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. 186 *June 1980*

The great achievements have always been individualistic. Indeed, any original achievement implies separation from the majority. Though society may honor achievement, it can never produce it. . . George Charles Roche

ANS/RP&S HONORS LABAUVE AND MUCKENTHALER

At its June 1980 meeting in Las Vegas the American Nuclear Society Radiation Protection and Shielding Division presented awards for outstanding technical achievement to **Raphael J. LaBauve** of Los Alamos Scientific Laboratory and **Francis J. Muckenthaler** of Oak Ridge National Laboratory.

The citations were presented by William E. (Bill) Kreger, Chairman of the ANS Radiation Protection and Shielding Division, and read as follows:

On behalf of the American Nuclear Society, the Radiation Protection and Shielding Division is pleased to present to

Raphael J. LaBauve

its award for technical achievement in recognition of his contributions to the advancement of radiation transport analysis particularly through his activities in the Cross Section Evaluation Working Group (CSEWG) to develop adequate nuclear data bases for radiation protection and shielding applications.

His interests include a wide range of areas in physics and engineering. He has made contributions in fields ranging from health physics and optics to reactor design calculations and cross sections. During his early years at LASL, he worked in high-speed photography and on the TURRET-UHTREX reactor projects. He is best known for his contributions to the Cross Section Evaluation Working Group (CSEWG).

He has been an active member of CSEWG since its inception, has designed and calculated benchmark experiments as a member of its Data Testing Subcommittee, and has served as Chairman of the Shielding Subcommittee and the Codes and Formats Subcommittee. Besides his activities in the design of formats and processing codes for handling neutron and photon-production files, he has been closely associated with the evaluation and data testing activities of the CSEWG. Moreover, he has been responsible for providing ENDF/B data in formats appropriate for use in discrete ordinates and Monte Carlo calculations.

Recently his interests have turned to fission-product decay-energy spectra and data for activation analyses. In the midst of all these activities, he has found time to participate on national and local committees of the ANS.

His list of over 50 publications and reports indicates that he has been active professionally and has been a valued collaborator with many people.

The Radiation Protection and Shielding Division is pleased to recognize his many years of hard work in the reactor and shielding communities, bringing out the best in others individually and collectively through inspiration and encouragement.

. . . . . .

On behalf of the American Nuclear Society, the Radiation Protection and Shielding Division is pleased to present to

Francis J. Muckenthaler

its award for technical achievement in recognition of his contributions in the development of radiation detection systems, particularly neutron detection systems, and of his leadership in performing large-scale deep-penetration radiation shielding experiments. The experiments, conducted at the Oak Ridge National Laboratory Tower Shielding Facility (TSF), have provided direct confirmation of specific radiation shield designs and also have produced a large data base

against which shield analysis methods and neutron cross sections could be tested. His accomplishments include the following.

He modified and improved the Hornyak button as a "point" detector capable of defining the shape of neutron fluxes across small regions. He also helped to develop an integrated neutron detection methodology that utilizes several detection systems with overlapping capabilities to provide detailed dose rate and spectral data for large-scale shielding experiments. This work has included the modification of Bonner ball detectors to spherical configurations and energies up to 15 MeV, the adaptation of thermoluminescent dosimeters to large-shield energy deposition measurements, and (in pre-TSF work) the development of a proton-recoil counter, threshold detectors, and an ^{6}LiI detector.

He has had the primary responsibility for the conduct of numerous TSF experiments that are widely used for testing radiation transport calculations for bulk shields, including several that have been cited as ANS shielding benchmarks. Other experiments have tested the validity of designs for specific systems, in particular, the FFTF, the CRBR, and the GCFBR.

In the 1950s he participated in the measurements that led to the Simon-Clifford theory for neutrons streaming through pipes with bends and in the 1960s served as a member of the BREN team that studied the penetration of radiation from a "fast-burst" reactor. He also performed experiments at the Lid Tank Shielding Facility to aid in the design of shields for military vehicles.

Without question, the sophisticated computer-based shield design methods in use today could not be applied with such confidence if they were not founded on and supported by the evidence provided by experimentalists such as Francis J. Muckenthaler and his associates.

NOMINEES SELECTED FOR ANS BEST PAPER AWARD

The Radiation Protection and Shielding Division of the American Nuclear Society has selected four papers for consideration for the Division's Best Paper Award. The papers were presented at the June 1980 ANS meeting in Las Vegas, as follows:

"A Novel Wide-Range Environmental Gamma-Ray Dosimeter," by W. R. Johnson, W. H. Rasin, G. E. Carlson, and M. Pope (University of Virginia).

"Corrosion Product Transport Modeling in the BWR Primary System," by C. C. Lin, R. C. Pao, J. S. Wiley, and W. R. DeHollander (General Electric).

"Evaluation of Flux Extrapolation Models for Discrete Ordinates Shielding Analysis," by E. T. Tomlinson and W. A. Rhoades (ORNL).

"Radioactive Inventories and Material Recyclability in a Tokamak Power Reactor," by J. Jung and M. A. Abdou (ANL).

