RSIC Newsletter

No. 251   *October 1985*

*No one is useless in this world who lightens the burdens of
another.—Charles Dickens*

RSIC SURVEY REMINDER

Many of our readers have responded to the RSIC Periodic Distribution Query attached to the August issue (249) of the newsletter. We must have your response in order to retain your name and address in our distribution files. If you have not responded do so now. If you wish to continue receiving the newsletter and need a survey form, call or write to us, and we will be pleased to send one to you. We will soon begin deleting from our files those persons who do not respond to the query.

SCALE Workshop Date Set

A great deal of interest has been demonstrated in the SCALE modular code system for criticality, shielding, and heat transfer analyses. A workshop featuring the current version, CCC-466/SCALE-3, is planned for April 14-18, 1986, in Oak Ridge, Tennessee. The code system was developed by the Computing and Telecommunications Division at Oak Ridge National Laboratory (ORNL), Martin Marietta Energy Systems, Inc., under Nuclear Regulatory Commission (NRC) sponsorship.

Many of our readers have already responded to a survey intended to ascertain interest in attending the workshop. The survey form is attached to this newsletter for the convenience of those who may not have responded yet. Further information about the workshop will be sent by direct mail to those who return the form.

Please return the form as soon as possible if you are interested in attending the workshop. A nominal registration fee will be required. The RSIC staff will assist with local lodging and transportation arrangements.

Special Note on CRAY MORSE-CGA

The Radiation Shielding Information Center (RSIC) has a CRAY version of MORSE-CGA packaged for distribution as CCC-474. The code system has also been placed on the fusion network at Lawrence Livermore National Laboratory (LLNL) and on the Defense Nuclear Agency (DNA) network at the Los

Alamos National Laboratory (LANL). Users with access to those systems can use it from the public files at either site. Persons wishing to implement MORSE-CGA on local computers should send a request and a tape to RSIC for transmitting the code system. Please include specifications for writing the tape to facilitate retrieval at your installation.

CHANGES TO THE COMPUTER CODES COLLECTION

During the month of September six changes were made to the computer codes collection. Five new code systems were packaged and added to the collection, and an existing hardware version of a code package was replaced with a newly-frozen hardware version. Four of the changes came from foreign contributors including the Fed. Rep. Germany, Finland, Italy and the United Kingdom.

CCC-469/TWOHEX

This code system for two-dimensional, neutral-particle transport in equilateral triangular meshes was contributed by Los Alamos National Laboratory, New Mexico. The system solves the two-dimensional multigroup transport equation on an equilateral triangular mesh in the x,y plane. Both regular and adjoint, inhomogeneous (fixed source) and homogeneous problems are solved. Three problem domains are treated. The "whole core" domain is a 60-degree parallelogram with vacuum boundary conditions on each face. The "third core" domain is a 120-degree parallelogram with two vacuum and two rotational boundary conditions. The "sixth core" domain is a 60-degree parallelogram with two vacuum and two rotational boundary conditions. General anisotropic scattering is allowed and an anisotropic inhomogeneous source may be input as cell averages. Reference: LA-10258-M. FORTRAN IV; CRAY 1/CRAY XMP.

CCC-471/MORSE-H

A new version of the MORSE code system was contributed by the United Kingdom Atomic Energy Authority, Harwell, England. This version of MORSE was created by combining the most useful features of several earlier versions, CCC-203/MORSE-CG, CCC-368/MORSE-B, and CCC-258/MORSE-E, and by adding a few new facilities. Fluxes of neutrons or photons (or both in a coupled case) may be scored by either a next-event estimator, which provides fluence at point detectors or by a track-length estimator, which provides volume-integrated fluxes. In either case, a restart option is available to enable a second or subsequent run to continue tracking particles in a case where the run was terminated for any reason. The specification of a fixed source of particles is up to 20 separate source regions of various geometric shapes with particles isotropic, monodirectional, or with directions in a defined cone about the +Z direction. Reference: AERE-R-20432. FORTRAN IV; IBM 3081.

CCC-472/ATM-TOX

This atmospheric transport model for toxic substances (ATM-TOX) was contributed by the Oak Ridge National Laboratory. The system predicts concentration and deposition on the earth's surface of airborne pollutants from point sources (such as smokestacks), line sources (such as rows of smelters) and area sources (such as landfills). ATM provides a means of calculating the ground-level air concentrations of trace contaminants from various sources and the deposition of those contaminants on a watershed. The subsequent movement of the contaminants through the watershed by hydrologic processes can then be traced with other models. Reference: ORNL/CSD-94. FORTRAN IV; IBM 3033.

PSR-107/THERMOS-OTA

The UNIVAC 1108 version of this multigroup integral code system for thermal lattice calculations using the collision probability method for

slabs and cylinders was replaced with a newly-frozen version contributed by the Technical Research Center of Finland through the OECD NEA Data Bank, Gif-sur-Yvette, France. LIBCON4 was added to the package and gives the capability of library conversion from binary to BCD or BCD to binary. THECOM was added for combining and listing libraries. The CYBER 173 and CYBER 740 versions of this code package were not affected by this update. Reference: YUI-19/4. FORTRAN IV; UNIVAC 1108 (A), CYBER 173 (B) and CYBER 740 (C).

PSR-213/ANIPLO-D50

This program for plotting results from a multigroup S_n transport code was contributed by the Institute of Plant Engineering, Gessellschaft für Kernenergieverwertung, Geesthacht, Fed. Rep. Germany. ANIPLO-D50 can be used to plot the distribution of flux and reaction rates. Reference: OLS-83-12. FORTRAN IV; IBM 360/370.

