RSIC Newsletter

Oak Ridge National Laboratory
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New discoveries in science . . . will continue to create a thousand new frontiers for those who would still adventure.—Herbert Hoover

Note RSIC Change of Address

Effective June 1, RSIC's Post Office Box is 2008. In order to expedite receipt of your requests for service please begin using the new P.O. Box immediately. Incorrectly addressed incoming mail will be held until all other mail has been processed. This could mean a delay of at least one day before your mail is sent on to RSIC.

ICRS7 Program Announced

The program has been set up for the 7th International Conference on Radiation Shielding (ICRS7) to be held September 12–16, 1988, in Bournemouth, United Kingdom. Authors whose papers were accepted have been notified as to whether they will be placed in oral or poster presentation. Six plenary sessions are planned as well as several parallel sessions and three poster sessions. General topics, provided by Enrico Sartori, are as follows:

- General Shielding — plenary
- Decommissioning — parallel
- Calculational methods — parallel
- Power Reactors 1 — plenary
- 14 MeV Neutrons — parallel
- Theoretical Methods — parallel
- Streaming — parallel
- Shielding Benchmark Experiments — parallel
- Calculational Methods — plenary
- Power Reactors 2 — parallel
- Sensitivity Analysis — parallel
- New Trends — plenary
- Fuel Flasks — parallel
- Pressure Vessel Dosimetry — parallel
- Accelerator Shielding — parallel
- Monte Carlo Methods — parallel
- General Topics — plenary
- Licensing and Environmental Dosimetry — plenary
- Benchmark Experiments and Data — poster
- General Shielding Design and Related Topics — poster
- Fuel Flasks and Calculational Methods — poster

No oral sessions will be held during the poster sessions.

IF YOU CHANGE YOUR ADDRESS, please notify us (including Building and Room No. where needed). *Third Class Mail* is returned to us at our expense if the addressee has moved. If your mail is returned, your name will be deleted from our distributions until we hear from you.

Changes in Tape Writing Policy

Due to software changes at the ORNL computing center, the use of non-labeled tapes is being discouraged. We can write either IBM standard-labeled tapes or ANSI-labeled tapes and urge our users to request labeled tapes whenever possible. Most computing environments support at least one type of label processing. Although we strive to write fixed-length records which greatly enhance the transportability of files, there are a few unformatted files in some of our older packages. These are not normally useful on machines other than those on which they were created, and we will omit them on ANSI-labeled tapes because IBM MVS no longer supports the use of unformatted records on ANSI-labeled tapes. VAX users may be especially pleased to learn that ANSI-labeled tapes can be read under VMS using the COPY command. The operating system retrieves the file attributes from the label and minimizes user responses. In the future, we will write IBM standard labeled tapes unless users request otherwise. The printer output from writing tapes on the IBM machine is always mailed with requests and can be used to determine the exact file attributes and data set names. Including information which identifies your computing environment in your request for packages will enable us to write tapes you can read with greater ease.

Jennie L. Bartley

Use of RSIC Networks

RSIC is increasing its use of networks for electronic mail and, occasionally, for file transfer. We generally do not ship code or data packages by file transfer because there are too many steps in moving multiple files from IBM mass storage or tape to the ORNL computer with network access. The following network systems are now being used.

Bitnet is a network of research and educational institutions with direct connections to Europe, Israel, and Japan. Mail can be routed to other networks through gateways which are specified in the destination character string. RSIC's destination name is pdc@ORNLSTC.

ARPANET is actually the Defense Data Network (DDN) and includes MILNET, the military network. Most users are military contractors or universities. The RSIC destination name is pdc@stc10.ctd.ornl.gov.

ANSIRS is the American Nuclear Society (ANS) Information Resource Service for electronic mail, Telex, and other services. Our Telex number on ANSIRS is 4900002013. The ANSIRS network is provided by Dialcom and is accessed by Tymnet or Telenet. File transfer is possible through the use of XMODEM or Kermit protocols.

EasyLink is a service of Western Union and is also accessed by Tymnet. The EasyLink account is 62813374 and the Telex number is 854467. These are the numbers that appear on the newsletter masthead each month.

SPEED>S supports PC file transfer as well as electronic mail. The Microcom Networking Protocol (MNP) is used, and network connection is provided by Telenet. SPEED>S is very easy to use, but both the sender and receiver must have SPEED>S accounts. IBM PC compatible and Macintosh computers are supported. The RSIC account is 1779.

D. K. Trubey

CHANGES TO THE COMPUTER CODE COLLECTION

Five changes were made to the computer code collection during the month. Two new code systems were packaged and added to the collection, two existing code packages were extended with additional versions, and one code package was updated.

