RSIC Newsletter

Nothing will ever be attempted if all possible objections must be first overcome. . . .Samuel Johnson

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made to the codes collection during June.

CCC-202/PELSHIE-81

PELSHIE, a general purpose kernel integration shielding code system for point and extended gamma-ray sources, has been replaced by a newly frozen version, contributed by the Atomic Energy Board, Pretoria, South Africa. PELSHIE was packaged originally in 1972 and has been updated twice since. PELSHIE-81, including all development since 1972, represents the current state of the art. A description of the new version may be requested from RSIC. FORTRAN IV; IBM 360.

CCC-203/MORSE-CG

The IBM version (C) of this general purpose Monte Carlo multigroup neutron and gamma-ray transport code system was extended to include DOMINO II, a Monte Carlo-discrete ordinates coupling code, contributed by the Oak Ridge National Laboratory. DOMINO II, a revised version of the Monte Carlo-discrete ordinates coupling code, PSR-64/DOMINO, compatible with CCC-320/DOT IV results. DOMINO also remains in the package for the use of those who wish to pair it with DOT 3.5 calculations. Reference for DOMINO II: ORNL-TM/7771. FORTRAN IV; IBM 360.

CCC-371/ORIGEN II

ORIGEN II, the isotope generation and depletion code package (matrix exponential method) was extended to include a Prime 400 version which was contributed by Tennessee Valley Authority, Chattanooga, Tennessee. This extension has been designated (C) version. FORTRAN IV; IBM 360, CDC, PRIME 400.

CCC-398/MILDOS

MILDOS, a calculational system for radiation dose from uranium recovery operations, was contributed by the Nuclear Regulatory Commission and Pacific Northwest Laboratory. The MILDOS package includes models for both point sources (stacks, vents) and area sources (ore pads, tailings areas). Gaseous releases are limited to consideration of ^{222}Rn plus ingrowth of daughters. Exposure pathways of concern are assumed to be inhalation of airborne radioactive material, ingestion of vegetables, meat and milk contaminated via deposition, and external exposure to radiation emitted by airborne activity and activity deposited on ground surfaces. For ALARA evaluations all releases, including radon and its daughters, are considered for calculation of population doses as well as individual doses. Population doses are calculated for the region (within 80 km) of the mill center, and for the continental U.S. (from radon and its daughters only). Reference: NUREG/CR-2011 (PNL-3767). FORTRAN IV; CDC.

PSR-131/CARP-81

CARP, which produces albedo data from DOT angular flux results, was replaced by a new version supplied by the Oak Ridge National Laboratory. The new version provides compatibility with the MVS operating system and also works on the MVT operating system. FORTRAN IV and assembler language; IBM 360.

PSR-158/SAMMY

The code package for multilevel R-matrix fits to neutron data using Baye's equations, has been extended to include an IBM 370 version. This extension, designated (B) version, was contributed by the Oak Ridge National Laboratory. The original computer model was written for the PDP-10. FORTRAN IV; PDP-10 and IBM 370.

PSR-162/DOMINO-II

DOMINO-II, a general purpose program for coupling DOT-IV discrete ordinates and Monte Carlo radiation transport calculations, was contributed by the Oak Ridge National Laboratory. Based on PSR-64/DOMINO, DOMINO-II extends the DOMINO capability to include CCC-320/DOT-IV calculations. The code allows processing of a DOT-IV multiple boundary source tape. PSR-64/DOMINO is the appropriate code package for use with CCC-276/DOT 3.5 and CCC-319/DOT 3.5E. References: ORNL/TM-7771 and ORNL-4853. FORTRAN IV; IBM 360.

PSR-163/TIMS-1

TIMS-1, a processing code system for production of group constants of heavy resonant nuclei, was contributed by the Japan Atomic Energy Research Institute. Specifically programmed to use the evaluated nuclear data file of ENDF/B or JENDL as input data, TIMS-1 calculates the infinitely dilute group cross sections and the temperature dependent self-shielding factors for arbitrary values of σ_0 and R, where σ_0 is the effective background cross section of potential scattering and R the ratio of the atomic number densities for two resonant nuclei if any. Reference: JAERI 1267. FORTRAN IV; FACOM-M200.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in the data collection in June.