PSR-214/PLOTENDF

The code system PLOTENDF produces graphical output of evaluated cross sections in ENDF/B. It was contributed by CNEN, Bologna, Italy, through the OECD NEA Data Bank, Gif-sur-Yvette, France. The system reads one ENDF/B tape and plots all of file 3 reaction cross sections vs. energy. For this purpose the evaluated data should be run with PSR-149/RESEND which generates cross sections from the resonance parameters and adds the result to the smooth background. Reactions with MT values of 1, 2, 18, and 102 are plotted on a log-log scale, the remaining reactions on a linear scale. In order to get the maximum portability of the program, all software referring to the graphic device is collected in two routines (BGNPLT and PLINE) that can easily be changed. Reference: Informal Notes. FORTRAN IV; IBM-3081.

CHANGES TO THE DATA LIBRARY COLLECTION

During the month of September an existing data library was enhanced with the addition of new materials.

DLC-113/VITAMIN-E

This multigroup cross section data library based on ENDF/B-V was updated to alter the 174-neutron group and 174-neutron and 38-photon group data libraries. Neutron and photon production data were added for four new materials, H-2 (930202), Ba-138 (135301), Bi-209 (137501) and Fe (260). A new data set for H-1 (9301) utilizes XLACS3 processing for the thermal region based on the MAT 1002 thermal scattering law data, followed by upscatter removal using a MALOCS recipe that adjusts the within-group scatter terms. The original H-1 (9301), which has the same thermal treatment as was used for VITAMIN-C, is still retained as part of DLC-113B. Finally, a few minor adjustments were made to the scatter matrices for Zr, Cs, Ba, Hf, Re, and Bi to bring them into balance with the corresponding reaction cross sections. Details of the changes may be requested from RSIC. Current users may send one tape and request the files that were changed, 4-6, and replace their own data with these new files. The total package requires four 2400-ft reels of tape written at 1600 bits per inch or one tape written at 6250 bits per inch. No retrieval program is provided. This package is designed to run in conjunction with PSR-63/AMPX-II or PSR-117/MARS. Reference: Informal notes.

Book Review
Nuclear Engineering, Data Bases, Standards, and Numerical Analysis., by Jacek Jedruch, Van Nostrand Reinhold Co., New York (1985). 295 pp. $58.50.

A major difference between an experienced professional and the newly-graduated engineer is the store of knowledge that has been built up over the years on how the current state of the art came to be. There are any number of pieces of information or information about sources of information that becomes extremely handy when one is faced with a new task — information that an old hand is likely to know. This book by Jacek Jedruch is one that could only be written by an old hand.

It reminds me of the bookshelves that I would expect to find in the office of the well-seasoned nuclear engineer.

We are living now in the age of information — engineering is a knowledge industry. Jedruch has attempted, and has succeeded very well, to survey all the sources of information that a nuclear engineer needs. Not surprisingly, his survey is highly computer oriented. He not only tells about most of the computer code systems used in nuclear engineering calculations, and computerized data, but also about the use of telecommunications to obtain the latest information.

Nine chapters cover resources ranging from sources of data, including the primary experiments, through data bases, data centers, computational methods and codes, to engineering societies and government publications.

Chapter One, "Experiments of Nuclear Reactor Engineering," surveys experimental programs and facilities which develop the test data needed to validate present day engineering calculations for fission and fusion designs. These include general-purpose facilities and specialized ones that support LWR and LMFBR safety research and fusion research. As is the case with the entire book, however, reference is made only to U.S. facilities. The brief descriptions of the facilities are useful in understanding the context and sources of data that one is using. But such descriptions quickly go out of date; some of the experimental programs discussed have already been terminated. The description of each facility is accompanied by a set of references which can be very useful if more detail is needed.

Chapter Two, "Data Access, Storage, and Transfer Systems," describes several organizations which supply general information. These are the Institute of Nuclear Power Operations (INPO), Electric Power Research Institute (EPRI), and the Atomic Industrial Forum (AIF). Jedruch also describes data base services such as DIALOG, BRS, ORBIT, the Dept. of Energy (DOE) Technical Information Center, and various networks, such as Nuclear Network and RECON.

Chapter Three, "Data Centers of Nuclear Engineering," takes up data centers. Jedruch not only describes the well-known centers such as the Brookhaven National Nuclear Data Center, the Argonne National Energy Software Center, and the Oak Ridge Radiation Shielding Information Center (RSIC), but sources of data for thermodynamic properties.

Chapter Four, "Property and Performance Data Bases," discusses material property data centers, reactor and equipment performance data sources, reactor safety data bases, spent fuel and waste disposal information, and other general data bases.

Chapter Five, "Machine Methods of Nuclear Design," opens with a discussion of computer code development, goes on to a discussion of numerical methods and reactor theory, and concludes with descriptions of the major cross section processing systems developed by the national laboratories.

Chapter Six, "Representative Codes for Nuclear Design," briefly discusses the major particle transport codes. The codes discussed implement the major methods: discrete ordinates, diffusion theory, and Monte Carlo, but, unfortunately for the novice, there are no guidelines for choosing among them. A major omission, it seems to me, are the point kernel gamma-ray shielding codes.