The final decision on the award, based on relevance, content, and presentation, will be announced in the next issue of the *RSIC Newsletter.*

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in May.

CCC-277/MORSE-SGC

MORSE-SGC, a super-grouped cross-section version of the MORSE code, was updated to correct an error in Subroutine GG. Two statements: **LRI=2** and **GO TO 1496** were added immediately preceding statement 1480. This error was called to RSIC attention by C. Ross Hirning, Defence Research Establishment, Ottawa, Ontario, Canada, and Jim West, UCCND, Computer Sciences Division at Oak Ridge National Laboratory.

CCC-315/FALSTF

The FALSTF multigroup code package, which uses response functions to calculate activities for detectors located at points external to a shielding configuration, has been extended to include a CDC version (**B**), contributed by Century Research Center Corporation, Tokyo, Japan. The original, version (A), written

for the IBM 360 computer, was contributed by UCCND, Computer Sciences Division at the Oak Ridge National Laboratory. FORTRAN IV; IBM 360 and CDC.

CCC-370/DCHAIN

This one-point depletion code system which solves the coupled equations of radioactive growth and decay for a large number of nuclides was contributed by Japan Atomic Energy Research Institute, Tokai-mura, Ibaraki-ken, Japan. A library of data for 1170 fission products is included in the package. The code can treat any type of transmutation through decays of neutron-induced reactions. Multiple decays and reactions are allowed for a nuclide. Unknown decay energy in the data library can be estimated. Variable dimension arrays are used, and there is little limitation in number of nuclides or length of a chain. Reference: JAERI 1250. FORTRAN IV; FACOM 230/75.

CCC-375/FANTOM

FANTOM, a Monte Carlo calculation of the response of an external detector of a photon source in the lungs of a heterogeneous phantom, was contributed by the hospital unit of Bhabha Atomic Research Centre, Bombay, India. The response of a 20-cm-diameter phoswich detector (3-mm thick NaI(Tl) primary detector) to a source of low-energy photons distributed in the lungs of a heterogeneous (Medical Internal Response Dose (MIRD)) phantom, approximating ICRP Reference Man, is calculated. Monte Carlo techniques are employed to generate photons and trace their fates in the thorax of the phantom. The calculations yield the exit photon energy spectrum which is then smeared with an experimentally determined Gaussian resolution function to convert into the pulse-height spectrum observable with the detector. There are provisions for incorporating the effects of the iodine K x-ray escape as well as the variable intrinsic efficiency of the detector. Reference: *Health Physics* 37:145-59, 1978. FORTRAN IV; BESM-6.

CCC-376/KIM

The KIM Monte Carlo code system, which solves the steady-state linear neutron transport equation for a fixed-source problem, was contributed by The CNEN Dipartimento Ricerca Tecnologica di Base ed Avanzata, Bologna, Italy via the OECD NEA Data Bank. By successive fixed-source runs, it solves the eigenvalue problem in a two-dimensional infinite thermal-reactor lattice. Fluxes and reaction rates are calculated and from these, power distribution and few-group averaged cross sections are derived. In addition to combinatorial geometry, capability for complex configurations represented by a discrete set of points is included. Reference: CNEN-RT/FIMA(80)2. FORTRAN IV and assembler language; IBM 360.

PSR-152/HAUSER*5

A code system for calculating nuclear cross sections was contributed by Hanford Engineering Development Laboratory, Richland, Washington. It can accurately predict nuclear cross sections over most energy ranges less than ~60 MeV. It is based on three models of nuclear reactions: the statistical model (Hauser-Feshbach), the pre-equilibrium model, and the statistical model for direct reactions. Reference: HEDL-TME 78-83. FORTRAN IV; UNIVAC.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in May.

DLC-23/CASK

The documentation for this 40-group coupled neutron and gamma-ray cross-section data package was updated to correct an error called to RSIC attention by Mike Strayer, Control Data Corp., Minneapolis, Minnesota. In table 3 (page 35 of document), gamma-ray group 9, flux to dose conversion factor was changed to read correctly 2.412-3. This value was incorrectly shown as 2.412-4.

DLC-74/PUDK

Measured beta- and gamma-ray spectra due to thermal neutron fission of Pu_{239} was contributed by the Oak Ridge National Laboratory. Samples of mass 1 to 5 microgram were irradiated for 1, 5, or 100 sec. using the fast pneumatic-tube facility at the Oak Ridge Research Reactor. For the gamma-ray data, the spectra were obtained using the NaI detector while for the beta-ray data the spectra were obtained using the NE-110 detector with an anticoincidence mantle. The final integral data are given in tabular and graphical forms, including a complete analysis of uncertainties. Retrieval codes are provided for tabulating the data. Reference: ORNL/NUREG-34. IBM 360.

