

# RSIC Newsletter



OAK RIDGE NATIONAL LABORATORY  
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(For RSIC TELEX Communication Only)

No. 262

September 1986

*Our greatest glory is not in never failing, but in rising every time we fail.—Confucius*

## TOPICAL CONFERENCE TAKES SHAPE

The Technical Program Committee for the upcoming American Nuclear Society (ANS) Radiation Protection and Shielding (RP&S) Division topical meeting on *Theory and Practice for Radiation Protection and Shielding* recently met in Knoxville, Tenn., to select the papers to be presented and to plan the program. About one-third of the 63 papers selected represent research from 8 foreign countries—Belgium, France, India, Japan, Libya, Poland, Republic of China (Taiwan), and Switzerland. The program consists of 11 sessions and a plenary session as follows:

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| I. Shielding and Radiation Transport Applications, I          | VI. Shielding Against Space Radiation                       |
| II. Radiation Protection Management and Operations Experience | VII. Fission Neutronics and Shielding                       |
| III. Radiation Measurement Instrumentation and Analysis       | VIII. Regulatory Requirements for Radiation Protection      |
| IV. Shielding and Radiation Transport Applications, II        | IX. High Energy Particle Shielding Methods and Applications |
| V. Fusion Neutronics and Shielding                            | X. Hiroshima-Nagasaki Dose Reevaluation                     |
|   | XI. Shielding and Radiation Transport Applications, III     |

The plenary session, to be held the morning of April 23, is entitled "Future Directions in Radiation Protection and Shielding," and will feature the following topics:

"Future Directions in Shielding Methods and Analysis," H. Goldstein, Columbia University;

"Shielding Applications in Space," C. A. Aeby, Air Force Weapons Laboratory; and

"Future Directions in Radiation Protection in Nuclear Power Plants," L. Lewis, Duke Power.

The meeting will be in Knoxville, Tenn., April 22–24, 1987. R. T. Santoro is chairman of the Technical Program Committee.

## CHANGES TO THE COMPUTER CODE COLLECTION

Seven changes were made to the computer code collection during the month: two new code systems were packaged, an existing code package was replaced with current technology, and four existing code packages were updated. Two changes resulted from foreign contributions—one each from Fed. Rep. of Germany and the International Atomic Energy Agency and the OECD Nuclear Energy Agency (NEA) Data Bank.

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### **CCC-203/MORSE-CG and CCC-474/MORSE-CGA**

All versions of the CCC-203/MORSE-CG and CCC-474/MORSE-CGA general purpose Monte Carlo multigroup neutron and gamma-ray transport code systems were updated by the contributors at Oak Ridge National Laboratory. The update corrects errors in subroutines GTNSDK and ENRGYS related to the cross-section downscatter matrix that affect only COMBINED (neutron and gamma ray) ADJOINT problems. If the primary-group mode is used, the error does not occur. Even in these combined cases the error is small. Users doing combined adjoint calculations should submit a tape to get the updated version. FORTRAN IV and Assembler Language. CCC-203; UNIVAC (A); CDC (B); IBM 360 (C); VAX (D); and CRAY (E). CCC-474; IBM (C) and CRAY (E).

### **CCC-466/SCALE3**

This modular code system for performing standardized computer analyses for licensing evaluation was extensively updated. Changes were made in CSAS4, KENO V.a, SAS2, MORSE-SGC, SAS3, the MARS library, the Material Information Processor, the Standard Composition Data Library, and the 27-group neutron data library. The specific changes are described in a memo from the contributor, the Computing and Telecommunications Division, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee, which may be requested from RSIC. Current users may request updated files which can be contained on one 1600-bpi tape. No change in the documentation is required. Reference: NUREG/CR-0200 (ORNL/NUREG/CSD-2), Vol. 1,2,3. FORTRAN IV; IBM 3033.

