RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

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

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Concentrate your energies and work hard. Launch out in new experiments. Never be afraid to have the courage of your opinions. Fix the lines you want to travel along and keep on them. That's all. . . .A. C. W. Harmsworth

NEW RSIC SHIELDING INFORMATION COORDINATOR IN JAPAN

For many years shielding information and related computer codes have been efficiently exchanged with scientists and engineers through the efforts of RSIC volunteer coordinators within the Japanese radiation protection, transport and shielding community. At the Japan Atomic Energy Research Institute (JAERI), Dr. T. Hirakawa performs a special service by acting as coordinator of the exchange of computer codes between Japan and RSIC, and as the head of the JAERI Shielding Laboratory serves as RSIC information coordinator.

The most recent coordinator, Dr. Shun-ichi Miyasaka, has recently been appointed supervisor of the Division of Safeguards Information Treatment, Nuclear Material Control (NMC) Center to establish a computer code system for safeguards in Japan. The NMC Center serves as the safeguards organization of Japan, and the Division is dealing with and evaluating all incoming safeguards information, such as accountancy data dispatched from nuclear facilities and inspection data taken by the Government of Japan. The Division is also developing new software relevant for safeguards information processing. We wish to thank Dr. Miyasaka for a job well done and extend our best wishes in his new position.

Dr. T. Suzuki, current head of the JAERI Shielding Laboratory, is RSIC's new shielding information coordinator. We look forward to a continuation of the excellent cooperation now in effect in the exchange of radiation protection and shielding codes and data between Japan and the USA.

STAFF MEMBER IN EUROPE

Robert W. Roussin, Engineering Physics Information Center's Data Coordinator and RSIC Deputy Director, is in Europe to attend the OECD Nuclear Energy Agency Specialists' Meeting on Nuclear Data and Benchmarks for Reactor Shielding, October 27–29 in Paris. He will present papers on RSIC multigroup and covariance data libraries and on the FORSS sensitivity and uncertainty analysis system. He is also visiting the OECD NEA Data Bank in Paris, the SERMA Shielding Laboratory (LEP) at Saclay, the UKAEA laboratory at Winfrith in the United Kingdom, and Imperial College in London. The visit to Imperial College will include a gathering of shielding specialists in the London area to discuss recent developments.

Bob will return November 13th.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in October.

CCC-387/HARAD

HARAD, a code for calculating radioactive daughter concentrations in air following the atmospheric release of a parent radionuclide under a variety of meteorological conditions, was contributed by the Oak Ridge National Laboratory. It can be applied most profitably to the assessment of doses to man from the

noble gases such as ^{222}Rn, ^{220}Rn, and Kr isotopes. The simultaneous processes of radioactive decay, buildup, and environmental losses through wet and dry deposition on ground surfaces are calculated for a daughter chain in an airborne plume as it is dispersed downwind from a point of release of a parent. Typical ^{222}Rn calculations require only 0.12 seconds on the IBM 3033. Reference: ORNL-5634. FORTRAN IV; IBM 360.

CCC-388/RACC

RACC, a code system for computing radioactivity-related parameters for fusion reactor systems, was contributed by the Argonne National Laboratory, Argonne, Illinois. Parameters such as decay heat, decay gamma-ray spectrum and biological hazard potential (BHP) can be calculated. Geometries which can be handled include slab, sphere, cylinder, and torus in multidimensions. RACC is capable of interfacing with most of the standard multigroup, multidimensional neutron/photon transport codes currently available for fusion system application. Reference: ANL/FPP/TM-122. FORTRAN IV; IBM 360.

CCC-390/FOCUS

FOCUS, an adjoint Monte Carlo neutron transport code, was contributed by the Inter-University Reactor Institute, Delft, The Netherlands via the OECD NEA Data Bank, Gif-sur-Yvette, France. A Monte Carlo code which is complementary to other Monte Carlo codes, FOCUS handles complicated scattering models, detailed cross-section representation and/or complex geometries which cannot be handled by neutron transport codes based on numerical analysis as diffusion or S_N codes. Time dependence is included in FOCUS and energy is treated as a continuous variable thus avoiding approximations due to the use of multigroup cross-section sets. Included in the FOCUS package is ETOF which handles ENDF/B data, supplemented with adjoint cross sections and energy distributions which are calculated from ENDF/B data by ADX. ADX is also included in the package. References: IRI-131-77-04, -05, and -06. FORTRAN IV; IBM 3033.

