RSIC Newsletter

OAK RIDGE NATIONAL LABORATORY
POST OFFICE BOX X • OAK RIDGE, TENNESSEE 37831
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U.S. DEPARTMENT OF ENERGY

Phone No. 615-574-6176 or FTS 624-6176
EasyLink Mailbox: 62813374
Telex(Answer Back): 854467(ORNL EPIC UD)
(For RSIC TELEX Communication Only)

No. 263 *October 1986*

I have never let my schooling interfere with my education.—Mark Twain

ARTHUR B. CHILTON DEATH

Arthur B. (Art) Chilton died at age 67 on September 3, 1986, as the result of injuries received in an automobile accident near his farm in Illinois. As a retired Navy captain, he was buried in Arlington National Cemetery, Washington. Art is survived by his wife, Charlotte, and three children; Stephen P. Chilton of Duluth, Minn. and Geoffrey P. Chilton and Sara Chilton of Urbana, Ill.

Art served 24 years in the Civil Engineering Corps of the U.S. Navy and commanded the Naval Civil Engineering Laboratory at Port Hueneme, California, in the 1950s. It was there that he supervised experiments to obtain information on neutron and gamma-ray streaming through ducts. The famous Chilton-Huddleston formula for gamma-ray backscattering was a direct result of this work. After retiring from the U.S. Navy in the early 1960s, he took up a career in education. As a professor of nuclear engineering at the University of Illinois, he continued research in radiation transport and became mentor to a number of graduate students now active in the industry.

A prolific author, Art has many papers and several books to his credit, including *Structure Shielding Against Fallout Gamma Rays from Nuclear Detonations* (with Lew Spencer and Charlie Eisenhauer) and *Principles of Radiation Shielding* (with Dick Faw and Ken Shultis). He was a principal editor of the *IAEA Engineering Compendium on Radiation Shielding.*

He was a Fellow of the American Nuclear Society (ANS), served on its board of directors, and received the Arthur Holly Compton Award from the ANS in 1984 for outstanding contributions in nuclear science and engineering education. In 1968, Art was elected chairman of the ANS Shielding and Dosimetry Division (now Radiation Protection and Shielding). Last fall the ANS Radiation Protection and Shielding Division Executive Committee voted to present Art with an award for "lifetime achievement." The occasion for presentation had not been determined when he died, but Art knew of the award and was pleased by the action of the committee.

Art was very interested in standards development and was a member (1973–1985) of the National Council on Radiation Protection and Measurements (NCRP) and served on several of its scientific committees. He also served the International Commission on Radiation Units and Measurements and was a member of American National Standards Institute (ANSI) Committee N17, Research Reactors, Reactor Physics, and Radiation Shielding. He was especially interested in the problem of converting flux density values to absorbed dose and dose equivalent. In this connection, Art maintained contact with European workers, and he was a member of ANS-6.1.1, Neutron and Gamma-Ray Flux-to-Dose-Rate Factors.

He will be missed both personally and professionally.

D. K. Trubey

CHANGES TO THE COMPUTER CODE COLLECTION

Eleven changes were made to the computer code collection during the month. Six new code systems were packaged and added to the collection; an existing code package was extended with an additional hardware version, an existing code package was replaced with a new version, and four code packages were updated with software enhancements or documentation. Six changes resulted from foreign contributions.

CCC-371/ORIGEN2

Some changes to this isotope generation and depletion code (matrix exponential method) have been suggested by INTERATOM, Federal Republic of Germany, and Toyo Engineering Corporation, Funabashi-shi, Chiba, Japan, and verified by the Oak Ridge National Laboratory (ORNL) contributors. The changes, which have not been incorporated in the RSIC package, involve some discrepancies in the decay data library recoverable Q-values for Fe-59, Ni-63, and W-185. Current ORIGEN2 values are too high because they contain energies of neutrinos released in beta decay. Details of the changes may be requested from RSIC. In addition, instructions to correct column headings for labeling photon energies are also provided. FORTRAN; IBM 360/370, CDC, VAX (A); PRIME 400 (C).

CCC-393/MONK 6.2

This general purpose Monte Carlo neutronics code system has been replaced by a version contributed by the Reactor Physics Division, UKAEA Atomic Energy Establishment, Winfrith, Dorchester, England, Chemical Plants, Laboratories and Criticality Group, UKAEA Safety and Reliability Directorate, Warrington, England, and Westinghouse Idaho Nuclear Company, Idaho Falls, Idaho. Written principally for criticality calculations relevant to the transport storage and processing of fissile material, MONK calculates the reactivity of an assembly of materials whose geometry can be described to almost any degree of complexity. The package includes SCAN, a geometry checking routine which produces pictures on the line printer of a cross section through the system. This version completely replaces the previous CCC-393/MONK 5.2. References: SRD R 86 and SRD R 88 and informal notes. FORTRAN 77 and Assembler Language.

CCC-421/TPHEX

This code package for transmission probability calculations of multigroup neutron flux distributions in systems of hexagonal cells was extended by the original contributor, Technical Research Center of Finland, Helsinki, to include TPCURR/T-2. A FORTRAN 77 program that reads the flux data written by TPHEX, TPCURR/T-2 calculates and sums partial current densities across the cell surfaces and prints these together with the cell average scalar fluxes. This version facilitates the determination of neutron leakage from one material zone to another. Additional reference: REP-17/85. FORTRAN IV and 77; CDC CYBER 173.

CCC-477/FEWA-FEMA

These companion codes were contributed by the ORNL. FEWA is a finite element model designed to treat complex transient real-world problems of sources/sinks, Dirichlet boundary values, Newmann or Cauchy fluxes, and leaky confining beds (aquitards) simultaneously. FEMA deals with the construction, verification, and demonstration of a finite element model of material transport through aquifers. The particular features of FEMA are its versatility and flexibility to deal with as many real-world problems as possible. References: ORNL-5976 and -6063. FORTRAN IV; IBM 3033.

CCC-490/PRIMEDANA

This system of codes for neutron physics calculations of fast neutron reactors was contributed by the Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria. The set includes the PRIDAN program for calculating the effective cross-section of the media, characteristics of the fast reactor systems, the MED program, a single dimension multigroup program for calculating fast reactors in multigroup diffusion approximation, and the ANALIT program for calculating the criticality in plane geometry. PRIDAN uses the formalism of the self-shielding factors and prepares the effective cross-sections using an iterative procedure. The values of the multigroup cross-sections obtained for different temperatures are used directly as input data for the other programs. MED calculates the critical dimensions, the coefficient of effective multiplication, the real zone, and

distribution of the neutron fission sources. The ANALIT program solves, under given conditions, the diffusion multigroup equation analytically using a method proposed by the authors. The body of mathematics pertaining to the case is presented in the documentation. Reference: Informal notes. FORTRAN IV; EC 1040.

