

RSIC Newsletter



OAK RIDGE NATIONAL LABORATORY
POST OFFICE BOX X • OAK RIDGE, TENNESSEE 37831-6362
OPERATED BY MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE U.S. DEPARTMENT OF ENERGY

Phone No. 615-574-6176 or FTS 624-6176
EasyLink Mailbox: 62813374
Telex(Answer Back): 854467(ORNL EPIC UD)
(For RSIC TELEX Communication Only)

No. 267

February 1987

... If it is your duty to look through a large mass of scientific work in order to find the high-grade scientific work, the mass of it makes finding more difficult... so I say that one of the needs of science at present is to keep the monkeys away from the typewriters.—Norbert Weiner

ANS Topical to be in Knoxville

Final arrangements have been made for the American Nuclear Society (ANS) Radiation Protection and Shielding Division (RP&S) Topical Meeting to be held April 22–24, 1987, in Knoxville, Tennessee. The meeting is sponsored by the RP&S Division and the Oak Ridge/Knoxville Section of the ANS. If you have not already received a registration form, the Newsletter has provided the registration form as well as a Hotel Reservation Request and a brief description of special events on the back of this issue. Please refer to page one of the September 1986 issue of the *RSIC Newsletter* for a description of the technical program.

CHANGES TO THE COMPUTER CODE COLLECTION

Seven changes were made to the computer code collection during the month. Three new code systems were packaged and added to the collection; one code package was extended with a new hardware version; and three code packages were updated to correct errors or to incorporate new technology. Two changes resulted from foreign contributions.

CCC-272/TRIPOLI-2.2(84)

This three-dimensional Monte Carlo radiation transport code system was updated by the CEA/CEN Saclay Shielding and Reliability Laboratory (LEPF), Gif-sur-Yvette, France, with the addition of revised shielding cross-section libraries based on ENDF/B-IV. The new versions provide additional materials and response functions and correct problems associated with anisotropy representation. The original versions are retained for reference purposes. References: OLS-80-10, OLS-

80-165, and SERMA/S/No. 492 (1981).
FORTRAN IV, ASSEMBLER; IBM 3033. Data libraries are binary.

CCC-476/CAAC

The AIRDOS source program of the IBM version of this code system, used for the 1984 Clean Air Act assessments, was modified to remove a bug introduced during the implementation of the revisions announced in the December 1986 *RSIC Newsletter*. We thank the Savannah River Laboratory for alerting us to the problem. The VAX

version is not affected. Those who requested the IBM version before January have been mailed a new copy of the AIRDOS source. References: ORNL-5532 (1979), ORNL-5692 (1981), and ORNL-5952 (1984) and informal notes. FORTRAN IV; IBM-3033 (A) and FORTRAN 77; VAX (B).

CCC-493/QAD-CGGP

Some additional coding is recommended for the IBM PC (B) and CRAY XMP (C) versions of this point kernel code system for neutron and gamma-ray shielding calculations. Alternative tests are suggested by Oak Ridge National Laboratory (ORNL), Oak Ridge, Tennessee, to prevent errors when certain geometry configurations are used. Users may request a description of the changes (4 FORTRAN statements). Reference: Bechtel Report NE007 and informal notes. FORTRAN 77; IBM 3033 and Data General MV/4000 (A), IBM PC MICRO (B) (2 diskettes required) and CRAY XMP (C).

CCC-507/SPEEDI

This suite of computer codes for predicting the dose to the public from a plume released in a nuclear accident was contributed by the Japan Atomic Energy Research Institute (JAERI), Tokai-mura, Japan. The main codes in SPEEDI include WIND04 for calculating 3-dimensional mass-consistent windfields by a variational method, PRWDA for computing concentration distributions via a random walk method, and CIDE for estimating internal and external doses. The combination of these codes allows the prediction of the consequences of an accident in about one minute on a vector processor FACOM VP-100 at JAERI. The package was not tested at RSIC. References: JAERI 1297 (1985) and informal reports. FACOM FORTRAN 77/VP; FACOM M-380 and VP-100.

PSR-51/SMUG

A VAX version of this code system for generating multigroup photon libraries from ENDF/B was contributed by EG&G Energy Measurements

Group, Goleta, California. SMUG, a module of the PSR-63/AMPX-II developed at ORNL, calculates multigroup averages of pair production and photoelectric cross sections from data tabulated in ENDF format and generates scattering matrices from direct integration of the Klein-Nishina equation. The methodology takes advantage of the recursive properties of Legendre polynomials. Ref: ORNL/TM-3706 (1976) [5.0 SMUG]; VAX FORTRAN, VAX 11/750.

PSR-237 MICRO/EZPLOT

This set of graphics routines for the IBM PC, contributed by ORNL, simulates a subset of the DISSPLA (Integrated Software Systems Corp., 4186 Sorrento Valley Blvd., Suite G, San Diego, California 92121, 1975 et seq.) plotting package to make plots on the IBM PC screen and an attached printer, using terminal emulators PCPLOT and TEK. The subroutines in the EZPLOT system are based on the Hewlett Packard HP 9000 simulation of DISSPLA. References: ORNL/CSD-129 and informal notes. Microsoft Fortran Version 3.31, PC DOS 3.1.

PSR-238 MICRO/PICTURE

Personal computer versions of this combinatorial geometry printer plotting package were contributed by Battelle Columbus Division and Lawrence Livermore National Laboratory. PICTURE generates plots, printed on a standard line printer, of two-dimensional slices through the three-dimensional geometry described by the combinatorial geometry (CG) package used in such codes as CCC-203/MORSE-CG and CCC-307/QAD-CG. PICTURE is operable on an IBM PC with 640K memory using either IBM Personal Computer Professional Fortran, Version 1.0 (requires 8087 math coprocessor), or Microsoft Fortran Version 3.31. The code was run at RSIC under PC DOS 3.1. References: Appendix B of CCC-307/QAD-CG manual, README.DOC file on diskette. Two 360K ds/dd diskettes are required to get both the IBM Professional and Microsoft Fortran versions.