Chapter Seven, "Structural, Thermo-Hydraulic and Safety Analysis," discusses the finite element stress analysis codes, heat transfer and transient analysis codes, and fast reactor safety analysis codes. Probabilistic risk assessment, activity generation, release and transport, nuclear structure and decay schemes, and spectra unfolding are also discussed, but only a small fraction of the available codes in these areas are described.

Chapter Eight, "Engineering Society Serials and Standards," is a valuable survey of the publications and standards activities of the many professional societies active in the nuclear industry. The serial publications and published nuclear standards are given in various lists for each society. I think this chapter is especially valuable for the engineer new to the field.

Chapter Nine, "Federal Regulations, Guides, and Serials," surveys the regulatory activities of the federal government, listing the various topics of Title 10 of the Code of Federal Regulations, lists the Nuclear Regulatory Guides, and lists the serials issued by various government and international agencies. The concluding section is a 15-page bibliography of books and monographs under the following headings: reactor materials, reactor thermo-hydraulics, reactor control and safety, fission reactor theory, reactor physics experimentation, fission reactor engineering, fast breeder reactors, computational methods, fusion reactors, radiation and shielding, reactor fuel cycles, and general topics including policy. Most of the titles are from the 1960–1980 period, but a few are classics from the 1950s, such as Glasstone and Edlund (1952), Rockwell (1956), and Goldstein (1959). Strangely enough, the Sullivan trilinear chart of the nuclides, which has not been available or updated for many years, is cited, but the modern General Electric wall chart is not mentioned. Also Weinberg and Wigner is missing, but there are many titles that I was not aware of. Apparently the cutoff date for publication of the book precluded listing the recent book on shielding by Chilton, Faw, and Shultis.

In summary, I think this book is unique. It can broaden the foundation of any nuclear engineer by providing the background of nearly all our present-day nuclear engineering practices. I don't know where else can be found such a complete list of the profession's sources of information. It is well-indexed and bound and available at what can be considered a reasonable price.

D. K. Trubey

Standards Acitivity

The following newly published American Society for Testing and Materials standard may be ordered for $8.00 from ASTM, 1916 Race St., Philadelphia, PA 19103.

ASTM E 722-85, *Practice for Characterizing Neutron Energy Fluence Spectra in Terms of an Equivalent Monoenergetic Neutron Fluence for Radiation-Hardness Testing of Electronics* (rev. of E722-80).

The International Electrotechnical Committee is calling for comment on the following standard by November 30, 1985. Order from IEC, 1 Rue de Varembe, 1211 Geneva 20, Switzerland; or in the United States, from ANSI, Attn: International Sales Dept. Send comments to Daniel W. Smith, ANSI.

45B(Central Office) *Beta, X and Gamma Radiation Dose Equivalent and Dose Equivalent Rate Meters for Use in Radiation Protection*, $24.00 (IEC six months' rule draft).

PERSONAL ITEMS

Before we note the movement of people concerned with radiation protection, transport, and shielding in the nuclear industry, we extend an apology to **Richard Malenfant** who did not leave Los Alamos National Laboratory as indicated in the August issue of the newsletter. He is currently serving in a temporary assignment with the U.S. Dept. of Energy.

During the past month we have been informed of the following change of address: **David T. Goldman** from the National Bureau of Standards to the U.S. Dept. of Energy, Chicago Operations Office.

Visitors to RSIC

During the month the following persons came for an orientation visit and/or to use RSIC facilities: *Luis Garcia de Viedma*, OECD Nuclear Energy Agency Data Bank, Gif-sur-Yvette, France; *Arnost Hönig*, BRNO Technical Univ., Czechoslovakia; *Eugene D. Zastera*, U.S. Army, Ft. Huachuca, Arizona; *Hajimu Yamana*, Power Reactor and Nuclear Fuel Development Corp., Tokai-mura, Japan; *Masayuki Shioda*, Century Research Center, Tokyo; *Tatsuo Nishimura*, Mitsubishi Atomic Power Industries, Inc., Tokyo;and *Elizabeth Selcow*, Grumman Corp., Knoxville, Tennessee.

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.

Health Physics Considerations in Decontamination and Decommissioning

The 19th Midyear Topical Symposium of the Health Physics Society hosted by the East Tennessee Chapter, will be held February 2–6, 1986, in Knoxville, Tennessee. Topics to be included for presentation and discussion include: Criteria for Decontamination and Decommissioning (D & D), Legal/Ethical Obligations, Applied Health Physics Problems, Environmental Problems, Instrumentation for Decontamination and Decommissioning, Equipment and Methods, Mathematical and Computer Applications in D & D, D & D Programs at Power Reactors/Major Non-Government Nuclear Facilities, and D & D Programs at Government-Owned and/or Operated Facilities. Registration information may be obtained from the symposium general chairman, T. W. Oakes, 19th Midyear Topical Symposium of the Health Physics Society, P.O. Box 30503, Knoxville, TN 30503 (615-576-8499), or from the symposium secretary, Alice Wittmer at 615-574-6669.

NSRP-6 Issues Call for Papers

A call for papers has been issued for the Sixth National Symposium on Radiation Physics, to be held March 3–6, 1986, in Kalpakkam, India. This sixth in a series of biennial symposia on radiation physics is sponsored by the Indian Society for Radiation Physics, Reactor Research Centre, Institute of Mathematical Sciences, University of Madras, and the Cancer Institute. The symposium will cover both basic and applied radiation physics in the following topics: Interaction of Radiation with Matter; Radiation Sources and Machines, Radiation Transport, Radioactive Source Terms, Radiation Metrology, and Applications of Nuclear Radiations in NDT. Three copies of the abstract should be submitted no later than **November 1, 1985**, to D. V. Gopinath, Program Committee, NSRP-6, Safety Research Laboratory, Reactor Research Centre, Kalpakkam, Tamil Nadu 603 102.