CCC-493/QAD-CGGP

This combinatorial geometry, GP buildup factor version of the QAD-P5A point kernel code for neutron and gamma-ray shielding calculations was announced in the July 1986 *RSIC Newsletter*. Additional work was required and performed at RSIC to provide working versions for IBM 3033 and Data General MV/4000 (CCC-493A) and IBM PC (CCC-493B). The Japan Atomic Energy Research Establishment, Tokai-Mura, and the Tokyo Institute of Technology, provided the basic package, which was based on CCC-307/QAD-CG from the Bechtel Corp., Gaithersburg, Maryland. Reference: Bechtel Report NE007 and informal notes. FORTRAN 77; IBM 3033 and Data General MV/4000 (A); IBM PC MICRO (B) (2 diskettes are required).

CCC-498/MESODIF II

This variable trajectory plume segment model to assess ground-level air concentrations and deposition of routine effluent releases from nuclear power facilities was contributed by Pacific Northwest Laboratory, Richland, Washington, and the Nuclear Regulatory Commission. The package contains sample input for and output from a calculation of χ/Q values using the 1974 hourly meteorological data from the Limerick Power Plant. The master files are written in the format peculiar to the VAX and can be installed using the VMS COPY command. Reference: NUREG/CR-0523 (PNL-2419). FORTRAN IV; VAX 11/780 (tested on VAX 8600).

PSR-137/MARLOWE

The documentation for this code for the simulation of atomic-displacement cascades in solids in the binary collision approximation was updated by ORNL with the addition of an article describing the theoretical basis of the program. In addition, a September 10, 1986, bulletin describing the corrections that have been suggested for the current version has also been provided. Users may request this bulletin from RSIC. References: Informal User's Guide; *Phys. Rev. B*, **9**(12), 5008 (1974).

PSR-227/ECIS-79

This code system to solve the coupled differential equations arising in nuclear model calculations was contributed by the CEA/CEN Service de Physique Theorique, Saclay, France, through the OECD NEA Data Bank, Gif-sur-Yvette, France. The system can be used for vibrational model, symmetric or asymmetric rotational model with a similar range of interaction potentials. It includes spin-orbit deformation. Reference: Notes on ESIS-79 by Jacques Raynal. FORTRAN 66 and Assembler Language; CDC CYBER 174 (A) and IBM-3081 (B).

PSR-231/GRESS

This FORTRAN compiler language for enhancing conventional FORTRAN programs with analytic differentiation of arithmetic statements was contributed by the ORNL. This precompiler uses computer calculus to automatically enhance FORTRAN computer codes with derivative-taking capabilities. From these derivatives generated concurrently with the normal results, sensitivities of any variable used in the code with respect to any other variable or input parameter can be readily obtained. A translation of a small energy model program is provided to illustrate the GRESS model. Reference: ORNL/TM-8339. FORTRAN IV; IBM 3033.

PSR-233 MICRO/LSL-M2

This code system for adjusting neutron spectra calculated in nuclear reactors was contributed by ORNL. The adjustment is based on the combination of neutron transport calculations and radiometric or other integral dosimetry measurements and their underlying uncertainties expressed in the form of variances and correlations. The underlying algorithm is a least-squares logarithmic statistical estimation procedure. Auxiliary programs provide the following functions: ACT converts measured activities to reaction rates, CALACT computes reaction rates from transport calculations and dosimetry cross sections, and FLXPRO

converts data from one group structure to another. A cross section file suitable for input to FLXPRO is also provided. Reference: NUREG/CR-4349 (ORNL/TM-9933), Informal Notes. FORTRAN 77; IBM-PC/AT or IBM-PC with 640K memory and 8087 math coprocessor and fixed disk; IBM PC Professional FORTRAN Compiler, Version 1.0, under DOS 3.1.

NOTE ON SCALE-3 DOCUMENTATION

It is RSIC policy to provide adequate documentation for each code package requested. We can usually provide an additional copy of the documentation for a code package when requested. In the case of CCC-466/SCALE-3 and related code packages, the documentation consists of several large volumes and is expensive to reproduce. In order to control our costs we supply only one copy of the document to any given group. Additional copies can be made available at our cost (currently $150 per copy). We appreciate your cooperation in this special case.

CHANGES TO THE DATA LIBRARY COLLECTION

One new data library was packaged and added to the data library collection during the month.

DLC-120/LENDL-V

This library of evaluated nuclear data in ENDF-V format was contributed by the Nuclear Data Section (NDS), International Atomic Energy Agency (IAEA), Vienna, and Lawrence Livermore National Laboratory (LLNL), Livermore, California. The NDS and LLNL collaborated to translate the 1984 version of the Livermore Evaluated Nuclear Data Library (ENDL-84) into the ENDF-V format. LENDL-V contains data for all significant neutron reactions, including photon production, in the energy range from 10-4 eV to 20 MeV. No retrieval program or sample run is provided. Ref: IAEA-NDS-11, Rev. 4; card images.

Approximate Calculational Techniques Now Available

The report *Approximate Calculational Techniques for Radiation Protection Applications (Collection of Papers Presented at the November 1985 American Nuclear Society Meeting)*, ORNL/RSIC-48 (ANS/SC-86/17), is now available upon request from RSIC. For the convenience of the reader an order form is appended to the end of the newsletter.

The report is made available as the result of the interest shown in the topic and is intended to be the first of a series of sessions and publications directed toward the qualification of radiation protection approximation techniques. The papers presented in the report give an overview of practical, approximate techniques that can be used by the practicing nuclear engineer in a variety of applications.

RP&S Division News

Committee Chairs

The committee chairs for the 1986–1987 term are as follows:

Program—*J. Cardito*, Stone & Webster,
Honors & Awards—*R. T. Santoro*, ORNL,
Nomination—*R. K. Disney*, Westinghouse,
Membership—*W. W. Engle, Jr.*, ORNL, and
Publication—*J. C. Courtney*, Louisiana State University.

Outstanding Service Awards

The Radiation Protection and Shielding Division will honor **Lewis V. Spencer** and **Richard E. Faw** for professional excellence. The awards will be presented at the November 1986 ANS Meeting with citations summarizing their contributions.

The Best Paper Award for the November 1985 ANS Meeting in the RP&S Div. will be presented to *R. E. Maerker* and *B. L. Broadhead* at the November 1986

ANS Meeting in Washington. Their paper is titled "Correlations Between Calculated Surveillance Dosimeter Activities and Pressure Fluxes in the Arkansas Nuclear One Unit 1 Reactor."

Nominees for the Best Paper Award to be judged during the November 1986 ANS Meeting are:

"Neutron and Gamma Ray Flux Calculations for the Venus PWR Engineering," Arnold H. Fero,

"Evaluation and Testing of Double Differential Fe (n,n') Cross Sections," C. Y. Fu and D. M. Hetrick, and

"PC-Class Micro Computer Experience in Radiation Protection and Shielding Analysis at INEL," W. Y. Yoon, D. K. Parsons, and D. W. Negg.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Eliana Amaral,* Brazilian Nuclear Energy Commission, Rio de Janeiro; *Harm Gruppelaar,* ECN, Petten, The Netherlands; *Mary Helen Sparks,* White Sands Missile Range, New Mexico; and *George H. Meriwether,* UNC Nuclear Industries, Richland, Washington.

