# RSIC Newsletter

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*(For RSIC TELEX Communication Only)*

*No. 264* *November 1986*

*One of the chief objects of education should be to widen the windows through which we view the world.—Arnold Glasow*

## EPIC Hosts NEDAC Group

A Japanese study group, led by staff members of the Nuclear Energy Data Center (NEDAC), recently visited the Engineering Physics Information Centers (EPIC) and the Center for Engineering Systems Advanced Research (CESAR) at the Oak Ridge National Laboratory (ORNL). The program included lectures on artificial intelligence and robotics by CESAR staff members, a demonstration of the Hostile Environment Robotic Machine Intelligence Experiment, Series II (HERMIES), and an overview presentation of NEDAC.

Established in 1981 by the Japanese government, NEDAC is a non-profit organization which encourages nuclear energy development through computer code development and related services. NEDAC collects, tests, and distributes scientific computer codes, develops codes under contract as needed, and performs calculations as a service. NEDAC operates an educational scholarship program and the computer facilities installed in the Japan Atomic Energy Research Institute (JAERI).

The visiting group included: **Kiyoshi ASAI**, General Manager, Computing Center, JAERI, Ibaraki; **Naotaka FUJIMORI**, Director, Tsukuba Branch, Daiko Electronics & Communication Co. Ltd., Chiba; **Hirokuni MONZEN**, Manager, System Section I, Science System Dept., Fujitsu Limited, Kanagawa; **Hideshiro NAKAMOTO**, Director, Jupiter Corp., Tokyo; **Junya SHIMAZAKI**, Sr. Engineer, Reactor Control Laboratory, Dept. of Reactor Engineering, JAERI, Ibaraki; **Tsutomu SHIOZAWA**, Deputy Head, System Control Dept., FACOM HITAC Ltd., Tokyo; **Yoshio TETSUGU**, Manager, System Enterprise Dept., MEITEC Corp., Aichi; **Yasuo TOKUNAGA**, Development Sect. IV, Development Dept. II, Fujitsu F.I.P. Co., Chiba; **Ryuzo UEDA**, Advisor, NEDAC, Tokyo; **Tasukazu YOSHII**, General Manager, Development Division III, Development Dept. I, Fujitsu Social Science Laboratory Ltd., Kanagawa; and **Takaya YAMADA**, General Manager, NEDAC, Ibaraki.

## CHANGES TO THE COMPUTER CODE COLLECTION

Eleven changes were made to the computer code collection during the month. Four new code systems were packaged and added to the collection; two existing code packages were replaced with newly frozen versions; two existing code packages were updated with additional or corrected documentation; two existing code packages were enhanced with additional or newer software; and one code package was extended with a new hardware version. Two of the changes resulted from a French and Japanese contributions.

### CCC-279/RAFFLE-V

This general purpose Monte Carlo code system for neutron and photon transport has been replaced by a newly frozen version contributed by EG&G Idaho, Inc., Idaho National Engineering Laboratory, Idaho Falls, Idaho. RAFFLE-V can be used for eigenvalue problems as well as neutron or photon fixed source problems. For neutronics calculations, RAFFLE-V uses data prepared by ENDRAFL above thermal energy and a thermal library prepared by the INCITE code. Both multigroup and point cross sections are employed for the transport calculations, and combinatorial geometry is available. Appropriate cross sections are provided with the package. References: EGG-PHYS-6003, REV. 1; ANCR-1022. FORTRAN IV and Assembler Language; CDC CYBER 176; NOS/BE.

### CCC-357/AIRDOS-EPA

The documentation for this code for estimating radiation doses caused by airborne radionuclides in areas surrounding nuclear facilities was modified to correct the formulas for vertical dispersion coefficients for Pasquill atmospheric stability categories E and F. The erroneous formulas appeared in Table 1 of ORNL-5532. The original contributors at Oak Ridge National Laboratory (ORNL) verified the correction, called to our attention by Fluor Engineers, Irvine, California. The computer code treats the formulas properly, and no change to the master file is required. Reference: ORNL-5532 (1979).

### CCC-379/SHIELDOSE

This code system for space shielding radiation dose calculations, originally contributed by the National Bureau of Standards, Gaithersburg, Maryland, and Martin Marietta Aerospace, Denver, Colorado (CYBER Version), has been converted to FORTRAN 77 at the Nuclear Energy Agency Data Bank (NEA), Saclay, France. A single source code provides versions for IBM 3084Q, VAX-11/780, and CDC CYBER-740 and replaces the previous CCC-379A (IBM) and -379B (CYBER) versions. Reference: NBS Technical Note 1116 and informal notes.