Calendar

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

November 1985
Joint Meeting of the American Nuclear Society and the Atomic Industrial Forum, November 11–15, 1985, San Francisco. Contact: Meetings Dept., ANS, 555 North Kensington Ave., La Grange Park, IL 60525, or James R. Sasso, General Electric–MC-871, San Jose, CA 95125 (phone 408-925-1195).

Assessment of Occupational Intake of Radioactive Materials, November 11–15, 1985, Vienna, sponsored by IAEA. Contact: F. N. Flakus, Division of Nuclear Safety, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

2nd Symposium on Progress in Individual Dosimetry for External Exposure to Radiation, November 12–15, 1985, Berlin, German Dem. Rep., sponsored by Council for Mutual Economic Assistance.

11th Symposium on Engineering Problems in Fusion Research, November 18–22, 1985, Austin, Texas. Contact: Ward Harris, Fusion Research Center, Univ. of Texas at Austin, RLM 11.1222, Austin, TX 78712 (phone 512-471-4576 or 4698).

Technical Committee on Procedures for Assessing the Reliability of Transfer Models, November 18–22, 1985, Vienna, Austria, sponsored by the International Atomic Energy Agency. Contact: I. Savolainen, Division of Nuclear Fuel Cycle, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

1st International Conference on Fusion Reactor Materials, November 19–22, 1985, Tokyo, Japan. Contact: R. R. Hasiguti, Science University of Tokyo, Kagurazaka, Shinjuku-ku, Tokyo, Japan 162.

December 1985

Technical Committee on Computer Codes in Fusion Research, December 3–5, 1985, Lausanne, Switzerland, sponsored by the International Atomic Energy Agency. Contact: M. Leiser, Head, Physics Section, Division of Research and Laboratories, IAEA, P.O. Box 100, A-1400 Vienna, Austria.

January 1986

3rd Symposium on Space Nuclear Power Systems, January 13–16, 1986, in Albuquerque, New Mexico, sponsored by the Institute for Space Nuclear Power Studies, Chemical/Nuclear Engineering Department, University of New Mexico. Contact: Institute for Space Nuclear Studies, Chemical/Nuclear Engr. Dept., Univ. of New Mexico, Albuquerque, NM 87131.

March 1986

Waste Management '86, March 2–6, 1986, Tucson, Arizona. Contact: Mort E. Wacks, Dept. of Nucl. and Energy Engr., Univ. of Arizona, Tucson, AZ 85721 (phone 602-621-6160).

June 1986

13th International Symposium on Effects of Radiation on Materials, June 23–25, 1986, in Seattle, Washington, sponsored by ASTM Committee E-10 on Nuclear Technology and Applications. Contact: F. A. Garner, Westinghouse Hanford Co., P.O. Box 1970, Mail Stop W/A-58, Richland, WA 99352 (509-376-4136 or 509-943-8509).

August 1986

8th International Conference on Solid State Dosimetry organized by the National Radiological Protection Board, U.K., 26–29 August, 1986, St. Catherine's College, Oxford. Further details from: Miss L. Ashby, National Radiological Protection Board, Chilton, Didcot, Oxfordshire, U.K.

SEPTEMBER 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

BNL-NCS-36272; DOE/NDC-36/U; NEANDC(US)-221/U INDC(US)-96/U, . . *Reports to the DOE Nuclear Data Committee.,* . . National Nuclear Data Center (Comp.), . . May 1985, . . NTIS, PC A09/MF A01

CONF-820948, pp.13-17, . . *Perspectives of Nuclear Fusion and Spallation Sources for Breeding Fissile Fuel.,* . . Schriber, S.O., . . 1983, . . Oxford, England; Pergamon Press

CONF-820948, pp.623-628, . . *Blanket Designs with Li-Pb Liquid Breeders.,* . . Casini, G.; Biggio, M.; Farfaletti-Casali, F.; Piana, C.; Ponti, C.; Rieger, M., . . 1983, . . Oxford, England; Pergamon Press

CONF-820948, pp.629-635, . . *Electricity Producing and Tritium Breeding Blanket Sector for IN-TOR.,* . . Bond, A.; Reynolds, P.; Mitchell, N.A.; Thompson, V.K.; Barnes, G.H.T.; Baker, L.J., . . 1983, . . Oxford, England; Pergamon Press

CONF-820948, pp.637-642, .. *Enhancement of Benchmark Experiments for CTR Blankets.*, . . Cloth, P.; Drueke, V.; Filges, D.; Hecker, R., .. 1983, .. Oxford, England; Pergamon Press

CONF-820948, pp.649-654, .. *Neutronic Implications of Lead-Lithium Blankets.*, .. Meier, W.R., .. 1983, .. Oxford, England; Pergamon Press

CONF-821213, pp.17-26, .. *Improved Fast Hybrid Thermionic Blankets.*, .. Sahin, S.; Kumar, A., .. 1983, .. Amsterdam, Netherlands; Elsevier

CONF-821213, pp.27-38, .. *Improved Thorium Hybrid Blankets.*, .. Sahin, S.; Kumar, A., .. 1983, .. Amsterdam, Netherlands; Elsevier

