RSIC Newsletter

Oak Ridge National Laboratory
POST OFFICE BOX 2008 ! OAK RIDGE, TENNESSEE 37831-6362
MANAGED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U.S. DEPARTMENT OF ENERGY

Phone No. 615-574-6176 or FTS 624-6176
FAX 615-574-9619
EasyLink Mailbox 62813374
Telex (Answer Back): 854467 (ORNL EPIC UD)
BitNet: PDC@ORNLSTC • Internet: PDC@EPIC.EPM.ORNL.GOV

No. 314 *January 1991*

Nothing relieves and ventilates the mind like a resolution.)John Burroughs

CHANGES TO THE COMPUTER CODE COLLECTION

Seventeen changes were made to the computer code collection during the month. Twelve new code systems were packaged and added to the collection, additional hardware versions were added to two existing code packages, one existing package was replaced with a new version, one existing code package was updated, and an existing code package was corrected. Twelve changes resulted from foreign contributions.

CCC-070/CHARGE

Experimental and Mathematical Physics Consultants, Gaithersburg, Maryland, contributed a PC version of CCC-070/CHARGE (a program written in FORTRAN IV for the IBM 360/370 and CDC 6000 computers). CHARGE was designed to compute the dose rates and energy fluxes behind multilayered shields exposed to electrons and/or protons. Also, the doses due to electron, primary proton, electron bremsstrahlung, secondary proton, and secondary neutron radiations are calculated as a function of shield penetration. The executable program as packaged will run on the IBM PC with or without a math coprocessor and requires 640K of memory. Plotting options are not implemented in the PC version. A FORTRAN 77 compiler is required for the PC version. The compiler used was Microsoft FORTRAN Version 5.0 under the DOS 3.3 operating system. The PC version is transmitted on one DS/HD 5.25-inch diskette (1.2MB). Reference: SM-46335 (April 1965); DAC-62231 (April 1969); Informal notes for the IBM PC, EPMC, Maryland, (October 13, 1990). FORTRAN IV, IBM 360/370 and CDC 6000 (A); FORTRAN 77 IBM PC (B).

CCC-459/BOLD VENTURE

Some FORTRAN 77 source files for the PC version of CCC-459B (September 1990 version, designated Version 2), were inadvertently omitted. The additional routines are transmitted on one DS/HD 5.25-inch diskette (1.2MB). The diskette contains some subroutines in the VENTURE code and the subroutines in the VIP processor. Users who have no wish to re-compile the sources do not need this update. The PC version of VENTURE is now distributed on six DS/HD 5.25-inch diskettes (1.2MB). Reference: EGG-2582, FORTRAN 77, IBM PC.

CCC-542/CAP-88

CAP-88 assesses dose and risk due to radionuclide emissions to the air in compliance with National Emission Standards for Hazardous Air Pollutants (NESHAPs) for radionuclides. The developers at the EPA Office of Radiation Programs, Las Vegas, Nevada, have added several files corresponding to a typical run of CAP-88. These files include population arrays, wind speed, direction, and stability classes, an example output file and a synopsis report. These files are only an addition to the existing package and are not necessary to run the code. Both the IBM and VAX versions contain this change. The IBM/MVS version is transmitted on magnetic tape; the added files for a typical run are transmitted on one DS/DD 5.25-inch diskette. The VAX version runs under VMS and is available on 3 DS/HD (1.2MB) diskettes. References: U.S. EPA Draft (Sept. 1989). FORTRAN 77; IBM (A) and VAX (B).

CCC-562/MCRAC

Ruder Boškovi*f* Institute, Zagreb, Yugoslavia, through the Nuclear Energy Agency (NEA) Data Bank, France, contributed the PC version of MCRAC, adapted from the IBM mainframe code developed at Pennsylvania State University (originally written in FORTRAN IV). MCRAC is an in-core fuel management code to be used principally for scoping purposes. It performs both reactor nucleonic and economic analyses over multiple reactor cycles. MCRAC uses a two-dimensional, two-group reactor model, and requires cross section sets in the form of polynomial functions of burnup. The main features are: multiple cycle depletion analysis, multiple cycle fuel cost analysis, 1.5-group neutron diffusion modelling, critical soluble boron concentration search, BOC power distribution flattening option, control rod or BPR simulation, and spatial power dependent xenon-135 distribution calculation. MCRAC runs on an IBM PC, IBM PC/XT, IBM PC/AT and PC 386 with a math coprocessor. The code was written in FORTRAN 77. The Microsoft FORTRAN Version 5.0 compiler was used to obtain the executable file. The code is transmitted on one DS/HD 5.25-inch (1.2MB) diskette. Reference: IAEA0889 (March 12, 1990). FORTRAN 77, IBM PC.

