

RSIC Newsletter



Oak Ridge National Laboratory
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(For RSIC TELEX Communication Only)

No. 298

September 1989

Nature and education are somewhat similar. The latter transforms man, and in so doing creates a second nature.—Democritus

RSIC Advisor Visits Shielding Groups in Eastern Europe

Betty F. Maskewitz, currently an RSIC Senior Technical Advisor, recently returned from a month of travel, during which she visited members of the international shielding community in Poland, the USSR, Bulgaria, and Greece. She reports a lively exchange of information and brought back technical literature, some computing technology, requests for information, and a better understanding of the progress and problems of international cooperation in areas of common concern.

The visits were by invitation from institutions where research participants had prior interaction with the Radiation Shielding Information Center. She was a guest of personnel in the following sites: the Institutes for Nuclear Studies and Atomic Energy (Warsaw area), and Nuclear Physics (Krakow) of Poland's Atomic Energy Authority and the Institute of Physics and Nuclear Tech-

niques of Poland's Academy of Metallurgy and Mining in Krakow; the Latvian State University and the Keldysh Institute of Applied Mathematics of the USSR Academy of Sciences; the Bulgarian Academy of Sciences Institute for Nuclear Research and Nuclear Energy; and the Greek Atomic Energy Commission and the Demokritos Research Center.

Maskewitz was warmly received by our colleagues within these institutions. She reports that there is evidence of a more favorable climate, within the countries visited and within western countries for, international scientific and technical information exchange. The RSIC experience indicates that such interaction within the international shielding community serves to accelerate the advancing state of the art.

Betty F. Maskewitz

CCC-475/SCALIAS 3.1 Alert

The contributors of the VAX version of this package, Atomic Energy of Canada, Ltd., Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, have asked RSIC to alert users of the code system that problems have been discovered in the CSAS4/KENO5a sequence. The problems

appeared when their computer center upgraded the VAX/VMS Math Lib from 4.7 to 5.1. Users are advised to run the CSAS4/KENO5a sequence under V5.02 operating system with the V4.7 Math Lib, until the contributors have isolated the problems. Feedback from users who may be able to help

solve the problem will be appreciated. The package is available on one 6250-bpi tape in VMS

Backup format. Reference: NUREG/CR-0200 (ORNL/NUREG/CSD-2), Vol. 1, 2, 3. FORTRAN 77; IBM 3033 (A) and VAX (B).

CHANGES TO THE COMPUTER CODE COLLECTION

During the month four changes were made to the computer code collection. One new code system was packaged and added to the collection, two existing code packages were replaced with newly frozen versions, and one existing code package was extended with an additional hardware version.

CCC-316/XOQDOQ-82 MICRO

An additional hardware version of this package for radiological assessment was contributed by Morton and Potter, Potomac, Maryland, for use on personal computers. XOQDOQ evaluates the transport, dispersion, and deposition of effluents released to the atmosphere. Since the program uses meteorological data averaged over long periods of time it is appropriate for use in environmental impact studies rather than in the analysis of accidental releases. The code runs on both IBM PC/XT and PC/AT computers. Ryan-McFarland FORTRAN, Version 2.0 or higher, must be used for compilation, and a math coprocessor is required. References: NUREG/CR-2919 (Sept. 1982) and U. S. Nuclear Regulatory Guide 1.11 (July 1977). FORTRAN; IBM 3033 (A), DG MV (B) and IBM PC (C).

CCC-514/ANISN-PC

A workstation version of this multigroup one-dimensional discrete ordinates transport code system with anisotropic scattering, contributed by EG&G Idaho, Inc., Idaho Falls, Idaho, was added to the existing package. This version is machine independent except for the UNIX timer and will work with up to 121 energy groups in approximately 2.6 MB of computer memory. No executable file is distributed for the workstation. The original PC version was modified to eliminate some unnecessary calculations in slab geometry which results in a slight decrease in running time. The energy group limit is still 25. The minimum hardware requirements for ANISN/PC are: an IBM PC or compatible, the 8087 math coprocessor, a 10MB

fixed disk, and 640K Random Access Memory. The Ryan McFarland IBM Professional Fortran compiler was used to compile the programs under PC/DOS. The PLINK86-Plus overlay linker was used to create an executable ANISN file of approximately 640K bytes. The PC/DOS linker was used to link the APE32 and LMOD programs. All files for both the workstation version and the PC version (with executable files) are included on one DS/HD (1.2MB) diskette in compressed form. Some minor corrections have also been made to the document. Reference: EGG-2500 (December 1988). FORTRAN 77, IBM PC and workstation.