CHANGES TO THE DATA LIBRARY COLLECTION

Three changes were made to the data library collection. Two new data libraries were added to the collection and an existing data library was updated. One of the new data libraries was contributed by India.

DLC-8/BP

The documentation for this collection of data for selected shielding benchmark problems specified in ORNL-RSIC-25, *Shielding Benchmark Problems*, was updated to consolidate abstract information and to expand descriptive material for the data now included. Information is provided for Benchmark Problems 3.0 (A) and 6.0 (B), contributed by ORNL and Science Applications International Corp., Albuquerque, New Mexico, respectively. Cross section data for BP 3.0 are 22-neutron-group data for air while that for BP 6.0 includes 22-neutron-, 18-photon-group data for the constituents of polyethylene. The data can be used in multigroup discrete ordinates codes to repeat the benchmark calculations performed by the contributors. Reference: Sections 3.0 and 6.0 of ORNL-RSIC-25 (1974).

DLC-124/BARC-35

This library of 35-group neutron cross sections (ISOTXS format) and resonance self-shielding factors (BRKOXS format) was contributed by the Bhabha Atomic Research Center, Bombay, India. The data were generated from ENDF/B-IV using PSR-105/MINX and are intended for neutronics and safety studies for thermal, fast, and fusion-fission hybrid reactors. Users should also request

PSR-117/MARS which has several handling codes for manipulating the data in these formats. Data are provided for the following elements or isotopes: ^1H , ^2H , ^3H , ^3He , ^4He , ^6Li , ^7Li , ^9Be , ^{10}B , ^{11}B , ^{12}C , ^{14}N , ^{16}O , F, Na, Mg, Al, Si, K, Ca, Ti, V, Cr, Mn, Fe, Ni, ZIRC2, Nb, Mo, Cd, Sm, ^{151}Eu , ^{153}Eu , Gd, Dy, ^{175}Lu , ^{176}Lu , ^{181}Tm , ^{182}W , ^{183}W , ^{184}W , ^{186}W , Pb, Th, ^{233}U , ^{234}U , ^{235}U , ^{238}U , Np, ^{238}Pu , ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu , ^{241}Am , ^{243}Am , Cm. No retrieval program or sample run is provided. Reference: BARC-1222, 1984; EBCDIC card images.

DLC-125 MICRO (NRC-10)/FIREDATA

This nuclear power plant fire data base for use on a personal computer was contributed by Sandia National Laboratories, Albuquerque, New Mexico. The FIREDATA package is built around the commercial program dBASE III (TM of Ashton-Tate, 20101 Hamilton Ave., Torrance, CA 90502-1319) and allows interactive searches of the data base for such specifics as fire location, detection and suppression means, plant operation mode, dollar loss, etc. Customized software programs specifically developed to access and display the fire event information are also provided. Also included is a guide to illustrate the use of the package. The user must have dBASE III to be able to utilize FIREDATA. Reference: SAND86-0300 (NUREG/CR-4586). dBASE III data and program files; IBM PC XT. Three 360k ds/dd diskettes are required.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Nancy C. Finley*, Sandia National Laboratories, Albuquerque, New Mexico, and *J. J. Wagschal*, Hebrew University, Jerusalem, Israel.

PERSONAL ITEMS

Elaine Plemons Copeland, RSIC secretary since 1981, has transferred to another position in the Computing and Telecommunications Division of ORNL. We are pleased to announce that **Dawn Human**, formerly of the Mathematical Sciences Section in the Engineering Physics and Mathematics Division, has joined the RSIC staff to fill the position Elaine left.

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.

NRC Program Announced

The National Council on Radiation Protection and Measurements (NCRP) has released the provisional program for the 1987 Annual Meeting to be held April 8-9, at the National Academy of Sciences in Washington. The session, entitled "New Dosimetry at Hiroshima and Nagasaki and Its Implications for Risk Estimates," will include the following topics:

Welcome, Warren K. Sinclair of NCRP and R. J. Michael Fry of the ORNL.

The New Dosimetry: Perspectives and Overview

Introduction, E. Tajima of the Japan Nuclear Safety Commission,

Historical Perspectives, T. Hamada of the Japan Radioisotope Association and W. C. Roesch of Battelle Pacific Northwest Labs., and

Overview of the New Dosimetry, R. F. Christy of the California Inst. of Technology.

Special Aspects of Dosimetry

Introduction, F. Seitz of Rockefeller University, New York,

The Use of Thermoluminescence Analysis, E. H. Haskell of the University of Utah,

Neutron Activation Studies, T. Kosako of the University of Tokyo,

The Assessment of Shielding and Organ Doses, D. C. Kaul of Science Applications International Corp., and

Perspectives on Special Aspects of the Dosimetry—Panel Discussion with W. H. Ellett of the National Academy of Sciences as chairman and J. H. Harley, Hoboken, New Jersey; G. D. Kerr of ORNL; W. E. Loewe of Lawrence Livermore National Lab.; and P. P. Whalen of Los Alamos National Lab. as panel members.

The New Dosimetry and Its Application

The Dosimetry System 1986, W. A. Woolson of Science Applications International Corp., and

Application of the New Dosimetry, D. Preston of the Japan Radiation Effects Research Foundation.

The Impact of the New Dosimetry

Chromosome Aberrations in Atomic Bomb Survivors, A. Awa of the Japan Radiation Effects Research Foundation,

Effects of Radiation on the Developing Brain, M. Otake of the Japan Radiation Effects Research Foundation, and

Implications of the New Dosimetry for Risk Estimates, W. J. Schull of the University of Texas, Houston.