CCC-563/PSU-LEOPARD

Ruder Boškovi*f* Institute, Zagreb, Yugoslavia, through the NEA Data Bank, France, contributed the PC version of PSU-LEOPARD, written in FORTRAN 77 for the IBM PC, based on the mainframe code LEOPARD developed at Westinghouse (see CCC-343/LEOPARD and CCC-343B/LEOPARD-PC) and later modified by Pennsylvania State University. PSU-LEOPARD is a spectrum-dependent non-spatial depletion code. It differs from the standard LEOPARD code in two aspects: generation of tables with polynomial coefficients representing macroscopic cross sections in terms of depletion and boron concentration; and input simplifications for calculations of the Three Mile Island reactor (a subroutine was added to accommodate this type of reactor). PSU-LEOPARD runs on an IBM PC, IBM PC/XT, IBM PC/AT, and PC 386 with a math coprocessor. The executable code as packaged requires a math coprocessor. The Microsoft FORTRAN Version 5.0 compiler is used. The code is transmitted on one DS/HD 5.25-inch diskette (1.2MB). Reference: IAEA Information File; IAEA0888, NEA Data Bank; WCAP-3269-26. FORTRAN 77; IBM PC.

CCC-564/GGG-GP

TU Electric, Glen Rose, Texas, contributed a PC version of CCC-075/G3-6ED, which is related to CCC-494/G33-GP. GGG-GP estimates gamma-ray scattering from a point source to a series of point detectors. The output includes detector response for each source energy, as well as a grouping by scattered energy in addition to an uncollided flux result. Although GGG-GP is basically a single-scatter calculation, it also includes a correction for multiple scattering by applying a buildup factor for the path segment between the point of scatter and the detector point. Results are recorded with and without buildup. GGG-GP employs the FASTER geometry routines to define region boundaries with the general quadric equation, the major difference from G33-GP. The buildup factor is computed from the coefficients using the Geometric Progression (GP) fitting function. A subroutine was added to compute flux-to-

dose rate conversion factors for arbitrary photon energies based on standard curve fit parameters. The code runs on an IBM PC with a math coprocessor (it has also been tested on an IBM PS/2 and PC 386). The code was tested at RSIC using Ryan-MacFarland/FORTRAN Version 2.42 FORTRAN 77 compiler running under DOS 3.3 operating system. The IBM PC version was compiled by TU Electric using the IBM Professional FORTRAN Version 1.00. Reference: Informal Notes, TU Electric; LA-5176 (1973). FORTRAN 77; IBM PC.

CCC-565/QADMOD-GP

TU Electric, Glen Rose, Texas, contributed a PC version of CCC-396/QADMOD-G written in FORTRAN 77 for the IBM PC. QADMOD-GP is a point-kernel integration code for calculating gamma ray fluxes and dose rates or heating rates at specific detector locations within a three-dimensional shielding geometry configuration due to radiation from a volume-distributed source. QADMOD-GP calculates gamma-ray fluxes, dose rates, or heating rates at discrete locations within a complex source-geometry configuration by representing a volume-distributed source with a number of point isotropic sources and computing the distances through all regions traversed by the line-of-sight from the source points to a desired receiver point. From these distances and the characteristics of the materials within them, energy-dependent exponential attenuation factors and energy-dependent buildup factors for gamma-rays are applied to calculate the direct gamma-ray dose and the gamma-ray dose with buildup. QADMOD-GP employs the FASTER geometry routines to define region boundaries with the general quadric surface equation, the major difference from QAD-CGGP.

Additional features of the PC version are: (1) use of the geometric progression buildup factors; (2) addition of a subroutine to allow use of updated mass attenuation coefficients (without coherent scattering); (3) addition of a subroutine to compute flux-to-dose rate conversion factors for arbitrary photon energies; (4) an increase of the number of allowable computed source point locations (from 500 to 3,000); (5) an increase of the exponential function argument minimum (from ! 180.218 to ! 87.0) in KERNEL to avoid underflows; (6) installation of a “card image” routine to print formatted input data at the beginning. QADMOD-GP runs on the IBM PC and compatibles with a math coprocessor. The IBM Professional FORTRAN Version 1.0 compiler was used by TU Electric to create the executable program. Alternatively, the Ryan-MacFarland/FORTRAN Version 2.42 compiler can be used. The code is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: Informal notes, TU Electric, Texas, (November 1990); RRA-N7914 (December 1979). FORTRAN 77 IBM PC.