CCC-391/PALLAS-2DCY

PALLAS-2DCY, a multigroup neutron/gamma-ray transport code for cylindrical geometry, was contributed by Ship Research Institute and Japan Atomic Energy Research Institute, Tokyo, Japan. Based on a method of direct integration, the code solves the energy- and angular-dependent Boltzmann transport equation with general anisotropic scattering. It is particularly suited to solution of deep penetration transport problems with an external source. Reference: JAERI-M 9014. FORTRAN IV; FACOM M200.

CCC-392/INREM II

INREM II, computer implementation of recent models for estimating the dose equivalent to organs of man from an inhaled or ingested radionuclide, was contributed by the Oak Ridge National Laboratory. Deposition and removal of radioactivity from the respiratory tract is represented by the ICRP Task Group Lung Model. A four-segment catenary model of the GI tract is used to estimate movement of radioactive material that is ingested or swallowed after being cleared from the respiratory tract. Retention of radioactivity in other organs is specified by linear combinations of decaying exponential functions. The formation and decay of radioactive daughters is treated explicitly, with each radionuclide species in the chain having its own uptake and retention parameters, as supplied by the user. Output permits the evaluation of crossfire components of dose when penetrating radiations are present. Reference: NUREG/CR-0114, ORNL/NUREG/TM-84. FORTRAN IV; IBM 3033.

CCC-393/MONK 5.2

MONK, a general purpose Monte Carlo neutronics code system, was contributed by the United Kingdom Atomic Energy Authority, Health and Safety Branch, Risley, Warrington, England, through the OECD NEA Data Bank, Gif-sur-Yvette, France. 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. References: SRD-R-86 and -88. FORTRAN IV; IBM 360.

SCA-07/KENO IV(CG)

KENO-IV/CG, the multigroup Monte Carlo criticality code system with combinatorial geometry, has been updated to correct errors in Subroutine GG. Information for the correction was furnished by the UCCND, Computer Sciences Division, ORNL contributors. A mailing has been made informing current users of the correction.

SCA-08/CESAR

CESAR, a critical experiment storage and retrieval code package, has been updated to add new materials to the library. The code and the new materials for the library were contributed by UCCND Computer Sciences Division, Oak Ridge National Laboratory. FORTRAN IV; IBM 360.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in October.

DLC-44/COVERX

The compilation of multigroup covariance matrices related to ENDF/B-IV has been updated by the ORNL contributors to replace the COVERT source program with the new service module from the FORSS (CCC-334) system. The new package is designated DLC-44C/COVERX. A single reel of magnetic tape is needed for transmittal.

DLC-77/COVERV

The compilation of multigroup covariance matrices in COVERX format was contributed by Oak Ridge National Laboratory. The essential difference from DLC-44/COVERX is that the covariances are based on evaluated covariance files from ENDF/B-V data and were generated using the PUFF2(PSR-157) program. A single 2400-ft. reel of magnetic tape is sufficient for transmittal. References: ORNL/TM-7389 and ORNL/TM-7181. FORTRAN IV; IBM 360.

PERSONAL ITEMS

The following changes of address have been noted: **Mike Strayer** *from* Control Data Corporation, Minneapolis, MN *to* PG&E, San Francisco, CA; **George Imel** *from* Princeton Plasma Physics Laboratory, NJ *to* EG&G Idaho, Idaho Falls, ID; **Ed Tomlinson** *from* UCCND Computer Sciences Division, Oak Ridge, TN *to* TVA, Chattanooga, TN; **Eugene Normand** *from* Puget Sound Power & Light, Bellevue, WA *to* Northwest Energy Service Co., Kirkland, WA; **Andor Kerekes** *from* F.J.C. National Research Inst. for Radiobiology & Radiohygiene, Hungary *to* National Office of Measures, Budapest, Hungary; and **J. Russell Johnson** *from* Idaho National Engineering Laboratory, Idaho Falls *to* Nuclear Fuel Services, Commonwealth Edison Co., Chicago, IL.

VISITORS TO EPIC

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

Jack Courtney, Louisiana State University, Baton Rouge, LA; **M. C. Thorne**, Associated Nuclear Services, Epsom, Surrey, United Kingdom; **C. M. Lampley**, Radiation Research Associates, Ft. Worth, TX; **M. Moghari**, Control Data Corporation, Rockville, MD; **G. E. Powers**, General Electric, Wilmington, NC; **Sidney Fernbach**, Information Systems, Livermore, CA; and **Paul Thesing**, Institut Fuer Naturwiss-Technische Trendanalysen, Euskirchen, Germany.