VISITORS TO EPIC

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

Vic Cain, Science Applications, Inc., Oak Ridge, TN; **Michihisa Ikeda**, Century Research Center Corp., Tokyo, Japan; **Stanley A. Jones**, Goodyear Atomic Corporation, Piketon, OH; **Leo B. Levitt**, Atomics International Division of Rockwell International, Canoga Park, CA; **Claes Nordborg**, OECD NEA Data Bank, Paris, France; **C. Philis**, CEA/Bruyeres Le Chatel, Paris, France; **George Salaita**, Southern Methodist University, Dallas, TX; **Kenji Sumita**, Osaka University, Osaka, Japan; and **John T. Ward, Jr.**, Combustion Engineering Co., Windsor, CT.

EPA–NRC RULE MAKING

The following report was given by W. E. Kreger, ANS Radiation Protection and Shielding Division Chairman, in the recent Division newsletter:

Division members who have been following the activities of EPA and NRC regarding various regulation changes may be interested in the latest predictions about rule making or rule implementation. For the Clean Air Act Amendments of 1977, EPA and NRC are working on the memorandum of understanding that follows EPA's finding of November 8, 1979 that radionuclides are hazardous air pollutants. EPA has established priorities for setting radionuclide emission standards under the Act, and has assigned a low priority for setting standards for NRC-licensed facilities because of the relatively low levels of risk caused by radionuclide emissions from these facilities, and because EPA believes that issuing standards for other sources will provide a greater risk reduction.

The joint EPA-NRC-OSHA hearing on occupational dose limits now looks to be as far off as January 1981.

CALL FOR PAPERS

The following call for papers has been issued.

Waste Management '81—will be held February 23–26, 1981 at the Tucson Community Center, Tucson, Arizona. The conference is sponsored by the American Nuclear Society Divisions of the Nuclear Fuel Cycle and Environmental Science, the Arizona Section of the ANS, the University of Arizona, and the U.S. Department of Energy. The conference, which is one of a continuing series of symposia on waste management held annually in Tucson, will have sessions of both invited and contributed papers on regulatory issues, waste isolation issues, waste repository criteria, public communication problems, alternate waste forms and waste packages, alternatives for low level waste disposal, international approaches to waste management, and workshops on transportation, public confidence (how to gain it), wastes from fusion facilities, national waste management policy, and closing and decontamination of nuclear facilities. Titles and abstracts (up to 300 words) of contributed papers should be submitted by September 15, 1980 to the Publications Chairman, J. G. McCray or to the Technical Program Chairman, M. E. Wacks, Department of Nuclear Engineering, The University of Arizona, Tucson, Arizona 85721. Authors will be notified of paper acceptance by October 15, 1980. Completed papers are required by January 15, 1981. Poster Sessions are also planned and the Program Committee will select appropriate papers for these sessions.

ATMOSPHERIC TRANSPORT PROCESSES SYMPOSIUM SCHEDULED

A symposium on *Intermediate Range Atmospheric Transport Processes and Technology Assessment* will be held October 1–3, 1980 in Gatlinburg, Tennessee. The symposium is sponsored by the U. S. Department of Energy, the National Oceanic and Atmospheric Administration, and the Oak Ridge National Laboratory. It is designed to bring together experts concerned with observing and modeling atmospheric transport processes 10 to 100 km downwind of point and area sources of pollution. The purpose of this meeting is to assess the state of the art in this field, and to identify areas for future effort. Further, it is hoped that this interchange of information will result in recommendations concerning the most appropriate methods to use in technology assessment activities.

The sessions will consist of contributed papers, invited papers, and a panel discussion. The panel discussion will be concerned with models and methods to be used for technology assessment purposes and with data and research needs. Papers are solicited for sessions on technology assessments involving intermediate range atmospheric transport that have been performed; models for intermediate range transport; deposition, transformation, and complex terrain considerations; data bases available for studying intermediate range transport; and model validation studies.

For further information contact: Dr. Charles W. Miller, Technology Assessments Section, Health and Safety Research Division, Oak Ridge National Laboratory, Bldg. 7509, Post Office Box X, Oak Ridge, Tennessee 37830; Telephone (615) 576-2102.

6TH INTERNATIONAL SMiRT CONFERENCE ANNOUNCED

The *6th International Conference on Structural Mechanics in Reactor Technology (SMiRT)* will be held August 17–21, 1981 in Paris, France. SMiRT-6 is undertaken under the main sponsorship of the Commission of the European Communities and of the International Association for Structural Mechanics in Reactor Technology (IASMiRT). General responsibilities are assumed by the Societe Francaise d'Energie Nucleaire (SFEN) which includes the main French organizations in nuclear energy. A local organization committee assists SFEN in this task.

The 1st and 2nd SMiRT conferences were held in Berlin in 1971 and 1973, the 3rd in London in 1975, the 4th in San Francisco in 1977, and the 5th in Berlin in 1979. They provided a most useful meeting ground for reactor technologists, mechanical and civil structural engineers and engineering mechanics scientists from all over the world. The 6th SMiRT conference holds promise of maintaining the high level of contribution from engineers and researchers from many countries, and of increasing the interaction between fundamental and applied workers in this vital field.

For further information contact: SMiRT-6 Organization Committee, c/o SFEN—48, rue de la Procession, F-75724 Paris CEDEX 15, France.