CONFERENCES, COURSES, SYMPOSIA

RSIC attempts to keep its users/contributors advised of conferences, courses, and symposia in the field of radiation protection, transport, and shielding through this section of the newsletter. Should you be involved in the planning/organization of such events, feel free to send your announcements and calls for papers to RSIC.

RP&S Sessions Planned for ANS Meet

Sessions of interest to the international shielding community are planned for the November 16–20 ANS Meeting in Washington, D. C.

The session titled **Radiation Transport Methods** is sponsored by the Radiation Protection and Shielding Division with the following presentations to be made:

Neutron and Gamma-Ray Flux Calculations for the VENUS PWR Engineering Mockup, Arnold H. Fero (Westinghouse NTSD).

Development and Testing of a Monte Carlo Code System for Analysis of Ionization Chamber Responses, J. O. Johnson and T. A. Gabriel (ORNL).

Evaluation and Testing of Double Differential Fe (n,n') *Cross Sections,* C. Y. Fu and D. M. Hetrick (ORNL).

Neutron Shields for Medium Energy Accelerators, Robert J. Morford and Leland L. Carter (Westinghouse Hanford).

Production of Activation Products in Spacecraft Components by Protons in Low Earth Orbit, Eugene Normand and Margaret L. Johnson (Boeing Aerospace).

The session titled **Application of Personal Computers in Radiation Protection and Shielding** is sponsored by the RP&S Div.; session organizer is Victor R. Cain, Science Applications International Corp. (SAIC), and the presentations are as follows:

PC-Class Microcomputer Experience in Radiation Protection and Shielding Analysis at INEL, W. Y. Yoon, D. K. Parsons, and D. W. Nigg (EG&G Idaho).

Different Perspectives on the Use of Personal Computers for Technical Analyses, Richard A. Libby (Battelle HARC) and Ann L. Doherty (PNL).

Buildup Factor Data for Point Kernel Calculations, D. K. Trubey (ORNL) and Y. Harima (Tokyo Inst. of Technology).

Conversion of Radionuclide Transport Codes to IBM-Compatible Microcomputers, Wilfred D. Pon and Stephen F. Marschke (Envirosphere).

PROCESS-A Source Term Calculation Program for the PC, T. K. Gil and Bill Hopkins (Bechtel, Gaithersburg).

Microshield, A Microcomputer Program for Analyzing Dose Rate and Gamma Shielding, C. A. Negin (Grove Eng.).

The Fuel Cycle and Waste Management, the Environmental Sciences, and the RP&S Divisions are cosponsoring a session titled ***De Minimis* and Intermediate-Level Waste**; session organizer is Jerry Cohen (SAIC) and the presentations are as follows:

Defining Greater-Than-Class-C Low-Level Radioactive Waste, M. A. Knecht (INEL) and O. I. Oztunali (Envirosphere).

Transuranic Waste Disposal in the United States, Joseph D. Thompson (Rockwell International).

The Potential for Deregulated Disposal of Very Low Level Wastes, Joyce P. Davis (General Physics).

Criteria for Waste-Related Risks to be Below Regulatory Concern, Sheldon L. Trubatch (Commonwealth Edison).

Disposal of BRC Waste Containing Short-Lived Radionuclides, V. C. Rogers and R. D. Baird (Rogers & Assoc.).

A Proposed Classification Scheme for High-Level and Other Radioactive Wastes, David C. Kocher and Allen G. Croff (ORNL).

An Approach to Defining De Minimis, *Intermediate and Other Classes of Radioactive Waste,* Jerry J. Cohen and Craig F. Smith (SAIC).

Radiation Protection and Shielding Applications is a session sponsored by RP&S with the following presentations:

Reflection of Gamma Radiation in a Spherical Concrete-Walled Room, Gerald P. Lahti, William J. Johnson, and John M. Rich (Sargent & Lundy).

Gamma-Scanning the Primary Shield Cavity Under the TMI-2 Reactor Vessel, Reuben Rainisch, Victor R. Fricke (Burns & Roe), and Parker G. Atkins, Jr. (Bechtel).

Influence of Gamma-Ray Skyshine on Nuclear Facilities Design, Masahiro Ohta, Masatoshi Tsuji, and Yuji Kimura (Tokyo Eng. Corp.).

Operational Radiation Protection for Reducing Cumulative Exposure at a Boiling Water Reactor, John D. Parkyn (Dairyland Power).

Radioactive and Electron Microscope Analysis of Effluent Monitor Sample Lines, John F. Kowalski (Duquesne Light).

Calculations for Determining Appropriate Key Radionuclides for Failed Fuel Analysis, Richard D. Harris and Stephen E. Binney (Oregon State Univ.).

ANS Call for Papers

A call for papers has been issued for the American Nuclear Society (ANS) Annual Meeting to be held June 7–11, 1987, in Dallas, Texas. The deadline for submission of 450–900-word summaries is **January 9, 1987**. Authors will be notified of acceptance by February 25. Accepted summaries will be presented orally and published in the *Transactions.* For detailed information about subject categories and summary guidelines contact Craig F. Grochmal, Technical Program Chairman, ATTN: Transactions Office American Nuclear Society, 555 North Kensington Ave., La Grange Park, IL 60525.

REAC/TS Offers Radiation Accident Courses

The Radiation Emergency Assistance Center/Training Site (REAC/TS) in Oak Ridge, Tennessee, is offering several courses in the handling of radiation accidents. A brief description of the courses follows. Details may be obtained from Robert C. Hicks, Director, REAC/TS, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831-0117 (phone 615-576-3131).

Medical Planning and Care in Radiation Accidents is offered Nov. 3–7, 1986, and Mar. 2–6, and Aug. 17–21, 1987. The course is designed for health care officials who may have to provide medical services in the event of a radiation accident.

Health Physics in Radiation Accidents is offered Jan. 12–16, and Sept. 14–18, 1987. The course is designed for health physicists who may respond to accidents involving radioactive materials and personnel injury.

Handling of Radiation Accidents by Emergency Personnel is offered Nov. 11–14, 1986, and Feb. 3–6, Mar. 10–13, Mar. 31–Apr. 3, and Sept. 22–25, 1987. The course is designed for physicians and nurses in the emergency room who may have to administer initial hospital aid to radiation accident victims.

Calendar

Your attention is directed to the following additional events of interest to the radiation shielding and protection community.

November 1986

International Symposium on Nuclear Material Safeguards, Nov. 10–14, 1986, sponsored by IAEA. Contact: IAEA, Conf. Service Section, P.O. Box 100, A-1400 Vienna.

