shielding applications. **This new DLC replaces the DLC-47/BUGLE library which was prepared for use by the ANS 6.1.2 Working Group on Shielding Cross Sections for concrete shielding**

applications. Studies by members of ANS 6.1.2 and others have led to the development of BUGLE-80. Since it has a different group structure, BUGLE-80 was given a new DLC number to help minimize confusion with the earlier version.

The current library was generated by collapse from DLC-41C/VITAMIN-C using a spectrum typical to that expected in a PWR shield. The cross sections should be useful for shielding situations where resonance self-shielding and temperature effects are not important.

The package contains microscopic coupled (47n,20g) data for 42 isotopes and 47n data for 24 isotopes (gamma-production not available on ENDF/B-IV for those isotopes). In addition, sample input and output for running ANISN test cases for a concrete and LWR problem in both (47n,20g) and (171n,36g) energy structures are provided. Kerma factors in the 47n,20g structure (based on DLC-60 MACKLIB-IV) are included as well as (47n,20g) cross sections with delayed gammas from fission for ^{235}U, ^{238}U, and ^{239}Pu. A full reel of magnetic tape, blocked and written at 9 track, 800 bpi, is required for transmittal. Reference: informal notes. IBM 360/91.

X-RAY ATTENUATION PROJECT

At the International Union of Crystallography Congress which was held in Warsaw in 1978, the Commission on Crystallographic Apparatus decided that there was a need to evaluate the techniques for the measurement of x-ray attenuation coefficients. A committee was set up to organize the project, and planning for the project is now well advanced.

It is the aim of the organizing committee to encourage the participation in the project of laboratories using a diverse range of techniques of measurement. For example, sources of incident x-ray beams which are to be used range from synchrotron radiation sources to radio-isotope sources. A diverse range of detection systems are also to be used.

All laboratories participating in the project will receive standard specimens from the project organizers and will be required to answer detailed questions about their equipment, techniques of measurement and their analysis of the experimental results. The first specimen will be silicon. Later specimen sets will include germanium, magnesium and pyrolytic graphite.

Any laboratory interested in participating in the project should contact: Dr. D. C. Creagh, Chairman, IUCr X-ray Attenuation Project, Physics Department, Royal Military College, Duntroon, ACT 2600, Australia; or J. H. Hubbell, Project Secretary, X-ray and Ionizing Radiation Data Center, National Bureau of Standards, Washington, D.C. 20234, U.S.A.

NEW ICRU REPORT ON QUANTITIES AND UNITS

The International Commission on Radiation Units and Measurements (ICRU) has announced the publication of **ICRU Report 33, "Radiation Quantities and Units."** It is the latest in a continuing series of ICRU reports providing definitions for fundamental quantities and units and supersedes ICRU Report 19 and its supplement which were published in 1971 and 1973, respectively.

The new report, in defining radiation quantities, continues the previously utilized division of quantities and units into those intended for general use and those intended for use in radiation protection. In the first category are such quantities as particle fluence, energy fluence, mass attenuation coefficient, linear energy transfer, absorbed dose, kerma, exposure and activity. The section treating quantities and units for use in radiation protection includes definitions of such quantities as dose equivalent, absorbed dose index, and dose equivalent index. New definitions for general use quantities include those for particle number, radiant energy, particle flux, energy flux, particle radiance, energy radiance, cross-section radiation chemical yield, and decay constant. In addition, the previously defined exposure rate constant has been replaced with air kerma rate constant. New definitions in the section on quantities for use in radiation protection include those for shallow dose equivalent index and deep dose equivalent index as well as definitions for various rates.

In an effort to provide more didactic material and useful source material for other ICRU reports, the sections on general considerations and stochastic quantities and non-stochastic quantities that appeared in ICRU Report 19 have been expanded and placed in a separate sub-section of the new report. A number of clarifying modifications in various definitions have also been introduced and the utilization of SI units is noteworthy.

Copies of ICRU Report 33 can be purchased for $8.50 each from ICRU Publications, P. O. Box 30165, Washington, D.C. 20014, U.S.A.

UPCOMING MEETINGS

We call attention to the following meetings.

July 1980

1980 Annual Conference on Nuclear and Space Radiation Effects, July 15–18, 1980, Cornell University, Ithaca, NY. Contact: Joanne Davenport, Cornell University Conference Office, IEEE/NSRE Conference, Ithaca, NY 14853.