CCC-467/ITS 2.1

Sandia National Laboratories, Albuquerque, New Mexico, the original contributor of this integrated TIGER code system, has advised us of the need for a simple correction to the Fortran preprocessor input files 5, 9, and 11. Users are advised to replace the line containing the parameters involved with the following line.

```
$ INEPS=9, INGAS-1000, INLAN-5000, INPPS=21, INLAMB=1591,
```

Because this is a Fortran statement, the $ must begin in column 6. References: Sandia National Laboratories Memo (December 1987 and April 1987), SAND 84-0573 (November 1984), and Informal Report (1988). FORTRAN-77; CRAY, CYBER-76, IBM, CRAY-1, VAX.

CCC-525/XRAY-AAC

This point-source, polychromatic, discrete energy X-ray transport and energy deposition code system was contributed by Boeing Aerospace Company, Seattle, Washington. XRAY-AAC calculates first-order spectral estimates of X-ray energy transmission through slab materials and the associated spectrum of energy absorbed by the material. X-ray source spectra may be internally generated and normalized (Kramer or Planck spectrum), read from data files, or read from an electronic library. Virtually any material consisting of any combination of the first 100 chemical elements may be specified as a shield or absorber using a common symbolic format. The calculated spectra may be selectively written to data files which in turn may be used as input to further calculations. An ASCII database containing both attenuation and absorption coefficients of the first 100 elements from 1 keV to 10 MeV may be converted to the required binary format using software contained herein. One aspect of this software that is believed unique is its ability to parse chemical compounds and alloys that are entered in a conventional symbolic format and calculate the relative mass of the constituent elements. Because this software is written in VAX Fortran, a superset of ANSI Fortran 77, and takes appropriate advantage of VMS system routines and run-time library functions, its transportability is limited. It is available in VAX BACKUP format. Reference: Informal Report, Boeing Aerospace Corporation (1987). Fortran 77; VAX.

PSR-63/AMPX-II

A Burroughs 6900 version of this modular code system for generating coupled multigroup neutron-gamma-ray libraries from ENDF/B data has been contributed by the Institute of Military Engineering – Section 7, Rio de Janeiro, Brazil. References: ORNL/TM-3706 (March 1976), ORNL/CSD/TM-72 (January 1979), and Informal Notes. Fortran IV, Assembler Language; IBM (A) and Fortran IV, Algol; Burroughs (B).

PSR-112/MAME

There were two extensions to this collection of AMPX modules which allows non-IBM users to process the data in DLC-41/VITAMIN-C and DLC-113/VITAMIN-E. The modules in both packages were taken from PSR-063/AMPX-II. Nuclear Assurance Corporation, Norcross, Georgia, contributed sources to extend the PSR-112B package for the UNIVAC. The modules added to this package include AIM, NITAWL, XSDRNPM and KENO-IV. Mississippi State University, Mississippi State, Mississippi, under contract with the Air Force Weapons Laboratory, Kirtland Air Force Base, New Mexico, converted several modules to run on the CRAY under CTSS using CFTLIB. The modules in this version, denoted PSR-112D, include AJAX, AIM, BONAMI, NITAWL, XSDRNPM, RADE, DIAL, and VASELINE. References: Informal notes, selected portions from ORNL/TM-3706 and NUREG/CR-0200, Vol. 2, Section F5. Fortran; UNIVAC (B) and Cray (D).

PSR-258/DATINIT

This software, contributed by the Australian Radiation Laboratory, Yallambie, Australia, provides easy access to photon interaction data from

within a Fortran program in a mini-computer environment. The photon cross section file included in this package was extracted from DLC-099/HUGO. The user must write a driver program for DATINIT to extract the data of interest. Because this code is interactive and uses Data General system routines and Fortran 5 compiler, its transportability is limited. The package is transmitted in Data General COPY format. References: Informal Notes. Fortran 66; Data General MV family.

CHANGE TO THE DATA LIBRARY COLLECTION

An existing data library was updated during the month.

DLC-36D/CLAW-IV

This 30-neutron, 12-gamma-ray group cross section library has been updated with the addition of retrieval programs to facilitate its use with existing neutron and gamma-ray transport codes which use libraries in ANISN format. The updated version was contributed by King Saud University, Riyadh, Saudi Arabia. The cross section files were also updated with the introduction of ID numbers and appropriate titles which facilitate the use of retrieval codes for producing unformatted ANISN libraries. References: Unpublished document from Saudi Arabia (1984) and LA-7808-MS (April 1979). Fortran 66; IBM.