RPI 1980 SUMMER PROGRAMS SCHEDULED

The Rensselaer Polytechnic Institute will offer a three-week comprehensive study program in nuclear power plant technology, operations, safety, maintenance, reload analysis, computer codes, and related areas. The overall program consists of three separate self-contained course modules: Basic Nuclear Power Technology, July 7–13; Nuclear Power Plant Design, July 14–18; and Analytical Methods & Computer Codes, July 21–25. For further information, call 518-270-6442 or write to the Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy, New York 12181.

GEORGIA TECH OFFERS RADIATION PROTECTION COURSE

The Georgia Institute of Technology's Department of Continuing Education will offer a ten-day short course on *Radiation Protection* August 4–15, 1980. The course will place emphasis on radiation protection, interaction of radiation with matter, measurement techniques for specific radionuclides, biological effects of radiation, personnel monitoring, operation of field and laboratory instruments, public health and environmental considerations, appropriate standards, and rules and regulations. It is designed for those in industry, government (federal, state, and local) and academic institutions having an interest in and need for basic radiological health training. Completion of this course will satisfy most radionuclide-use requirements of federal and state regulatory agencies.

Georgia Tech's School of Nuclear Engineering and Office of Interdisciplinary Programs are the co-sponsors of this course.

The course fee will be $750 and registration deadline is July 24, 1980. For further information contact the Department of Continuing Education, Georgia Institute of Technology, Atlanta, GA 30332; Telephone (404) 894-2400.

MAY 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

AECL-6189
Neutron-Induced Displacement Damage Analysis (with Particular Reference to Zirconium)., Woo, C.H., October 1978, Dep., NTIS (U.S. Sales Only), PC A05/MF A01

BARC-983
Range and Energy Functions of Interest in Neutron Dosimetry., Bhatia, D.P.; Nagarajan, P.S., 1978, Dep., NTIS (U.S. Sales Only), PC A02/MF A01

BARC-1000
ENDF/B Based 27-Group Cross-Sections for Some Rare Earth and Concrete Elements., Garg, S.B., 1979, Dep., NTIS (U.S. Sales Only), PC A03/MF A01

CENBG-7802; CONF-780172-1
Energy Dependence of Multiplicities in Continuum Gamma-Rays., Alconard, M.-M., 1978, Dep., NTIS (U.S. Sales Only), PC A02/MF A01

CONF-790402,Vol.I, pp.3-1–3-31
Modern Coarse-Mesh Methods - A Development of the '70's., Dorning, J.J., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-1–4-18
A Timing Comparison of Two-Dimensional Discrete-Ordinates Codes for Criticality Calculations., Miller, W.F.,Jr.; Alcouffe, R.E.; Bosler, G.E.; Brinkley, F.W.,Jr.; O'Dell, R.D., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-19–4-33
A Comparison of Codes for Deep Penetration Transport Studies., Rhoades, W.A.; Tomlinson, E.T., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-35–4-47
Continuous Four-Point Triangular Mesh Difference Schemes for the Multigroup Neutron Transport Equation., Kufner, K.; delMarmol, B.; Minsart, G., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-49–4-63
A Three-Dimensional Hexagonal-Z Difference Scheme for Discrete-Ordinates Codes., Walters, W.F.; O'Dell, R.D., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-65–4-78
Convergence of Two-Dimensional Discrete-Ordinates for Regions with Imbedded Vacuums., Nelson, P., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-79–4-94
Time-Dependent Continuous-Energy Benchmark Solutions in Neutron Transport Theory., Ganapol, B.D.; Roybal, J.A.; Peddicord, K.L.; Henninger, R.J., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-95–4-115
Refinements for Spatial Channel Theory Computations., Abu-Shumays, I.K.; Selva, R.J.; Shure, K., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.4-117–4-133
A Nodal Discrete-Ordinates Method for the Numerical Solution of the Multidimensional Transport Equation., Wagner, M.R., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-1–5a-7
Panel on Recent Developments in Standards Activities in Computer Technology., Olhoeft, J.E., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-9–5a-12
Development of a Standard for the Validation and Verification of Calculational Procedures., Ozer, O., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-13–5a-19
Guidelines for Considering User Needs in Computer Program Development (ANS 10.5)., Main, G.C., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-21–5a-30
Standards Activities Within X3 - the Computers and Information Processing Community., Butler, M.K., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-31–5a-36
FORTRAN - Past, Present, and Future., Marshall, N.H., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.5a-37–5a-40
Recommended Programming Practices to Facilitate the Portability of Scientific Computer Programs., Kopp, L.I., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-1–7-8
A Comprehensive Survey of Continuous Energy Three-Dimensional Monte Carlo Criticality Codes., Steinberg, H.A., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-9–7-19
Monte Carlo Computation of Directional Diffusion Coefficients., Gelbard, E.M.; Pego, R., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-21–7-35
Monte Carlo Statistical Weighting Methods for External Source Driven Multiplying Systems., Ragheb, M.M.H.; Maynard, C.W., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-37–7-53
A Monte Carlo Method for Calculating Fusion Product Behavior in Field-Reversed Mirrors., Driemeyer, D.; Miley, G.H.; Condit, W.C., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-55–7-69
Improvements of the Integral Transport Theory Method., Kavenoky, A.; Lam-Hime, M.; Stankovski, Z., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-790402,Vol.II, pp.7-71–7-83
An Interface-Currents Integral Transport Model for Treating Doubly Heterogeneous, Multisystem Geometries., Westfall, R.M.; Bjerke, M.A., 1979, HC–ANS Virginia Section, P.O. Box 1260, Lynchburg, Va. 24505; MF–NTIS

