RSIC Newsletter

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One ship drives east and another west
While the self-same breezes blow:
'Tis the set of the sail and not the gale
That bids them where to go.
—Ella Wheeler Wilcox

NEA/RSIC Personnel Exchange—II

John E. White, of the Radiation Shielding Information Center, has left for an 8-week assignment with the Nuclear Energy Agency (NEA) Data Bank in Paris. The NEA and the U.S. Department of Energy (DOE) have an arrangement for the exchange of technical software and data between the NEA Data Bank and RSIC, which includes the exchange of personnel. Since the two Centers have similar missions and programs, these exchanges offer an opportunity to coordinate shared procedures.

The objectives of this exchange are: (1) to fulfill the cooperative arrangement through discussion, identification, and implementation of common standards in computer program and data library exchange; (2) to carry out Working Party on International Evaluation Cooperation (WP-IEC) activities in support of the mandate of Subgroup B; and (3) to work on the Radiation Shielding Experiment Data Base, a program of the Nuclear Science Committee (NSC), to include continuing development of SINBAD, collection and preservation of essential and comprehensive data sets from experiments carried out on radiation shielding facilities before they are closed down and expertise is lost (data will be stored in a computerized data base for easy retrieval by the radiation shielding community for validating shield design and analysis tools), and to add more NEA benchmarks to the collection.

ICRS8 Summary

The *8th International Conference on Radiation Shielding* was held in Arlington, Texas, April 24 to 28th, 1994. Despite stormy weather during the week, 261 persons from 16 different countries registered for the meeting. Approximately 40 percent of the attendees were from outside the United States. The meeting began with a mixer Sunday evening and continued with a plenary session on Monday morning. As John Butler indicated in his address to the plenary, the 8th ICRS indicates that the shielding community is alive and well some 40 years after its beginnings!

The meeting had 188 presentations on a wide variety of topics including Shielding Materials and Radiation Effects, Sensitivity and Uncertainty Analysis, Personal Computer Applications, Transport Methods, Radiation Field Characterizations, Monte Carlo Methods, Waste Management, Aircraft and Space Radiation, Accelerators, Pressure Vessel Dosimetry, Medical Applications, and many, many more. The meeting had a total of 20 sessions, 3 concurrent sessions in the mornings and 4 concurrent sessions in the afternoon. All in all a very busy week for the attendees. (Proceedings of the meeting are available from the American Nuclear Society.)

Richard Rubin
Chairman, ICRS8
TU Electric

CHANGES TO THE COMPUTER CODE COLLECTION

Four changes were made to the computer code collection during the month. Two existing code packages were replaced with newly frozen versions and two existing code packages were updated to enhance performance.

CCC-125/RSAC 5.2

OP SYS: DOS

Language: Fortran 77

Computers: PC

Format: DOS

Westinghouse Idaho Nuclear Company, Inc., Idaho National Engineering Laboratory, Idaho Falls, Idaho contributed a newly frozen version of RSAC 5.2, which calculates the consequences of the release of radionuclides to the atmosphere. A user can generate a fission product inventory; decay and ingrow the inventory during transport through processes, facilities, and the environment; model the downwind dispersion of the activity; and calculate doses to downwind individuals. Doses are calculated through the inhalation, immersion, ground surface and ingestion pathways. RSAC+, a menu-driven companion program to RSAC-5, assists users in creating and running RSAC-5 input files. RSAC-5 has been subjected to extensive independent verification and validation for use in performing safety-related dose calculations to support safety analysis reports.

A fission product inventory can be calculated from the reactor operating history or to simulate a nuclear criticality accident. Radionuclide inventories can also be directly input into RSAC-5 if desired. Source term modeling allows for complete progeny ingrowth and decay during all accident phases. RSAC-5 release scenario modeling allows fractionation of the inventory by chemical group or element. RSAC-5 also models the effects of high-efficiency particulate air (HEPA) filters or other cleanup systems. RSAC-5's meteorological capabilities include Gaussian plume diffusion for Pasquill-Gifford, Hilsmeier-Gifford, and Markee models. RSAC-5 possesses the unique ability to model Class F fumigation conditions. Optionally, users can supply plume standard deviations or atmospheric diffusion to the code as input data. RSAC-5 also includes corrections for plume rise and building wake.