CCC-517/SADDE-MOD1

This code for calculating scaled beta-ray absorbed dose distributions, contributed by Battelle Pacific Northwest Laboratory, Richland, Washington, generates input data for the CCC-522/VARSKIN code. VARSKIN was limited to isotopes for which the data were provided by Medical Internal Radiation Dose (MIRD) Pamphlet No. 7 or to data estimated by interpolating between isotopes that had similar spectra. SADDE can now calculate the scaled absorbed dose distribution for any isotope, including emissions by daughter isotopes, allowing the user to calculate beta skin dose with more ease and accuracy. The code is transmitted on one DS/DD diskette. Reference: NUREG/CR-5276, PNL-6761 (January 1989). FORTRAN 77; IBM PC.

PSR-242/SABRINA

A newly frozen version of this interactive three-dimensional geometry-modeling program for use with the CCC-200/MCNP Monte Carlo neutron and photon transport code system was contributed by Los Alamos National Laboratory, New Mexico. With SABRINA the user constructs geometry shapes and debugs spatial descriptions for complicated geometry models. The graphics capabilities available in Version 10 of the PSR-243/CGS plot-

ting package are compatible with the requirements of SABRINA. Source files are available for three systems: CRAY/CTSS, VAX/VMS, and CRAY/UNICOS. All files are included on one DS/HD (1.2MB) diskette. A TEKTRONIX type monitor

is required for plotting on a terminal. References: LA-10688-M (October 1986), LANL informal report (May 1989) and ORNL informal notes (August 1989). FORTRAN 77; VAX/VMS, CRAY/CTSS, and CRAY/UNICOS.

CHANGES TO THE DATA LIBRARY COLLECTION

A new data library was added to the data library collection and a subset of an existing data library is now available on diskette.

DLC-75/BUGLE-80

BUGLE-80 is an ENDF/B-IV derived, coupled 47 neutron, 20 gamma-ray, P3 cross-section library for LWR shielding calculations, developed and guided by the ANS-6.1.2 working group on multi-group cross sections. To facilitate use on personal computers, the neutron data from files 1 and 2 were downloaded to diskettes and contributed by EG&G Idaho, Inc., Idaho Falls. The data, in ANISN format with each of the 192 materials in separate files, are available on one DS/HD (1.2 MB) diskette. The data from files 1 and 2 are also available in ISOTXS format (4D isotope control and group-independent data records) and are available in a single file written on one DS/HD diskette. Specify the format you require in your request for files 1 and 2. These files can be used with the new workstation version of CCC-514/ANISN-PC, also released this month. The files on diskettes are compressed and require a hard drive and a 1.2

MB disk drive to decompress the stored files. The complete BUGLE-80 data library is available on 9-track tape. Reference: Informal Notes (June 1980).

DLC-146/HUGO-VI

The National Institute of Standards and Technology (NIST), Gaithersburg, Maryland, and Oak Ridge National Laboratory (ORNL) contributed this library of photon interaction cross sections in ENDF/B-VI format. A portion of DLC-136/PHOTX was translated into ENDF/B format and is expected to be part of the ENDF/B-VI library. The following cross sections of file 23 are included: total cross section; coherent scattering; incoherent scattering; pair production, electron field; pair production, nuclear field; pair production, total; and photoelectric. The file 27 coherent scattering form factors and incoherent scattering functions are unchanged from DLC-99/HUGO (ENDF/B-V). The package is distributed on magnetic tape. References: Informal notes (Aug. 1989), ORNL/RSIC-46 (December 1983) and selected pages from BNL-NCS-50946 (ENDF 102) (October 1979). FORTRAN 77; IBM 3033.