CONF-791204-23
Starfire: A Commercial Tokamak Reactor., Baker, C.C.; Abdou, M.A.; DeFreece, D.A.; Trachsel, C.A.; Graumann, D.; Kokoszenski, J., 1979, Dep., NTIS, PC A04/MF A01

COO-2431-2
Thermal-Hydraulic and Neutronic Considerations for Designing a Lithium-Cooled Tokamak Blanket., Mikic, B.; Todreas, N., December 1978, Dep., NTIS, PC A06/MF A01

DOE/TIC-10124
Organization for Radiation Protection. Operations of the ICRP and NCRP: 1928-1974., Taylor, L.S., September 1979, Dep., NTIS, PC $25.00/MF $8.50

DNA-1251-1-EX
Compilation of Local Fallout Data from Test Detonations 1945-1962 Extracted from DASA-1251. Vol.I-Continental U.S. Tests., Defense Nuclear Agency, May 1979, General Electric Company for the Defense Nuclear Agency. $19.00

DNA-1251-2-EX
Compilation of Local Fallout Data from Test Detonations 1945-1962 Extracted from DASA-1251. Vol.II-Oceanic U.S. Tests., Defense Nuclear Agency, May 1979, General Electric Company for the Defense Nuclear Agency. $12.50

EUR-5629e, pp.57-60 (Extended Abstract)
The Use of 3-He Proportional Counter to Measure Continuous Neutron Spectra and Associated Gamma Fluxes., Holt, P.D.; Boot, S.J., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.61-63 (Extended Abstract)
Characteristic Energy Deposition Spectra Inside a Phantom for 15 MeV Neutrons., Maier, E., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.65-67 (Extended Abstract)
Summary of the Discussions on "Source and Field Characteristics"., Goodman, L.J., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.69-76 (Extended Abstract)
Kerma Factors for Tissue Compositions, Compounds and Mixtures., Caswell, R.S.; Coyne, J.J.; Randolph, M.L., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.77-80 (Extended Abstract)
Measurement of the Dose Components Arising from Cf-252 by the Method of Stochastic Current Analysis., Sherwin, A.G., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.81-82 (Extended Abstract)
Summary of the Discussions on "Cross Sections and Mass Energy Transfer Coefficients; Measurements and Calculations"., Burger, G., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.83-86 (Extended Abstract)
On the Effective W-Value for Cavity Ionization Chambers and Indirectly Ionizing Radiation., Booz, J., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-5629e, pp.87-94 (Extended Abstract)
Analysis of the Currently Available W-Values and Stopping Power Data for Fast Neutron Dosimetry., Bichsel, H.; Moore, W.E.; Rubach, A., 1976, Office for Official Publications of the European Communities, Boite postale 1003 - Luxembourg

EUR-6182
Introduction of Neutron Metrology for Reactor Radiation Damage., Alberman, A.; Genthon, J.P.; Mas, P.; Schneider, W.; Wright, S.B.; Zijp, W.L., 1979, Dep., NTIS (U.S. Sales Only), PC A05/MF A01

IA-1348, pp.35-36
U-238 Blanket Calculations for a Laser-Fusion Reactor Using Modified ENDF/B-IV Cross Sections., Segev, M.; Krumbein, A.D.; Lemanska, M., June 1978, In: Research Laboratories Annual Report 1977.

IAEA-TECDOC-223
Nuclear Data for Fusion Reactor Technology., Lorenz, A.; Muir, D.W. (Eds.), December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria, Proceedings of the Advisory Group Meeting on Nuclear Data for Fusion Reactor Technology organized by the IAEA and held in Vienna, 11-15 December 1979.