DLC-23/CASK-81

The 22 neutron, 18 gamma-ray group, P_3, cross section library (CASK) was updated by RSIC by replacing the previous data set for zirconium with one prepared by collapsing from DLC-41C/VITAMIN-C. We thank the Yankee Atomic Electric Company, Framingham, Massachusetts, for pointing out the erroneous zirconium data, which had total cross section values lower than the sum of partial cross sections. Users may request only the updated zirconium or the complete library. The updated version of the data library is packaged as DLC-23F/CASK-81. Reference: Informal notes. IBM-370/3033.

DLC-83/GAMDAT-78

The library of gamma-ray decay data for 2055 radionuclides was contributed by the Central Division of Chemical Analysis, Nuclear Research Establishment, Jülich, Federal Republic of Germany. Included are half-lives, generating reactions, parent and daughter nuclides, and for most radionuclides, the energies and intensities of gamma- and x-rays emitted during their radioactive decay. The documentation describes the data format and lists sample FORTRAN and PL/1 programs to access the library. EBCDIC characters. Reference: Jül-Spez-34.

DLC-85/FCXSEC

The 22 neutron, 21 gamma-ray group cross section library in ANISN format for nuclear fuel cycle shielding calculations was contributed by the Chemical Technology and Computer Sciences Divisions, Oak Ridge National Laboratory. The library was derived from DLC-41/VITAMIN-C and both microscopic and

macroscopic cross sections are included. Data are provided for water, stainless steel 304, spent U-fuel, air, spent Th-fuel, Gd_2O_3, limonite concrete, type 2a concrete, boron in water, Li, plutonium oxide, Eu, B in boral, W, and zircalloy. Microscopic cross sections for the constituents of the above materials are also contained in the package. A retrieval code for BCD-to-binary conversion is included. Reference: ORNL/TM-7038 (ENDF-287). IBM-370/3033.

ICRU ANNOUNCES AWARD OF GRAY MEDAL

The International Commission on Radiation Units and Measurements (ICRU) has announced that Professor Maurice Tubiana is the fourth recipient of the L. H. Gray Medal. The medal is awarded for outstanding contributions in scientific fields of interest to the ICRU and honors the late Louis Harold Gray, former member and Vice Chairman of the Commission. Professor Tubiana, who is Chief of the Radiation Department and the Director of the Research Laboratory on Clinical Radiobiology at the Institute Gustave-Roussy in Villejuif, received the award at the XVth International Congress on Radiology held in Brussels in June 1981.

The award to Professor Tubiana is based on his outstanding contributions involving the use of radioactive isotopes and high energy radiation in medicine. His early work was mainly in nuclear medicine and medical physics and included the first system (nonautomated) for scanning the neck after administration of radioactive iodine. He was also the first to describe profile counting, a technique he used for the study of spinal fluid circulation. His early work in clinical dosimetry, the assessment of relative biological effectiveness and clinical use of high energy photons and electrons is also noteworthy. In 1959 he pioneered whole body irradiation for organ transplants. Research on the kinetics of cell proliferation became a particular interest in 1962 and, with his coworkers, he soon showed that cell loss is one of the important parameters for explaining the progressive increase in the doubling time for experimental tumors. With this as a basis, and in cooperation with other centers, Professor Tubiana organized controlled clinical trials on Hodgkin's disease and osteosarcoma and demonstrated that prophylactic therapy is able to prevent the occurrence of metastases.

The Gray Medal was established by the ICRU in 1967. The medal may be awarded once in each four years although the scientific work on which award of the medal is based need not have occurred during the four year period prior to the award. The recipient of the medal is invited to give a scientific lecture to the ICRU and its guests. In Professor Tubiana's case, this lecture was given during the International Congress of Radiology in Brussels, and it will be published in the open literature.

GAMMA-RAY SPECIFIC DOSE CONSTANTS TO BE PUBLISHED IN RSIC REPORT

Tables of specific gamma-ray dose constants (the unshielded gamma-ray dose equivalent rate at 1 m from a point source) in SI units have been computed for approximately 500 nuclides important to dosimetry and radiological assessment. The half life, gamma-ray energies and emission probabilities, mean attenuation coefficient, and thickness for a lead shield providing 95% dose equivalent attenuation are also listed. The data will be published as ORNL/RSIC-45 by Laurie M. Unger and D. K. Trubey and titled, "Specific Gamma-Ray Constants for Nuclides Important to Dosimetry and Radiological Assessments," ORNL/RSIC-45, 1981.