CCC-566/PIEDEC

Kansai Electric Power Company and Mitsubishi Atomic Power Industries Inc., Japan, through NEA Data Bank, France, contributed the dose evaluation code PIEDEC, originally written to run on a FACOM-M380 and adapted for the IBM 3083. PIEDEC calculates the initial intake activity and effective dose equivalent of a worker (who ingests radioactive nuclides by inhalation or oral intake) using measured data (whole-body counting or bioassay test). The transformation of radioactive nuclides in each source organ is calculated by integrating the analytically solved retention function using the Gauss-Legendre method. The effective dose equivalent is obtained from multiplying specific energies and the transformations. The input for gamma-ray emitters is the internal contamination measured by the whole-body counter; for alpha- and beta-ray emitters it is the activity in urine or faeces. The code contains two sections: initial intake activity evaluation and dose equivalent evaluation. The first applies the retention functions of the total body to gamma-ray emitters and excretion functions to alpha- and beta-ray emitters. The excretion functions have been obtained from the excretion models as prepared in this study. PIEDEC runs on the IBM 3083 and FACOM-M380. On the IBM 3083, the compiler used was VS FORTRAN Level 2.1.1. The code is transmitted on one DS/HD 5.25-inch diskette (1.2MB). Reference: NEA 1084 (January 20, 1989). FORTRAN 77, IBM 3083 and FACOM-M380.

CCC-567/AIRGAMMA

The Japan Atomic Energy Research Institute (JAERI), Japan, through NEA Data Bank, France, contributed AIRGAMMA, originally written in FORTRAN IV for the FACOM-M380, and adapted for the IBM 3083. AIRGAMMA calculates the external exposure to gamma rays from a radioactive cloud. Cloudshine doses are calculated by interpolating normalized doses based on the Gaussian plume model. The normalized dose is defined as the dose on the ground when a gamma-emitting nuclide is released at a rate of 1 Ci/hr or the amount of 1 Ci and the wind speed is 1 m/s. The code takes into account the depletion of the dispersing materials for calculation of the cloudshine doses, but ignores effects of the building wake and the mixing layer. The code was written in FORTRAN IV and modified to FORTRAN 77 by the NEA Data Bank. On the IBM 3083, the compiler used was VS FORTRAN Level 2.1.1; several subroutines are written in IBM Assembler. The code is transmitted on one DS/HD 5.25-inch diskette (1.2MB). Reference: NEA 1130/01. FORTRAN 77, IBM Assembler; IBM 3083.

CCC-568/HORN

The Japan Atomic Energy Research Institute, Ibaraki-ken, Japan, through the NEA Data Bank, France, contributed HORN, which calculates the transport of volatile fission products in a dry primary cooling circuit under severe accidents of water reactors. HORN determines the chemical forms of fission products both in the bulk flow and at the wall by the gas-liquid-solid equilibrium model. The results are used to calculate the diffusional deposition rates of vapors and to estimate the nucleation rates of aerosols. The number of fission product elements is minimized by using the periodicity of elements and by treating less volatile elements collectively as one imaginary element which always behaves like an aerosol. The elements considered are H, O, B, Kr, Xe, Cs, I, Te, Sb, Ag, Cd, and Ba. HORN runs on the IBM 3083. The code was written in FORTRAN 77. On the IBM 3083, the compiler used was VS FORTRAN Level 2.3.0. The code is transmitted on one DS/DD 5.25-inch diskette (360K). Reference: JAERI-M 86-158. FORTRAN 77, IBM 3083.

CCC-569/RICANT

Indira Gandhi Center for Atomic Research, India, through NEA Data Bank, France, contributed RICANT, written in FORTRAN IV for the VAX 8810. RICANT performs 2-dimensional neutron transport calculations in *x-y* geometry using the interface current method. In the interface current method, the angular neutron currents crossing region surfaces are expanded in terms of the Legendre polynomials in the two half-spaces made by the region surfaces. The region of interest is divided into small regions with constant material properties. The regions are connected by neutron currents crossing the interfaces. The outgoing current in one region is the incoming current in the adjacent region. The region sizes have to be very small so that spatial dependence can be ignored. Associated Legendre polynomials are used to represent the angular dependence of the fluxes. The weighted residual method is used to find the expansion coefficients of the angular fluxes. Making use of the superposition principle of neutron currents, inner iterations are performed over current components. Outer iterations are performed over groups. The compiler used was VAX FORTRAN under the VMS Version 5.1 operating system. The code is transmitted on one DS/DD 5.25-inch diskette (360K). Reference: RG/RPD-311, Kalpakkam, India, (December 1987). FORTRAN IV, VAX 8810.