RSAC-5 and RSAC+ run on IBM personal computers or compatibles, with the following minimum requirements: math co-processor, 80386 processor, 2.6 MB hard disk space, 450 K of available memory. RSAC-5 is programmed in Fortran 77. The Lahey F77L (Version 5.01) and F77L-EM/32 (Version 5.10) compilers were used to create the executables included in the package. RSAC+ is programmed in the CLARION Professional Developer (Version 2.1). **Note that source codes are not distributed.** The package is transmitted on one DS/HD 3.5-in. (1.44 MB) diskette in self-extracting compressed DOS files. Reference: WINCO-1123 (Feb. 1994). Fortran 77; IBM PC 386 (C00125/PC386/01).

CCC-493/QAD-CGGP

OP SYS: DOS, MVS, AOS

Language: Fortran 77

Computers: Many, PC

Format: DOS

The QAD-CGGP documentation was updated with the addition of a report written by Bechtel Eastern Power Company in Gaithersburg, Maryland, to document a systematic parametric study of how QAD-CGGP compared to other point kernel codes for a class of radwaste problems relevant to the everyday experience in the nuclear power industry. The original QAD-CGGP code was developed by Mitsui Engineering and Shipbuilding Co. Ltd. QAD-CGGP, contributed to RSIC by Japan Atomic Energy Research Institute and Oak Ridge National Laboratory, is a combinatorial geometry version of QAD-P5A, a point kernel code for neutron and gamma-ray shielding calculations. QAD-CGGP includes the use of the geometric progression

fitting function for the buildup factors. References: Informal notes (Oct. 1988) , NE007 (1977) and MAP-115 (April 1988). Fortran 77; Data General MV/family, IBM 3033 (C00493/ALLMF/00) and IBM PC (C00493/IBMPC/00).

PSR-231/GRESS 3.0

OP SYS: VMS, UNIX, ULTRIX

Language: Fortran 77, C

Computers: VAX, workstations

Format: DOS, tar

Oak Ridge National Laboratory contributed a newly frozen version of this gradient enhanced software system which incorporates a few corrections to the previous release. Improvements in the implementation of the CHAIN option have resulted in a 70 to 85 per cent reduction in execution time and up to 50 per cent reduction in memory required for forward chaining applications.

GRESS uses a precompiler to interpret Fortran statements and to symbolically calculate derivatives for each floating point assignment statement. The result of the precompilation step is a new Fortran program that can produce derivatives for any REAL (i.e., single or double precision) variable calculated by the model along with the original output. Derivatives from a GRESS enhanced model can be used internally (e.g., iteration acceleration) or externally (e.g., sensitivity studies). By calling GRESS run-time routines, derivatives can be propagated through the code via the chain rule (referred to as the CHAIN option) or accumulated to create an adjoint matrix (referred to as the ADGEN option). A third option, GENSUB, makes it possible to process a subset of a program (i.e., a do loop, subroutine, function, a sequence of subroutines, or a whole program) for calculating derivatives of dependent variables with respect to independent variables. The GENSUB option uses either forward or reverse mode of automatic differentiation depending on the situation.

GRESS accepts a majority of ANSI-X3.9 Fortran 77, including subroutines, common blocks, data statements, read statements, user functions, intrinsic functions, block data subprograms, single precision variables, double precision variables, and equivalence statements. Only the CHAIN option is available on the DEC Alpha Workstation. The code was tested on VAX/VMS, VAX/ULTRIX, IBM RISC/6000, Hewlett-Packard 9000, DEC Alpha under OSF1, and SUN SPARC Station 1+. Both Fortran 77 and C compilers are required.