United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy, Nov. 10–28, 1986. Contact: Executive Secretary, UN Conf. for the Promotion of Internatl. Co-operation in the Peaceful Uses of Nuclear Energy, Vienna International Centre, P.O. Box 500, A-1400 Vienna.

International Symposium on Nuclear Material Safeguards, Nov. 10–14, 1986, Vienna, sponsored by the IAEA. Contact: IAEA, Conference Service Section, P.O. Box 100, A-1400 Vienna.

ANS and Atomic Industrial Forum Joint Meeting, Nov. 14–21, 1986, Washington, D. C. Contact: D. G. Pettengill, ANS, 555 N. Kensington Ave., La Grange Park, IL 60535 (phone 312-352-6611 ext. 257).

Neutron Personnel Dosimetry, Nov. 17–20, 1986, Knoxville, Tennessee, a course offered by ORNL. Contact: C. S. Sims or R. E. Swaja, Oak Ridge National Laboratory, Bldg. 7710, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-5851).

Workshop on Age-Related Factors in Radionuclide Metabolism and Dosimetry, Nov. 26–28, 1986, Angers, France, sponsored by the Commission of the European Communities, and the French Atomic Energy Commission. Contact: G. B. Gerber, Commission of the European Communities, DG XII/PI, Rue de la Loi 200, B-1049 Brussels, Belgium (phone 2-2354041).

Radiation Protection Problems Encountered in Major Development in New Techniques and Technologies,

14th ATSR Symposium, Nov. 26–28, 1986, Paris, France, sponsored by the French Association for Technical and Scientific Radiation Protection (ATSR). Contact: Secretariat GRA-SPR, CEN de Saclay, F-91191 Gif-sur-Yvette, France.

January 1987

4th Symposium on Space Nuclear Power Systems, Jan. 12–16, 1987, Albuquerque, New Mexico, sponsored by the Univ. of New Mexico, ANS, Sandia National Laboratories, and the U. S. Dept. of Energy. Contact: Mohamed S. El-Genk, Institute for Space Nuclear Power Studies, Chemical and Nuclear Engineering Dept., Univ. of New Mexico, Albuquerque, NM 87131 (phone 505-277-5442).

February 1987

Radiation Transport Calculations Using EGS4, Feb. 16–19, 1987, Montreal, Canada, a course sponsored by the National Research Council of Canada. Contact: David W. O. Rogers, Ionizing Radiation Standards, National Research Council of Canada, Ottawa, Ontario K1A OR6 Canada (phone 613-993-2715).

March 1987

Radioactive Waste Management (WM 87), March 1–5, 1987, Tucson, Arizona, sponsored by the Univ. of Arizona. Contact: Technical Program Chairman, WM 87, Dept. of Nuclear and Energy Engineering, College of Engineering and Mines, Univ. of Arizona, Tucson, AZ 85721 (602-621-2475).

Conference on Health Effects of Low Dose Ionizing Radiation: Recent Advances and Their Implications, March 31–April 3, 1987, sponsored by the British Nuclear Energy Society. Contact: P. J. Ross, BNES, Institution of Civil Engineers, 1-7 Great George St., Westminster, London SW1P 3AA, United Kingdom (phone 01-222-7722 ext. 283).

April 1987

23d Annual Meeting of the National Council on Radiation Protection and Measurements, Apr. 8–9, 1987, Washington, D. C. Contact: NCRP, 7910 Woodmont Ave., Suite 1016, Bethesda, MD 20814.

Radiation Protection and Shielding Conference, Apr. 20–23, 1987, Knoxville, Tenn., sponsored by ORNL. Contact: D. L. Selby, ORNL, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-6161).

Theory and Practices in Radiation Protection and Shielding, Apr. 22–24, 1987, Knoxville, Tennessee, sponsored by the ANS Radiation Protection and Shielding Division. Contact: Robert T. Santoro, Chairman, Technical Program Committee, ANS Topical Conference, RP&S, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-6084).

Advances in Reactor Physics, Mathematics and Computation, Apr. 27–30, 1987, sponsored by the European Nuclear Society, French Nuclear Energy Society, Commission of the European Communities, French Atomic Energy Commission, Electricité de France, ANS, Nuclear Energy Agency, Organisation for Economic Co-operation and Development. Contact: R. Alcouffe, Los Alamos National Laboratory, P.O. Box 1663, MS-B226, Los Alamos, NM 87545.

May 1987

6th Symposium on Reactor Dosimetry, May 31–June 5, 1987, Jackson Hole, Wyoming, sponsored by the American Society for Testing and Materials, and the Commission of the European Communities in cooperation with the International Atomic Energy Agency. Contact: G. R. Lamaze, National Bureau of Standards, Bldg. 235, Gaithersburg, MD 20899 (phone 301-921-2767) or H. Röttger, Joint Research Centre, Petten Establishment, HFR Div., Postbus 2, 1755 ZG Petten, The Netherlands.

June 1987

Application of Computer Technology to Radiation Protection, June 22–26, 1987, Bled, Yugoslavia, sponsored by the IAEA. Contact: Conference Service Section, IAEA, P.O. Box 100, A-1400 Vienna.

August 1987

9th International Conference on Structural Mechanics in Reactor Technology (SMiRT-9), Aug. 17–21, 1987, Lausanne, Switzerland, sponsored by the International Association for Structural Mechanics in Reactor Technology, the Commission of the European Communities, and the École Polytechnique Fédérale de Lausanne. Contact: Folker H. Wittmann, École Polytechnique Fédérale de Lausanne, SMiRT-9, Chemin de Bellerive 32, CH-1007 Lausanne, Switzerland.

International Conference on Nuclear Fuel Reprocessing and Waste Management, Aug. 24–28, 1987, Paris, sponsored by the American Nuclear Society and the European Nuclear Society. Contact: Lloyd McClure, Westinghouse Idaho Nuclear Co., Idaho Chemical Processing Plant, P.O. Box 4000, Idaho Falls, ID 83401.

September 1987

Pacific Basin Nuclear Conference, Sept. 6–11, 1987, Beijing, People's Republic of China, sponsored by the Chinese Nuclear Society and the American Nuclear Society. Contact: Xu Honggui, Chinese Nuclear Society, P.O. Box 2125, Beijing, People's Republic of China, or ANS, 555 North Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

ANS/ENS International Conference on Fast Breeder Reactor Systems: Experience Gained and Path to Economical Power Generation, Sept. 13–17, 1987, Richland, Washington. Contact: M. C. Carelli, Westinghouse-AESD, P.O. Box 158, Madison, PA 15663 (phone

412-722-5284), or W. Marth, Kernforschungszentrum Karlsruhe, Postfach 3640, D-7500 Karlsruhe 1, F. R. Germany.