### CCC-419/CRAC2

This code system for calculating reactor accident consequences was updated with newly frozen versions provided by the original developers at Sandia National Laboratories, Albuquerque, New Mexico. This package incorporates change 46 (2/20/86) of "Notification of Change to the CRAC2 Code" from the originators and adds additional documentation. References: NUREG/CR-2326 (SAND81-1994); NUREG/CR-2552 (SAND82-0342). FORTRAN 77; IBM (A). FORTRAN IV; CDC (B).

### CCC-475/SCALIAS 3.1

This collection of FORTRAN 77 versions of selected modules of CCC-466/SCALE-3 was corrected to fix errors in KENO V.a and enhanced with the addition of the Material Information Processor (MIPLIB), CSAS4, MODIFY, XSDOSE, ORIGEN-S, COUPLE, and COMPOZ. Details of the specific changes are described in a memo from the contributor, the Computing and Telecommunications Division at ORNL, Oak Ridge, Tennessee, and may be requested from RSIC. This version of SCALIAS corresponds to the SCALE-3 code system, CCC-466/SCALE 3.1, announced in the September 1986 *RSIC Newsletter*. The documentation has been extended to add appropriate sections from the SCALE reports. If written at 1600 bpi, two tapes are required for transmittal of this version of SCALIAS. Reference: NUREG/CR-0200 (ORNL/NUREG/CSD-2), Vol. 1,2,3. FORTRAN 77; IBM 3033.

### CCC-476/CAAC

The documentation for this code system for the

implementation of atmospheric dispersion assessment required by the Clean Air Act was updated to reflect the correction described elsewhere in this newsletter for CCC-357/AIRDOS-EPA. The document in question, ORNL-5532, and AIRDOS-EPA are part of the CAAC package. The code system treats the formulas properly and, no change to the master file is required. Reference: ORNL-5532 (1979).

### CCC-493/QAD-CGGP

This combinatorial geometry, GP buildup factor version of the QAD-P5A point kernel code for neutron and gamma-ray shielding calculations was updated with the addition of a version for the CRAY XMP (CCC-493C) by ORNL. The JAERI, Tokai-Mura, and the Tokyo Institute of Technology, Tokyo, provided the basic package, which was based on CCC-307/QAD-CG from the Bechtel Corp., Gaithersburg, Maryland. Reference: Bechtel Report NE007 and informal notes. FORTRAN 77; IBM 3033 and Data General MV/4000 (A), IBM PC MICRO (B) (2 diskettes required), CRAY XMP (C).

### CCC-502/NACT

This screening program for neutron activation reactions was contributed by Hanford Engineering Development Laboratory, Richland, Washington. It calculates activity levels and photon production for all possible reactions resulting from incident particles (usually neutrons) of a given energy (up to 50 MeV). Generic activation cross sections are provided, and user input activity levels and half lives can be used to screen out unimportant nuclides for any particular application. Reference: HEDL-TC-2591. FORTRAN; UNIVAC 1100/44.

### CCC-503/MARINRAD

This marine radionuclide transport and dose systems model was developed by the Analytical Sciences Corporation, Reading, Massachusetts, for Sandia National Laboratories, Albuquerque, New Mexico, for assessing the consequences of the release of radioactive material into the oceans. Doses to humans and biota are computed using an ocean transport model that calculates nuclide concentrations as a function of time, a steady-state food-chain model that provides concentration factor matrices, and a pathways-to-man model that calculates dose and health effects. MARINRAD consists of three computer programs: MARRAD, MAROUT and, optionally, ORIGEN. Reference: SAND83-7104. FORTRAN IV; CDC CYBER 170/855, NOS 2.

### PSR-232/MARTHA

This Monte Carlo response function calculator for sodium iodide photon detectors was contributed by the JAERI, Tokai-mura, Japan via the OECD NEA Data Bank, Saclay, France. Photon interaction processes considered are photoelectric, Compton, and pair production. Electrons are tracked using multiple-scattering theory losing energy via inelastic collisions and bremmstrahlung. Energies up to 10 MeV are possible with good results verified experimentally for 6.13 MeV photons. A conversion library EBCBIN was provided by the NEA Data Bank for conversion of binary libraries needed by the code. References: *Nucl. Instr. Meth.* **185**, 299 (1981) and JAERI-M 9741 (in Japanese). The package was not tested at RSIC. EBCDIC; FORTRAN-H Extended; IBM 3084Q.