The package is transmitted on one DS/HD 5.25-in. (1.2 MB) diskette in a self-extracting compressed DOS file. It is alternately available in tar format on any of the following media: one DS/HD 3.5-in. (1.44 MB) diskette or on either DC 6150 (150 MB), 4 mm DAT (8 GB), or 8 mm (2.3 GB) cartridge tape. References: ORNL/TM-11951 (Nov. 1991), ORNL/TM-8776 (May 1983), ORNL/TM-11037 (May 1989), ORNL/TM-11261 (Nov. 1989), and ORNL/TM-12050 (March 1992). Fortran 77 and C; VAX, IBM RISC/6000, SUN and HP 9000 (P00231/MFMWS/02).

PSR-242/SABRINA 3.54

OP SYS: UNIX, ULTRIX, UNICOS

Language: Fortran 77, C

Computers: Many

Format: tar

Los Alamos National Laboratory contributed an update to this interactive, three-dimensional, geometry-modeling code system, primarily for use with CCC-200/MCNP4A. An additional sample case and its associated image files were added to the package. SABRINA's capabilities include creation, visualization, and verification of three-dimensional geometries specified by either surface- or body-base combinatorial geometry; display of particle tracks as calculated by MCNP; and volume fraction generation. This release, designated Version 3.54, runs on IBM, SUN, DEC, Apollo, Hewlett Packard, and Silicon Graphics workstations running UNIX operating systems, Vax

computers running ULTRIX, and Cray computers running UNICOS. Fortran 77 and ANSI C compilers are required as well as a graphics display with X-Window capability. The package is distributed in tar format on either DC 6150 (150 MB), 4 mm DAT (8 GB), or 8 mm (2.3 GB) cartridge tapes. Users who already have version 3.54 may request that the new sample case be mailed to them in compressed tar format on a DS/HD 3.5-in. (1.44 MB) diskette. Reference: LA-UR-93-3696 (October 1993). Fortran 77 and C; IBM, SUN, DEC, Apollo, Hewlett Packard, and Silicon Graphics workstations; Vax; and Cray (P00242/MFMWS/02).

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 1996 Topical

Keith Spinney, Technical Program Chairman, and Richard Cacciapouti, General Chairman, of the planned *Radiation Protection and Shielding Topical Meeting*, are seeking assistance with the planning and organization of the meeting. The tentative dates and location are April 21–25, 1996, in Cape Code Massachusetts. If you would like to and are able to participate in some capacity, Keith or Richard can be contacted at 508-779-6711.

Calendar

Your attention is directed to the following events of interest.

June 1994

41st Annual Meeting of the Society of Nuclear Medicine, June 5–8, 1994, Orange County Convention Center, Orlando, Florida. Contact: SNM, 136 Madison Ave., New York, NY 10016-6760 (phone 212-889-0717).

Radiation Safety Officer Training, June 13–17, 1994. Contact: Woodson Assoc., Inc., P.O. Box 2665, Gaithersburg, MD 20886 (phone 301-990-0751, Fax 301-990-6153).

Management and Disposal of Radioactive Wastes, June 13–17, 1994, a course offered by the Harvard School of Public Health. Contact: Harvard School of Public Health, Office of Continuing Education, 677 Huntington Ave., Boston, MA 02115-0023 (phone 617-432-1171, fax 617-432-1969).

An Introduction to the MCBEND Monte Carlo Radiation Transport Package, June 14–17, 1994, a workshop presented by AEA Technology at Winfrith, U.K. Contact: Mrs. J. Wilkinson-James, AEA Technology, Winfrith, Dorchester, Dorset DT2 8DH, UK (phone 0305-202352; fax 0305-202746).

ANS Annual Meeting, June 19–24, 1994, New Orleans, Louisiana. Contact: ANS, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 708-352-6611).