NEW ANSI STANDARD ON TESTING LWR SHIELDING APPROVED

The new American National Standard, ANSI/ANS-6.3.1, *Program for Testing Radiation Shields in Light Water Reactors (LWR),* has recently been approved and is now available. The standard was developed by the ANS-6.3 Standards Working Group, Paul Persiani of Argonne National Laboratory, Chairman, and is a replacement of ANSI N18.9-1972. It describes a test program to be used in evaluating all biological radiation shielding in nuclear reactor facilities under normal operating conditions including anticipated operational occurrences. The program encompasses examining and testing to be performed before startup, and testing subsequent to the startup phase.

This standard may be obtained for $20.00 from the American Nuclear Society, 555 North Kensington Ave., La Grange Park, IL 60525; Phone 312-352-6611.

ICRU REPORT ON QUANTITIES AND UNITS

The International Commission on Radiation Units and Measurements (ICRU) has published ICRU Report 33, "Radiation Quantities and Units." This is the latest in a series of ICRU reports providing definitions for fundamental quantities and units. The new report superceded ICRU Report 19 and its Supplement which were published in 1971 and 1973, respectively. The new report, in defining radiation quantities, continues the previously utilized division of quantities and units into those intended for general use and those intended for use in radiation protection. In the first category are such quantities as particle fluence, energy fluence, mass attenuation coefficient, linear energy transfer, absorbed dose, kerma, exposure and activity. The section treating quantities and units for use in radiation protection includes definitions of such quantities as dose equivalent, absorbed dose index, and dose equivalent index. New definitions for general use quantities include those for particle number, radiant energy, particle flux, energy flux, particle radiance, energy radiance, cross-section, radiation chemical, yield, and decay constant. In addition, the previously defined exposure rate constant has been replaced with air kerma rate constant. New definitions in the section on quantities for use in radiation protection include those for shallow dose equivalent index and deep dose equivalent index as well as definitions for various rates.

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

Copies of the report can be obtained from ICRU Publications, P.O. Box 30165, Washington, D.C. 20014.

1981 MUNICH TOPICAL MEETING ON MATHEMATICAL METHODS

A topical meeting on "Advances in Mathematical Methods for Nuclear Engineering Problems" will be held April 27–29, 1981, in Munich, Federal Republic of Germany. It is sponsored by the American Nuclear Society Mathematics and Computation Division, the European Nuclear Society, and Kerntechnische Gesellschaft e.V., in cooperation with the International Atomic Energy Agency and with the Nuclear Energy Agency Committee on Reactor Physics of the Organization for Economic Cooperation and Development.

The meeting will focus on current developments and recent advances in mathematical and computational methods for analyzing nuclear reactors and other nuclear systems. Papers have been solicited on the following topics: multidimensional transport and diffusion theory methods; integral transport theory; Monte Carlo methods; multidimensional coarse-mesh reactor analysis; homogenization techniques; computational methods in thermal-hydraulics and fluid mechanics; reactor dynamics and safety analysis; power distribution control; parallel computing; and computational methods for controlled fusion.

The conference language is English. The detailed technical program will be published as an insert in the January 1981 issue of Nuclear News. All accepted papers will be published in full length in the meeting proceedings (which will be available at the start of the meeting).

If you wish to have further information, you may contact any of the following people. The Technical Program Chairman is Manfred R. Wagner, Kraftwerk Union AG, Department R121, Postfach 3220, D-8520 Erlangen, FRG. The Technical Program Cochairman is Henry C. Honeck, 118 Vivion Dr., Aiken, SC 29801. The General Chairman for the meeting is W. F. Werner, Gesellschaft fur Reactorsicherheit, D-8046, Garching, F.R. Germany.

CALL FOR PAPERS

A call for papers has been announced for the Second Topical Meeting on Fusion Reactor Materials to be held in Seattle, Washington, August 9–12, 1981. The conference is sponsored by the American Nuclear Society, the Nuclear Metallurgy Committee of AIME and ASM, the Office of Fusion Energy of the Department of Energy, and the Electric Power Research Institute. Researchers actively interested in the materials problems associated with the development and commercialization of fusion power are invited to participate.

The conference will provide a forum for the reporting, review and discussion of recent developments in the technology of materials for magnetically and inertially confined fusion reactors. Invited papers will summarize the state of reactor design and system studies. A mix of invited and contributed papers on materials are expected to include the following subject areas: structural and blanket materials, systems studies, plasma-material interface, special purpose materials, magnetic materials, and analytical studies and modeling.

For further information concerning the conference contact: R. D. Nelson, General Chairman, Pacific Northwest Laboratory, P. O. Box 999, Richland, WA 99352; or J. J. Holmes, Technical Program Chairman, Hanford Engineering Development Laboratory, P. O. Box 1970, Richland, WA 99352.

OCTOBER 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

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