The gamma-ray energy and emission probability data were taken from a new compilation by D. C. Kocher, "Radioactive Decay Data Tables: A Handbook of Decay Data for Application to Radiation Dosimetry and Radiological Assessments," U. S. Department of Energy, DOE/TIC-11026 (NTIS, $18.75). The data are available in computer-readable form from the ORNL Radiation Shielding Information Center as DLC-80/DRALIST. The computation of dose rate was based on flux-to-dose-rate factors given in "Neutron and Gamma-ray Flux-to-Dose-Rate Factors," ANSI/ANS-6.1.1, American Nuclear Society, La Grange Park, IL 60525, 1977.

If you wish to reserve a copy, please send your request to RSIC.

NEW ANS PUBLICATION

A newly published ANS-9 (revision of N1.1-1976), "Trial Use Glossary of Terms in Nuclear Science and Technology," is now available from ANS. This trial use and comment glossary is a revision of American National Standard "Glossary of Terms in Nuclear Science and Technology," ANS-9/ANSI N1.1-1976, and is presented for a 12-month trial use and comment period to gain input by its users. Order from ANS at $20.00 per copy. Send comments to ANS, Attention: Mrs. Marilyn D. Weber, Manager, ANS Standards.

PERSONAL ITEMS

The Japan Atomic Energy Research Institute - Tokai Research Establishment has announced recent organization changes as follows: **Shigeya Tanaka** is the new chief of the Nuclear Physics Laboratory (Linac Laboratory). **Sin-iti Igarasi** is the new chief of the JAERI Nuclear Data Center.

Neill P. Taylor, formerly with the University of Birmingham, is now at the Harwell Laboratory of the UK Atomic Energy Authority.

Masao Kitamura is now in the United States as a TDA participant in the Hitachi Liaison Office of General Electric Company in San Jose, California 95125. He is working on radiation reduction on nuclear power plants, mainly the activity reduction on the primary coolant piping.

VISITORS TO EPIC

The following persons came for an orientation visit and/or to use EPIC facilities during the month of June: **John Chen**, Technology for Energy, Inc., Knoxville, Tennessee; **Rosanne Giovanetti**, Massachusetts Institute of Technology, Cambridge, Massachusetts; **Hermann Krause**, Max-Planck Institut fur Plasmaphysik, Garching, Fed. Rep. of Germany; **John Lakey**, Royal Naval College, London, England; **Sheng-Chi Lin**, Institute of Nuclear Energy Research, Lung-tan, Taiwan; **Tadakuni Matsumoto**, University of New Mexico, Albuquerque, New Mexico; **Patrick McDaniel**, Sandia Laboratories, Albuquerque, New Mexico; **Maxwell C. E. Petersen**, Australian Atomic Energy Commission, Lucas Heights, Australia; and **W. Rothenstein**, Israel Institute of Technology, Haifa, Israel.

UPCOMING MEETINGS

Monte Carlo Workshop

A special course is being offered in Monte Carlo shielding analysis by the Nuclear Engineering Department of the University of Tennessee, August 31 thru September 4. This workshop has been offered annually and has been attended by several hundred participants over an eight-year period and has been well received. The main emphasis is to help develop the background necessary for the effective use of Monte Carlo in shield analysis. The course includes basic theory for both forward and adjoint analyses, descriptions of Monte Carlo codes, and a wide range of computational experiences. The topics presented have been continually evaluated and upgraded so that a good and up-to-date treatment of the subject can be expected. If you desire additional information, contact Dean of Engineering, The University of Tennessee, Knoxville, Tennessee 37916 (615-974-5321) or phone P. N. Stevens (615-974-2525).

BNL Seminar/Workshop

A seminar/workshop on *Thermal Reactor Benchmark Calculations, Techniques, Results, and Applications* will be held at Brookhaven National Laboratory on October 19-20, 1981. The meeting is to be sponsored by the Electric Power Research Institute.

The call for papers suggests the following general topics.

I. Benchmark Data Testing—Reactor Physics and Nuclear Data: Thermalization and Kernel Representation, Resonance Region Analysis, Computational Methods (Monte Carlo, Integral Transport,

Modified Diffusion Theory, Library Representation, and Uncertainty Analysis of Thermal Systems), Temperature Defect Calculations, Pu and ^{238}U Cross Sections, Fission Spectra, Fission Products, and Thermal η, and LSF Fit of Thermal Parameters of Fissile Nuclei. II. Analysis of Thermal Benchmarks: Pu and Mixed Oxide Experiments, Homogeneous ^{235}U Criticals, ^{238}U-^{235}U-H$_2$O Experiments, ^{238}U-^{235}U-D$_2$O Experiments, Th-^{233}U Experiments, Computational Benchmarks, and Interpretation of Experimental Data. III. Benchmark Data Testing–Utility and Vendor Needs: PWR-BWR Benchmarks, Isotopics and Comparison with Experiment, and Design Tool Improvement via Benchmark Data Testing.