Standards Activity

The following standards have been approved.

ANSI/ANS-10.2-1988, *Recommended Programming Practices to Facilitate the Portability of Scientific and Engineering Computer Programs* (revision of ANSI/ANS-10.2-1982); approved April 18, 1988.

ANSI/ANS-15.16-1988, *Emergency Planning for Research Reactors* (reaffirmation of ANSI/ANS-15.16- reaffirmation date April 18, 1988.

The American Society for Testing and Materials (ASTM) has announced the withdrawal of the following standards.

D2470-70(1982), *Method for Measurement of Delayed Neutron-Emitting Fission Products in Nuclear Reactor Coolant Water During Reactor Operation.*

D2577-86, *Test Method for Radioactive Cesium in* Water.

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.

CALLS FOR PAPERS

HEART

The seventh *Hardened Electronics and Radiation Technology (HEART)* conference will be held February 7–10, 1989, at Patrick Air Force Base, Melbourne, Florida. The HEART Conference provides a scientific forum specifically for research of a classified or sensitive nature. Technical papers, either classified up to Secret Restricted Data or unclassified but restricted by export-control (ITAR), are invited for consideration in the following proposed technical sessions.

Effects on Electronic Devices, Pieceparts, Subsystems, and Systems (including phenomena, coupling, and response) from Nuclear Weapon Direct Radiation, Enhanced Space Radiation, Directed Energy (e.g., Neutral Particle Beam, High-Power Microwave), Electromagnetic Pulse (e.g., HAEMP, IEMP, SGEMP, SREMP), Spacecraft Charging,

Hardening Processes, Techniques, and Designs, Hardened Device Processing, Circuit Hardening, Circumvention Design, and Circuit EMP Protection Design,

Hardness Verification (Above-Ground Testing and Underground Testing, including Methodology), Facilities, Energy Deposition/Dosimetry, Simulation Fidelity, System Experience,

Hardness Assurance/Hardness Maintenance, Test Chip Design/Correlation, System Implementation of Hardness Assurance, System Experience, and

Underground Test Results, SREMP Coupling, Soil and Air Conductivity, Effects on Optical Materials, Tests on Systems.

Contributions on other topics of electronics susceptibility are also welcomed. Contributing authors must submit an informative two- to five-page summary (including figures) by **August 17, 1988**. Five copies and a cover letter should be mailed to Roland Leadon, 1989 HEART Tech. Prog. Chairman, JAYCOR, P.O. Box 85154, San Diego, CA 92138.

NRC 16th WRSI Meeting

The Nuclear Regulatory Commission (NRC) Office of Nuclear Regulatory Research will hold its *16th Water Reactor Safety Information (WRSI) Meeting* at the National Bureau of Standards (NBS) on October 24–27, 1988. The meeting will cover the results and plans of NRC's nuclear reactor safety and regulatory programs. Invited papers on the results of industry-sponsored safety research as well as safety research being conducted abroad will be presented. Concurrent sessions in the major areas of nuclear safety are planned. Complete details on the 16th WRSI meeting are available from the Meeting Coordinator, Allen J. Weiss (BNL), phone 516-282-4473.

Reactor Analysis and Radiation Transport Short Courses

The Department of Nuclear Engineering at the University of Tennessee-Knoxville is offering two five-day short courses of interest to radiation transport specialists during Tennessee Industries Week (TIW-23), August 15–19, 1988.

Computational Methods in Reactor Analysis will familiarize the course participant with computational methods and computer codes currently used to describe the neutronic behavior of nuclear fission reactors. Emphasis will be placed on "understanding" the neutronic models and associated numerical methods currently employed in codes. A good understanding of the models and methods is essential for the successful use of the codes in designing new reactors and/or improving the performance and safety of existing reactors. Areas to be covered include multi-dimensional diffusion theory methods and perturbation theory methods for applications in reactor statics, space-dependent kinetics, and fuel depletion; transport theory methods including the discrete ordinates method, integral transport theory, and the Monte Carlo method; and cross section generation and processing utilizing the AMPX and SCALE systems developed at ORNL. The first day of the course will cover the fundamentals of reactor physics beginning with the fission process and proceeding through development of the Boltzmann transport equation and the diffusion approximation of the transport equation. This material will provide a good foundation for the non-nuclear engineer for study of the more advanced material to be presented Tuesday through Friday. For the participant with some nuclear background, the first day would be a review of basic nuclear engineering.