PSR-274/PLOTTAB-89.1

The International Atomic Energy Agency (IAEA), Vienna, Austria, through the NEA Data Bank, France, recently supplied a newly frozen version of PLOTTAB. PLOTTAB is designed to plot any combination of continuous curves and/or discrete points (with associated error bars) using user-supplied titles and *x* and *y* axis labels and units. The program uses a simple Calcomp-like graphics interface which requires three subroutines: PLOTS, PLOT and PEN. All characters and symbols are drawn using tables or pen strokes supplied with this program. Using this method, the program should be simple to interface to virtually any plotter or graphics terminal. The current version differs from the previous one in the following aspects: one-sided *x* and *y* limits; 10,000 points for curves and 2,000 discrete points; 3 character fonts; linear or log *x* and *y* interpolation; optional rounding of plot limits and

optional legend box on plot. The code was tested on a VAX 8810 under the VMS operating system using VAX FORTRAN. The PC version can be compiled with IBM Professional FORTRAN Version 1.0 under the DOS 3.2 operating system and requires a math coprocessor. The code is available on one DS/HD 5.25-inch diskette (1.2MB). Reference: IAEA-NDS-83 (January 1988); IAEA-NDS-82 (June 1987). FORTRAN 77; IBM PC/AT and VAX 8810.

PSR-291/ICAR

ENEA, Bologna, Italy, through IAEA, Vienna, through NEA Data Bank, France, contributed a PC version of ICAR written in FORTRAN 77 for the IBM PC/AT. ICAR performs state and level density calculations for a specified type of nucleon. Calculations can be carried out in terms of the free gas model or in the frame of the BCS formalism to account for the pairing interaction. The code starts by calculating properties of the ground state, such as the correlation function, chemical potential, total energy and condensation energy. Next all possible configurations of *n* excitons within the adopted orbitals are generated by means of a combination enumeration algorithm. ICAR runs on an IBM PC/AT with a math coprocessor. The NEA Data Bank used the Ryan-MacFarland/FORTRAN Version 2.4 compiler under the MS-DOS 3.20 operating system. The code is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: ISSN/0393-6333; IAEA 0974/01. FORTRAN 77, IBM PC/AT.

PSR-292/EMPIRE

The Institute of Nuclear Studies, Warsaw, Poland, through NEA Data Bank, France, contributed EMPIRE, written in FORTRAN 77 for the IBM PC/AT. EMPIRE calculates spectra and cross sections for capture and/or multistep nuclear reactions in the frame of a combined pre-equilibrium and compound nucleus mechanism model. Angular momentum conservation is observed throughout the whole calculation. The decay of the compound nucleus is treated either in terms of the HRTW theory, to account for the width fluctuation effects, or in terms of standard Hauser-Feshbach theory if many open particle channels cause the fluctuations to cancel. The transmission coefficients of the nuclear potential are calculated with an optical model subroutine. The full gamma cascade is included in the calculations providing the gamma-ray spectra and populations of the discrete levels in the residual nuclei. EMPIRE runs on an IBM PC/AT with a math coprocessor. The NEA Data Bank used IBM Professional FORTRAN Version 1.0 and the Ryan-MacFarland/FORTRAN Version 2.42 compiler under the MS-DOS 3.20 operating system. The code is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: IAEA-NDS-95. FORTRAN 77; IBM PC/AT.

PSR-293/PEQAG-2

The Institute of Physics, Bratislava, Czechoslovakia, through IAEA, Vienna, through NEA Data Bank, France, contributed this version of PEQAG-2, written in FORTRAN 77 for the IBM PC/AT. PEQAG-2 performs an exciton model calculation of angle-integrated nucleon and gamma energy spectra. All the emissions are treated consistently within the pre-equilibrium approach based on the master equations of the model. Multiple particle and/or multiple gamma-ray emissions are included. Angle-integrated energy spectra of neutrons, protons and gamma-rays, as well as the corresponding integrals, are computed. No angle-dependent or spin-dependent calculations are included. The state density used is the equidistant-spacing model in the finite potential well. PEQAG-2 runs on an IBM PC/AT with a math coprocessor. The NEA Data Bank used Microsoft FORTRAN Version 5.0 and the Ryan-MacFarland/FORTRAN Version 2.42 compiler under the MS-DOS 3.20 operating system. The code is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: IAEA1185. FORTRAN 77.