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.

Joseph M. Cardito is serving as chairman of the Radiation Protection and Shielding Division of the ANS for the 1990 term. Serving with him is vice chair, Daniel T. Ingersoll; secretary, Donald A. McClure; treasurer, Margaret B. Emmett; new EC, James H. Renken, Richard M. Rubin, and Leon West; continuing EC,

Leland J. Carter, Jacob Celnik, Jess Greenborg, Nolan E. Hertel, Bernard Wehring, and Mark L. Williams.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Makoto Amakai*, Fujitsu Systems Engineering of America, Inc., Santa Clara, California; *Masahide Fujisaki*, Fujitsu Limited, Tokyo; *Lt. Col. Ronald F. Tuttle*, Air Force Institute of Technology, Wright Patterson AFB, Ohio; and *Jong Yi Moon*, Korea Advanced Energy Research Institute, Daejeon.

ANS Offers Videotapes

The following two sets of videotapes are available from ANS, P.O. Box 97781, Chicago, IL 60678-7781.

Lessons Learned from TMI-2 Accident includes highlights of a 2½-hour question-and-answer meeting of an eleven member panel of industry experts on the long-term ramifications of the accident. Major points addressed during the discussions were core melt, survival of the reactor's lower head, filtered vents, design considerations for future reactors, recovery and cleanup from the accident, the use of robotics in hazardous environments, regulatory and licensing issues, NRC perceptions as a result of the accident and the future of nuclear plants. The tape is available in ½-inch VHS format for \$200, ¾-inch format for \$225, or PAL format for \$350.

50 Years with Nuclear Fission is a set of tapes which document the conference of the same title held April 25-28, 1989, in Gaithersburg, Maryland, commemorating the 50th anniversary of the discovery of the atom. The documentary is edited to preserve the spontaneity of the speakers and includes personal reminiscences of those who were directly involved in unlocking the secrets of the atom. Those appearing on the tape include Edoardo Amaldi, Henry H. Barshall, Leslie G. Cook, P. Dastidar, G. N. Flerov, Siegfried Fluegge, Bertrand Goldschmidt, Jules Gueron, Darleane Hoffman, Paul Kuroda, Rudolf Peierls, Etienne Roth, P. Savic, Glenn Seaborg, V. Strutinsky, Alvin Weinberg, John Wheeler, Walter Zinn, and others. The tape will be available soon on four, ½-inch VHS cassettes for \$489.

IAEA TECDOC-482 Released

Prevention and Mitigation of Groundwater Contamination from Radioactive Releases, IAEA TECDOC-482, gives basic information on potential pathways and mechanisms by which radioactive materials from releases can reach man, and on modeling considerations to predict the behavior of radioactive materials in the ground. In general, the document applies to any installation or facility where radioactive materials are: (1) handled in sufficient quantities in liquid state and where potential exists for leakage from the original containment and contamination of the groundwater; (2) where leaching of radioactive materials precipitated on the ground surface can occur; or (3) where groundwater comes in direct contact with radioactive materials. TECDOC-482 is available in the United States from UNIPUB, 4611-F Assembly Drive, Lanham, MD 20706-4391, and in Europe from the Division of Publications, IAEA,

Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna, Austria.

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.

REAC/TS Offers Radiation-Accident Courses

The Radiation Emergency Assistance Center/Training Site (REAC/TS) in Oak Ridge, Tennessee, offers several courses in the handling of radiation accidents during the year. A brief description of the courses follows.

Handling of Radiation Accidents by Emergency Personnel is a 3½-day course designed for emergency room nurses and physicians who may need to administer initial hospital aid to a radiation accident victim. Lectures, complemented by demonstrations, laboratory exercises, and a simulated radiation accident drill, will emphasize the handling of the victim. Discussions include the fundamentals of radiation, detection and measurement, prevention of the spread of contamination, dose reduction for the victim and attending personnel, and the role of the medical physicist in caring for contaminated accident victims.