International Conference on Nuclear Waste Transmutation, July 22-24, 1980, The University of Texas, Austin. Contact: Continuing Engineering Studies, College of Engineering, ECJ 2.102, The University of Texas at Austin, Austin, TX 78712.

September 1980

International Executive Conference on Non-Proliferation and Safeguards, September 7–10, 1980, Maria Isabel-Sheraton, Mexico City. Contact: David G. Pettengill, ANS Meetings Manager, 555 N. Kensington, La Grange Park, IL 60525.

1980 Advances in Reactor Physics and Shielding, September 14–17, 1980, Sun Valley, Idaho Falls, ID. Contact: Carl H. Cooper, Registration Chairman, 748 Adell, Idaho Falls, ID 83401; Phone toll free 800-635-8261.

Safety of Light-Water-Cooled Nuclear Power Plants, September 22–26, 1980, Northwestern University Technological Institute, Evanston, IL. Contact: Continuing Engineering Studies, 2804 Technological Institute, Northwestern University, Evanston, IL 60201; Phone 312-492-3365.

November 1980

ANS/ENS International Conference on World Nuclear Energy – Accomplishments and Perspectives, November 16–21, 1980, Sheraton Washington Hotel, Washington, D.C. Contact: Stacey Oldfield, Accounting Dept., American Nuclear Society, 555 N. Kensington Ave., La Grange Park, IL 60525.

December 1980

National Conference on Renewable Energy Technologies, December 7–11, 1980, Sheraton-Waikiki Hotel, Honolulu, Hawaii. Contact: Donni S. Hopkins, Hawaii Natural Energy Institute, University of Hawaii at Manoa, 2540 Dole Street, Holmes 246, Honolulu, Hawaii 96822.

August 1981

Second Topical Meeting on Fusion Reactor Materials, August 9–12, 1981, Seattle Park Hilton Hotel, Seattle, Washington. Contact: Stephen M. Bruemmer, Publicity Chairman, Battelle Pacific Northwest Laboratories, P. O. Box 999, Richland, WA 99352; Phone 509-376-0636.

May 1982

Fifth Congress of International Technology, May 3–6, 1982, Pittsburgh Convention/Exposition Center, Pittsburgh, PA. Contact: Technology Center, 7125 Saltsburg Road, Pittsburgh, PA 15235; Phone 412-795-5300.

JUNE 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.

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

AAEC/E-461
Application of the Monte Carlo Transport Code MORSE to the Calculation of Pulsed Neutron Experiments., Rainbow, M.T., March 1978, Dep., NTIS (U.S. Sales Only), PC A03/MF A01

AERE-R-9502
Note on the Capture Gamma-Ray Spectrum of Natural Ti Produced by Thermal Neutrons., Sowerby, M.G., June 1979, Dep., NTIS (U.S. Sales Only), PC A02/MF A01; Also available from H.M. Stationery Office, price Pound 1.00

ANL/FPP/TM-129
Gamma Irradiation of Nitrate-Based Salts., Breon, S.R.; Chellew, N.R.; Clemmer, R.G.; Hoh, J.C., March 1980, NTIS, PC A03/MF A01

ANL/FPP/TM-130
Evaluation of Organic Moderator/Coolants for Fusion Breeder Blankets., Romero, J.B., March 1980, NTIS, PC A03/MF A01

BNL-NCS-17541(Ed.3); ENDF-201(Ed.3)
ENDF/B Summary Documentation., Kinsey, R. (Comp.), July 1979, Dep., NTIS, PC A22/MF A01

BNL-NCS-51152; ENDF-286
Evaluation of Natural Chromium Neutron Cross Sections for ENDF/B-V., Prince, A.; Burrows, T.W., February 1979, NTIS $6.00

CEGB-RD/B/N-4423
Brief Description of the ENDF/B-V Format Adopted for Use in the UK Decay and Fission Product Yield Data Files., Tobias, A., November 1978, Dep., NTIS (U.S. Sales Only), PC A03/MF A01

CONF-791102-127
First Wall and Blanket Design for the STARFIRE Commercial Tokamak Power Reactor., Morgan, G.D.; Trachsel, C.A.; Cramer, B.A.; Bowers, D.A.; Smith, D.L., 1979, Dep., NTIS, PC A02/MF A01