IAEA-TECDOC-223, pp.1-7
Nuclear Data Requirements of the Magnetic Fusion Power Program of the United States of America. (Introductory Paper No.I), Head, C.R., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.11-29
Nuclear Data Requirements for Fusion Reactor Design - Neutronics Design, Blanket Neutronics and Tritium Breeding. (Review Paper No.A1), Constantine, G., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.31-45
Review of Nuclear Heating in Fusion Reactors. (Review Paper No.A2), Seki, Y., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.47-74
Nuclear Data Requirements for Transmutation and Activation of Reactor Wall and Structural Materials. (Review Paper No.A3), Jarvis, O.N., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.75-89
Nuclear Data Needs for Radiation Damage Studies Relevant to Fusion Reactor Technology. (Review Paper No.A4), Qaim, S.M., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.91-110
Nuclear Data Requirements for Fusion Reactor Shielding. (Review Paper No.A5), Abdou, M.A., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.111-118
Neutron Data for Hybrid Reactor Calculations. (Review Paper No.A6), Markovskii, D.V.; Shatalov, G.E., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.121-138
Cross-Section Sensitivity and Uncertainty Analysis for Fusion Reactors - A Review. (Review Paper No.B1), Dudziak, D.J., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.139-152
Theoretical Approach to Nuclear Data Required for Fusion Reactor Calculations. (Review Paper No.B2), Seeliger, D., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.153-183
Evaluated Files of Nuclear Cross Sections for Fusion Reactor Calculations. (Review Paper No.B3), Bhat, M.R., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.185-197
Neutron Reaction Data in the MeV Range. (Review Paper No.B4), Liskien, H., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.199-222
Status of 14-MeV Neutron Cross Section Data. (Review Paper No.B6), Csikai, J., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IAEA-TECDOC-223, pp.223-236
Data for Charged Particle Reactions with Heavier Nuclides. (Review Paper No.B7), Muenzel, H., December 1979, MF Only - INIS Microfiche Clearinghouse, IAEA, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria

IPP-1/177
1 D Calculations on Transport, Neutral Injection Heating and Ignition Control in Zephyr., Gruber, O., December 1979, Max-Planck-Institut fuer Plasmaphysik, Garching/Muenchen (Germany, F.R.)

IPP-1/178
Transport Calculations with the BALDUR Code. I. Basic Scenario with Impurity Free Plasma and Standard Diffusion Model., Lackner, K.; *et al.*, December 1979, Max-Planck-Institut fuer Plasmaphysik, Garching/Muenchen (Germany, F. R.)

JAERI-M-7799 (In Japanese)
Two-Dimensional Shielding Benchmark Calculations by Discrete Ordinates and Monte Carlo Codes, (1)., Japan Atomic Energy Research Inst., Tokyo, August 1978, Dep., NTIS (U.S. Sales Only), PC A04/MF A01

JAERI-M-7988
MCRTOF: A Monte-Carlo Program for Multiple Scattering of Neutrons in Resonance Energy Region., Ohkubo, M., November 1978, Dep., NTIS (U.S. Sales Only), PC A03/MF A01

LA-8193-MS
Computational Benchmark Problem for Deep Penetration in Iron., Hendricks, J.S.; Carter, L.L., January 1980, Dep., NTIS, PC A06/MF A01

NUREG CR-1419; ORNL/NUREG-68
Cost-Benefit Effects of Conversion to SI Units in Health Physics., Eichholz, G.G.; Poston, J.W.; Fair, M.F.; Auxier, J.A., May 1980, NTIS; GPO Sales Program, Div. of Technical Information and Document Control, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555

ORNL/TM-6980
User's Manual to the ICRP Code: A Series of Computer Programs to Perform Dosimetric Calculations for the ICRP Committee 2 Report., Watson, S.B.; Ford, M.R., February 1980, Dep., NTIS, PC A10/MF A01

SAND-79-0772
Cross Sections for Electron and Photon Processes Required by Electron-Transport Calculations., Peek, J.M., November 1979, Dep., NTIS, PC A06/MF A01

UCRL-15188
User's Manual for Biosphere and Dose Simulation Program (BIODOSE)., Duffy, J.J.; Bogar, G.P., January 4, 1980, Dep., NTIS, PC A04/MF A01

UCRL-50,400, Vol.22
GAMIDENT: A Program to Aid in the Identification of Unknown Materials by Gamma-Ray Spectroscopy., Howerton, R.J.; *et al.*, January 1980, Dep., NTIS

UCRL-82969; CONF-791058-66
Burning Nuclear Wastes in Fusion Reactors., Meldner, H.W.; Howard, W.M., February 20, 1980, Dep., NTIS, PC A02/MF A01

WAPD-TM-1310
Three Core Concepts for Producing Uranium-233 in Commercial Pressurized Light Water Reactors for Possible Use in Water-Cooled Breeder Reactors (AWBA Development Program)., Conley, G.H.; *et al.*, December 1979, Bettis Atomic Power Lab., West Mifflin, PA

Ann. Nucl. Energy, 5(1), 35-45
Experimental Benchmark Data Showing the Importance of Bremsstrahlung in Shielding Calculations., Bishop, G.B.; Marafie, A.M., 1978

Kernenergie, 21(6), 186-188
Comparison of Shielding Studies., Zappe, D., June 1978

Kernenergie, 21(7), 219-222 (In German)
Experimental Determination of Neutron Flux Density in the Vicinity of Iron Shields., Streubel, G., July 1978

N.E.A. Data Bank Newsletter, No.23, 1-10
Some Experiences with the AMPEX Code., Caglioti, E., November 1979

N.E.A. Data Bank Newsletter, No.23, 11-12
Implementation of the AMPX System at KFA Julich., Scherer, W., November 1979

N.E.A. Data Bank Newsletter, No.23, 13-14
Operating Experience on AMPX Code., Panini, G.C., November 1979