CONF-821213, pp.39-46, . . *Advanced Fusion Fuel Driven Hybrid Blankets.*, .. Kumar, A.; Sahin, S., .. 1983, .. Amsterdam, Netherlands; Elsevier

CONF-850310-64, .. *TFCX Shielding Optimization.*, .. Yang, S.; Gohar, Y., .. 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850310-65, .. *MFTF-alpha + T Shield Design.*, .. Gohar, Y., .. 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850310-69, .. *MIG: MCNP Input Generator for EFFI Magnet Geometries.*, .. Attaya, H.; Gohar, Y., .. March 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850310-74, . . *Molten Salt Cooling/$^{17}Li^{83}Pb$ Breeding Blanket Concept.*, .. Sze, D.K.; Cheng, E.T., .. February 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850310-78, . . *Neutronics Activities for Next Generation Devices.*, .. Gohar, Y., .. 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850310-79, . . *Nuclear Responses in INTOR Plasma Stabilization Elements.*, .. Gohar, Y.; Mattas, R.F.; Yang, S.; Wiffen, F.W., .. 1985, .. NTIS, PC A02/MF A01; GPO

CONF-850507-1, .. *Measurement and Evaluation of Selected 14-MeV Neutron Cross Sections for Fusion.*, .. Meadows, J.W.; Smith, D.L.; Cox, S.A., .. 1985, .. NTIS, PC A02/MF A01; GPO

DOE/ER-0046/18, pp.5-10, . . *Dosimetry Measurements and Damage Calculations for the ORR-MFE4B Experiment.*, . . Greenwood, L.R.; Smither, R.K., .. August 1984, .. NTIS, PC A08/MF A01

EPRI-EA-3755, .. *Summary Results and Conclusions for the EPRI Plume Model Validation and Development Project: Moderately Complex Terrain Site.*, . . Bowne, N.E.; Londergan, R.J., .. May 1985, .. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303

EPRI-EA-3759, . . *Operational Validation of Gaussian and First-Order Closure Plume Models at a Moderately Complex Terrain Site. Final Report.*, .. Reynolds, S.D.; Myers, T.C.; Langstaff, J.E., . . May 1985, .. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303

EPRI-NP-3789, .. *Corrosion-Product Buildup on LWR Fuel Rods.*, .. Strasser, A.; Sheppard, K.; Santuc-

ci, J., .. March 1985, .. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303

EPRI-NP-3948, . . *Postaccident Krypton-85 Releases and Control at Nuclear Power Plants.*, . . Pence, D.T.; Voilleque, P.G., .. April 1985, .. Research Reports Center, P.O. Box 50490, Palo Alto, CA 94303

GEND-INF-063, . . *Analysis of the TMI-2 Dome Radiation Monitor.*, .. Murphy, M.B.; Mueller, G.M.; Jernigan, W.C., .. August 1985, .. Sandia National Laboratories, Albuquerque, NM 87185

ICRP-40, .. *Protection of the Public in the Event of Major Radiation Accidents: Principles for Planning: A Report.*, .. International Commission on Radiological Protection, Committee 4, .. 1984, .. Pergamon Press

ICRP-41, .. *Nonstochastic Effects of Ionizing Radiation: A Report.*, .. International Commission on Radiological Protection, Committee 1, .. 1984, .. Pergamon Press

ICRP-42, .. *A Compilation of the Major Concepts and Quantities in Use by ICRP: A Report.*, .. International Commission on Radiological Protection, Committee 4, .. 1984, .. Pergamon Press

ICRP-43, .. *Principles of Monitoring for the Radiation Protection of the Population: A Report.*, .. International Commission on Radiological Protection, Committee 4, .. 1984, .. Pergamon Press

INDC(CCP)-239/L, .. *Review of Measurements of the Average Number of Prompt Fission Neutrons.*, .. Malinovskij, V.V.; Vorob'eva, V.G.; Kuz'minov, B.D., . . June 1985, .. IAEA Nuclear Data Section, Wagramerstrasse 5, A-1400 Vienna

INIS-SU-259, pp.89-96 (In Russian); CONF-8106209-Vol.4, pp.89-96 (In Russian), .. *Calculation of Radiation Effect on the First Wall of a Pulsed Thermonuclear Reactor.*, .. Kolgatin, S.N.; Stepanov, A.M.; Khachatur'yants, A.V., .. 1982, .. NTIS (U.S. Sales Only), PC A19/MF A01 File No.TI85780020

INIS-SU-259, pp.201-208 (In Russian); CONF-8106209-Vol.4, pp.201-208 (In Russian), .. *Foam Shield for the Pulsed Thermonuclear Reactor First Wall.*, .. Andreev, M.A.; Kantan, V.V.; Khachatur'yants, A.V., .. 1982, .. NTIS (U.S. Sales Only), PC A19/MF A01 File No.TI85780020

INIS-SU-259, pp.303-309 (In Russian); CONF-8106209-Vol.4, pp.303-309 (In Russian), .. *Main Problems in Designing Blankets of Hybrid Thermonuclear Reactors.*, .. Gornostaev, B.D.; Gur'ev, V.V.; Epinat'ev, A.M.; Kuz'min, E.M., .. 1982, .. NTIS (U.S. Sales Only), PC A19/MF A01 File No.TI85780020

INS-TS-22 (In Japanese); CONF-8305246-1 (In Japanese), .. *Report of the Study Meeting on Fast Monochromatic Neutrons and Their Interdisciplinary Use.*, .. Nakamura, N.; Ishizaki, Y.; Kosako, T., .. July 1983, .. NTIS (U.S. Sales Only), PC A04/MF A01

IPPCZ-249, pp.259-269; CONF-8303171, pp.259-269, .. *Energy Balance Simulation and Blan-*

ket Characteristics of the RF Heated Hybrid Tokamak Reactor., .. Krlin, L.; Pavlo, P.; Tluchor, Z., .. March 1983, .. NTIS (U.S. Sales Only), PC A12/MF A01

JAERI-M-9957 (In Japanese), .. *Preliminary Analysis on Shielding Experiment of a Spent Fuel Transport Cask.*, .. Katakura, J.; Komuro, Y.; Yamano, N.; Naito, Y., .. March 1982, .. MF available from INIS.