COO-4247-2
Technical Assessment of Niobium Alloys Data Base for Fusion Reactor Applications., Pionke, L.J.; Davis, J.W., August 1979, NTIS, PC A05/MF A01

ECN-65
Tables of RCN-2 Fission-Product Cross Section Evaluation. Volume 3. (Nd and Pm Isotopes)., Gruppelaar, H., May 1979, Dep., NTIS (U.S. Sales Only), PC A08/MF A01

FOA-C-20236
Time Dependent Dose Rate and Compton Electron Generation from Mono-Energetic Gamma Sources in Homogeneous Air., Engstroem, G., April 1978, Foersvarets Forskningsanstalt, Stockholm, Sweden; INIS

IA-1353
Curium-244 Neutron Data Evaluation., Caner, M.; *et al.*, March 1979, Soreq Nuclear Research Center, Israel Atomic Energy Commission, Yavne

IKE-4-88; Thesis
Finite Element Methods for the Solution of Multidimensional Reactor Physics Problems., Schmidt, F.A.R., Stuttgart University, March 1979, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

JAERI-M-7288 (In Japanese)
Problems for Evaluation of the Skyshine Calculation Code., Tanaka, S.; Sasamoto, N., September 1977, Japan Atomic Energy Research Inst., Tokyo

JAERI-M-7733 (In Japanese)
Evaluation of Neutron Nuclear Data for ^{245}Cm., Igarasi, S.; Nakagawa, T., June 1978, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

JAERI-M-7915 (In Japanese)
Sensitivity Analysis of Neutronics Calculation in the Preliminary Design of Japan Experimental Fusion Reactor., Yamauchi, M.; Iida, H., October 1978, Dep., NTIS (U.S. Sales Only), PC A05/MF A01

JAERI-M-8686
Shielding Benchmark Problems (II)., Tanaka, S.; Sasamoto, N.; Oka, Y.; Shin, K.; Tada, K.; Nakazawa, M.; Nakamura, T.; Harima, Y.; Hirayama, H.; Furuta, Y.; Miura, T.; Yamauchi, M.; Yamano, N.; Hyodo, T., January 16, 1980, Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken, Japan

JAERI-M-8739
Sensitivity Analysis of Neutronics Calculations in the Preliminary Design of JAERI Experimental Fusion Reactor. (Revised), Yamauchi, M.; Seki, Y.; Iida, H., March 1980, Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken, Japan

KDK-35
Compilation of Actinide Neutron Nuclear Data., Condé, H.; Nordborg, C.; Andersson, P.; Häggblom, H.; Christiansson, J.-E.; Trostell, B., 1979, H. Condé, National Defence Research Institute, Fack, S-104 50 Stockholm

KEK-78-7
Studies on Current Problems of Radiation Shielding in KEK., Thomas, R.H.; Watanabe, N.; Hirayama, H.; Katoh, K., June 1978, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

KFKI-1980-07
REBEL-3: A Code for Calculating Doses in the Organs of a Phantom Standing in a Dwelling Room., Koblinger, L., February 1980, Central Research Institute for Physics, Budapest, Hungary

KIYI-78-9 (In Russian)
Evaluated Neutron Cross Sections and Resonance Integrals of the Fission Products from Z=32-37., Pisanko, Zh.I.; Fedorova, A.F., 1978, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

LA-8041-MS, Revised
TMI-2 Decay Power: LASL Fission-Product and Actinide Decay Power Calculations for the President's Commission on the Accident at Three Mile Island., England, T.R.; Wilson, W.B., March 1980, NTIS

LA-tr-79-45
Fission Neutron Logging with Threshold Detectors., Kartashov, M.P.; Davydov, Yu.B., 1979, Dep., NTIS, PC A02/MF A01

LA-UR-80-35; CONF-800607-2
Calculation of Neutron Cross Sections on Iron up to 40 MeV., Arthur, E.D.; Young, P.G., 1980, Dep., NTIS, PC A02/MF A01

LiU-RAD-R-035
Absorbed Dose Equations. The General Solution of the Absorbed Dose Equation and Solutions Under Different Kinds of Radiation Equilibrium., Alm Carlsson, G., January 1978, Dep., NTIS (U.S. Sales Only), PC A03/MF A01