The Lauriston S. Taylor Lecture, "How to be Quantitative About Radiation Risk Estimates," will be delivered by Seymour Jablon, Director of the Medical Follow-Up Agency.

Calendar

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

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).

6th Annual Conference on Incineration of Mixed and Low-Level Radioactive Wastes, Apr. 22-25, 1987, St. Charles, Illinois, sponsored by the University of California, U.S. Dept. of Energy, and the American Society of Mechanical Engineers. Contact: J. B. Tripodes, Mgr., Health Physics, EH and S, Univ. of California, Irvine, CA 92717.

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 7-12, 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.

July 1987

32nd Annual Meeting of the Health Physics Society, July 5-9, 1987, Salt Lake City, Utah. Contact: John W. Poston, Sr., Dept. of Nuclear Engr., Texas A&M Univ., College Station, TX 77843-3133 (phone 409-845-4161).

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 0R6 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).

April 1988

Seventh International Congress of the International Radiation Protection Association (IRPA 7), Apr. 10-17, 1988, Sydney, Australia. Contact: J.C.E. Button, Scientific Secretary, IRPA 7, Health & Safety Div., Australian Atomic Energy Commission, Private Mail Bag, Sutherland, N.S.W. 2232, Australia (phone 61-2-543-3295) (Telex: AA.24562).

September 1988

Industrial Radiation and Radioisotope Measurement Applications, Sept. 25-28, 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.

JANUARY 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

AD-A-172422, . . *High and Low Energy Particle Beams Interactions with Solids. Office of Naval Research Final Report.*, . . Winograd, N., . . 1986, . . NTIS

AEEW-R 1748, . . *The Photon and Neutron Calibration of Thermoluminescent Dosimeters for Reactor Measurements.*, . . Knipe, A.D., . . January 1984, . . HMSO

ANL-7416, Suppl.3, . . *National Energy Software Center: Benchmark Problem Book.*, . . Computational Benchmark Problems Committee, . . December 1985, . . NTIS, PC A19/MF A01

ANSI N 13.11-1983, . . *American National Standard for Dosimetry—Personnel Dosimetry Performance—Criteria for Testing.*, . . American National Standards Committee N13, . . September 16,

1982, . . American National Standards Institute, 1430 Broadway, New York, New York 10018

BLG-592 (In French), . . *Spontaneous and Induced Fission of Plutonium Isotopes.*, . . Wagemans, C.; Schillebeeckx, P.; Deruytter, A.; Barthelemy, R., . . November 1986, . . Centre D'Etude de L'Energie Nucléaire, Ch., Lemairestraat 1, 1160 Brussel

BNL-51778, **pp.121-132**; **CONF-8310104**, **pp.121-132**, . . *Fission Yield Data for Neutron Dosimetry.*, . . Fudge, A.J., . . October 1983, . . NTIS, PC A24/MF A01

CONF-840142, **pp.811-821**, . . *Nuclear Design of Hiblic.*, . . Nakashima, H.; Kanda, Y.; Nabeshima, K., . . In: Proceedings of 1984 INS International Symposium on Heavy Ion Accelerators and Their Applications to Inertial Fusion. Hirao, Y.; Katayama, T.; Tokuda, N. (Eds.), . . 1984, . . INS, Tokyo University, Tokyo, Japan

CONF-8406139, **pp.291-295**, . . *Basic Nuclear Data for Nuclear Fission and Fusion Reactors.*, . . Schmidt, J.J.; Lorenx, A.; Cullen, D.E., . . In: ROLE OF DATA IN SCIENTIFIC PROGRESS. Glasser, P.S. (Ed.) Committee on Data for Science and Technology (CODATA), Paris, France, . . 1985, . . North-Holland, Amsterdam, Netherlands

CONF-840902-10, . . *LSL-M1 and LSL-M2: Two Extensions of the LSL Adjustment Procedure for Including Multiple Spectrum Locations.*, . . Stallman, F.W., . . 1984, . . NTIS, PC A02/MF A01

CONF-850419, . . *Radioactive Waste.*, . . NCRP, . . Proceedings of the Twenty-First Annual Meeting of the National Council on Radiation Protection and Measurement, held on April 3-4, 1985, National Academy of Sciences Building, Washington, D.C., . . June 1, 1986, . . NCRP, 7910 Woodmont Ave., Bethesda, MD 20814

DOE/RW-0006, Rev.2, . . *Integrated Data Base for 1986: Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics.*, . . ORNL, . . September 1986, . . NTIS, PC A14/MF A01

ECN-153, . . *Lecture Notes on Computerized Neutron Spectrometry*, . . Zijp, W.L., . . March 1984, . . MF available from INIS.

EGG-2466, . . *Current Status of Nuclear Decay Data and Report on the IAEA Coordinated Research Programme on the Measurement and Evaluation of Transactinium Isotope Nuclear Decay Data*, . . Reich, C.W.; Vaninbrouckx, R., . . July 1986, . . EG and G Idaho, Inc., Idaho Falls, ID

EPRI-EM-4570, . . *Radiation Curing: State-of-the-Art Assessment. Final Report*, . . McGinniss, V.D., . . June 1986, . . Research Reports Center (RRC), Box 50490, Palo Alto, CA 94303

EPRI-NP-4619, . . *Decay Heat Measurements and Predictions of BWR Spent Fuel*, . . McKinnon, M.A.; Heeb, C.M.; Creer, J.M., . . June 1986, . . Research Reports Center, Box 50490, Palo Alto, CA 94303

FEI-1333 (In Russian), . . *Using Spherical Functions in Calculation of Shielding Functionals by the Conjugate Disturbance Method*, . . Usanov, V.I., . . 1982, . . MF available from INIS.