### PSR-234/FLOWPLOT-II

This fluid dynamics and heat transfer plotting package was contributed by the Computing and Telecommunications Division at the Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee. It may be used with fluid dynamics or heat transfer codes to create velocity vector, contour, two-dimensional profile, and three-dimensional surface plots for the $u$ or $v$ velocity components. The commercial package DISSPLA graphics package used by FLOWPLOT-II is not included in the code package. Reference: K/CSD/TM-53. FORTRAN IV; EBCDIC and binary files, IBM 3033.

## Calendar

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

### December 1986

*4th Miami International Symposium on Multi-Phase Transport and Particulate Phenomena,* Dec. 15–17, 1986, Miami Beach, sponsored by Clean Energy Research Institute. Contact: T. Nejat Vezirogulu, Director, Clean Energy Research Inst., University of Miami, P.O. Box 248294, Coral Gables, FL 33124.

### January 1987

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

*Reactor Accidents: What Chernobyl Has Taught Us,* Jan. 28, 1987, London, sponsored by the Society for Radiological Protection. Contact: J. H. Martin, Bldg. 15, Park Wynd, University of Dundee, Dundee DD1 4HN, Scotland, UK (phone Dundee 23181 ext. 4438).

### February 1987

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

### March 1987

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

*International Conference on Radiation Dosimetry and Safety,* Mar. 2–4, 1987, Taipei, Taiwan, Rep. of China, sponsored by Nuclear Energy Society of the Rep. of China and ANS. Contact: C. J. Tung, Inst. of Nuclear Science, National Tsing Hua University, Hsinchu 30043, Rep of China, or C. S. Sims, Health & Safety Research Div., ORNL, P.O. Box X, Oak Ridge, TN 37831.

*Annual Meeting of the Atomic Energy Society of Japan,* Mar. 26–28, 1987, Nagoya, Japan. Contact: Minoru Masamoto, Secretary General, Atomic Energy Society of Japan, No. 1-13, 1-chome, Shimbashi, Minato-ku, Tokyo 105, Japan (phone 03 508-1261).

*Occupational and Environmental Radiation Protection,* Mar. 30–Apr. 3, 1987, Boston, Massachusetts, a course sponsored by the Harvard School of Public Health. Contact: Dade W. Moeller, Office of Continuing Education, 677 Huntington Ave., Boston, MA 02115 (phone 617-732-1171).

*Meeting on Practical Radiation Protection,* Mar. 31–Apr. 1, 1987, London. Contact: J. H. Martin, Bldg. 15, Park Wynd, University of Dundee, Dundee DD1 4HN, Scotland, UK (phone 23181 ext. 4438).

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

### April 1987

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

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

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

### May 1987

*Control of Occupational Exposures in Nuclear Power Plants,* May 11–15, 1987, Boston, Massachusetts, a course sponsored by the Harvard School of Public Health. Contact: Dade W. Moeller, Office of Continuing Education, 677 Huntington Ave., Boston, MA 02115 (phone 617-732-1171).

*6th Symposium on Reactor Dosimetry,* May 31–June 5, 1987, Jackson Hole, Wyoming, sponsored by the American Society for Testing and Materials, and the Commission of the European Communities in cooperation with the International Atomic Energy Agency. Contact: G. R. Lamaze, National Bureau of Standards, Bldg. 235, Gaithersburg, MD 20899 (phone 301-921-

2767) or H. Röttger, Joint Research Centre, Petten Establishment, HFR Div., Postbus 2, 1755 ZG Petten, The Netherlands.

**June 1987**

*American Nuclear Society Annual Meeting,* June 6–12, 1987, Dallas, Texas. Contact: ANS, Meeting Dept., 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

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

**August 1987**

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

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

**September 1987**

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

*ANS/ENS International Conference on Fast Breeder Reactor Systems: Experience Gained and Path to Economical Power Generation,* Sept. 13–17, 1987, Richland, Washington. Contact: M. C. Carelli, Westinghouse-AESD, P.O. Box 158, Madison, PA 15663 (phone 412-722-5284), or W. Marth, Kernforschungszentrum Karlsruhe, Postfach 3640, D-7500 Karlsruhe 1, F. R. Germany.

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

**October 1987**

*Annual Congress of the Association for Radiation Protection,* Oct. 6–9, 1987, Basle, Switzerland. Contact: Fachverband f. Strahlenschutz e.V., c/o H. Brunner, Abt. SU/81, Eidg. Institut f. Reaktorforschung (EIR), CH-5303 Würenlingen, Switzerland (phone 0041 56-99 2350).

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# 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 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

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