Occupational Health in Nuclear Facilities is a 5-day course for nurses, physicians, and others who provide occupational health care to employees of government nuclear facilities. Information will be given on basic radiation sciences, health surveillance and evaluation, on-site emergency management of injuries, and medical implications of chemical, physical, biological, social, and psychological stresses on the ability to work. Interdepartmental relationships and medical, legal, and ethical issues will also be discussed.

Health Physics in Radiation Accidents is a 5-day course for health physicists and radiation protection technologists who may be called upon to respond to accidents involving radioactive materials and injury to personnel. The major topics are radiological emergency procedures and the role of the health physicist in a medical environment.

Medical Planning and Care in Radiation Accidents, a 5-day course designed for physicians, presents an advanced level of information on diagnosis and treatment of acute local and total body radiation exposure, internal and external contamination, combined injuries, and multi-casualty incidents involving ionizing radiation.

The dates the courses will be offered and registration information may be obtained from Martha Payne, Reg-

istrar, REAC/TS, Oak Ridge Associated Universities, P.O. Box 117, Oak Ridge, TN 37831-0117 (phone 615-576-3131, FTS 626-3131).

WATTec '90

"WATTec '90 Technical Conference and Exhibition" will be held February 20-23, 1990, in Knoxville, Tennessee. WATTec is an interdisciplinary conference and exhibition which provides a forum for the dissemination and exchange of information on current national issues affected by the broadening role of science and technology in a global economy. The theme for the 1990 conference is "Global Competitiveness: Managing Technology." The 42 local chapters of national technical and professional societies have developed a multifaceted program to focus on the selected theme. The Society-sponsored technical sessions are the core of the conference with an anticipated 130 speakers providing programs in technical sessions and panel discussions. About 40 companies will display their products and provide consultation (contact Lillian Mashburn at the WATTec address). The National Society Presidents' Program provides an opportunity for society presidents, executive officers, and staff to discuss important issues in today's high-technology society (contact Clemence Noakes at the WATTec address). The WATTec scholarship program, begun in 1979, will present \$10,000 in scholarships in 1990. Further information about WATTec and the 1990 meeting may be obtained from WATTec, P.O. Box 629, Oak Ridge, TN 37831-0629.

Recent Advances in Physics

An "International Symposium and Workshop on Recent Advances in Physics" will be held January 15-19, 1990, in Dhaka, Bangladesh. It will also mark the 25th anniversary of the Atomic Energy Centre and 70 years of the Physics Department of the University of Dhaka. The Bangladesh Physics Society in collaboration with the Physics Departments of various Universities, the Bangladesh Atomic Energy Commission, and the Space Research and Remote Sensing Organization have planned a program on the following topics: Mathematical physics, Nuclear physics, Reactor physics, Solid State physics, Bio-physics, Plasma physics, and Laser.

The symposium will provide an opportunity for researchers in various branches of physics to acquaint themselves with the latest developments in their subject and enhance their own research activities. The International Centre for Theoretical Physics, the Third World Academy of Science, the Regional Office of UNESCO in New Delhi and other organizations have been asked to provide travel expenses for a limited number of foreign participants. Those who wish to request travel support must have their request in to the Bangladesh Physical Society by **September 30, 1989**. Requests should be

sent to Dr. M. A. Mannan, President, Bangladesh Physical Society and Chairman, Bangladesh Atomic Energy Commission, P.O. Box 158, Dhaka-1000, Bangladesh (Cable: BANGLATOM, Telex: 632203 BATOM BJ, phone: 502600), or to Dr. M. A. Asgar, Secretary, Bangladesh Physical Society and Professor, Department of Physics, Bangladesh University of Engineering and Technology, Dhaka-1000, Bangladesh (phone 502595).