FEI-1391 (In Russian), . . *Accuracy of the Diffusion Approximation in Neutron Leakage Calculation and the Group Method*, . . Shulepin, V.S., . . 1983, . . MF available from INIS.

FEI-1430 (In Russian), . . *On Calculating Fission Product Concentrations in a Reactor*, . . Zakharova, S.M., . . 1983, . . MF available from INIS.

FLPU-85-7, . . *In Situ Radionuclide Migration Studies in a Shallow Sand Aquifer (Part 1)*, . . Williams, G.M.; Alexander, L.S.; Hitchman, S.P., . . July 1985, . . Fluid Processess Research Group, British Geological Survey, Keyworth, UK

FLPU-85-10, . . *In Situ Radionuclide Migration Studies in a Shallow Sand Aquifer (Part 2 - Appendices)*, . . Williams, G.M.; Alexander, L.S.; Hitchman, S.P., . . July 1985, . . Fluid Processess Research Group, British Geological Survey, Keyworth, UK

FNAL-TM-1422, . . *Update on the Tevatron Muon Shield*, . . Malensek, A.; Stutte, L., . . September 1986, . . Fermi National Accelerator Lab., Batavia, IL

GA-A18133, . . *Program Element II - Blanket and Shield Thermal-Hydraulic and Thermomechanical Testing of the First Wall/Blanket/Shield Program. Final Report*, . . Schultz, K.R.; Wong, C.P.C.; Veca, A.R.; Yang, L.; Deis, G.A.; Hsu, P.Y.S.; Masson, L.S., . . November 1986, . . NTIS, PC A05/MF A01

ICASE-86-57; NASA-CR-178178, . . *Some Recent Developments in Spectral Methods*, . . Hussaini, M.Y., . . August 1986, . . Langley Research Center, Inst. for Computer Applications in Science and Engineering, National Aeronautics and Space Administration, Hampton, VA

INDC(AUS)-011/LI; INT(86)-6, . . *Calculation of the Energy Spread and the Average Neutron Energy of 14 MeV Neutrons Produced Via the T(d,n)⁴He Reaction*

in Solid TI-T Targets, . . Pavlik, A.; Winkler, G., . . July 1986, . . IAEA Nuclear Data Section, Wagramerstrasse 5, A-1400 Vienna

JAERI-M-85-035, . . **pp.304-313**; **CONF-8411174**, . . **pp.304-313**; **NEANDC(J)-112/A**, . . **pp.304-313**; **INDC(JPN)-98/G**, . . **pp.304-313**, . . *Nuclear Data for Neutron Radiation Damage Studies for LWR-PV and Fusion Reactor Materials*, . . Nakazawa, M., . . March 1985, . . NTIS (U.S. Sales Only), PC A18/MF A01

JAERI-M-86-182, . . *Fusion Blanket Benchmark Experiments on a 60 cm-Thick Lithium-Oxide Cylindrical Assembly*, . . Maekawa, H.; Ikeda, Y.; Oyama, Y.; Yamaguchi, S.; Tsuda, K.; Fukumoto, T.; Kosako, K.; Yoshizawa, M.; Nakamura, T., . . December 1986, . . Information Division, Department of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken 319-11, Japan

LA-9330-MS, . . *Effects of Long-Term Exposure of Tufts to High-Level Nuclear Waste Repository Conditions: Final Report*, . . Blacic, J.D.; Vaniman, D.T.; Bish, D.L.; Duffy, C.J.; Gooley, R.C., . . August 1986, . . NTIS, PC A03/MF A01

LA-10699-MS, . . *Bibliographic Survey of Medium Energy Inclusive Reaction Data*, . . Arthur, E.D.; Madland, D.G.; McClellan, D.M., . . April 1986, . . NTIS, PC A08/MF A01

LA-10770-MS, . . *The Performance of Low Pressure Tissue Equivalent Chambers and a New Method for Parameterizing the Dose Equivalent*, . . Eisen, Y.; Vasilik, D.G.; Brake, R.J.; Erkkila, B.H.; Littlejohn, G.J., . . September 1986, . . NTIS, PC A04/MF A01

LA-10791-MS, . . *Low-Energy Neutron Shielding*, . . Lee, D.M., . . August 1986, . . NTIS, PC A02/MF A01

LBL-21806, . . *Steady-State and Transient Radionuclide Transport Through Penetrations in Nuclear Waste Containers*, . . Chambre, P.L.; Lee, W.W.-L.; Kim, C.L.; Pigford, T.H., . . July 1986, . . NTIS, PC A03/MF A01

NUREG/BR-0024, . . *Working Safely in Gamma Radiography. A Training Manual for Industrial Radiographers*, . . McGuire, S.A.; Peabody, C.A., . . 1986, . . NTIS; GPO; NRC

NUREG/CR-3320, Vol.1, . . *LWR Pressure Vessel Surveillance Dosimetry Improvement Program: PSF Experiments Summary and Blind Test Results*, . . McElroy, W.N., . . July 1986, . . NTIS; GPO; NRC

NUREG/CR-4013; PNL-5270, . . *LADTAP II - Technical Reference and User Guide*, . . Streng, D.L.; Peloquin, R.A.; Whelan, G., . . April 1986, . . NTIS; GPO; NRC

NUREG/CR-4447; BMI-2131, . . *Radiological Source Terms Resulting from Sabotage to Transportation Casks. Final Report*, . . Miller, N.E.; Fentiman, A.W.; Kuhlman, M.R.; Ebersole, H.N.; Trott, B.D.; Orban, J.E., . . November 1986, . . NTIS; GPO; NRC