11th Topical Meeting on the Technology of Fusion Energy, June 19–24, 1994, New Orleans, sponsored by American Nuclear Society Fusion Energy Division. Contact: Donald J. Dudziak, Dept. of Nuclear Engineering, 110B Burlington Engg. Labs., North Carolina State University, Raleigh, NC 27695-7909 (phone 919-515-2301; fax 919-515-5115, email dudziak@ncsu.edu).

Annual Meeting of the Health Physics Society, June 26–30, 1994, San Francisco, California.

Contact: HPS, 8000 Westpark Dr., Suite 130, McLean, VA 22101-8101.

Third International Symposium on Fusion Nuclear Technology, June 27–July 1, 1994, University of California, Los Angeles. Contact: Dr. Mark Tillack, 44-139 Engineering-IV, Univ. of California, Los Angeles, CA 90024-1597 (phone 310-206-1230; Fax 310-825-2599, Internet, MST@fusion.ucla.edu).

5th Annual Scientific and Technical Conference of the Nuclear Society–Nuclear Power and Industry (NP-94), June 27–July 1, 1994, Obninsk, Russia. Contact: A. Gagarinski, Russia phone 007 (095) 196 99 00; fax 007-(095) 196 20 73; telex 411594 SHUGA.

July 1994

First International Congress of Environmental Geotechnics: Geotechnical and Related Aspects of Waste Management Associated with Municipal, Mine, Industrial and Nuclear Wastes, July 10–15, 1994, Edmonton, Canada. Contact: D. C. Sego, University of Alberta, Dept. of Civil Engineering, Sego, Edmonton, TG6 2G7, Canada.

Symposium on Use of Nuclear and Related Techniques in Soil/Plant Studies for Sustainable Agriculture and Environmental Preservation, July 10–16, 1994, Acapulco, Mexico. Contact: W.E.H. Blum, Secretary General, ISSS, Univ. f. Bobenkultur, Gregor-Mendel Strasse 33, A-1180 Vienna.

Environmental Health Physics, July 11–15, 1994. Contact: Woodson Assoc., Inc., P.O. Box 2665, Gaithersburg, MD 20886 (phone 301-990-0751, Fax 301-990-6153).

Planning for Radiation Emergencies, July 11–15, 1994, Guildford, Surrey, England. Contact: Prof. J.R.A. Lakey, c/o MOS Ltd, 17 Wrotham Road, Gravesend, Kent DA11 OPA, UK (phone 44-0-474-350580, Fax 44-0-474-320042).

SPECTRUM '94, Aug. 14–18, 1994, Atlanta, Georgia jointly sponsored by the ANS, the Canadian Nuclear Society, the Atomic Energy Society of Japan, IAEA, the European Nuclear Society, and the U. S. Department of Energy. Contact: Laura Jordan, SPECTRUM '94, Bldg. 773-41A, Westinghouse Savannah River Co., Aiken, SC 29808 USA (phone 803-725-3426; fax 803-725-2978).

6th International Radiation Physics Society (ISRP 6), July 18–22, 1994, Rabat, Morocco. Contact: D. B. Isabelle, CERI-CNRS, 3A Rue de la Ferollerie, 45071 Orleans Cedex 2, France (fax 33-38-63-02-71) or Pr. M. Berrada, Lab. de Physique Nucléaire, Faculté des Sciences, B. P. 1014 Rabat, Morocco (Fax 212-7-77-99-78).

27th International Conference on High Energy Physics, July 21–27, 1994, Glasgow, United Kingdom. Contact: Institute of Physics, 47 Belgrave Square, London SW1X 8OX, UK.

International Conference on Low-Level Waste, July 24–26, 1994, Norfolk, Virginia USA, sponsored by the Electric Power Research Institute. Contact: Ms. L. Nelson, EPRI, P.O. Box 10412, Palo Alto, CA 94304 (fax 415-855-2954).