First High-Level Waste Management Conference

The "First Annual International High-Level Radioactive Waste Management Conference" will be held April 8-12, 1990, in Las Vegas, Nevada. The conference, jointly sponsored by the American Nuclear Society and the American Society of Civil Engineers, will provide an international forum for presentation and discussion of scientific and technical information on the management and disposal of high-level radioactive wastes. Technical and plenary sessions will stimulate awareness of the relevance of scientific and technical information to the achievement of public health and safety objectives, and address the interaction and integration of HLRW program activities. Topics selected for the conference are: Natural Systems, Integrated Systems, Engineering Systems, and Social Systems. Presentations will be made in both oral and poster sessions. Further information may be obtained from the American Nuclear Society, 555 N. Kensington Ave., La Grange Park, IL 60525 USA (phone 312-352-6611, Telex 4972673).

7th Symposium on Radiation Measurements and Applications

The call for papers for the "7th Symposium on Radiation Measurements and Applications" has been issued. The symposium will be held May 21-24, 1990, at the University of Michigan, Ann Arbor. Papers are solicited for the following session topics: Radiation sources, including secondary target sources; Detectors and detection systems; Data acquisition and data analysis systems and methods; Radiation spectroscopy; Particle-induced X-ray emission and radiation-induced fluorescence; Analytical standards and elemental analysis; New and unique applications of radiation; and Industrial radiography and tomography. Authors must submit five copies of their summary by **January 26, 1990**, to Helen J. Lum, Symposium Secretary, The University of Michigan, 3034 Phoenix Memorial Laboratory, Ann Arbor, MI 48109-2100 (phone 313-764-6214, Fax 313-763-4540).

ASTM-EURATOM Reactor Dosimetry Conference Call for Papers

The "7th ASTM-EURATOM Reactor Dosimetry Symposium," to be held August 27-31, 1990, in Strasbourg, France, has issued a call for papers on the following topics: Characterization of neutron and gamma ray environments; Dosimetry techniques (new developments and improvements); Adjustment procedures and accuracy determination; Nuclear data, benchmarking and calibration procedures; Radiation monitoring of experiments; Dosimetry for irradiating electronics devices; Radiation damage correlations and damage analysis techniques; Neutron and gamma ray transport calculations; and Reactor surveillance and quality assurance. Authors are requested to submit two copies of a 300-500-word abstract by **October 1, 1989**, to both program secretaries: G. Tsotridis, Joint Research Centre, Petten Establishment, HFR Division, Postbus 2, NL-1755 ZG Petten, The Netherlands (phone 02246 5122, Telex REACP NL 57211, Fax 02246 1449), and G. P. Lamaze, National Inst. of Standards and Technology, Bldg. 235, Gaithersburg, MD 20899 USA (phone 301-975-6202, Telex 197 674 NBS UT, Fax 301-921-9847). The conference is held approximately every two years and sponsored by the Commission of the European Communities and the American Society of Testing and Materials. The conference theme is dosimetry necessary

for the assessment of irradiated reactor materials featuring radiation metrology techniques, data bases, and standardization with emphasis on radiation dosimetry in fission and fusion environments.

Monte Carlo Methods for Neutron and Photon Transport Calculations

Budapest, Hungary, is the site for the "International Conference on Monte Carlo Methods for Neutron and Photon Transport Calculations," to be held September 25-28, 1990. The conference is sponsored by the Roland Eötvös Physical Society and the Central Research Institute for Physics with cooperation from the International Atomic Energy Agency. The program committee has issued a call for papers on the following topics: Simulation of particle transport (direct and adjoint MC); MC applications in reactor criticality; MC applications shielding/deep penetration calculations; New developments and special methods in MC; MC applications in radiation protection and health physics; Application of parallel computing/vectorization in MC; and MC programs in program libraries. Authors should submit their abstracts by **January 31, 1990**, to Dr. László Koblinger, Central Research Inst. for Physics, P.O. Box 49, H-1525 Budapest, Hungary.

Calendar

Your attention is directed to the following events of interest.

October 1989

International Conference on New Trends in Liquid Scintillation Counting and Organic Scintillators, Oct. 2-5, 1989, Gatlinburg, Tennessee, sponsored by Oak Ridge National Laboratory and the University of Georgia. Contact: University of Georgia, Center for Isotope Studies, 120 Riverbend Road, Athens, GA 30605.