NUREG/CR-4487, . . *Uncertainty and Sensitivity Analysis of a Dry Containment Test Problem for the MAEROS Aerosol Model*, . . Helton, J.C.; Iman, R.L.; Johnson, J.D.; Leigh, C.D., . . June 1986, . . NTIS; GPO; NRC

NUREG/CR-4603, . . *Appraising Atmospheric Transport and Diffusion Models for Emergency Response Facilities*, . . Sagendorf, J.F.; Fairbent, J.E., . . May 1986, . . NTIS; GPO; NRC

NUREG/CR-4656; BMI-2140, . . *Verification Test Calculations for the Source Term Code Package*, . . Denning, R.S.; Wooton, R.O.; Alexander, C.A.; Curtis, L.A.; Cybulskis, P.; Gieseke, J.A.; Jordan, H.; Lee, K.W.; Nicolosi, S.L., . . July 1986, . . NTIS; GPO; NRC

NUREG/CR-4743; PNL-6014, . . *Neutron Dosimetry at Commercial Nuclear Plants. Final Report of Subtask D: TEPC Feasibility*, . . Cummings, F.M.; Haggard, D.L.; Endres, G.W.R., . . October 1986, . . NTIS; GPO; NRC

ORNL-6324, . . *Reevaluation of HFIR Source Term. Supplement 2*, . . Thomas, W.E., . . October 1986, . . NTIS, PC A02/MF A01

ORNL/TM-10040, . . *Shielding of Manned Space Stations Against Van Allen Belt Protons - A Preliminary Scoping Study*, . . Santoro, R.T.; Alsmiller, R.G., Jr.; Barnes, J.M.; Corbin, J.M., . . September 1986, . . NTIS, PC A03/MF A01

ORNL/TM-10168, . . *An Algorithm for Unfolding Neutron Dose and Dose Equivalent from Digitized Recoil-Particle Tracks*, . . Bolch, W.E.; Turner, J.E.; Hamm, R.N., . . October 1986, . . NTIS

ORNL/TM-10191, . . *Gamma-Ray Production Cross Sections for 0.9 to 20 MeV Neutron Interactions with ¹⁰B*, . . Bywater, R.L., Jr., . . September 1986, . . NTIS, PC A03/MF A01

ORNL/TM-10207, . . *Response of a Segmented Lead Glass Cerenkov Counter to (1-10 GeV) Incident Electrons, Gamma Rays and Hadrons*, . . Gabriel, T.A.; Bishop, B.L., . . November 1986, . . NTIS, PC A03/MF A01

PNL-5777, Vol.2, . . *Pre- and Post-Test Decay Heat, Heat Transfer, and Shielding Analyses. Volume II. BWR Spent Fuel Storage Cask Performance Test*, . . Wiles, L.E.; Lombardo, N.J.; Heeb, C.M., . . June 1986, . . Pacific Northwest Lab., Richland, WA

PNL-5799, . . *Monticello BWR Spent Fuel Assembly Decay Heat Predictions and Measurements*, . . McKinnon, M.A.; Doman, J.W.; Heeb, C.M., . . June 1986, . . Pacific Northwest Lab., Richland, WA

SAIC-84-1374, . . *FIIDOS - A Computer Code for the Computation of Fallout Inhalation and Ingestion Dose to Organs. Computer User's Guide*, . . Egbert, S.D.; Kaul, D.C.; Klemm, J., . . December 1985, . . Science Applications International Corp., McLean, VA

SAND-86-0530, . . *Risk Assessment and Ranking Methodologies for Hazardous Chemical Defense Waste:*

A State-of-the-Art Review and Evaluation: Task 1 Report, . . Chu, M.S.Y.; Rodricks, J.V.; St.Hilaire, C., . . June 1986, . . Waste Management Systems Div., Sandia National Labs., Albuquerque, NM

UCLA/ENG-86-38; PPG-1009, . . *TOKOPS: Tokamak Reactor Operations Study. The Influence of Reactor Operations on the Design and Performance of Tokamaks with Solid-Breeder Blankets*, . . Conn, R.W.; Ghoniem, N.M.; Firestone, M.A. (Eds.), . . September 1986, . . NTIS

UCRL-53719, . . *Radiation Chemical Effects in Experiments to Study the Reaction of Glass in an Environment of Gamma-Irradiated Air, Groundwater, and Tuff*, . . Van Konyenburg, R.A., . . May 2, 1986, . . NTIS, PC A03/MF A01

UCRL-95890, . . *Recommended Set of Neutron Differential Cross Sections for Carbon at 14.1 MeV*, . . Hansen, L.F., . . December 1986, . . Technical Information Department, Lawrence Livermore National Laboratory, University of California, Livermore, CA 94550

Ann. Nucl. Energy, 10(12), 649-663, . . *The Integral-Transform Method for Solving Neutron Transport Problems with General Anisotropic Scattering in a Cylinder of Finite Height*, . . Kumar, V.; Sahni, D.C., . . 1983

Annual Report of the Rad. Center of Osaka Prefecture, 24, 29-33, . . *Measurements of Particles Emitted from D-T Target with Si-SSD*, . . Taniguchi, R.; Okuda, S.; Iida, T.; Sumita, K., . . March 1984

Fusion Technology, 10(3, Pt.1), 382-395, . . *Neutronic Data-Base Assessment for U.S. INTOR*, . . Jung, J.-C.; Youssef, M.Z.; Cheng, E.T.; Lee, J.D., . . November 1986

Fusion Technology, 10(3, Pt.1), 396-404, . . *Neutron Dosimetry Qualification Experiments for the Tokamak Fusion Test Reactor Lithium Blanket Module Program*, . . Tsang, F.Y.; Harker, Y.D.; Anderl, R.A.; Nigg, D.W.; Jassby, D.L., . . November 1986