PSR-294/SCAT-2

The International Center For Theoretical Physics, Trieste, Italy, through NEA Data Bank, France, contributed SCAT-2, written in FORTRAN 77 for IBM PC/AT. SCAT-2 is designed as a fast, easy-to-use program to calculate total cross sections, elastic scattering cross sections and their angular distributions, and transmission coefficients from the

optical model of a spherical nucleus. The calculation is performed at a specified set of energies for one of the following incident particles: neutron, proton, deuteron, triton, helium-3, or alpha. The nuclear potential contains the following terms: Coulomb, a real volume Woods-Saxon potential, an imaginary surface Woods-Saxon or Gaussian potential, an imaginary volume Woods-Saxon potential, and a spin-orbit potential. A partial wave expansion of the Schroedinger equation is numerically integrated using Cowell's method. SCAT-2 runs on an IBM PC/AT with a math coprocessor. The NEA Data Bank used Microsoft FORTRAN Version 5.0 under the MS-DOS 3.20 operating system. Other compilers used are IBM Professional FORTRAN Version 1.00 and Ryan-MacFarland/FORTRAN Version 2.42. The code is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: NEA 0829. FORTRAN 77; IBM PC/AT.

PSR-295/SAIPS-PC

The Latvian University, Riga, Latvia, contributed a PC version of PSR-203/SAIPS (originally developed for the ES EhVM computer and written in FORTRAN IV). This PC version is highly interactive and is written in FORTRAN 77. The SAIPS information and computing system solves the problem of program organization and processing of data sets used for unfolding neutron spectra. SAIPS includes the SAND-II, WINDOWS, and RFSP-JUL programs. SAND-II is an iterative method for neutron flux spectra determination by multiple foil activation. WINDOWS analyzes spectra data (foil activation measurements) using integral responses, i.e., integrals of weighting functions against the neutron flux. RFSP-JUL calculates the spectral neutron flux density from activity measurements, guess spectrum, and cross section data. SAIPS runs on an IBM PC with a math coprocessor. A FORTRAN 77 compiler is required. The test compiler was Ryan-MacFarland/FORTRAN Version 2.42 under the DOS 3.3 operating system. The code is transmitted on 2 DS/HD 5.25-inch diskettes (1.2MB). Reference: Informal document, Latvia, (March 1990). FORTRAN 77, IBM PC.

CHANGE TO THE DATA LIBRARY COLLECTION

An existing data library was updated during the month.

DLC-134/RADDECAY

Grove Engineering, Inc., Rockville, Maryland, recently updated RADDECAY to version 3.1 which supports CGA, EGA, VGA, and Hercules graphics boards in order to properly view the time-decay curves. The user may initialize a Hewlett Packard LaserJet printer to PC-8 font for printing the line and arrow representation of the decay chains. RADDECAY is based on DLC-80/DRALIST, a data set giving radioactive decay energies, spectra, half lives, and other information. RADDECAY is an interactive program for the IBM PC or compatible for retrieving and displaying decay information for 497 radionuclides. Data provided include the half life, radioactive daughter nuclides, probabilities per decay and decay product energies for alpha particles, beta rays, positrons, electrons, x-rays, and gamma rays. RADDECAY is written in TrueBasic. A math coprocessor is desirable but not necessary. RADDECAY Version 3.1 is distributed on one DS/HD 5.25-inch diskette (1.2MB). Reference: Grove Engineering informal notes. TrueBasic; IBM PC.

PERSONAL ITEMS

In serving a specialized area of scientific endeavor, it seems important that we note significant changes in the activities of people concerned with radiation protection, transport, and shielding in the nuclear industry. We, therefore, continue to carry personal items as they are brought to our attention.

Dr. William J. Veigele is now a consultant physicist in Santa Barbara, California. He did extensive work in

radiation effects, photon transport, x- and gamma-ray cross sections, and Compton scattering.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities:
Jordan Jordanov and *Gzoudev Pavlin*, Institute for Nuclear Research and Nuclear Energy, Sofia, Bulgaria.

A two-volume set of the *1990 Annual Book of ASTM Standards: Nuclear, Solar, and Geothermal Energy*, is now available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187. Volume 12.01, *Nuclear Energy (I)*, contains 100 standards that focus on materials for nuclear reactor applications. Volume 12.02, *Nuclear (II), Solar, and Geothermal Energy*, contains 139 standards featuring test methods and practices for solar and geotechnical energy.

STANDARDS NEWS

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.

Techniques in Nuclear Radiation Shield Analysis

The College of Engineering of the University of Texas at Austin is offering a short course entitled ``Techniques in Nuclear Radiation Shield Analysis." The course is scheduled for May 20 ! 24, 1991, in Ft. Worth. The course is designed to help students perform shield analysis and design calculations with greater confidence as well as obtain a better understanding of the underlying assumptions and simplifications used in many radiation protection computations. Emphasis will be placed on point-kernel techniques. Several PC codes will be demonstrated and participants will execute sample problems using the codes. The faculty includes Nolan E. Hertel (The University of Texas at Austin), Richard M. Rubin and J. Karl Warkentin (TU Electric), and Norman M. Schaeffer (Radiation Research Associates). Registration information may be obtained from: Continuing Engineering Studies, College of Engineering, ECJ 10.324, The University of Texas at Austin, Austin, TX 78712 (phone 512-471-3506, Fax 512-471-0831).