13th International Symposium on Fusion Engineering, Oct. 2-6, 1989, Knoxville, Tennessee, sponsored by the American Nuclear Society. Contact: T. E. Shannon, ORNL, P.O. Box Y, FEDC Building, Oak Ridge, TN 37831 USA (phone 615-576-5500 or FTS 626-5500).

Meeting on Human Exposure to Natural Radiation: Its Variation, Regulation, and Consequences, Oct. 3, 1989, London, sponsored by the Society for Radiological Protection. Contact: D.N.S. Dixon, 67 Oatlands Park, Linlithgow, W. Lothian, Scotland, UK (phone 301-244-2253).

International Symposium on Safety Assessment of Radioactive Waste Repositories, Oct. 9-12, 1989, Paris, sponsored by the Commission of the European Communities, IAEA, and the OECD Nuclear Energy Agency. Contact: Conference Service Section, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

International Symposium on the Determination of Foodstuff Contamination After a Nuclear Accident, Oct. 9-13, 1989, Vienna, sponsored by the Food and Agriculture Organization of the United Nations, IAEA, and the World Health Organization. Contact: Conference Service Section, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

Below Regulatory Concern (BRC) Radwaste Disposal, Oct. 9-13, 1989, a short course presented by the University of Texas at Austin. Contact: Continuing Engineering Studies, College of Engineering, Cockrell Hall 10.324, The University of Texas at Austin, Austin, TX 78712.

First International Conference on Radioactive Nuclear Beams, Oct. 16-18, 1989, Berkeley, California, sponsored by the U.S. Dept. of Energy. Contact: J. M. Nitschke, Nuclear Science Division, Lawrence

Berkeley Laboratory, 1 Cyclotron Road, Berkeley, CA 94720 (phone 415-486-6471).

Supercomputing Conference, Oct. 16-20, 1989, Santa Clara, California. Contact: R. Bailey, National Aeronautics and Space Administration, Ames Research Center, Moffet Field, CA 94035.

17th Water Reactor Safety Information Meeting, Oct. 23-25, 1989, Rockville, Maryland, sponsored by the Office of Nuclear Regulatory Research, Nuclear Regulatory Commission. Contact: Allen J. Weiss, Meeting Coordinator, Brookhaven National Laboratory, Building 197-C, Upton, New York 11973.

Joint International Waste Management Conference, Oct. 23-28, 1989, Kyoto, Japan, sponsored by the American Society of Mechanical Engineers. Contact: Steve Slate, Pacific Northwest Laboratory, P.O. Box 999, Mailstop A4-90, Richland, WA 99352 (phone 509-376-8019 or FTS 444-8019) or the Japanese Organizing Committee, c/o JSME, 4-9 Yoyogi 2-chome, Shibuya-Ku, Tokyo, Japan.

International Conference on Decommissioning of Nuclear Installations, Oct. 24-27, 1989, Brussels, Belgium, sponsored by CEC. Contact: Mme. F. Rey, Conference Services, Avenue de l'Observatoire 3, Boite 17, B-1180 Brussels, Belgium (phone 32-2-235-8425).

November 1989

International Symposium on Recovery Operations in the Event of a Nuclear Accident or Radiological Emergency, Nov. 6-10, 1989, sponsored by IAEA. Contact: Barbara Thomas, IE-13, U. S. Department of Energy, Forrestal Building, Washington, DC 20585 USA (phone 202-586-6188 or FTS 896-6188).

Selected Topics of Monte Carlo Applications in Science and Technology, Nov. 6-10, 1989, a course sponsored by the Joint Research Centre, Ispra Establishment. Contact: Secretariat "ISPRA-Courses", Centro Comune di Ricerca, I-21020 ISPRA (Varese) Italy (phone 0332-789819/789839/781128).

9th International Conference on Solid State Dosimetry, Nov. 6-10, 1989, Vienna. Contact: Dr. A. Hefner, Austrian Research Center at Seibersdorf, A-2444 Seibersdorf, Austria (02254-80, ext. 2500).