Health Phys., 51(6), 699-713, . . *A Monte Carlo Program to Calculate the Exposure Rate from Airborne Radioactive Gases Inside a Nuclear Reactor Containment Building*, . . Sherbini, S.; Tamasis, D.; Sykes, J., III; Porter, S.W., Jr., . . December 1986

Health Phys., 51(6), 723-735, . . *A Study of Neutron Leakage Through an Fe Shield at an Accelerator*, . . Elwyn, A.J.; Cossairt, J.D., . . December 1986

J. Nucl. Mater., 139(1), 1-10, . . *Impurity Activation and Surface Gamma-Dose Levels in First Wall Structural Materials*, . . Giancarli, L., . . May 1986

Kernenergie, 27(5), 204-206 (In German), . . *Neutron Fields of Shielded Laboratory Sources*, . . Hermanska, J.; Prouza, Z.; Starostova, V., . . May 1984

Nucl. Instrum. Methods, B10/11(1), 401-404; CONF-841117, pp.401-404, . . *14 MeV Neutron Scattering Experiments at Pinstech*, . . Gul, K.; Anwar, M.; Ahmad, M.; Saleem, S.M., . . In: *Beam Interactions with Materials and Atoms*, . . May 15, 1985

Nucl. Instrum. Methods, B10/11(1), 483-486; CONF-841117, pp.483-486, . . . SUPER-FMIT, An Accelerator Based Neutron Source for Fusion Components Irradiation Testing, . . . Burke, R.J.; Holmes, J.J.; Johnson, D.L.; Mann, F.M.; Miles, R.R., . . . In: *Beam Interactions with Materials and Atoms*, . . . May 15, 1985

Nucl. Sci. Eng., 94(4), 291-308, . . . Accounting for Changing Source Distributions in Light Water Reactor Surveillance Dosimetry Analysis, . . . Maerker, R.E.; Williams, M.L.; Broadhead, B.L., . . . December 1986

Nucl. Sci. Eng., 94(4), 323-336, . . . Variance Reduction Under Exponential and Scattering Angle Biasing: An Analytic Approach, . . . Indira, R.; John, T.M., . . . December 1986

Nucl. Sci. Eng., 94(4), 353-364, . . . Composite Delayed Neutron Energy Spectra for Thermal Fission of ^{235}U , . . . Tanczyn, R.S.; Sharfuddin, O.; Schier, W.A.; Pullen, D.J.; Haghighi, M.H.; Fisteag, L.; Couchell, G.P., . . . December 1986

Nucl. Sci. Eng., 94(4), 365-379, . . . Measurements of the Energy Dependence of Prompt Neutron Emission from ^{235}U , ^{235}U , and ^{239}Pu for E_n — 0.0005 to 10 MeV Relative to Emission from Spontaneous Fission of ^{252}Cf , . . . Gwin, R.; Spencer, R.R.; Ingle, R.W., . . . December 1986

Nucl. Sci. Eng., 94(4), 426-427, . . . A Short Table of Indefinite Integrals of the Exponential Integral Function. (Letters to the Editor), . . . Gunther, N.G., . . . December 1986

Nucl. Technology, 75(3), 338-349, . . . Probabilistic Modeling of Radionuclide Release at the Waste Package Subsystem Boundary of a Repository in Basalt, . . . Sagar, B.; Eslinger, P.W.; Baca, R.G., . . . December 1986

Physics Data, No.28-2 (In German), . . . Attenuation of Gamma-Rays from Radionuclides. Vol.2. Shielding Material: Lead, . . . Dorner, R.; Vogt, H.-G., . . . 1986

Physics Data, No. 28-4 (In German), . . . Attenuation of Gamma-Rays from Radionuclides. Vol.4. Shielding Material: Barytes Concrete, . . . Dorner, R.; Vogt, H.-G., . . . 1986

Physics Data, No. 28-5 (In German), . . . Attenuation of Gamma-Rays from Radionuclides. Vol.5. Shielding Material: Ordinary Concrete, . . . Dorner, R.; Vogt, H.-G., . . . 1986

Physics Data, No. 28-6 (In German), . . . Attenuation of Gamma-Rays from Radionuclides. Vol.6. Shielding Material: Water, . . . Dorner, R.; Vogt, H.-G., . . . 1986

Vestsi Akad. Navuk BSSR, Ser. Fix.-Ehnerg. Navuk., No.2, 32-33 (In Russian), . . . On Some Methods of Modelling the Neutron Flight Direction After Scattering, . . . Rozin, S.G., . . . 1983

Thesis, . . . Radiological Hazards of Fusion Reactors: Models and Comparisons, . . . Fetter, S.A., . . . University of California, Berkeley, CA, . . . 1985, . . . University Microfilms Order No.85-24,946

Thesis, . . . Measurements of Neutron Energy Spectra in the Fast Breeder Blanket Facility, . . . Vehar, D.W., . . . Purdue University, Lafayette, IN, . . . 1980, . . . University Microfilms Order No.81-13768

BOOK, . . . TABLE OF RADIOACTIVE ISOTOPES, . . . Browne, E., . . . 1986, . . . Wiley, New York, NY

BOOK, . . . THE WORK OF THE NRPB 1981/1983, . . . Dainton, F. (Ch.), . . . 1984, . . . HMSO

BOOK, pp.153-169 (In Russian), . . . Biological Shielding. Chapter 8, . . . Dollezhal', N.A.; Emel'yanov, I.Ya., . . . In: CHANNEL TYPE POWER REACTOR, . . . 1980, . . . Atomizdat, Moscow

BOOK, pp.211-215 (In Russian), . . . Technique for Calculating Radiation Field Functional in Cylindrical Cavities, . . . Utkin, V.A., . . . In: RADIATION SAFETY AND SHIELDING OF NPP. Egorov, Yu.A.(Ed.), . . . 1982, . . . Ehnergoizdat, Moscow