Calendar

Your attention is directed to the following events of interest.

February 1991

Nuclear News Marketing Conference, Feb. 4 ! 6, 1991, Clearwater Beach, Florida, USA, sponsored by the American Nuclear Society. Contact: ANS Meetings Dept., 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 708-579-8258).

International Conference on Research Trends in Inertial Confinement Fusion, Feb. 4 ! 6, 1991, La Jolla, California. Contact: Institute for Advanced Physics Studies, P.O. Box 2946, La Jolla, CA 92038.

7th All-Union Conference on Monte Carlo Methods in Computational Mathematics and Mathematical Physics, Feb. 19 ! 21, 1991, in Novosibirsk, USSR. Contact: Dr. J. V. Bulavsky, Computational Center of Siberian Branch of Academy of Science, 6, prospect Ak.Lavrentyeva, Novosibirsk 630090, USSR (phone 356721).

*Waste Management `91*, Feb. 24 ! 28, 1991, Tucson, Arizona, sponsored by the University of Arizona, the American Society of Mechanical Engineers, the American Nuclear Society, and the U.S. Department of Energy. Contact: Waste Management `91, College of Engineering and Mines, Building 20, University of Arizona, Tucson, AZ 85721 USA.

March 1991

Specialists' Meeting on Advanced Modelling and Computer Codes for Calculating Local Scale and Meso-Scale Atmospheric Dispersion of Radionuclides and Their Applications, Mar. 6 ! 8, 1991, Saclay, France, sponsored by the OECD Nuclear Energy Agency Data Bank. Contact: Enrico Sartori, OECD/NEA Data Bank, Bat. 445, F-91191 Gif-sur-Yvette Cedex, France (phone 33 1 6908-6095, Fax 33 1 6941-3965).

April 1991

27th Annual Meeting of the National Council on Radiation Protection and Measurements, Apr.

3!4, 1991, Bethesda, Maryland. Contact: NCRP, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814 (phone 301-657-2652).

Advances in Mathematics, Computations, and Reactor Physics, Apr. 28!May 1, 1991, Pittsburgh, Pennsylvania, an international topical meeting sponsored by the ANS, Mathematics & Computation Division and the Reactor Physics Division. Contact: J. E. Olhoeft, Westinghouse Electric Corp., P.O. Box 355, WEC-E205, Pittsburgh, PA 15230-0355 USA (phone 412-374-5704).

1991 International High-Level Radioactive Waste Management Conference, Apr. 28!May 3, 1991, Las Vegas, Nevada, sponsored by the ANS and the American Society of Civil Engineers. Contact: Dillard B. Shipler, Technical Program Chair, American Nuclear Society, 555 N. Kensington Ave., La Grange Park, IL 60525 USA.

Conference on Occupational Radiation Protection, Apr. 29!May 3, 1991, Guernsey, United Kingdom, sponsored by the British Nuclear Energy Society. Contact: British Nuclear Energy Society, Secretariat, 1-7, Great George St., London SW1P 3AA U.K.

May 1991

Radiopharmaceutical Dosimetry Symposium, May 7!10, 1991, in Oak Ridge, Tennessee, sponsored by the Radiopharmaceutical Internal Dose Information Center. Contact: Audrey T. Schlafke-Stelson, Program Committee, 5th International Dosimetry Symposium, Radiopharmaceutical Internal Dose Information Center, Medical Sciences Division, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831-0117 USA (phone 615-576-3450).

*ICRM `91*, May 27!31, 1991, Madrid, Spain, sponsored by CIEMAT. Contact: J. M. Los Arcos, ICRM`91 Secretariat, CIEMAT, Investigasción Básica, Avenida Complutense, 22, 28040-Madrid, Spain (phone 34-1-3466225, Fax 34-1-3466005).

June 1991

ANS Annual Meeting, June 2!6, 1991, Orlando, Florida. Contact: General Chair John A. DeMastry, Florida Power & Light Co., P.O. Box 14000, Juno Beach, FL 33408 (phone 407-694-3613).

5th International Symposium on Radiation Physics, June 10!14, 1991, Dubrovnik, Yugoslavia. Contact: Dr. Ante Ljubi‡i*f*, ISRP-5 Chairman, Ruder Bo×kovi*f* Inst., P.O. Box 1016, 41001 Zagreb, Yugoslavia (phone 41 425-563 or 41 434-467, Telex 21383 irbzg yu, Fax 41 425-497).

International Conference on Emerging Nuclear Energy Systems (ICENES`91), June 16!21, 1991, Monterey, California. Contact: C. D. Henning, LLNL L-644, P.O. Box 808, Livermore, CA 94551.