Monte Carlo Analysis is designed specifically for the practicing engineer engaged in shield design and does not presume any prior knowledge of Monte Carlo methods. However, some understanding of radiation transport physics is desirable. A wide range of topics will be presented that will lead to a good understanding of the basics of Monte Carlo analysis and the specialized applications of Monte Carlo methods to practical shielding problems. Many advanced topics will be included that will promote the best use of existing computer code systems. Special attention will be paid to the understanding and Monte Carlo implementation of the adjoint analysis. Advantages and disadvantages of the adjoint mode versus the forward mode of analysis will be described including several practical applications of the adjoint mode of Monte Carlo analysis. Variance reduction techniques will be developed in a comprehensive fashion for both forward and adjoint calculations. The versatile computer code system, MORSE, will be described to illustrate the general features of Monte Carlo computer programs. The relationships of the Monte Carlo methods to other methods of solving radiation transport problems, such as discrete ordinates, will be described, as well as computational advantages and disadvantages of Monte Carlo versus the other methods. This course will cover, in depth, the theory and mathematics a user must have in order to understand and use the Monte Carlo method effectively to solve difficult problems in radiation transport.

The registration fee is $695 per person for each course. The deadline for registration in these two courses is August 1, 1988. For additional information contact T. W. Kerlin, Head of the Dept. of Nuclear Engineering, University of Tennessee, Knoxville, TN 37996 (phone 615-974-2525).

Calendar

Your attention is directed to the following events of interest.

May 1988

Workshop on Biological Assessment of Occupational Exposure to Actinides, May 30–June 2, 1988, Versailles, France, sponsored by the U.S. Dept. of Energy and the Commission of the European Communities. Contact: G. B. Gerber, Commission of the European Communities, DG XII/F/1, Rue de la Loi 20, B-1049 Brussels, Belgium (phone 0-2-2354041).

International Conference on Nuclear Data for Science and Technology, May 30–June 3, 1988, Mito, Japan, sponsored by the Japan Atomic Energy Research Institute. Contact: Sin-iti Igarasi, Conference Secretariat, Nuclear Data Center, JAERI, Tokai-mura, Naka-gun, Ibaraki-ken 319-11 Japan (phone 0292-82-5480).

June 1988

International Conference on Computational Physics (ICCP), June 1–5, 1988, Beijing, sponsored by the Institute of Applied Physics and Mathematics, Beijing, and Drexel University, Pennsylvania. Contact: Zhang Tianyuan, IAPCM, P.O. Box 8009, Beijing, China (PRC) or D. H. Feng, Department of Physics and Atmospheric Science, Drexel University, Philadelphia, PA 19104 USA.

American Nuclear Society Annual Meeting, June 12–17, 1988, San Diego, California. Contact: ANS, Meetings Dept., 555 North Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

35th Annual Meeting of the Society of Nuclear Medicine, June 14–17, 1988, San Francisco. Contact: Society of Nuclear Medicine, 136 Madison Ave., 8th Floor, New York, NY 10016 (phone 212-889-0717).

July 1988

33rd Annual Meeting of the Health Physics Society, July 4–8, 1988, Boston. Contact: Health Physics Society, Suite 506, 1340 Old Chain Bridge Road, McLean, VA 22101 (phone 703-790-1745).

25th Annual Conference on Nuclear and Space Radiation Effects, July 12–15, 1988, Portland, Oregon, sponsored by the Inst. of Electrical and Electronics Engineers. Contact: IEEE, 345 E. 47th St., New York, NY 10017 (phone 212-705-7895).

August 1988

International Reprocessing and Waste Management Symposium, Aug. 21–24, 1988, Denver, Colorado, sponsored by the American Inst. of Chemical Engineers. Contact: Wayne Freeby, Bechtel National, Inc., Fifty Beale St., San Francisco, CA 94119.

September 1988

Industrial Radiation and Radioisotope Measurement Applications, Sept. 6–8, 1988, Pinehurst, North Carolina, a topical meeting sponsored by the Isotopes and Radiation Division of the ANS. Contact: Robin P. Gardner, General Chairman, or Kuruvilla Verghese, Tech. Program Chairman, North Carolina State Univ., School of Engineering, Box 7909, Raleigh, NC 27695-7909.

International Topical Meeting on Waste Management, Sept. 11–15, 1988, Pasco, Washington. Contact: Bill Bonner, Pacific Northwest Laboratory, P.O. Box 999, Richland, WA 99352 (phone 509-376-5451 or FTS 444-5451).