Workshop on Radwaste, July 26–29, 1994, Norfolk, Virginia, sponsored by the American Society of Mechanical Engineers and EPRI. Contact: Ms. L. Nelson, EPRI, P.O. Box 10412, Palo Alto, CA 94304 (fax 415-855-2954).

August 1994

Occupational & Environmental Radiation Protection, Aug. 15–19, 1994, a course offered by the Harvard School of Public Health. Contact: Harvard School of Public Health, Office of Continuing Education, 677 Huntington Ave., Boston, MA 02115-0023 (phone 617-432-1171, fax 617-432-1969).

Advanced Workshop on Occupational & Environmental Radiation Protection, Aug. 22–26, 1994, a course offered by the Harvard School of Public Health. Contact: Harvard School of Public Health, Office of Continuing Education, 677 Huntington Ave., Boston, MA 02115-0023 (phone 617-432-1171, fax 617-432-1969).

Interregional Seminar on Radiotherapy Dosimetry: Radiation Dose in Radiotherapy from Prescription to Delivery, Aug. 27–30, 1994, Rio de Janeiro, Brazil, sponsored by the International Atomic Energy Agency. Contact: IAEA Conference Service Section, P.O. Box 100, Wagramerstrasse 5, A-1400 Vienna, Austria.

September 1994

First International Workshop on Accelerator-Based Neutron Sources for Boron Neutron Capture Therapy, Sept. 11–14, 1994, Jackson, Wyoming, sponsored by the U.S. Department of Energy. Contact: D. W. Nigg, Idaho National Engineering Laboratory, P.O. Box 1625, Idaho Falls, ID 83415-3890 (fax 208-526-0528).

9th International Meeting on Radiation Processing, Sept. 11–16, 1994, Istanbul, Turkey. Contact: Prof. Dr. Olgun Guven, Chairman (IMRP-9), P.O. Box 177, Bahcelievler, Ankara, 06502 Turkey (phone 90-4-298-1894, fax 90-312-815-4307).

6th Russian Scientific Conference on Radiation Shielding of Nuclear Installations, Sept. 20–23, 1994, Obninsk, Russia. Contact: A. P. Suvorov, Inst. of Physics and Power Engineering, 249020, Bondarenko Sq. 1, Obninsk, Kaluga Region, Russia (fax 095-230-2326, telex 911509 URAN SU).

Fundamentals of Radiation Protection, Sept. 26–30, 1994, Cambridge, Massachusetts, a short course offered by Arthur D. Little, Radiation Technology and Policy Unit, ATTN: David J. Allard, 20 Acorn Park, Rm. 321, Cambridge, MA 02140-2390 (phone 617-498-6101; fax 617-498-7161).

3rd International Conference on Decommissioning of Nuclear Facilities, Sept. 26–30, 1994, Luxembourg, sponsored by Commission of European Communities. Contact: FBCL Conference Services, Rue J.P. Brasseur 29, L-158 Luxembourg, Luxembourg (fax 352-455905).

October 1994

European Nuclear Conference and Exhibition, Oct. 2–6, 1994, Lyon, France. Contact: P. Fuez, European Nuclear Society, P.O. Box 5032, CH-3001 Berne, Switzerland (phone 41-31-21-61-11; fax 41-31-22-92-03).

Meeting of the American Society for Therapeutic Radiology and Oncology, Oct. 3–7, 1994, Philadelphia, Pennsylvania. Contact: ASTRO, 1101 Market St., 14th Floor, Philadelphia, PA 19107-2990 (phone 215-574-3180).

ANSWERS Shielding & Criticality Seminar, Oct. 11–14, 1994, a workshop presented by AEA Technology at Winfrith, U.K. Contact: Mrs. J. Wilkinson-James, AEA Technology, Winfrith, Dorchester, Dorset DT2 8DH, UK (phone 0305-202352; fax 0305-202746).

Fourth Conference on Radiation Protection and Dosimetry, Oct. 24–26, 1994, Orlando, Florida, sponsored by the Oak Ridge National Laboratory. Contact: J. S. Bogard, ORNL, P.O. Box 2008, Oak Ridge, TN 37831-6379 (phone 625-574-5851, fax 615-574-9174).