A Joint Symposium on Radiation Protection, June 16!23, 1991, in Winnipeg, Canada. Contact: Danny Buksak, Conference Chairman, The University of Manitoba, 191 Frank Kennedy Bldg., Winnipeg, Manitoba, R3J 2N2, Canada (phone 204-474-6633).

July 1991

2d International Symposium on Biophysical Aspects of Auger Processes, July 5!6, 1991, University of Massachusetts, Amherst, Massachusetts, sponsored by the American Association of Physicists in Medicine. Contact: Roger W. Howell, Dept. of Radiology, Div. of Radiation Research, M.S.B. F-451, Univ. of Medicine & Dentistry of NJ, 185 South Orange Ave., Newark, NJ 07103 USA (phone 201-456-5067).

Health Physics Society Annual Meeting, July 21!26, 1991, Washington, D.C. Contact: Nancy E. Newman, NIH Bldg. 21, Rm. 236, 9000 Rockville Pike, Bethesda, MD 20892 (phone 301-496-5774).

International Illinois Low Level Radioactive Waste (LLWM) Symposium: The Quiet Revolution)Innovations in Low-Level Waste Management, July 29!Aug. 1, 1991, Chicago, Illinois, sponsored by the Illinois Dept. of Nuclear Safety. Contact: Ms. P. Burnett, Illinois Dept. of Nucl. Safety, 1035 Outer Park Drive, Springfield, IL 62704 USA.

September 1991

ICNC '91, Sept. 9!13, 1991, Christ Church, Oxford, England, sponsored by AEA Technology, the OECD Nuclear Energy Agency, with cooperation from IAEA. Contact: John Bentley, 062/A32, AEA Technology Winfrith, Dorchester, Dorset DT2 8DH, England (phone 0305 203316; Fax 0305 202122).

INEL Computing Symposium, Sept. 10 ! 12, 1991, Idaho Falls, Idaho, sponsored by the Idaho National Engineering Laboratory. Contact: Teri Williams, EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415-2602 (phone 208-526-9728, FTS 583-9728).

Brazilian Meeting on Reactor Physics and Thermal Hydraulics, Sept. 17 ! 20, 1991, São Paulo, Brazil. Contact: José Rubens Maiorino, IPEN-CNEN/SP, Caixa Postal 11049 (Pinheiros), 05499-São Paulo-SP-Brazil (phone 011 211-6011 Ext. 270; Telex 11 83592-IPEN-BR).

October 1991

7th Symposium on Neutron Dosimetry, Oct. 14 ! 18, 1991, Berlin, Fed. Rep. of Germany, sponsored by the Commission of the European Communities. Contact: Dr. R. Jarh, Physikalisch-Technische Bundesanstalt, Abt. 7, Bundesallee 100, 3300 Braunschweig, FRG.

1991 Joint International Waste Management Conference, Oct. 21 ! 26, 1991, Seoul, Korea. Contact: Mr. Larry C. Oyen, Sargent & Lundy, 55 East Monroe St., Chicago, IL 60603 (phone 312-269-6750, Fax 312-269-3475, Telex 280603).

November 1991

Nuclear Energy Forum, Nov. 10 ! 13, 1991, San Francisco, California. Contact: Conference Office, U.S. Council for Energy Awareness, 1776 I Street, N. W., Suite 400, Washington, DC 20006-2495 USA.

International Conference on Fusion Reactor Materials, Nov. 17 ! 22, 1991, Clearwater, Florida. Contact: P. J. Maziasz, Metals and Ceramics Division, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-6376.

April 1992

New Horizons in Radiation Protection and Shielding, Apr. 26 ! May 1, 1992, Pasco, Washington, a topical meeting of the ANS Radiation Protection and Shielding Division. Contact: Wilbur Bunch, HO-36, Westinghouse Hanford Co., P.O. Box 1970, Richland, WA 99352 (phone 509-376-6313).

May 1992

8th International Radiation Protection Association Conference, May 17 ! 22, 1992, Montreal, Canada. Contact: G. Webb, NRPB, IRPA 8 Secretariat, Chilton, Didcot, Oxon OX11 ORQ, United Kingdom.