BOOK, . . . NEUTRON MONITORING FOR RADIOLOGICAL PROTECTION: A MANUAL. (Rev.), . . . Gibson, J.A.B., . . . 1985, . . . IAEA, Vienna

BOOK, . . . THE DOSIMETRY OF IONIZING RADIATION, . . . Kase, K.R., . . . 1985, . . . Academic Press, Orlando, FL

BOOK (In Russian), . . . SHIELDING OF IONIZING RADIATION. A Handbook - 3rd Ed. Revised and Amended, . . . Mashkovitch, V.P., . . . 1982, . . . Atomizdat, Moscow

COMPUTER CODES LITERATURE

AECL-6828 LIMCAL
Parameter Values for the Long-Term Nuclear Waste Management Food Chain Model LIMCAL, . . . Zach, R., . . . Atomic Energy of Canada Limited, Whiteshell, . . . September 1982

ANL/FPP-TM-197 SPECTER
SPECTER: Neutron Damage Calculations for Materials Irradiations, . . . Greenwood, L.R.; Smither, R.K., . . . Argonne National Laboratory, IL, . . . January 1985

DOE/RW-006, Rev. 2 SPENT FUEL
Integrated Data Base for 1986: Spent Fuel and Radioactive Waste Inventories, Projections, and Characteristics, . . . Oak Ridge National Laboratory, TN, . . . September 1986

HEDL-TC-2591 NACT
NACT: A Screening Program for Neutron Activation, . . . Smith, D.R.; Morford, R.J., . . . Hanford Engineering Development Laboratory, Richland, WA, . . . October 1984

IAEA-TECDOC-287 INTERTRAN
INTERTRAN: A System for Assessing the Impact

- from Transporting Radioactive Material, . . .
Ericsson, A.; Elert, M., . . . International Atomic
Energy Agency, Vienna, . . . 1983
- JAERI 1267 TIMS-1
TIMS-1: A Processing Code for Production of
Group Constants of Heavy Resonant Nuclei., . .
Takano, H.; Ishoguro, Y.; Matsui, Y., . . Japan
Atomic Energy Research Institute, Tokai-mura,
Japan, . . September 1980
- JAERI-M 9396 MGCL-PROCESSOR
MGCL-PROCESSOR: A Computer Code System
for Processing Multigroup Constants Library
MGCL., . . Naito, Y.; Tsuruta, S.; Matsumura, T.;
Ohuchi, T., . . Japan Atomic Energy Research
Institute, Tokai, Japan, . . March 1981
- LA-7396-M, Rev. 2 MCNP Version 3A
MCNP - A General Monte Carlo Code for Neutron
and Photon Transport, Version 3A., . . Briesmeister,
J.F.; Booth, T.E.; Collins, D.G., . . Los Alamos
National Laboratory, NM, . . September 1986
- LBL-21806 CONTAINER TRANSPORT
Steady-State and Transient Radionuclide
Transport Through Penetrations in Nuclear Waste
Containers., . . Chambre, P.L.; Lee, W.W.-L.; Kim,
C.L., . . Lawrence Berkeley Lab., CA; California
University, Berkeley, . . July 1986
- Nucl. Instrum. Methods, 185, 299-308 . . . MARTHA
Monte Carlo Calculation of Accurate Response
Functions for a Na(Tl) Detector for Gamma Rays.,
. . Saito, K.; Moriuchi, S., . . Japan Atomic Energy
Research Institute, Tokai, Japan, . . 1981
- NUREG/CR-3328 SWIFT II
Theory and Implementation for SWIFT II, the
Sandia Waste-Isolation Flow and Transport Model
for Fractured Media, Release 4.84., . . Reeves, M.;
Ward, D.S.; Johns, N.D., . . Sandia National Labs.,
NM, . . August 1986
- NUREG/CR-4308 VANESA
VANESA: A Mechanistic Model of Radionuclide
Release and Aerosol Generation During Core
Debris Interactions with Concrete., . . Powers, D.A.;
Brockmann, J.E.; Shiver, A.W., . . Sandia National
Labs., NM, . . July 1986
- NUREG/CR-4656 SOURCE TERM
Verification Test Calculations for the Source Term
Code Package., . . Denning, R.S.; Wooton, R.O.;
Alexander, C.A., . . Battelle Columbus Labs., OH,
. . July 1986
- NUREG/CR-4677 TRAP-MELT2
TRAP-MELT2 Code: Development and
Improvement of Transport Modeling., . . Kuhlman,
M.R.; Kogan, V.; Schumacher, P.M., . . Battelle
Columbus Labs., OH, . . July 1986
- ORNL/TM-9976 WASTE ASSESSMENT
A Waste Package Performance Assessment Code
with Automated Sensitivity-Calculation
Capability., . . Worley, B.A.; Horwedel, J.E., . . Oak
Ridge National Laboratory, TN, . . September 1986
- P6-86-394 DECAY SCHEMES
A Set of Programs for Constructing Radionuclide
Decay Schemes., . . Adam, I., et al, . . Joint Institute
for Nuclear Research, Dubna, . . 1986
- PNL-5899 UNSAT-H
UNSAT-H Version 1.0: Unsaturated Flow Code
Documentation and Applications for the Hanford
Site., . . Fayer, M.J.; Gee, G.W.; Jones, T.L., . .
Pacific Northwest Lab., Richland, WA, . . August
1986
- SAIC-84-1374 FIIDOS
FIIDOS - A Computer Code for the Computation of
Fallout Inhalation and Ingestion Dose to Organs.
Computer User's Guide., . . Egbert, S.D.; Kaul, D.C.;
Klemm, J., . . Science Applications International
Corp., McLean, VA, . . December 1985
- UCLA-PPG-917 FENAT
A User's Manual for FENAT: A Two-Dimensional
Multigroup Diffusion Theory Finite Element
Neutral Atom Transport Code., . . Hansan, M.Z., . .
California University, Los Angeles, . . July 1986

A MOST BEAUTIFUL TIME OF YEAR

During the dates of the meeting, Knoxville will be celebrating a city-wide Dogwood Arts Festival as spring turns the entire city into a garden of flowering plants with miles of streets lined with blooming pink and white dogwood trees. Many of the events of this nationally recognized festival are free and are within easy walking distance from the meeting hotel. The weather is mild with sunny days and cool nights. Temperatures range from 55 to 75 degrees (F).