### **CCC-473/INTERTRAN-I**

This code system for assessing the impact from and the transport of radioactive material was contributed by the International Atomic Energy Agency (IAEA) Vienna, and the OECD NEA Data Bank, Gif-sur-Yvette, France. Based on and completely replacing the earlier INTERTRAN, INTERTRAN-I calculates the radiological impacts from incident-free transport and vehicular accidents involving radioactive materials. This version is more portable. Several errors were cor-

rected both in the code and in the document. The programming language was changed to FORTRAN 77 and differences between CDC and IBM versions were eliminated so that versions for either can be automatically derived from a single source program. The package includes UPEML, a machine-portable CDC UPDATE emulation program from Sandia National Laboratories, Albuquerque, New Mexico, used for source code management. UPEML is also part of the CCC-467/ITS package. References: SAND 84-1896, IAEA-TECDOD-287, IAEA-0886/03-TC-556, informal notes. FORTRAN 77; NAS 9080, CDC CYBER 740, VAX 11/780.

### **CCC-496/HETC-KFA**

This version of the Monte Carlo, high-energy, nucleon-meson transport code system was contributed by Kernforschungsanlage (KFA) Jülich GmbH, Institut für Reaktorentwicklung, Jülich, Federal Republic of Germany. Based on CCC-178/HETC, the package includes the code SIMPEL which is an analysis routine and a driver. HETC-KFA is a high energy transport code for neutrons, protons, pions, and muons. It can use combinatorial geometry and has enhanced evaporation, high energy fission, "light" heavy-ion beams, and other features. A means of coupling to low energy transport programs, such as CCC-203/MORSE-CG, is also provided. Reference: Jul-Spez-196. FORTRAN IV; IBM 3033.

### **CCC-500/UTMTOX**

This unified transport model for toxic materials, contributed by the Oak Ridge National Laboratory, predicts the dispersion of pollutants through air, soil, and water. This comprehensive model incorporates three previous models, ATM, WHTM, and SEDMT, which treat atmospheric, hydrologic, and soil transport of pollutants, respectively, and extends the scope to predict the transport of not only trace metals but also of many chemical compounds, including organics. Computational capabilities are (1) the atmospheric dispersion of 20 chemicals from a maximum of 10 point, 10 line, and 10 area sources; (2) deposition of one chemical at a time in both wet and dry form on foliage or the surface of the earth; (3) surface flow and erosion; (4) percolation through the soil to a stream channel; and (5) flow in the stream channel to the outfall of a watershed. Reference: ORNL-6064. FORTRAN IV; IBM 3033.

## PSR-212/MRSPAK

This code system to create a text file containing combinatorial geometry data corresponding to PADL2 geometry was updated to supply missing parts. MRSPAK allows users of radiation transport analysis code packages based on combinatorial geometry, such as CCC-203/MORSE-CG, to

create geometry using the PADL2 system, then automatically generate the combinatorial geometry data from the PADL2 representation. The tape is written in VAX-Backup Format and there are 13 save sets. All persons using the MRSPAK code package should request the new package. PADL2, a commercial software package, is not included. Reference: SNL Memo. FLEX; VAX 11.

## 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.

### Larsen and Williams Join Michigan Staff

Two internationally-known scholars in nuclear engineering have accepted appointments with the Department of Nuclear Engineering, The University of Michigan. **Dr. Edward Larsen** joined the staff as Professor of Nuclear Engineering on September 1. He received a PhD. in mathematics from Rensselaer Polytechnic Institute. He has served on the faculties of Courant Institute of New York University and the University of Delaware. His most recent work has been with the Los Alamos National Laboratory X-6 Division.

**Prof. Michael M. R. Williams**, currently Head of Nuclear Engineering at Queen Mary College in London,

will join the staff on January 1, 1987. His work has covered a broad spectrum of nuclear science and engineering, including particle transport theory, neutron thermalization, reactor theory, and random processes. He is a fellow of the American Nuclear Society and of the Institute of Physics, and serves as the editor for *Annals of Nuclear Energy* and *Progress in Nuclear Energy*. He currently serves on the Advisory Committee on the Safety of Nuclear Installations in the United Kingdom.

**Experimental and Mathematical Physics Consultants** has changed locations from Northridge, California, to Box 3191, Gaithersburg, Maryland 20878.

### Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Henry W. Morton*, Morton and Potter, Potomac, Maryland; *Paul W. Frame*, Oak Ridge Associated Universities, Oak Ridge, Tenn.; *Vahé Keshishian*, Rocketdyne Division, Rockwell International Corp., Canoga Park, Calif.; *Luiz Bertelli*, CNEN, Rio de Janeiro; *Yoshiaki Oka*, Univ. of Tokyo, Tokyo; and *Eliana Amaral*, Brazilian Nuclear Energy Commission, Rio de Janeiro.

## Calendar

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

### October 1986

*American Physical Society Nuclear Physics Division Meeting*, October 9-11, 1986, Vancouver, Canada. Contact: APS, 335 E. 45th St., New York, NY 10017 (phone 212-682-7341).

*Nuclear Transportation Issues*, Oct. 19-22, 1986, Charleston, South Carolina, sponsored by the Atomic Industrial Forum. Contact: Conference Office, AIF, 7101 Wisconsin Ave., Bethesda, MD 20814-4891 (phone 301-654-9260).

*Hanford Life Sciences Symposium: Radiation Protection—A Look to the Future—Celebrating Four Decades of Research at Hanford*, Oct. 21-23, 1986, Richland, Washington, sponsored by the Dept. of Energy. Contact: William J. Bair, Environment, Health and Safety Research Program, Battelle, Pacific Northwest Laboratories, P.O. Box 999, Richland, WA 99352 (phone 509-375-2421).

### November 1986

*International Symposium on Nuclear Material Safeguards*, Nov. 10-14, 1986, sponsored by IAEA. Contact: IAEA, Conf. Service Section, P.O. Box 100, A-1400 Vienna, Austria.

*United Nations Conference for the Promotion of International Co-operation in the Peaceful Uses of Nuclear Energy*, Nov. 10-28, 1986. Contact: Executive Secretary, UN Conf. for the Promotion of Internatl. Co-operation in the Peaceful Uses of Nuclear Energy, Vienna International Centre, P.O. Box 500, A-1400 Vienna, Austria.

*International Symposium on Nuclear Material Safeguards*, Nov. 10-14, 1986, Vienna, sponsored by the IAEA. Contact: IAEA, Conference Service Section, P.O. Box 100, A-1400 Vienna, Austria.

*ANS and Atomic Industrial Forum Joint Meeting*, Nov. 14-21, 1986, Washington, D. C. Contact: D. G. Pettengill, ANS, 555 N. Kensington Ave., La Grange Park, IL 60535 (phone 312-352-6611 ext. 257).

*Workshop on Age-Related Factors in Radionuclide Metabolism and Dosimetry*, Nov. 26-28, 1986, Angers, France, sponsored by the Commission of the European Communities, and the French Atomic Energy Commission. Contact: G. B. Gerber, Commission of the European Communities, DG XII/PI, Rue de la Loi 200, B-1049 Brussels, Belgium (phone 2-2354041).

*Radiation Protection Problems Encountered in Major Development in New Techniques and Technologies*, 14th ATSR Symposium, Nov. 26-28, 1986, Paris, France, sponsored by the French Association for Technical and Scientific Radiation Protection (ATSR). Contact: Secretariat GRA-SPR, CEN de Saclay, F-91191 Gif-sur-Yvette, France.

#### 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).

#### 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 0R6 Canada (phone 613-993-2715).

#### March 1987

*Radioactive Waste Management (WM 87)*, March 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).

*Conference on Health Effects of Low Dose Ionizing Radiation: Recent Advances and Their Implications*,

March 31-April 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.

*Radiation Protection and Shielding Conference*, Apr. 20-23, 1987, Knoxville, Tenn., sponsored by Oak Ridge National Laboratory. Contact: D. L. Selby, ORNL, P.O. Box X, Oak Ridge, TN 37831 (phone 615-574-6161).

*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

*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 co-operation 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

*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, Austria.

#### 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 Tech-

nology, 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 0R6 Canada (phone 613-993-2715).

## AUGUST 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.**

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