19th International Symposium on Nuclear Physics: Nuclear Processes in Fusion Reactors, Nov. 6-10, 1989, Gausig, German D. R. Contact: D. Seeliger, Technische Universitaet Dresden, Sektion Physik, Mommsenstr. 13, DDR-8027 Dresden, GDR.

International Symposium on Radiological Protection (ISRP), Nov. 20-22, 1989, Beijing, sponsored by the Chinese Medical Association. Contact: Dr. Wei Kedao, Ministry of Public Health, Laboratory of Industrial Hygiene, 2 Xinkang Street, Deshengmenwai, Beijing 100088, People's Republic of China.

Winter Meeting of the American Nuclear Society, Nov. 26-30, 1989, San Francisco. Contact: Mary J. Keenan, Meetings Manager, ANS, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

Scientific Basis for Nuclear Waste Management, Nov. 27-30, 1989, Boston Massachusetts, sponsored by the Materials Research Society. Contact: Conferences, MRS, 9800 McKnight Road, Suite 327, Pittsburgh, PA 15237 (phone 412-367-3003).

December 1989

4th International Conference on Fusion Reactor Materials, Dec. 4-8, 1989, Kyoto, Japan. Contact: Prof. S. Ishino, Dept. of Nuclear Engineering, University of Tokyo, Bunkyo-ku, Tokyo 113, Japan.

January 1990

Recent Advances in Physics, Jan. 15-19, 1990, Dhaka, Bangladesh. Contact: Dr. M. A. Mannan, P.O. Box 158, Dhaka-1000, Bangladesh (Cable: BANGLATOM; Telex 632203 BATOM BJ; phone 502600).

February 1990

HEART Conference, Feb. 12-16, 1990, Monterey, California. Contact: Thomas A. Tumolillo, Kaman Sciences Corp., P.O. Box 7463, Colorado Springs, CO 80933 (phone 719-599-1718).

WATTEC '90 Technical Conference and Exhibition, Feb. 20-23, 1990, Knoxville, Tennessee. Contact: WAAtec. P.O. Box 629, Oak Ridge, TN 37831-0629.

Waste Management '90, Feb. 25-Mar. 1, 1990, Tucson, Arizona, sponsored by the University of Arizona and the American Nuclear Society. Contact: Dr. Morton E. Wacks, Dept. NEE, University of Arizona, Tucson, AZ 85721 (phone 602-621-6160).

March 1990

7th Pacific Basin Conference, Mar. 4-8, 1990, San Diego, California, sponsored by the ANS. Contact: ANS Meetings Department, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

International Conference on Supercomputing in Nuclear Applications, Mar. 12-16, 1990, Mito City, Japan, sponsored by JAERI. Contact: Kiyoshi Asai, Computing Center, JAERI, Tokai-mura, Naka-gun, Ibaraki 319-11, Japan (phone 0292(82)5611; Fax 0292(82)6070).

April 1990

26th Annual Meeting of the National Council on Radiation Protection and Measurement, Health and Ecological Implications of Radioactively Contaminated Sites, Apr. 4-5, 1990, Washington. Contact: NCRP, 7910 Woodmont Ave., Suite 800, Bethesda, MD 20814.

International Conference for High-Level Radioactive Waste Management, April 8-12, 1990, Las Vegas, Nevada. Contact: Dean William Wells, Howard Hughes College of Engineering, UNLV, Las Vegas, NV 89154 (phone 702-739-3699).

Physor '90, Apr. 23-26, 1990, Marseille, France. Contact: Yuri Orechwa, Engineering Physics Division, Bldg. 208, Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60439 USA.

May 1990

International Symposium on Radiation Protection Infrastructure, May 7-11, 1990, Munich, Fed. Rep. of Germany, sponsored by the IAEA. Contact: Conference Service Section, IAEA, P.O. Box 100, A-1400, Vienna, Austria.