NRPB-R94
The Effects of Actinide Separation on the Radiological Consequences of Disposal of High-Level Radioactive Waste on the Ocean Bed., Camplin, W.C.; Grimwood, P.D.; White, I.F., January 1980, HMSO

ORNL-5541
Blast Tests of Expedient Shelters in the Misers Bluff Event., Kearny, C.H.; Chester, C.V.; York, E.N., January 1980, NTIS

ORNL/RSIC-5/V6
Bibliography, Subject Index, and Author Index of the Literature Examined by the Radiation Shielding Information Center., Trubey, D.K.; Roussin, R.W.; Gurney, J.; Gustin, A.B.; Bryant, E.W., May 1980, NTIS, PC A16/MF A01

ORNL/TM-7033
Flux Extrapolation Models Used in the DOT IV Discrete Ordinates Neutron Transport Code., Tomlinson, E.T.; Rhoades, W.A.; Engle, W.W.,Jr., May 1980, NTIS, PC A04/MF A01

ORNL/TM-7042
A Consistent Nuclear Model for Compound and Precompound Reactions with Conservation of Angular Momentum., Fu, C.Y., May 1980, NTIS, PC A03/MF A01

ORNL/TM-7188
DOGS: A Collection of Graphics for Support of Discrete Ordinates Codes., Ingersoll, D.T.; Slater, C.O., March 1980, Dep., NTIS, PC A07/MF A01

ORNL/TM-7246
Analysis of the Initial Shielding Design for the Upflow Gas-Cooled Fast Reactor (GCFR)., Slater, C.O.; Tomlinson, E.T.; Williams, L.R., May 1980, NTIS, PC A05/MF A01

ORNL/TM-7299
Calculation of Neutron Die-Away Times in a Large-Vehicle Portal Monitor., Lillie, R.A.; Santoro, R.T.; Alsmiller, R.G.,Jr., May 1980, NTIS, PC A03/MF A01

ORNL/TM-7310
A Statistical Sensitivity Analysis of a Simple Nuclear Waste Repository Model., Ronen, Y.; Lucius, J.L.; Oblow, E.M., June 1980, NTIS, PC A05/MF A01

R-2341/1-NSF/FF
Evaluating Nuclear Power: Voter Choice on the California Nuclear Energy Initiative., Hensler, D.R.; Hensler, C.P., July 1979, Rand Corp., Santa Monica, CA

RISO-M-1972
Comparison of Nordic Dose Models., Thykier-Nielsen, S., April 1978, Dep., NTIS (U.S. Sales Only), PC A10/MF A01; Also available from Risoe Library, DK-4000 Roskilde, Denmark

STUDSVIK-79/1
UNIDOSE - A Computer Program for the Calculation of Individual and Collective Doses from Airborne Radioactive Pollutants., Karlberg, O.; Schwartz, H.; Forssen, B.H.; Marklund, J.E., January 1979, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

TREE-1116, pp.217-221
Data Testing ENDF/B IV Dosimetry Data., Harker, Y.D.; Heath, R.L., April 1977, Idaho National Engineering Lab., Idaho Falls, Idaho

UCID-17774
Definition of Two Band Parameters for Use in Photon Transport Calculations., Cullen, D.E., April 1978, NTIS, PC A02/MF A01

UCRL-52,923
Neutron Yield Measurements on a TMX Endplug., Slaughter, D.R., March 1980, NTIS

UCRL-83457; CONF-800426-1
Local Energy Transfer to TLDs by Neutrons and Photons., Singh, M.S.; Gaines, J.L.; Parlagreco, J.R., March 3, 1980, Dep., NTIS, PC A02/MF A01

UCRL-84291
Measurements and Calculations of the Neutron Emission Spectra from Materials Used in Fusion-Fission Reactors., Hansen, L.F.; Wong, C.; Komoto, T.T.; Pohl, B.A.; Howerton, R.J., February 1980, Technical Information Department, Lawrence Livermore Laboratory, Univ. of California, Livermore, CA 94550, Paper submitted to Nuclear Technology

UWFDM-313
Minerals Resource Implications of a Tokamak Fusion Reactor Economy., Cameron, E.; Conn, R.W.; Kulcinski, G.L.; Sviatoslavsky, I., September 1979, Fusion Engineering Program, Nuclear Engineering Dept., Univ. of Wisconsin, Madison, WI 53706