Additional information may be secured from Philip F. Rose, National Nuclear Data Center, Brookhaven National Laboratory, Upton, Long Island, New York 11973.

Topical Meeting on Treatment and Handling of Radioactive Wastes

A Call for Papers has been issued for the *ANS Topical Meeting on Treatment and Handling of Radioactive Wastes* to be held April 19-22, 1982, in Richland, Washington, USA. The conference is sponsored by the American Nuclear Society (Remote Systems Technology Division, Fuel Cycle and Waste Management Division, and Richland, Washington Section) and co-sponsored by the U. S. Department of Energy. The conference will cover, on an international basis, the status of technology for the treatment and associated handling of high-level, transuranic, and low level, liquid and solid wastes resulting from fission or fusion activities. Treatment concepts to be addressed include: pretreatment of waste; volume reduction; immobilization of waste; removal of radionuclides from waste; change of waste composition; and product characterization.

By August 1, 1981, titles of papers and summaries of up to 900 words, in English, should be submitted to A. G. Blasewitz, Technical Program Chairman, Hanford Engineering Development Laboratory, W/C-31, P. O. Box 1970, Richland, Washington 99352, USA. The summaries will be used only for the purpose of paper selection. Authors will be advised concerning paper acceptance by November 1, 1981.

Second International Symposium on Radiation Physics

The *Second International Symposium on Radiation Physics* will be held at the Universiti Sains Malaysia on May 25–30, 1982. The purpose of this symposium, recognizing radiation physics as the thread held in common by a variety of medical, engineering and scientific disciplines, is to bring together specialists from these disciplines to report on, exchange, and make available through proceedings, information and experiences of common interest to workers in these diverse disciplines.

The conference topics include: Basic Radiation Physics Data: Experimental and Theoretical; Radiation Source Types, Characteristics, Spectra; Radiation Detectors, Instrumentation, Interpretation; Radiation Transport; Application of Radiation Physics; Radiation and Environment; and Teaching of Radiation Physics in the Universities.

Inquiries may be addressed to Professor A. M. Ghose, Second International Symposium on Radiation Physics, School of Physics, Universiti Sains Malaysia, Minden, Penang, Malaysia.

CALENDAR OF MEETINGS

We call attention to the following meetings.

July 1981

Radioactive Waste Management, July 20–24, 1981, Rensselaer Polytechnic Institute, Troy, New York. Contact: Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy New York 12181, (518) 270-6442.

August 1981

Computational Methods in Nuclear Reactor Analysis - Statics, Kinetics, Depletion, August 31–September 4, 1981, University of Tennessee, Knoxville, Tennessee. Contact: P. F. Pasqua or H. L. Dodds, Nuclear Engineering Department, University of Tennessee, Knoxville, Tennessee 37916, (615) 974-2525.

September 1981

International ANS/ENS Topical Meeting on Probabilistic Risk Assessment, September 20–24, 1981, Rye Town Hilton Hotel, Port Chester, New York. Contact: R. E. Hall, Bldg. 130, Brookhaven National Laboratory, Upton, New York 11973.

March 1982

FIPS Software Documentation Workshop, March 3, 1982, National Bureau of Standards, Gaithersburg, Maryland. Contact: A. J. Neumann, (301) 921-3486 or Documentation Workshop, National Bureau of Standards, Institute for Computer Sciences and Technology, Building 225, Room A-265, Washington, DC 20234.

JUNE ACCESSION OF LITERATURE

The following literature cited has been ordered for review, and that selected as suitable will be placed in the RSIC Information Storage and Retrieval Information System (SARIS). This early announcement is made as a service to the shielding community. Copies of the literature are not distributed by RSIC. They may generally be obtained from the author or from a documentation center such as the National Technical Information Service (NTIS), Department of Commerce, Springfield, Virginia 22151.

RSIC maintains a microfiche file of the literature entered into SARIS, and duplicate copies of out-of-print reports may be available on request. Naturally, we cannot fill requests for literature which is copyrighted (such as books or journal articles) or whose distribution is restricted.

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

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