Monte Carlo Transport of Electrons and Photons Below 50 MeV, Sept. 24–Oct. 3, 1987, Trapani, Italy. The closing date for application has been extended to May 15, 1987 (see July 1986 *RSIC Newsletter* for details). Contact: David W. O. Rogers, Ionizing Radiation Standards, National Research Council of Canada, Ottawa, Ontario K1A OR6 Canada (phone 613-993-2715).

SEPTEMBER ACCESSION OF LITERATURE

The following literature cited has been ordered for review, and that selected as suitable will be placed in the RSIC Information Storage and Retrieval Information System (SARIS). This early announcement is made as a service to the shielding community. Copies of the literature are not distributed by RSIC. They may generally be obtained from the author or from a documentation center such as the National Technical Information Service (NTIS), Department of Commerce, Springfield, Virginia 22161.

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.

RADIATION SHIELDING LITERATURE

CONF-811145-16, . . *Neutron-Source Characterization and Radiation-Damage Calculations for Material Studies.*, . . Greenwood, L.R., . . November 9, 1981, . . NTIS, PC A02/MF A01; MF available from INIS

CONF-850507, Vols. 1 and 2, . . *Nuclear Data for Basic and Applied Science.*, . . Young, P.G.; Brown, R.E.; Auchampaugh, G.F.; Lisowski, P.W.; Stewart, L., . . Proceedings of the International Conference, Sante Fe, New Mexico, 13-17 May 1985., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.15-44, . . *Nuclear Data Needs for Fusion Reactors.*, . . Gohar, Y., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.59-70, . . *Integral Measurements and Analysis of Nuclear Data Pretaining to Fusion Reactors.*, . . Takahashi, A., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.83-95, . . *Measurements and Calculations of Neutron Scattering Angular Distributions over a Wide Mass and Energy Range.*, . . Hansen, L.F., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.97-100, . . *Determination of (n, charged particle) Reaction Cross Sections for FRT-Relevant Materials.*, . . Qaim, S.M.; Wolfle, R.; Stocklin, G.; Rahman, M.; Sudar, S.; Suhaimi, A., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.101-105, . . *Integral Test of JENDL-3PR1 Through Benchmark Experiments on Li_2O Slab Assemblies.*, . . Maekawa, H.; Nakagawa, M.; Ikeda, Y.; Oyama, Y.; Yamaguchi, S.; Tsuda, K.; Fukumoto, T.; Hasegawa, A.; Mori, T.; Kosako, K.; Seki, Y.; Nakamura, T., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.107-111, . . *Measurements and Calculations of Fast Neutron Spectra in Several Assemblies.*, . . Sekimoto, H.; Oishi, K.; Hojo, T.; Hojo, D.-W.L.; Yukinori, S.; Yamamuro, N.; Hyodo, T.; Yamamoto, J., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.113-116, . . *The Effect of Self-Shielding of Resonance Cross Sections on Performance of Swiss LOTUS Hybrid Device.*, . . Pelloni, S.; Cheng, E.T., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.117-121, . . *Fusion Neutronics Calculational Benchmarks for Basic Nuclear Data and Transport Codes Intercomparison.*, . . Youssef, M.; Jung, J.; Sawam, M., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.129-132, . . *Fast-Neutron Interaction with Niobium.*, . . Smith, A.B.; Guenther, P.T.; Poenitz, W.P.; Smith, D.L.; Whalen, J.F.; Howerton, R.J., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.159-162, . . *Neutronic Analysis of Fusion-Fision (Hybrid) Blankets.*, . . Al-Kusayer, T.A.; Sahin, S.; Raoof, M.A., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.163-166, . . *New Neutron Cross Sections for Fusion Materials Studies.*, . . Greenwood, L.R.; Smither, R.K., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.167-170, . . *Benchmark Calculations for Fusion Blanket Development.*, . . Sawan, M.E.; Cheng, E.T., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.171-174, . . *Measurement and Analysis of Leakage Neutron Spectra from Lithium Spheres with 14 MeV Neutrons.*, . . Yamamo-