N.E.A. Data Bank Newsletter, No.23, 15-26
Comparison Between Group Constants Produced by Processing Codes ETOX and TIMS., Takano, H.; Ishiguro, Y.; Matsui, Y., November 1979

N.E.A. Data Bank Newsletter, No.23, 27-34
BABEL: A New Multi-Purpose Neutron and Gamma Library for Fast Reactor Shielding Design., Rado, V.; Reynaud, G.; Salvatores, M.; Trapp, J.P., November 1979

N.E.A. Data Bank Newsletter, No.23, 35-43
Formation of GAM Library Data in Energy Groups Containing Resolved Resonances in Cases of PWR Applications., Penndorf, K.; Schult, F., November 1979

N.E.A. Data Bank Newsletter, No.23, 45-49
WIMS-D Performance in Cell Parameters Calculation for UO_2-D_2O Systems., Corcuera, R.P.; Galia, A.V.; Pezzoni, R.E., November 1979

N.E.A. Data Bank Newsletter, No.23, 51-54
The MORSE Continuous Weights Code., Berthier; Ledanois, November 1979

N.E.A. Data Bank Newsletter, No.23, 55-58
Use of DOT 3.5 for the Calculation of a Fast Power Reactor Shield., Lochouarn, F.; Palmiotti, G.; Salvatores, M., November 1979

N.E.A. Data Bank Newsletter, No.23, 59-85
The Transport-Codes DOT and TWOTRAN as Standards for a Diffusion-Treatment of Pebble-Bed-Reactors Containing a Large Cavity., Gerwin, H., November 1979

N.E.A. Data Bank Newsletter, No.23, 87-100
Two-Dimensional Shielding Benchmark Calculations by Discrete Ordinates and Monte Carlo Codes., Sasamoto, N.; Takeuchi, K., November 1979

Nucl. Sci. Eng., 74(2), 106-129
Fission-Product Energy Release for Times Following Thermal-Neutron Fission of 235-U Between 2 and 14 000 s., Dickens, J.K.; Love, T.A.; McConnell, J.W.; Peele, R.W., May 1980

Nucl. Sci. Eng., 74(2), 130-139
A Separation Method for the Transport Equation and Sensitivity Theory for Fusion-Fission Hybrid Analysis., Youssef, M.Z.; Conn, R.W., May 1980

Nucl. Sci. Eng., 774(2), 147-153
Application of Generalized Variational Principles to Controlled Thermonuclear Reactor Neutronics Analysis. (Tech. Note), Cheng, E.T., May 1980

Nucl. Technology, 48(3), 187-195
Dose Rates from Induced Activity in the Tokamak Fusion Test Reactor Test Cell., Alsmiller, R.G.,Jr.; Barish, J.; Santoro, R.T.; Lillie, R.A.; Barnes, J.M.; Ragheb, M.M.H., May 1980, Announced previously as ORNL/TM-6904

Nucl. Technology, 48(3), 204-215
Development Studies Regarding the Construction of Epithermal-Enriched Neutron Field for Medical Purposes at the University of Tokyo YAYOI Fast Reactor., An, S.; Furuhashi, A.; Oka, Y.; Akiyama, M.; Kuga, H.; Tanaka, H., May 1980

Nucl. Technology, 48(3), 216-232
Nuclear Performance of Molten Salt Fusion-Fission Symbiotic Systems for Catalyzed Deuterium-Deuterium and Deuterium-Tritium Reactors., Ragheb, M.M.H.; Santoro, R.T.; Barnes, J.M.; Saltmarsh, M.J., May 1980, Announced previously as ORNL/TM-6560

COMPUTER CODES LITERATURE

Atomkernenerg. Kerntech., 34(1), 3-10 (In French) ..... FLICA II C; TRIDENT
Three-Dimensional Model of Neutronic-Thermo-Hydrodynamic Interaction in the Core of Light Water Reactors (Stationary State)., Mastrangelo, V., Conservatoire National des Arts et Metiers (CNAM), 75-Paris, France; Lyon-I Univ., 69 France, 1979

Atomkernenerg. Kerntech., 34(4), 275-277 .. DTF-IV; GGC-3
Outgoing Neutron Spectrum from H_2O in a H_2O-Uranium Interface., Lolich, J.V.; Abbate, M., Comision Nacional de Energia Atomica, San Carlos de Bariloche, Argentina, Centro Atomico Bariloche, 1979

CENBG-7707 ..... GROGi-F
GROGi-F. Modified Version of GROGi 2 Nuclear Evaporation Computer Code Including Fission Decay Channel., Delagrange, H., Bordeaux-I Univ., 33-Gradignan, France, Centre d'Etudes Nucleaires, 1977

CNEN-RT/FI-79-7 ..... DANTE
DANTE-Unfolding Code for Energy Spectra Evaluation. Part I: Mathematical Method., Petilli, M., Comitato Nazionale per l'Energia Nucleare, Casaccia, Italy, Centro di Studi Nucleari; Comitato Nazionale per l'Energia Nucleare, Rome, Italy, 1979