LA-UR-85-1315; CONF-8504110-11,.. *Hybrid Two-Dimensional Monte-Carlo Electron Transport in Self-Consistent Electromagnetic Fields.*, .. Mason, R.J.; Cranfill, C.W., .. 1985, .. NTIS, PC A02/MF A01; GPO Dep. File No.DE85010757

NUREG/CR-3442, .. *RADTWO: A Computer Code for Simulating Fast-Transient, Two-Dimensional, Two-Layer Radionuclide Concentration Conditions in Lakes, Reservoirs, Rivers, Estuaries, and Coastal Regions.*, .. Eraslan, A.H.; Codell, R.B.; Diament, H., .. July 1984, .. NRC, GPO

NUREG/CR-4038,.. *Sensitivity and Uncertainty Studies of CRAC2 Computer Code.*, .. Kocher, D.C.; Ward, R.C.; Killough, G.G.; Dunning, D.E.,Jr.; Hicks, B.B.; Hosker, R.P.,Jr.; Ku, J.-Y.; Rao, K.S., .. May 1985, .. NRC; GPO

ORNL/TM-9355, .. *Applications Guide to the MORSE Monte Carlo Code.*, .. Cramer, S.N., .. August 1985, .. NTIS, PC A05/MF A01

UCRL-53480-Vol.1B, .. *Mirror Advanced Reactor Study (MARS). Final Report. Volume 1-B. Commercial Fusion Electric Plant.*, .. Donohue, M.L.; Price, M.E. (Eds.), .. July 1984, .. NTIS, PC A20/MF A01

UCRL-92024; CONF-850310-71,.. *Design of a Helium-Cooled Molten Salt Fusion Breeder.*, .. Moir, R.W.; Lee, J.D.; Fulton, F.J.; Huegel, F.; Neef, W.S.,Jr.; Sherwood, A.E.; Berwald, D.H.; Whitley, R.H.; Wong, C. P.C.; DeVan, J.H., .. February 1985, .. NTIS, PC A02/ MF A01; GPO Dep. File No.DE85010474

Atomic Data and Nucl. Data Tables, 33(2), 217-233,.. *Relativistic Cross Sections for Atomic K- and L-Shell Ionization by Protons, Calculated from a Dirac-Hartree-Slater Model.*, .. Chen, M.H.; Crasemann, B., .. September 1985

Atomic Data and Nucl. Data Tables, 33(2), 255-343,.. *K- and L-Shell Ionization Cross Sections for Protons and Helium Ions Calculated in the ECP-SSR Theory.*, .. Cohen, D.D.; Harrigan, M., .. September 1985

Atomkernenergie, 45(2), 131-134, .. *Fission-Fusion Hybrid with a Minimum Size D^3He Satellite.*, .. Pantis, G., .. 1984

Fusion Technology, 8(2), Pt.1, 1927-1943, .. *Structural Materials Data Base Assessment for the Blanket Comparison and Selection Study.*, .. Davis, J.W.; Lechtenberg, T.A.; Smith, D.L.; Wiffen, F.W., .. September 1985

Fusion Technology, 8(2), Pt.1, 1970-1984, .. *Solid Tritium Breeder Materials Li_2O and $LiAlO_2$:*

A Data Base Review., .. Liu, Y.Y.; Billone, M.C.; Fischer, A.K.; Tam, S.W.; Clemmer, R.G.; Hollenberg, G.W., .. September 1985

Fusion Technology, 8(2), Pt.1, 1998-2009, .. *A Comparative Multidimensional Nuclear Analysis of Candidate Blanket Designs for Tokamak and Tandem Mirror Reactor Concepts.*, .. Jung, J.; Foley, J.V., .. September 1985

Fusion Technology, 8(2), Pt.1, 2010-2020, .. *Energy Deposition and Shielding Requirements for All Concepts of the Blanket Comparison and Selection Study.*, .. Gohar, Y.; Yang, S., .. September 1985

J. Comput. Phys., 47(3), 489-496,.. *Stability of the Explicit Finite Differenced Transport Equation.*, .. Paolucci, S.; Chenoweth, D.R., .. September 1982

J. of Fusion Energy, 4(4), 289-314, .. *Nuclear Analysis of a Laser Fusion Reactor, SENRI-I.*, .. Oomura, H.; Nakashima, H.; Ido, S.; Nakai, S.; Yamanaka, C., .. August 1985

J. of Fusion Energy, 4(4), 315-319,.. *Neutronic Optimization for a Blanket of the Laser Fusion Reactor, SENRI-I.*, .. Nakashima, H.; Kanda, Y.; Ido, S., . . August 1985

J. Nucl. Sci. Technol., 20(2), 154-162, .. *Neutronics Design of Tritium Breeding Blanket for Fusion Experimental Reactor.*, .. Mori, S.; Seki, Y.; Kawasaki, H., .. February 1983