7th Symposium on Radiation Measurements and Applications, May 21-24, 1990, the University of Michigan, Ann Arbor. Contact: Helen Lum, Symposium Secretary, 3034 Phoenix Memorial Laboratory, The University of Michigan, Ann Arbor, MI 48109-2100 (phone 313-764-6214; Fax 313-763-4540).

June 1990

American Nuclear Society Annual Meeting, June 10-15, 1990, Nashville, Tennessee. Contact: Mary Keenan, Meetings Manager, ANS, 555 N. Kensington Ave., La Grange Park, IL 60525 (phone 312-352-6611).

15th Symposium on Effects of Radiation on Materials, June 17-21, 1990, Nashville, Tennessee, sponsored by the American Society for Testing and Materials. Contact: Conferences, ASTM, 1916 Race St., Philadelphia, PA 19103 (phone 215-299-5400).

17th European Conference on Controlled Fusion and Plasma Heating, June 25-29, 1990, Amsterdam, The Netherlands. Contact: F. C. Schuller, FOM-

Institut voor Plasmafysica "Rijhuizen," Postbus 1207, NL-3430 BE Nieuwegein.

July 1990

5th Conference on Radiation Chemistry, July 1-6, 1990, Québec. Contact: Jean-Paul Jay-Gerin, JECR-90 Committee, Département de médecine nucléaire et de radiobiologie, Faculté de médecine, Université de Sherbrooke, Sherbrooke, Québec, J1H 5N4, Canada (phone 819-563-5555).

27th Annual International Nuclear and Space Radiation Effects Conference and Short Course, July 16-20, 1990, Reno, Nevada, sponsored by the Institute of Electrical and Electronics Engineers, Inc. Contact: Joseph R. Srour, Northrop Corp., M.S. X400/N5, 2301 West 120th St., P.O. Box 5032, Hawthorne, CA 90251-5032 (phone 213-600-4151).

August 1990

International Topical Meeting on Fast Reactor Safety, Aug. 12-16, 1990, Snowbird, Utah, sponsored by the ANS. Contact: Wayne K. Letho, Argonne National Laboratory, P.O. Box 2528, Idaho Falls, ID 83403-2528 (phone 208-526-7369).

Operational Radiation Protection, Aug. 20-22, 1990, Idaho Falls, Idaho, sponsored by the ANS. Contact: Jack Liebenthal, EG&G Idaho, Inc., P.O. Box 1625, Idaho Falls, ID 83415-3515 (phone 208-526-1253).

7th ASTM-EURATOM Symposium on Reactor Dosimetry, Aug. 27-31, 1990, Strasbourg, France. Contact: G. Tsotridis, Joint Research Centre, Petten Establishment, HFR Div., Postbus 2, NL-1755 ZG, Petten, The Netherlands (phone 02246 5122, Telex REACP NL 57211, Fax 02246 1449) or G. P. Lamaze, National Inst. of Standards and Technology, Bldg. 235, Gaithersburg, MD 20899 USA (phone 301-975-6202, Telex 197 674 NBS UT, Fax 301-921-9847).

September 1990

16th Symposium on Fusion Technology, Sept. 3-7, 1990, London. Contact: JET Joint Undertaking, Conference Office, Abingdon, Oxon, OX14 3EA, United Kingdom.

International Conference on Monte Carlo Methods for Neutron and Photon Transport Calculations, Sept. 25-28, 1990, Budapest, Hungary. Contact: Dr. László Koblinger, Central Research Inst. for Physics, P.O. Box 49, H-1525 Budapest, Hungary.

October 1990

Spectrum '90: Radioactive Waste Technologies, Decontamination, Decommissioning and

Hazardous Wastes, Oct. 3-5, 1990, Knoxville, Tennessee, sponsored by ANS. Contact: Thomas H. Row, ORNL, P.O. Box 2008, 4500N MS6198, Oak Ridge, TN 37831-6198 (phone 615-574-5974 or FTS 624-5974).

9th Topical Meeting on Technology of Fusion Energy, Oct. 8-12, 1990, Chicago, sponsored by the American Nuclear Society. Contact: Dr. Charles

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