UWFDM-333
Impact of Fusion-Fission Hybrids on World Nuclear Future., Abdel-Khalik, S.I.; Jansen, P.; Kessler, G.; Klumpp, P., May 1980, Fusion Engineering Program, Nuclear Engineering Dept., Univ. of Wisconsin, Madison, WI 53706

UWFDM-354
The Fusion Fission Hybrid-Roles in the Energy Economy., Perry, R.T.; Leonard, B.R.,Jr.; Teofilo, V.L., December 1979, Fusion Engineering Program, Nuclear Engineering Dept., Univ. of Wisconsin, Madison, WI 53706

WFPS-TME-79-021
Blanket Design Study for a Commercial Tokamak Hybrid Reactor (CTHR)., Chapin, D.L.; *et al.*, September 1979, Fusion Power Systems Dept., Westinghouse Electric Corporation, Pittsburgh, PA

Ann. Nucl. Energy, 5(5), 197-201
Intercomparison of Unfolding Codes for Benchmark Gamma Spectrometry., Marafie, A.M.; Bishop, G.M., 1978

Atomkernenergie, 31(3), 144-145
Measurement and Calculation of Leakage Neutron Spectrum in Light Water., Lolich, J.; Abbate, M., 1978

Energ. Nucl. (Milan), 25(2), 75-84
Design, Construction and Erection of the Biological Shield Wall for the Caorso Nuclear Power Station., Crucitti, N., February 1978

FAPIG (Tokyo), 86, 11-16 (In Japanese)
Design Evaluation Methods for Skyshine., Tanaka, Y.; Murakami, H.; Mori, S., August 1977

Health Phys., 38(4), 543-621
Dose-Rate Conversion Factors for External Exposure to Photon and Electron Radiation from Radionuclides Occurring in Routine Releases from Nuclear Fuel Cycle Facilities., Kocher, D.C., April 1980

Health Phys., 38(5), 743-748
Determination of Environmental Radioactivity for Dose Assessment., Nakaoka, A.; Fukushima, M.; Takagi, S., May 1980

J. Fac. Eng., Univ. Tokyo, Ser.B, 34(2), 409-480
Spectral Characterization of Fast Reactor Neutron Fields., Kosako, T.; Nakazawa, M.; Sekiguchi, A., September 1977

J. Nucl. Sci. Technol., 14(8), 541-550
Application of Finite Element Method to Two-Dimensional Multi-Group Neutron Transport Equation in Cylindrical Geometry., Fujimura, T.; Tsutsui, T.; Horikami, K.; Nakahara, Y., August 1977

J. Nucl. Sci. Technol., 14(12), 878-891
A Two-Dimensional Benchmark Experiment for Neutron Transport in Water., Miura, T.; Yamaji, A.; Takeuchi, K., December 1977

J. Nucl. Sci. Technol., 16(1), 1-15
Method for Calculating Anisotropic Neutron Transport Using Scattering Kernel Without Polynomial Expansion., Takahashi, A.; Yamamoto, J.; Ebisuya, M.; Sumita, K., January 1979

J. Nucl. Sci. Technol., 17(1), 37-43
Fast Neutron Spectra Transmitted Through Iron and Sodium Slabs., Shin, K.; Nishibe, T; Murakami, R.; Fujita, H.; Hyodo, T.; Oka, Y.; An, S. January 1980

J. Nucl. Sci. Technol., 17(4), 255-268
Measurements and Calculations of Angular Flux Spectra Emitted from Lithium and Graphite Slabs with D-T Neutron Source., Yamamoto, J.; Takahashi, A.; Ebisuya, M.; Sumita, K., April 1980

J. Nucl. Sci. Techol., 17(4), 301-304
Monte Carlo Calculation of First Wall Neutron Flux in Tokamak Fusion Reactor. (Tech. Note), Seki, Y.; Iida, H., April 1980

J. Nucl. Sci. Technol., 17(4), 315-317
Simple Method of Eliminating Infinite Variance in Point Detector Problem of Monte Carlo Calculation. (Short Note), Iida, H.; Seki, Y., April 1980

Kobe Shosen Daigaku Kiyo, Dai-2-Rui, No.25, 129-138 (In Japanese)
Radiation Shielding of Two-Region Neutron-Source Storage Vessel., Nakajima, T.; Kitamura, A.; Yano, S., July 1977