Nucl. Instrum. Methods, 203(1-3), 353-358, .. *Monte Carlo Calculation of Energy Spectrum and Spatial Distribution of Photons from Positron Annihilation.*, .. Capitani, G.P.; De Sanctis, E.; Di Giacomo, P.; Guaraldo, C.; Lucherini, V.; Polli, E.; Reolon, A.R.; Bellini, V., .. December 1, 1982

Nucl. Instrum. Methods, 227, 535-548, .. *Low Energy Electron Transport with EGS.*, .. Rogers, D. W.O., .. 1984

Nucl. Sci. Eng., 91(1), 114-116,.. *Prompt Neutron Emission Probabilities Following Spontaneous and Thermal Neutron Fission.*, .. Boldeman, J.W.; Hines, M.G., .. September 1985

Nucl. Technology/Fusion, 1(4), 419-478,.. *Recent Progress in Fusion-Fission Hybrid Reactor Design Studies.*, .. Maniscalo, J.A.; Berwald, D.M.; Campbell, R.B.; Lee, J.D.; Moir, R.W., .. October 1981

Nucl. Technology/Fusion, 4(2), 373-380; CONF-830406, pp.373-380, .. *Low Cost Shield for Tokamak Fusion Reactors.*, .. Gohar, Y., .. September 1983

Nucl. Technology/Fusion, 4(2), 477-482; CONF-830406. pp.477-482,.. *Control of Neutron Albedo in Toroidal Fusion Reactors.*, .. Micklich, B.J.; Jassby, D.L., .. September 1983

Nucl. Technology/Fusion, 4(2), 1101-1106; CONF-830406, pp.1101-1106, . . *Conceptual Study of a Lithium Lead Eutectic Blanket for a Power Reactor.*, .. Carre, F.; Filliette, Z., .. September 1983

Nucl. Technology/Fusion, 4(2), 1107-1112; CONF-830406, pp.1107-1112,.. *Economic Design Optimization of the LiPb Blanket for the Mirror Advanced Reactor (MARS)., .. Perkins, L.J.; Kulcinski, G.L., .. September 1983*

Nucl. Technology/Fusion, 4(2), 1146-1151; CONF-830406, pp.1146-1151,.. *The Influence of Steel Type on the Activation and Decay of Fusion Reactor First Walls., .. Blink, J.A.; Lasche, G.P.,.. September 1983*

Nucl. Technology/Fusion, 4(2), 1183-1188; CONF-830406, pp.1183-1188,.. *Neutron Activation in EBT-P., .. Driemeyer, D.E.,.. September 1983*

Nucl. Technology/Fusion, 4(2), 1222-1227; CONF-830406, pp.1222-1227,.. *The TFTR Lithium Blanket Module Final Design and Materials Development., .. Graumann, D.W.; Creedon, R.L.,.. September 1983*

Nucl. Technology/Fusion, 4(2), 1346-1351; CONF-830406, pp.1346-1351, .. *A Minimum-Thickness Low-Activation Torodial Field Coil Concept for Tokamak Reactor., .. Chen, W.; Cheng, E.T.,.. September 1983*

Nuovo Cimento, A, 57(2), 157-175,.. *Quadrature Sums of Highest Algebraic Degree of Precision for Neutron Transport Integrals., .. Gallone, S.,.. May 21, 1980*

Radiat. Prot. Dosim., 3(1-2), 3-11,.. *Dosimetric Quantities and the Radiation Field., .. O'Brien, K., . . 1982*

Radiat. Prot. Dosim., 3(1-2), 13-24, .. *On the Calculation of the Effective Dose Equivalent., .. Kramer, R.; Drexler, G.,.. 1982*

Radiat. Prot. Dosim., 3(1-2), 25-38, .. *Experimental Study of Standardized Fluence and Dose, Data, Neutron Fluence-to-Dose Conversion Factors and Quality Factors for the Health Physics Research Reactor Using the Single Sphere Albedo Technique., .. Piesch, E.; Gurgkhardt, B.; Venkataraman, G.,.. 1982*

Radiat. Prot. Dosim., 3(1-2), 67-70,.. *Neutron Leakage Characteristics in High Energy Medical Accelerators., .. Hassib, G.M.; Spyropoulos, B.,.. 1982*

Physics Data, 17-2, 1-560,.. *Compilation of Experimental Values of Internal Conversion Coefficients and Ratios for Nuclei with Z greater than 60., .. Hansen, H.H.,.. 1985*

Reviews of Modern Physics, 57(3), Pt.II, S1-S154,.. *Report to the APS of the Study Group on Radionuclide Release from Severe Accidents at Nuclear Power Plants., .. Pines, D. (Ed.),.. July 1985*

Thesis,.. *The Development and Application of the Discrete Ordinates-Transfer Matrix Hybrid Method for Deterministic Streaming Calculations., .. Clark, B.A.,.. Arizona University, Tucson, AZ,.. 1981,.. University Microfilms Order No.82-06888*

Thesis, .. *Aspects of Tritium Release from Neutron-Irradiated Lithium Oxide., .. O'Kula, K.R., ..* University of Wisconsin, Madison, WI, .. 1984, .. University Microfilms Order No.84-15,572

BOOK (In Japanese),.. *PRESENT STATUS OF DESIGN, RESEARCH AND DEVELOPMENT OF NUCLEAR FUSION REACTORS AND PROBLEMS., .. Atomic Energy Society of Japan, Tokyo, Japan, .. 1983*