The Holiday Inn - World's Fair is located adjacent to the 1982 World's Fair site, a restored park-like area in which many of the festival activities are held. The hotel is also adjacent to downtown Knoxville and the main campus of the University of Tennessee. Outside the city, the mountains, lakes, rolling hills, and green valleys of the surrounding countryside provide a panorama of beautiful scenery. Area attractions span the full gamut from mountain crafts on display at the Museum of Appalachia in Norris to nuclear power achievements displayed at the Museum of Science and Energy in Oak Ridge.

Special Events

<p>Tuesday, April 21 Registration</p> <p>Wednesday, April 22 Reception and Riverboat Cruise on Tennessee River (Evening)</p>	<p>Thursday, April 23 Banquet (Evening)</p> <p>Friday, April 24 Great Smoky Mountains Tour</p>
--	--

Travel Information

Airlines. Knoxville's McGhee-Tyson Airport is served by American Eagle, Atlantis/Piedmont, Comair/Delta, Eastern, New York Air, Northwest, Tennessee Airways, United, and U.S. Air.

Ground Transportation. McGhee-Tyson Airport is 10 miles from downtown Knoxville. Airport Limousine meets all major airline flights and also has a regular schedule from the airport to the Holiday Inn - World's Fair. Rental cars and taxicabs are also available at the airport.

Tour Information

1. **Friday, April 24: Great Smoky Mountains National Park and Gatlinburg.** Most visited national park in U.S. Stop at scenic Newfound Gap for photos and hiking trail. Nonhikers will visit Gatlinburg, a resort city having a delightful array of shops, entertainment, places to eat, and seasonal events.

2. **Dogwood Trails.** Spring returns to Knoxville in full color with the blooming of beautiful pink and white dogwood trees and spring flowers. Six scenic trails wind more than 50 miles. Free tour buses each day.

HOTEL RESERVATION REQUEST

**TOPICAL CONFERENCE ON
THEORY AND PRACTICES IN
RADIATION PROTECTION AND SHIELDING
APRIL 22-24, 1987**

AMERICAN NUCLEAR SOCIETY

Name _____

Address _____

City _____ State _____ Zip _____

Firm/Group/Convention _____

Phone No. _____

Amount of Deposit Enclosed \$ _____

Credit Card # _____
AE MC BA DC CB Circle One

Credit Card Expiration Date _____

Arrival Date _____ Departure Date _____

No. of Nights _____

Rate: Single \$65 Double \$65
All rates based on existing beds. Rollaways \$10 extra. Children under 19 occupying room with parents, no additional charge.

Sharing with _____

One day's deposit is required to guarantee your reservation. Refunds will only be made when cancellations are received 72 hours prior to arrival date. Rooms subject to current sales tax.

Reservations received after 3/22/87 will be confirmed on a space available basis. Mail check with hotel reservation form to:

HOLIDAY INN - WORLD'S FAIR
Reservations Office
525 Henley St.
Knoxville, TN 37902 USA
615/522-2800

CHECK-OUT TIME 11:00 AM CHECK-IN 3:00 PM

REGISTRATION CARD

**TOPICAL CONFERENCE ON
THEORY AND PRACTICES IN
RADIATION PROTECTION AND SHIELDING
APRIL 22-24, 1987**

HOLIDAY INN - WORLD'S FAIR, KNOXVILLE, TENNESSEE

Name _____ Phone _____

Organization _____

Mailing Address _____

City _____ State _____ Zip _____

Country _____

Check if: Author Session Chairman

REGISTRATION FEES	ANS Member	Nonmember
Full Meeting	<input type="checkbox"/> \$200*	<input type="checkbox"/> \$230*
Includes Proceedings, Reception and Banquet		
One Day <input type="checkbox"/> Wed <input type="checkbox"/> Thu <input type="checkbox"/> Fri	<input type="checkbox"/> \$140*	<input type="checkbox"/> \$140*
Includes Proceedings and Reception or Banquet		
Students	<input type="checkbox"/> Free	<input type="checkbox"/> Free
Spouse Program		<input type="checkbox"/> \$10
Includes breakfast of Danish roll and coffee each day		

*Registration with fees must be received by April 1.
After this date, a \$25 late registration fee will be charged.

Late Registration \$25

Extra Proceedings at \$50/copy:	Number _____	Amount \$ _____
Extra Reception Tickets at \$25 ea.:	Number _____	Amount \$ _____
Extra Banquet Tickets at \$25 ea.:	Number _____	Amount \$ _____

TOUR

Great Smoky Mountains National
Park and Gatlinburg (\$12) Number _____ Amount \$ _____
(meals not included) TOTAL \$ _____

Make checks payable in U.S. DOLLARS to:

RP & S Topical Conference

Mail this registration form to:

Mr. Ward Engle
Oak Ridge National Laboratory
Building 6025, P.O. Box X
Oak Ridge, TN 37831-6363 USA

Cancellation requests for full refund must be postmarked by April 1, 1987. After this date, there will be a \$75 charge, which will include one copy of the proceedings.