COO-3494-29 ..... OVERLAID ALICE
OVERLAID ALICE: A Statistical Model Computer Code Including Fission and Precquilibrium Models., Blann, M., Rochester Univ., NY, Nuclear Structure Research Lab.; Bonn Univ., Germany, F.R.; Kernforschungsanlage Juelich G.m.b.H., Germany, F.R., 1976, AVAIL: NTIS

EPRI-NP-1017 ..... SAIL
SAI EPRI Albedo Information Library., Simmons, G.L., Science Applications, Inc., La Jolla, CA, March 1979, AVAIL: NTIS

EUR-5722 ..... MODESTY
Calculation of Nuclear Reaction Cross Section with the Statistical Model., Matthes, W., Commission of the European Communities, Ispra, Italy, Joint Research Centre, 1977

IAE-2877 (In Russian) ..... MOCDIF
MOCDIF-Program for Neutron Field Characteristic One-Dimensional Calculation., Kozhevnikov, A.N.; Marin, S.V.; Markovskij, D.V.; Khrustalev, A.V.; Shatalov, G.E., Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow, Inst. Atomnoj Ehnergii, 1977

IAE-2994 (In Russian) ..... NEDAM
Program for Shaping Neutron Microconstants for Calculations by Means of the Monte-Carlo Method on the Base of Estimated Data Files (NEDAM)., Zakharov, L.N.; Markovskij, D.V.; Frank-Kamenetskij, A.D.; Shatalov, G.E., Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow, Inst. Atomnoj Ehnergii, 1978, FORTRAN, BESM-6

IAE-3044 (In Russian) ..... BLANK
Computer Code for Calculating Spatial and Energy Neutron Distributions in a One-Dimensional Geometry (Modification of the BLANK Code)., Marin, S.V.; Markovskij, D.V.; Shatalov, G.E., Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow, Inst. Atomnoj Ehnergii, 1978

ICEFIZ-NP-1-1978 ..... GIGMF
GIGMF - A Statistical Model Program., Vladuca, G.; Deberth, C., Bucharest Univ., Romania; Institutul de Reactori Nucleari Energetici, Pitesti, Romania, Institutul Central de Fizica, Bucharest, Romania, January 1978, PDP-15

IEA-INF-068 ..... PHOEL
A Monte Carlo Code (PHOEL) for Generating Initial Energies of Photoelectrons and Compton Electrons Produced by Photons in Water., Turner, J.E.; Modolo, J.T.; Sordi, G.M.A.A.; Hamm, R.N.; Wright, H.A., Instituto de Energia Atomica, Sao

Paulo, Brazil, Centro de Protecao Radiologica e Dosimetria, February 1979

INDC(NDS)-103/M, 98-116 ..... ITER-2
Iteration Acceleration in the ITER-2 Unfolding Code., Pauko, M.; Najzer, M., Institut Jozef Stefan, Ljubljana, Yugoslavia, May 1979

INDC(NDS)-103/M, 117-130 ..... ITER
Multispectrometer Unfolding by ITER Code., Glumac, B.; Najzer, M., Institut Jozef Stefan, Ljubljana, Yugoslavia, May 1979

JAERI-1259 ..... LAMP-B
LAMP-B: A FORTRAN Program Set for the Lattice Cell Analysis by Collision Probability Method., Tsuchihashi, K., Japan Atomic Energy Research Institute, Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Institute, Tokyo, February 1979

JAERI-M-7445 (In Japanese) ..... PALLAS
Multi-Group Neutron Cross Section Libraries for Code PALLAS., Sasamoto, N.; Tanaka, S.; Takeuchi, K., Japan Atomic Energy Research Institute, Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Institute, Tokyo, December 1977

JAERI-M-8019 (In Japanese) ..... THIDA
THIDA: Code System for Calculation of the Exposure Dose Rate Around a Fusion Device., Iida, H.; Igarashi, M., Japan Atomic Energy Research Institute, Tokai, Ibaraki, Tokai Research Establishment; Japan Atomic Energy Research Institute, Tokyo, December 1978

LA-7849-MS ..... MCNP
Contributon Monte Carlo., Dubi, A.; Gerstl, S.A.W., Los Alamos Scientific Lab., NM, May 1979, AVAIL: NTIS

NUREG/CR-0776; LA-7793-MS ..... DASH
DASH: A Multicomponent Time-Dependent Concentration Diffusion with Radioactive Decay Program., Apperson, C.E. Jr.; Lee, C.E.; Carruthers, L.M., Los Alamos Scientific Lab., NM, April 1979, AVAIL: NTIS

SAND-79-0386 ..... CHARTB
CHARTB Multigroup Transport Package., Baker, L., Sandia Labs., Albuquerque, NM, March 1979, AVAIL: NTIS

SGAE-2800; RS-116/77 (In German) ..... FONTA
FONTA - A Computer Code for Calculating the Radiological Consequences of Radioactive Releases as the Result of Hypothetical Accidents in Nuclear Plants., Woloch, F.; Kamelander, G., Oesterreichische Studiengesellschaft fuer Atomenergie G.m.b.H., Vienna, September 1977