7th International Conference on Radiation Shielding (ICRS), Sept. 12–16, 1988, Bournemouth, United Kingdom, sponsored by the OECD Nuclear Energy Agency and the UK Atomic Energy Agency. Contact: A. K. McCracken, UKAEA Winfrith, Dorchester, Dorset, DT2 8DH, UK or Leo LeSage, Argonne National Laboratory (ANL), Argonne, IL 60439 (phone 312-972-6048).

International Reactor Physics Conference, Sept. 18–21, 1988, Jackson Hole, Wyoming, sponsored by the ANS. Contact: Mike Lineberry, ANL, P.O. Box 2528, Idaho Falls, ID 83403 (phone 208-526-7434).

11th International CODATA Conference, "Scientific and Technical Data in a New Era," Sept. 26–29, 1988, Karlsruhe, Fed. Rep. of Germany. Contact: DECHEMA, ATTN: CODATA Conference, P.O. Box 97 01 46, D-6000 Frankfurt/M. 97, Fed. Rep. of Germany (phone 069 7564 241/242/243; Telex: 412490 dcha d.).

October 1988

4th International Symposium on Radiation Physics (ISRP-4), Oct. 3–7, 1988, São Paulo, Brazil. Contact: Prof. Ivan Cunha Nascimento, ISRP-4 Chairman of the Organizing Committee, Inst. de Fisica-Universidade de São Paulo, Caixa Postal 20516 (TELEX: 011-37920 IF SP -1498-São Paulo-SP-Brazil).

4th Annual DOE Model Conference, Oct. 3–7, 1988, Oak Ridge, Tennessee. Contact: Cynthia Kendrick, ORNL, P.O. Box 2008, Oak Ridge, TN 37831-6029 (phone 615-576-2632 or FTS 626-2632).

Fundamentals of Nondestructive Assay of Nuclear Material, Oct. 3–7, 1988, Los Alamos, New Mexico, sponsored by the U.S. Dept. of Energy. Contact: Linda Robinson, LANL, Los Alamos, NM 87545 (phone 505-667-5258 or FTS 843-5258).

International Symposium on the Feedback of Operational Safety Experience from Nuclear Power Plants, Oct. 3–7, 1988, Vienna, sponsored by the IAEA. Contact: IAEA, Conference Service Section, P.O. Box 100, A-1400 Vienna, Austria.

8th Topical Meeting on Technology of Fusion Energy, Oct. 9–13, 1988, Salt Lake City, Utah. Contact: Clyde R. Toole, EG&G Idaho, P.O. Box 1625 (WCB-W3), Idaho Falls, ID 83415.

IMechE International Conference on Decommissioning of Major Radioactive Facilities, Oct. 11–12, 1988, London, sponsored by the Institution of Mechanical Engineers. Contact: Conference Dept. C376, Inst. of Mechanical Engineers, 1 Birdcage Walk, Westminster, London SW1H 9JJ, United Kingdom.

12th International Conference on Plasma Physics and Controlled Nuclear Fusion Research, Oct. 12–19, 1988, Nice, France, sponsored by the IAEA. Contact: IAEA, P.O. Box 100 A-1400, Vienna, Austria.

5th National Conference on Biomedical Physics and Engineering, Oct. 15–17, 1988, Sofia, Bulgaria. Contact: M. Markov, Department of Biophysics, Biological Faculty, Sofia University, 8, Dragan Tzankov Blvd., Sofia 1000, Bulgaria.

Meeting of the American Nuclear Society, Oct. 30–Nov. 4, 1988, Washington, D.C. Contact: ANS, Meetings Department, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

2nd Conference on Radiation Protection and Dosimetry, Oct. 31–Nov. 3, 1988, Orlando, Florida, sponsored by ORNL. Contact: C. S. Sims, ORNL, P.O. Box X, Oak Ridge, TN 37831-6379.

November 1988

Gamma-Ray Assay of Nuclear Materials, Nov. 28–Dec. 2, 1988, Los Alamos, New Mexico, sponsored by the U.S. Dept. of Energy. Contact: Linda Robinson, LAN, Los Alamos, NM 87545 (phone 505-667-5258 or FTS 843-5258).

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.

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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ANSI/ANS-15.11-1987, . . *Radiation Protection at Research Reactor Facilities.,* . . Raby, T.M.(Ch.), . . 1987, . . American Nuclear Society, 555 North Kensington Ave., La Grange Park, Illinois 60525

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ICRU Report 42, . . *Use of Computers in External Beam Radiotherapy Procedures with High-Energy Photons and Electrons.,* . . Wyckoff, H.O. (Ch.), . . December 15, 1987, . . ICRU, 7910 Woodmont Avenue, Suite 1016, Bethesda, MD 20814

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