to, J.; Takahashi, A.; Kanda, K.; Itoh, S.; Yugami, K.; Sugiyama, K.; Sumita, K., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.195-198, . . *Lithium Resonance Self-Shielding: Effect on Tritium Breeding in Fusion Blankets.,* . . Velarde, G.; Aragones, J.M.; Honrubia, J.J.; Martinez-Val, J.M.; Minguez, E.; Perlado, J.M.; Santolaya, J.M., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.199-202, . . *Assessment of Nuclear Data for Copper and Silicon by Neutron Spectra in These Piles.,* . . Kimura, I.; Hayashi, S.A.; Kobayashi, K.; Yamamoto, S.; Nishihara, H.; Mori, T., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.203-206, . . *Tritium Production and Foil Reaction Rates in a Large Lithium Sphere by D-T Neutrons.,* . . Igushi, T.; Nakazawa, M.; Hashikura, H.; Yamamoto, J.; Takahashi, A.; Sumita, K.; Sugiyama, K.; Kanda, K.; Itagaki, S.; Itoh, S.; Hino, Y., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.207-210, . . *REAC Nuclear Data Libraries.,* . . Mann, F.M.; Lessor, D.E.; Pintler, J.S., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.231-234, . . *Comparative Study of Nuclear Data Libraries for Tritium Breeding Calculations in Fusion Blankets.,* . . Cheng, E.T.; Huang, J.H., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.235-238, . . *Blanket Neutronics Experiments at the LOTUS Facility.,* . . Haldy, P.-A.; Kumar, A.; Leo, W.R.; Green, L., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.239-243, . . *Analysis of a 14-MeV Neutron Scattering Experiment with LiO_2.,* . . Shin, K.; Oyama, Y.; Abdou, M., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.245-248, . . *Fusion Product Diagnostics on the Princeton Large Torus.,* . . Lovberg, J.; Strachan, J.; Heidbrink, W., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.253-256, . . *Integral Benchmark of 14 MeV Neutrons Passed Through Lead Layers.,* . . Antonov, S.; Voykov, G.; Ilieva, K.; Jordanova, J., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.477-481, . . *Combining Integral and Differential Dosimetry Data in an Unfolding Procedure with Application to the Arkansas Nuclear One-Unit 1 Reactor.,* . . Maerker, R.E.; Broadhead, B.; Fu, C.-Y.; Wagschal, J.J.; Williams, J.; Williams, M., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.505-508, . . *Analysis of ^{238}U Self-Indication Experiments.,* . . Harris, D.R.; Block, R.C.; Hwang, R.N., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.509-515, . . *Nuclear Data Qualification Through French LWR Integral Experiments.,* . . Santamarina, A.; Darrouzet, M.; Martin-Deidier, L., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.647-659, . . *Nuclear Decay Data: Some Applications and Needs.,* . . Reich, C.W., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.661-673, . . *Beta-Delayed Neutron Spectra for Application in Reactor Technology, Nuclear Physics and Astrophysics.,* . . Kratz, K.-L.; Gabelmann, H., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.675-686, . . *Nuclear Data for Biomedical Applications.,* . . Caswell, R.S., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.687-699, . . *Neutron Induced Charged Particle Spectra and Kerma from 25 to 60 MeV.,* . . Romero, J.L.; Brady, F.P.; Subramanian, T.S., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.717-721, . . *Application of Evaluated Fission-Product Delayed-Neutron Precursor Data in Reactor Kinetics Calculations.,* . . Perry, R.T.; Wilson, W.B.; England, T.R.; Brady, M.C., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.723-726, . . *Applications of Cross Section Data for Nuclear Geochemical Well Logging.,* . . Hertzog, R.C.; Soran, P.D.; Schweitzer, J.S., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.739-742, . . *Delayed Neutron Spectra and Intensities from Evaluated Precursor Data.,* . . England, T.R.; Brady, M.C.; Wilson, W.B.; Schenter, R.E.; Mann, F.M., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.743-746, . . *Fission-Product Decay Heat for Fast-Neutron Fissions of ^{238}U and ^{232}Th.,* . . Akiyama, M.; Oka, Y.; Kondo, S.; An, S., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.787-790, . . *Measurements and Calculations of Neutron Spectra in Infinite Media.,* . . Case, C.R.; Antkiw, S.; Albats, P., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.791-794, . . *Measurements of Gamma-Ray Spectra in Infinite Media.,* . . Schweitzer, J.S.; Manente, R.A., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.799-802, . . *VITAMIN-E 174n,38g General Purpose Cross-Section Library.,* . . Roussin, R.W.; White, J.E.; Bartley, J.L., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.1, pp.835-852, . . *Some Nuclear Data Needs in Astrophysics.,* . . Mathews, G.J.; Bauer, R.W.; Bloom, S.D.; Haight, R.C.; Howard, W.M.; Takahashi, K.; Ward, R.A., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1053-1063, .. *GRS: A Statistical and Non-Statistical Model Code for Calculations of Cross Sections and Gamma-Ray Spectra.,* .. Ho, Y.; Liu, J., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1065-1077, .. *A New Code System for the Calculation of Double Differential Reaction Cross Sections.,* .. Gruppelaar, H.; Akkerman, J.M., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1221-1224, .. *A Methodology to Evaluate the (n,xn) Cross Sections of Fertile and Fissile Nuclei.,* .. Fort, E.; Long, P., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1367-1370, .. *A New Approach to Unfold Neutron Spectra Based on the Maximum Likelihood Method.,* .. Itoh, S., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1375-1378, .. *Unfolding of Ne214 Scintillation Spectra Compared with Neutron Time-of-Flight Measurements.,* .. Antunes, L.J.; Borker, G.; Klein, H.; Bulski, G., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1399-1402, .. *Neutronic Calculations for a New High Flux Reactor.,* .. Difilippo, F.C.; Worley, B.A.; Vondy, D.R., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1403-1406, .. *Neutron Spectrometry in Large Iron and Sodium Assemblies.,* .. Perlini, G.; Rief, H., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1411-1414, .. *A New Approach to Neutron Spectra Unfolding by Differentiation.,* .. Gadjokov, V.; Jordanova, J., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1429-1440, .. *The Neutron Cross Section Standards Evaluations for ENDF/B-VI.,* .. Carlson, A.D.; Poenitz, W.P.; Hale, G.M.; Peelle, R.W., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1481-1492, .. *Calculational Tools for the Evaluation of Nuclear Cross-Section and Spectra Data.,* .. Gardner, M.A., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1493-1509, .. *The Joint Evaluated File: A New Nuclear Data Library for Reactor Calculations.,* .. Rowlands, J.L.; Tubbs, N., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1533-1536, .. *Analysis of Neutron Data in the Resonance Region via the Computer Code SAMMY.,* .. Larson, N.M., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1537-1540, .. *Integral Test of Fission-Product Cross Sections.,* .. Gruppelaar, H.; Heijboer, R.J.; Janssen, A.J.; van der Kamp, H.A.J.; Karouby-Cohen, N.; Martin-Deidier, L.; Rimpault, G.; Salvatores, M., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1555-1559, .. *Nuclear Data Status and Needs for Spallation Physics Investigations.,* .. Armstrong, T.W.; Cloth, P.; Filges, D.; Neef, R.D.; Schaal, H., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1573-1575, .. *The 1983 Atomic Mass Table.,* .. Wapstra, A.H.; Audi, G., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1577-1580, .. *Effect of Interpolation Error in Pre-Processing Codes on Calculations of Self-Shielding Factors and Their Temperature Derivatives.,* .. Ganesan, S.; Gopalakrishnan, V.; Ramanadhan, M.M.; Cullen, D.E., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1581-1584, .. *Reanalysis of Tritium Production in a Sphere of ^{6}LiD Irradiated by 14-MeV Neutrons.,* .. Fawcett, L.R.,Jr., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1585-1588, .. *Evaluation of Nuclear Data for Fusion Neutronics.,* .. Shibata, K.; Kikuchi, Y., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1593-1596, .. *Uncertainty Propagation from Raw Data to Final Results.,* .. Larson, N.M., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1597-1600, .. *Cross Sections, Benchmarks, Etc.: What is Data Testing All About?,* .. Wagschal, J.; Yeivin, Y., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1601-1606, .. *Generation of ENDF/B-IV Based 35 Group Neutron Cross-Section Library and Its Application in Criticality Studies.,* .. Garg, S.B.; Sinha, A., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1607-1610, .. *Sensitivity Analysis of JENDL Library Using Fast Reactor Physics Parameters.,* .. Takeda, T.; Aoyama, T.; Nishigori, T.; Kikuchi, Y.; Hasegawa, A., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1627-1630, .. *Evaluation of FP Cross Sections for JENDL-2.,* .. Aoki, T.; Iijima, S.; Kawai, M.; Kikuchi, Y.; Matsunobu, H.; Nakagawa, T.; Nakajima, Y.; Nishigori, T.; Sasaki, M.; Watanabe, T.; Yoshida, T.; Zukeran, A., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1655-1658, .. *A Programme of Evaluation, Processing and Testing of Nuclear Data for ^{232}Th and ^{233}U.,* .. Ganesan, S.; Gopalakrishnan, V.; Ramanadhan, M.M.; Keshavamurthy, R.S., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1661-1668, .. *Summary Talk Covering Sessions on Basic Physics.,* .. Michaudon, A., .. 1986, .. Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1669-1676, .. *Summary Talk Covering Application-Oriented Sessions.,* .