DECEMBER 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

Health Phys., 59, 837-848. . *Estimation of Neutron Dose Equivalent at the Mezzanine of the Advanced Light Source and the Laboratory Boundary Using the ORNL Program MORSE*. . Sun, R-K.S. . Dec. 1990

Health Phys., 59, 931-934. . *Source Inventory Limits*. . Kerr, G.D.; Eckerman, K.F. . Dec. 1990

Nucl. Sci. Eng., 106, 235-242. . *Mirror-Based Neutron Sources for Fusion Technology Studies*. . Ivanov, A.A.; Ryutov D.D. . Nov. 1990

Nucl. Sci. Eng., 106, 243-248. . *KORONA, An Intense Sealed-Tube 14 MeV Neutron Generator*. . Pepelnik, R.; Fanger, H.U.; Michaelis, W. . Nov. 1990

Nucl. Sci. Eng., 106, 249-265. . *Status of OKTAVIAN I and Proposal for OKTAVIAN II*. . Sumita, K.; Takahashi, A.; Iida, T.; Yamamoto, J. . Nov. 1990

Nucl. Sci. Eng., 106, 266-278. . *The Multipurpose 14-MeV Neutron Source at Bratislava*. . Pivarc, J.; Hlavac, S. .

Nov. 1990

Nucl. Sci. Eng., 106, 279-295. . *Sources of Variable Energy Monoenergetic Neutrons for Fusion-related Applications*. . Drosg, M. . Nov. 1990

Nucl. Sci. Eng., 106, 296-298. . *A Rotating Gas Cell for High-Intensity Monoenergetic Neutron Production*. . Haight, R.C.; Garibaldi, J. . Nov. 1990

Nucl. Sci. Eng., 106, 299-307. . *Dense Plasma Focus as a Neutron Source for Fusion Research*. . Conrads, H. . Nov. 1990

Nucl. Sci. Eng., 106, 308-317. . *Neutron Production from the Deuteron Breakup Reaction on Deuterium*. . Cabral, S.; Borker, G.; Klein, H.; Mannhart, W. . Nov. 1990

Nucl. Sci. Eng., 106, 318-331. . *Summary of Monoenergetic Neutron Beam Sources for Energies >14 MeV*. . Brady, F.P.; Romero, J.L. . Nov. 1990

Nucl. Sci. Eng., 106, 332-344. . *Calibrated Fission and Fusion Neutron Fields at the Kyoto University Reactor*. . Kimura, I.; Kobayashi, K. . Nov. 1990

Nucl. Sci. Eng., 106, 345-352. . *Evaluation of 252Cf Prompt Fission Neutron Data from 0 to 20 MeV by Watt Spectrum Fit*. . Frohner, F.H. . Nov. 1990

Nucl. Sci. Eng., 106, 353-366. . *The 252Cf(sf) Neutron Spectrum in the 5- to 20-MeV Energy Range*. . Marten, H.; Richter, D.; Seeliger, D.; Fromm, W.D.; Bottger, R.;Klein, H. . Nov. 1990

Nucl. Sci. Eng., 106, 367-376. . *Results of a Low-Background Measurement of the Fission Neutron Spectrum from 252Cf in the 9- to 29-MeV Energy Range*. . Chalupka, A.; Malek, L.; Tagesen, S.; Bottger, R. . Nov. 1990

Nucl. Sci. Eng., 106, 377-398. . *Investigation of the Spectral Fluence of Neutrons from Spontaneous Fission of 252Cf by Means of Time-of-flight Spectrometry.* . Bottger, R.; Klein, H.; Chalupka, A.; Strohmaier, B. . Nov. 1990

Nucl. Sci. Eng., 106, 409-414. . *Accurate Determination of (n,2n) Cross Sections for Heavy Nuclei from Neutron Production Spectra*. . Vonach, H.; Pavlik, A.; Strohmaier, B. . Dec. 1990

Nucl. Sci. Eng., 106, 452-456. . *Attenuation of External Bremsstrahlung in Metallic Absorbers*. . Dhaliwal, A.S.; Powar, M.S.; Singh, M. . Dec. 1990

Nucl. Sci. Eng., 106, 471-479. . *The SKn Method I: A High-Order Transport Approximation to Neutron Transport Problems*. . Altac, Z.; Spinrad, B.I. . Dec. 1990

Nucl. Sci. Eng., 106, 480-488. . *The SKn Method II: Heterogeneous Problems*. . Spinrad, B.I.; Altac, Z. . Dec. 1990

Nucl. Sci. Eng., 106, 494-500. . *Evaluated Cross Sections for Neutron Scattering from Natural Carbon Below 2 MeV Including R Matrix Fits to 13C Resonances*. . Fu, C.Y. . Dec. 1990

Radiat. Prot. Dosim., 32, 83-89. . *The Quality Factor for Photons*. . Drexler, G.; Veit, R.; Zankl, M. . 1990

CINDA-A 1935-1987, VOL. 1. . Introduction, CINDA Listing for Collective Entries and Compounds Detailed Explanation of CINDA. . Sept. 1990. . IAEA

NCRP Report No. 106. . Limit for Exposure to ``Hot Particles" on the Skin. . Dec. 1989