Nucl Instrum. Methods, 151(1-2), 233-239
Gamma Ray Scintillator Response and Unscrambling of Pulse Height Spectra., Dupont, A.; Giordano, G.; Mandrou, P.; Niel, M., May 1, 1978

Nucl. Safety, 21(2), 171-183
Development and Assessment of the Transient Reactor Analysis Code (TRAC)., Vigil, J.C.; Pryor, R.J., March-April 1980

Nucl. Technology, 49(1), 150-158
A Model for the Transport of Radionuclides and Their Decay Products Through Geologic Media., Burkholder, H.C.; Rosinger, E.L.J., June 1980

Nippon Hoshasen Gijutsu Gakkai Zasshi, 33(4), 433-437 (In Japanese)
A Simple Determination of the Dose-Rate at Point in Water Around Linear Radioactive Source., Takada, T., November 1977

Ont. Hydro Res. Q, 29(2), 1-8
Properties of High-Density Concrete for Nuclear Shielding., Sturrup, V.R., 1977

Radioisotopy, 18(2), 161-178 (In Czech)
Computation of Gamma Radiation Transport by the Monte Carlo Method., Cechak, T.; Kluson, J., April 1977

Stud. Cercet. Fiz., 29(8), 851-863 (In Romanian)
The Calculation of the Multigroup Cross Section Taking into Account the Self-Shielding. Subgroup Method and Applications., Anton, V., 1977

Stud. Cercet. Fiz., 29(8), 865-878 (In Romanian)
The Buildup Factor Determination for the Measurements in the Air of the Gamma Radioactive Sources Placed on the Soil., Sirbu, M., 1977

Thesis
Neutron Spectra Associated with a Fast Pulse Assembly., Harvey, J.T., Arkansas University, Little Rock, Arkansas, 1977, University Microfilms Order No.77-23,339

COMPUTER CODES LITERATURE

AAEC/E-461 ..... MORSE
Application of the Monte Carlo Transport Code MORSE to the Calculation of Pulsed Neutron Experiments., Rainbow, M.T., Australian Atomic Energy Commission Research Establishment, Lucas Heights, March 1978

CNEN-RT/ING-79-33 ..... MORSE CG; KENO IV
Validation Tests Codes MORSE C.G. and KENO IV., Landeyro, P.A., Comitato Nazionale per l'Energia Nucleare, Casaccia, Italy, Centro di Studi Nucleari; Comitato Nazionale per l'Energia Nucleare, Rome, Italy, 1979

Comput. Phys. Commun., 16(3), 395-400 . DWPI
A New Version of DWPI (Inelastic Pion-Nucleus Scattering) to Incorporate Microscopic Form Factors and Differing Proton and Neutron Radii., Funsten, H.O., College of William and Mary, Williamsburg, VA, March 1979

Comput. Phys. Commun., 17(3), 305-308 .....
..... NONRELATIVISTIC BREMSSTRAHLUNG
Extension to High Frequencies of a Program for Calculating the Angular Distribution of Nonrelativistic Bremsstrahlung., Banuelos, A.; Rodriguez-Trelles, F.; Bilbao, L., Buenos Aires Univ. Nacional, Argentina, Facultad de Ciencias Exactas y Naturales, June 1979

CONF-790594-1 ..... CONDOS
CONDOS Methodology for Evaluation of Radiation Exposure from Consumer Products., O'Donnell, F.R., Oak Ridge National Laboratory, TN, 1979, AVAIL: NTIS

IA-1338 ..... S_N
S_N Code for One-Dimensional Cylindrical Geometry., Lemanska, M.; Shatz, M., Israel Atomic Energy Commission, Tel Aviv, June 1977

IAE-2958 (In Russian) ..... PLAN
Computer Code for Numerical Solution of the Boltzmann Equation in Plane Geometry., Vlasov, Yu.A., Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow, Inst. Atomnoj Ehnergii, 1978, ALGOL-60 BESM

INIS-mf-5220 (In German) ..... S_N
Monte Carlo Estimation of the Reactivity of Movable Reflector Elements for Compact Reactors., Bernnat, W., Stuttgart Univ., Germany, F.R., June 1972

JAERI-M-7392 (In Japanese) CODAC-No.5
A Computer Program to Calculate Nuclide Yields in Complex Decay Chain for Selection of Optimum Irradiation and Cooling Condition., Takeda, T., Japan Atomic Energy Research Inst., Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Inst., Tokyo, November 1977, FORTRAN