. Peelle, R.W., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

CONF-850507, Vol.2, pp.1677-1681, . . *Summary Talk on Evaluation and Theory.,* . . Reffo, G., . . 1986, . . Gordon and Breach, Science Publishers, Inc.

IA-1383, . . *Curium-248 Neutron Data Evaluation.,* . . Caner, M.; Yiftah, S., . . February 1983, . . MF available from INIS

ORNL/TM-10036, . . *Shielding Considerations for the 750-MeV Electron Accelerator at the University of Illinois.,* . . Gabriel, T.A.; Lillie, R.A.; Bishop, B.L., . . August 1986, . . NTIS, PC A03/MF A01

ORNL/TM-10058, . . *Deterministic Sensitivity Theory for Nonlinear Systems: The Forward and Adjoint Methods.,* . . Cacuci, D.G., . . August 1986, . . NTIS, PC A05/MF A01

PPPL-2318, . . *Fusion-Neutron Production in the TFTR with Deuterium Neutral Beam Injection.,* . . Hendel, H.W.; England, A.C.; Jassby, D.L., . . June 1986, . . NTIS

PPPL-2353, . . *Calculated Particle Inventories in the TFTR Moveable Limiter and First Wall.,* . . Heifetz, D.B.; Dylla, H.F.; Ulrickson, M.; Baskes, M.I., . . August 1986, . . NTIS, PC $10.00/MF $4.50

PPPL-2369, . . *Meteorological Data Summaries for the TFTR from January 1984 to December 1985.,* . . Kolibal, J.; Ku, L.P.; Liew, S.L., . . July 1986, . . NTIS, PC $10.00/MF $4.50

J. Nucl. Sci. Technol., 22(1), 70-73, . . *Measurement of Gamma-Ray Heating with Thermoluminescense Dosimeters Including Sr_2SiO_4 and Ba_2SiO_4.,* . . Okajima, S.; Osugi, T.; Kawase, Y.; Ohno, A.; Sanda, T., . . January 1985

J. Nucl. Sci. Technol., 22(5), 337-357, . . *Evaluation of Neutron Nuclear Data of Natural Nickel and Its Isotopes.,* . . Kikuchi, Y.; Sekine, N., . . May 1985

J. Nucl. Sci. Technol., 22(6), 496-498, . . *Human Error Classification and Analysis in Nuclear Power Plants.,* . . Ujita, H., . . June 1985

J. Nucl. Sci. Technol., 22(9), 708-722, . . *Measurement and Analysis of Neutron Spectra in Lithium Fluoride and Polytetrafluoroethylene Piles.,* . . Mori, T.; Nishihara, H.; Kimura, I.; Hayashi, S.A.; Kobayashi, K.; Yamamoto, S.; Nakagawa, M., . . September 1985

J. Nucl. Sci. Technol., 22(12), 959-971, . . *Applicability of Albedo-Sn Transport Method to Analysis of Radiation Shielding Problem.,* . . Kawai, M.; Hayashida, Y.; Uematsu, M., . . December 1985

J. Nucl. Sci. Technol., 23(5), 381-386, . . *Scalar Fast Neutron Spectra in Graphite-Reflected Lithium Fluoride Pile with D-T Neutron Source.,* . . Sekimoto, H.; Lee, D.-W., . . May 1986

Nucl. Instrum. Methods, A245(2,3), 323-327, . . *Comparison of Measurements of Angular Hadron Energy Spectra, Induced Activity and Dose with FLUKA82 Calculations.,* . . Stevenson, G.R.; Aarnio, P.A.; Fasso, A.; Ranft, J.; Sandberg, J.V.; Sievers, P., . . May 1, 1986

Nucl. Instrum. Methods, B16(1), 1-4, . . *Total Stopping Power Formulae for High Energy Electrons and Positrons.,* . . Pal, P.B.; Varshney, V.P.; Gupta, D.K., . . May 1986

Soviet J. At. Energy(English Transl.), 50(4), 271-272, . . *Average Cross Sections for the Interaction of Nuclides with Prompt Fission Neutrons. (Letter-to-the-Editor),* . . Starostov, B.I.; Kudryashov, L.N., . . April 1981

Soviet J. At. Energy(English Transl.), 50(5), 297-301, . . *Errors in the Calculation of Radiation Fields in Media.,* . . Bolyatko, V.V.; Vyrskii, M.Yu.; Ilyushkin, A.I.; Maskovich, V.P.; Sakharov, V.K.; Stroganov, A.A., . . May 1981

Soviet J. At. Energy(English Transl.), 50(5), 311-312, . . *Backscattered X-Ray Spectrum at an Air-Concrete Interface. (Letter-to-the-Editor),* . . Gerchikov, F.L.; Gudovskikh, V.A.; Morgovskii, L.Ya., . . May 1981

Soviet J. At. Energy(English Transl.), 52(1), 60-67, . . *Propagation of Retarded-Neutron Pulse in a Heavy Medium with Arbitrary Scattering and Capture Cross Sections.,* . . Podosenov, S.A.; Trukhanov, G. Ya., . . January 1982

Soviet J. At. Energy(English Transl.), 52(2), 150-152, . . *Combined Use of S_n and Integral-Equations Methods to Calculate Angular Characteristics of a Radiation Field.,* . . Barkovskii, A.N.; Kulikov, V.I.; Popkov, K.K., . . February 1982

Soviet J. At. Energy(English Transl.), 52(4), 274-277, . . *Transport of Radioactive Particles in the Primary Loop of a Reactor.,* . . Vasil'eva, K.I.; Zhilkin, A.S.; Kuznetsov, I.A., . . April 1982

Soviet J. At. Energy(English Transl.), 52(6), 381-386, . . *Pade-Approximation Method in Problems of Neutron Moderation.,* . . Dynin, E.A., . . June 1982

Soviet J. At. Energy(English Transl.), 52(6), 422-424, . . *Experimental Investigation of Neutron Spectrum in Lead with a 14-MeV Source.,* . . Aleksandrov, V.D.; Zagryadskii, V.A.; Markovskii, D.V.; Novikov, V.M.; Chuvilin, D.Yu.; Shatalov, G.E., . . June 1982

Soviet J. At. Energy(English Transl.), 52(6), 427-429, . . *Density of Melts of Thorium Fluoride with Sodium and Uranium Chlorides.,* . . Katyshev, S.F.; Kurbatov, N.N.; Desyatnik, V.N., . . June 1982

Soviet J. At. Energy(English Transl.), 53(4), 729-733, . . *Characteristics of Reflected Gamma Rays with a Short Distance Between the Detector and the Scattering Surface.,* . . Kulikov, V.I.; Popkov, K.K.; Titov, V.I., . . October 1982

Soviet J. At. Energy(English Transl.), 53(5), 787-790, . . *Determining the Relaxation Length of a Flux of Moderated and Thermal Neutrons on the Basis of the P_2 Approximation.,* . . Kozachok, I.A.; Kulik, V.V., . . November 1982