International Conference on Radiation and Society: Comprehending Radiation Risks, Oct. 24–28, 1994, Paris, sponsored by the IAEA. Contact: IAEA, IAEA-CN-54, P.O. Box 100, A-1400 Vienna, Austria (fax 43-1234564).

Nuclear Science Symposium: Medical Imaging Conference, Oct. 30–Nov. 5, 1994, Norfolk, Virginia, sponsored by the U.S. Department of Energy, the Institute of Electrical and Electronics Engineers, and the Stanford Linear Accelerator Center. Contact: L. A. Kleisner, SLAC, P.O. Box 4349, MS 12, Stanford, CA 94309.

November 1994

2nd Radiation Physics Conference, Nov. 20–24, 1994, Sadaat City, Egypt, sponsored by the Atomic Energy Authority, Menoufia University. Contact: Prof. M. A. Gomaa, Atomic Energy Authority, 101. Kasr El-Aini Street, Cairo, Egypt (phone 02-355-8269/8264, fax 02-354-0982).

Workshop on Various Reduction Schemes Developed at ENEA for Use With the MCNP Transport Code, Nov. 28–Dec. 1, 1994, Bologna, Italy. Contact: K. W. Burn (kwb@lboenea.bitnet)

March 1995

1995 HEART Conference, Mar. 13–17, 1995, Sandia National Laboratories, Albuquerque, New Mexico. Contact: Delores Walters, JAYCOR, P.O. Box 85154, San Diego, CA 92138 (619-535-9763).

5th Topical Meeting on Tritium Technology in Fission, Fusion, and Isotopic Applications, Mar. 26–31, 1995, Augusta, Georgia, sponsored by the ANS. Contact: C. E. Murphy, Westinghouse SRC, Savannah River Lab., Aiken, SC 29808.

APRIL 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. For literature listed as available from INIS contact INIS Clearinghouse, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna.

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. 66(5), 513-531. . *Sensitivity Analysis of ECOSYS-87: An Emphasis on the Ingestion Pathway as a Function of Radionuclide and Type of Deposition.* . . Hinton, T.G. . 05/94

Health Phys. 66(5), 573-576. . *Chest Wall Thickness Measurements for Enriched Uranium: An Alternative Approach.* . . Kramer, G.H.; Puscalau, M. . 05/94

FZR-92-15, 41-46. . *Analyses of Radiation Induced Embrittlement of Reactor Pressure Vessels.* . . Mehner, H.C.; Popp, K. . 08/92. . OSTI; NTIS; INIS

INDC(CCP)-364. . *Selected Papers on Nuclear Data Analysis.* . . Lorenz, A., ed. . 02/94. . Translation of Russian papers published in Yadernye Konstanty 1/1989.

KEK Preprint 93-193. . *Skyshine of Synchrotron Radiation.* . . Ban, S.; Hirayama, H.; Namito, Y. . 01/94. . Submitted to the 8th International Conference on Radiation Shielding, Arlington, TX, USA April 24-28, 1994.

KEK Preprint 93-196. . *Effects of Linear Polarization and Doppler Broadening on the Exposure Buildup Factors of Low-Energy Gamma Rays.* . . Hirayama, H.; Namito, Y.; Ban, S. . 01/94. . Submitted to the 8th International Conference on Radiation Shielding, Arlington, TX, USA April 24-28, 1994.

OCDE/GD(94)21. . *Sensitivities of Calculated Cross Sections of 56Fe to Model Parameters.* . . Shibata, K. . 1994

SLAC-437; SLAC/SSRL-0066; CONF-940250. . *Workshop on Scientific Applications of Coherent X-Rays.* . . Birgeneau, R.J.; Fadley, C.S.; Materlik, G.; Pellegrini, C.; Winick, H.;et al. . 1994