JAERI-M-8097 (In Japanese) .....
DELIGHT-4; SLALOM; BRIQUET; TWOTRAN; ZADOC-3; CITATION-DEGA
Point Reactivity Burnup Code DELIGHT-4 for High Temperature, Gas-Cooled Reactor Cells., Shindo, R.; Hirano, M.; Minami, K., Japan Atomic Energy Research Inst., Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Inst., Tokyo, February 1979

JAERI-M-8178 (In Japanese) CASCADE/CLUSTER; MARLOWE; DAIQUIRI; CASCMARL; CASCSRB
Computer Codes for Simulating Atomic-Displacement Cascades in Solids Subject to Irradiation., Asaoka, T.; Taji, Y.; Tsutsui, T.; Nakagawa, M.; Nishida, T., Japan Atomic Energy Research Inst., Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Inst., Tokyo, March 1979, FACOM 230-75

JAERI-M-8186 ..... MEDUSA-PIJ
MEDUSA-PIJ: A Code for One-Dimensional Laser Fusion Analysis Taking Account of Neutron Heating Effect., Takano, H.; Ishiguro, Y., Japan Atomic Energy Research Inst., Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Inst., Tokyo, March 1979, FORTRAN IV , FACOM 230-75

JEN-448 ..... DTF-TRACA
The Neutron Transport Code DTF-TRACA. User's Manual and Input Data., Anbert, C., Junta de Energia Nuclear, Madrid, Spain, 1979

J. Nucl. Med., 20(8), 882-887 .. RADIATION DOSE
Monte Carlo Computer Code to Calculate Radiation Dose from Syringes Containing Radioactive Substances., Sherbini, S.; Schadt, W.; Thomas, M.; Alavijeh, H.S.; Tripathi, A., Howard Univ., Washington, D.C., August 1979

Nucl. Sci. Eng., 66(1), 60-66 ..... KENO
Monte Carlo Perturbation Source Method for Reactivity Calculations., Hoffman, T.J.; Petrie, L.M.; Landers, N.F., Oak Ridge National Laboratory, TN, April 1978

Nucl. Technol., 44(1), 61-75 ..... PRE-RACINE;
..... CARNAVAL IV; CARNAVAL III
Physics Performances of a Heterogeneous Fast Reactor Core Concept Studied in MASURCA., Bouget, Y.H.; Cosimi, M.; Hammer, P.; Humbert, G.; Lyon, F.; Martini, M., Centre d'Etudes Nucleaires de Cadarache, Saint-Paul-les-Durance, France, June 1979

ORNL/NUREG/CSD/TM-2 ..... SUPERDAN
SUPERDAN: Computer Programs for Calculating the Dancoff Factor of Spheres, Cylinders, and Slabs., Knight, J.R., Oak Ridge National Laboratory, TN, March 1978, AVAIL: NTIS

ORNL/RSIC-43, 28-42 ..... MQT
Applications of Monte Carlo and Discrete Ordinates Techniques to PWR Cavity Shield Design., Cavanaugh, G.P., Combustion Engineering, Inc., Windsor, CT, February 1979

Radioisotopy, 18(2), 161-178 (In Czech) ..... GAMMA TRANSPORT

Computation of Gamma Radiation Transport by the Monte Carlo Method., Cechak, T.; Kluson, J., Ceske Vysoke Uceni Technicke, Prague, Czechoslovakia, Fakulta Jaderna a Fysikalne Inzenyrska, April 1977

Stud. Cercet. Fiz., 29(10), 1101-1106 (In Romanian) ..... MONTE CARLO

Evaluation of Solid Angle and Self-Absorption Factors by Monte-Carlo Method., Berceanu, I.; Petrascu, M.; Simion, V., Institutul de Fizica si Inginerie Nucleara, Bucharest, Romania, 1977

UCRL-50400 (Vol.1)(Pt. B) ... ECSX4 (Version 78-1)

Program ECSX4 (Version 78-1): Conversion of Experimentally Measured Cross-Section Data from the Four-Center-Exchange (X-4) Format to the Livermore ECSIL Format., Cullen, D.E.; Perkins, S.T., California Univ., Livermore, Lawrence Livermore Lab., December 1978, AVAIL: NTIS, AVAIL: NTIS

ORNL/RSIC–44
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