Soviet J. At. Energy(English Transl.), 56(1), 34-39, . . *Effect of Uncertainties in Neutron Cross Sections on the Characteristics of a Thermonuclear Reactor Blanket and Shield.,* . . Ilyushkin, A.I.; Linge, I.I.; Mashkovich, V.P.; Sakharov, V.K.; Shatalov, G.E.; Shikin, A.V., . . January 1984

U.S.S.R. Comput. Maths. Math. Phys., 21(3), 264-268, . . *Evaluation by Monte Carlo Methods of the Derivatives of Linear Functionals of the Flow with Respect to the Parameters of Surfaces.,* . . Sidorenko, L.L.; Khisamutdinov, A.I., . . May-June 1981

U.S.S.R. Comput. Maths. Math. Phys., 21(3), 269-273, . . *The Equations of the Invariant Imbedding Method for Functional of the Solution of the Transport Equation.,* . . Ezhov, A.A.; Shikhov, S.B., . . May-June 1981

COMPUTER CODES LITERATURE

AD-B-093042/0/XAB; AFWL-TR-84-148 . . . . . HETC/LHI/SGS
Introduction to the Physics of the HETC/LHI/SGS (High Energy Transport Code/Light-Heavy Ion/ Spallation Gamma Source) Radiation Transport Code. Final Report., . . Dietz, D., . . Air Force Weapons Lab., Kirtland AFB, NM, . . April 1985, . . AVAIL: NTIS

AECL-6827 . . . . . LIMCAL
LIMCAL: A Comprehensive Food Chain Model for Predicting Radiation Exposure to Man in Long-Term Nuclear Waste Management., . . Zach, R., . . Atomic Energy of Canada Limited, Whiteshell, . . August 1982

AECL-6828 . . . . . LIMCAL
Parameter Values for the Long-Term Nuclear Waste Management Food Chain Model LIMCAL., . . Zach, R., . . Atomic Energy of Canada Limited, Whiteshell, . . September 1982

EUR-8420 . . . . . MORSE-E1
MORSE-E1, Source and Analysis Routines to be Used with the MORSE Code., . . Ponti, C.; Heusden, R. van, . . Commission of the European Communities, Joint Research Centre, Ispra, Italy, . . 1983, . . AVAIL: INIS (microfiche only)

Fusion Tech., 8(1), Part 2A, 608-613 . . . . . NEWLIT; MCNP
NEWLIT - A General Code for Neutron Wall Loading Distribution in Toroidal Reactors., . . Attaya, H.M.; Sawan, M.E., . . University of Wisconsin, Madison, . . July 1985

Fusion Tech., 8(1), Part 2A, 1688-1692 . . . . . MIG
MIG: MCNP Input Generator for EFFI Magnet Geometries., . . Attaya, H.; Gohar, Y., . . University of Wisconsin, Madison; Argonne National Laboratory, IL, . . July 1985

INIS-mf-10110, 45-52 (In Czech) . MONTE CARLO
Use of Monte Carlo Method in Low-Energy Gamma Radiation Applications., . . Sulc, J., . . Vysoka Skola Strojni a Textilni, Liberec, Czechoslovakia, . . 1982, . . AVAIL: INIS (microfiche only)

JAERI-M 84-061 . . . . . MKENO-DAR
MKENO-DAR: A Direct Angular Representation Monte Carlo Code for Criticality Safety Analysis., . . Naito, Y.; Tsunoo, Y.; Komuro, Y.; Nakayama, M., . . Japan Atomic Energy Research Institute, Tokai, Japan, . . March 1984

JAERI-M-84-177 (In Japanese) . . . BERMUDA-1DG
BERMUDA-1DG: A One-Dimensional Photon Transport Code., . . Suzuki, T.; Hasegawa, A.; Nakashima, H.; Kaneko, K., . . Japan Atomic Energy Research Institute, Tokai, Japan, . . October 1984, . . AVAIL: NTIS (U.S. Sales Only)

JAERI-M 86-107 . . . . . MKENO-DAR
User's Manual of the MKENO-DAR Code System., . . Naito, Y.; Nakae, H., . . Japan Atomic Energy Research Institute, Tokai, Japan, . . August 1986

LA-10371-MS . . . . . EFFECTS; BIOTRAN
EFFECTS: Documentation and Verification for a BEIR III Cancer Risk Model Based on Age, Sex, and Population Dynamics for BIOTRAN., . . Wenzel, W.J.; Gallegos, A.F., . . Los Alamos National Lab., NM, . . September 1985

Newsletter NEA Data Bank, 30, 178-259 . . FINELM
FINELM Architecture and Usage., . . Higgs, C.E., . . Swiss Federal Institute for Reactor Research, Wuerenlingen, . . December 1983

Newsletter NEA Data Bank, 30, 260-286 . . FINELM
Possible Future FINELM Developments., . . Pelloni, S., . . Swiss Federal Institute for Reactor Research, Wuerenlingen, . . December 1983

Nucl. Sci. Eng., 94, 46-65 . . . . . GRESS; SWENT
Sensitivity Analysis Using Computer Calculus: A Nuclear Waste Isolation Application., . . Oblow, E.M.; Pin, F.G.; Wright, R.Q., . . Oak Ridge National Laboratory, TN, . . 1986

ORNL/TM-9910 . . . . . RISKAP
RISKAP, A Computer Code for Analysis of

Increased Risk to Arbitrary Populations., . . Leggett, R.W., . . Oak Ridge National Laboratory, TN, . . June 1986

ORNL/TM-10093 ..... TNG
Recent Improvements of the TNG Statistical Model Code., . . Shibata, K.; Fu, C.Y., . . Oak Ridge National Laboratory, TN, . . August 1986

PNL-SA-11801; CONF-831174-69 ..... .SCOPE
Description of the SCOPE (Simplified Codes for Performance Evaluation) System for Use in Exploratory Analysis of Radionuclide Transport in a Geologic Medium., . . Petrie, G.M.; Sneider, S.C.; Craig, R.A., . . Pacific Northwest Lab., Richland, WA, . . October 1983, . . AVAIL: NTIS; INIS (microfiche only)

SAND-85-0602 ..... .SPARTAN
SPARTAN: A Simple Performance Assessment Code for the Nevada Waste Storage Investigations Project., . . Lin, Y.T., . . Sandia National Labs., Albuquerque, NM, . . December 1985, . . AVAIL: NTIS

Trans. Am. Nucl. Soc., 45, 628-29 ..... MCNP
A Generalized Source Sampling Concept for MCNP and Applications in Radiation Transport., . . Estes, G.P.; Schrandt, R.G., . . Los Alamos National Lab., NM, . . October 1983

UCID-19813 ..... RYLLA
RYLLA., . . Hyde, R.A., . . Lawrence Livermore National Lab., Livermore, CA, . . June 1983, . . AVAIL: NTIS; INIS (microfiche only)