COMPUTER CODES LITERATURE

JAERI-1294 .... SLAROM
SLAROM: A Code for Cell Homogenization Calculation of Fast Reactor., . . Nakagawa, M.; Tsuchihashi, K., .. Japan Atomic Energy Research Institute, Ibaraki, .. December 1984

JAERI-M-83-049 .... MULTI-KENO
MULTI-KENO: A Monte Carlo Code for Criticality Safety Analysis.,.. Naito, Y.; Yokota, M.; Nakano, K., . . Japan Atomic Energy Research Institute, Tokyo, .. March 1983,.. AVAIL: NTIS (U.S. Sales Only)

Juel-1948 (In German) .... RSYST
Solution of a D2O-Benchmark Problem Using RSYST.,.. Kalker, K.J.,.. Kernforschungsanlage Juelich G.m.b.H., Germany, .. August 1984, .. AVAIL: NTIS (U.S. Sales Only)

LA-10049, Rev. 1 .... TWODANT
User's Guide for TWODANT: A Code Package for Two-Dimensional, Diffusion-Accelerated, Neutral-Particle Transport., . . Alcouffe, R.E.; Brinkley, F.W.; Marry, D.R.; O'Dell, R.D., . . Los Alamos National Laboratory, NM, .. October 1984

LA-9683-MS .... PARTEN
Energy Deposition from Particle Beams., . . Osborne, W.Z.,.. Los Alamos National Laboratory, NM, .. November 1984,.. AVAIL: NTIS

LA-10235-MS .... TRACE
Documentation for TRACE: An Interactive Beam-Transport Code.,.. Crandall, K.R.; Rusthoi, D.P., .. Los Alamos National Laboratory, NM,.. January 1985,.. AVAIL: NTIS

NRPB-M119 .... GRINDS
GRINDS - A Computer Program for Evaluating the Shielding Provided by Buildings from Gamma Radiation Emitted from Radionuclides Deposited on Ground and Urban Surfaces., . . Crick, M.J.; Dimbylow, P.J.,.. National Radiological Protection Board, Chilton, Didcot, UK, .. January 1985

OLS-83-11 .... SAIPS
SAIPS - Information Processing System for
Calculating Neutron Spectra from Measured
Reaction Rates., . . Berzonis, M.; Bondars, Kh.;
Vasielevskis, M., . . Latvian State University, Riga,
Latvia, USSR, . . March 1984

ONWI-433 .... GETOUT
GETOUT: A Computer Code for One-Dimensional
Analytical Solution for Radionuclide Transport., .
. Intera Environmental Consultants, Houston, TX,
. . April 1983

ORNL-5976 .... FEWA
FEWA: A Finite Element Model of Water Flow
Through Aquifers., . . Yeh, G.T.; Huff, D.D., . . Oak
Ridge National Laboratory, TN, . . November 1983,
. . AVAIL: NTIS; INIS (Microfiche only)

ORNL-6174 .... MORSE-CGA
MORSE-CGA: A Monte Carlo Radiation Transport
Code with Array Geometry Capability., . . Emmett,
M.B., . . Oak Ridge National Laboratory, TN, . .
April 1985

ORNL/CSD/TM-150 .... SCOPE
Summary Report on Optimized Designs for
Shipping Casks Containing 2-, 3-, 5-, 7-, or 10-Year-
Old PWR Spent Fuel., . . Bucholz, J.A., . . Oak Ridge
National Laboratory, TN, . . April 1983, . . AVAIL:
NTIS

ORNL/TM-9486 .... CALOR
Monte Carlo Studies of Uranium Calorimetry., . .
Brau, J.; Hargis, H.J.; Gabriel, T.A.; Bishop, B.L.,
. . University of Tennessee, Knoxville; Oak Ridge
National Laboratory, TN, . . January 1985

RISO-M-2270 .... GAMMA RADIATION
Shielding Factors for Gamma Radiation from
Activity Deposited on Structures and Ground
Surfaces., . . Jensen, P.H., . . Riso National
Laboratory, Roskilde, Denmark, . . February 1982

RISO-M-2322 .... RATE CONSTANTS
Table of Exposure Rate Constants and Dose
Equivalent Rate Constants., . . Lauridsen, B., . .
Riso National Laboratory, Roskilde, Denmark

Trans. Am. Nucl. Soc., 44, 69-70 .... CRRIS
CRRIS: A Methodology for Assessing the Impact of
Airborne Radionuclide Releases., . . Baes, C.F.,III;
Miller, C.W., . . Oak Ridge National Laboratory,
TN, . . June 1983

UCID-19972 .... SANDYL
Monte-Carlo Calculations of Forward Directed
Bremsstrahlung Produced by 20 and 45 MeV
Electrons on Tungsten., . . Goosman, D.R., . .
Lawrence Livermore National Laboratory, CA, . .
December 1983, . . AVAIL: NTIS; INIS (Microfiche
only)

UCID-20169 .... ALICE/85/300
Code ALICE/85/300., . . Blann, M., . . Lawrence
Livermore National Laboratory, CA, . . September
1984

Z. Angew. Math. Phys., 34(5), 627-641 ....
.... RADIATION TRANSPORT
Radiation Transport in Plane-Parallel Media with
Non-Uniform Surface Illumination., . . Siewert,
C.E., . . North Carolina State University, Raleigh,
. . September 1983

RADIATION SHIELDING INFORMATION CENTER

Survey for Workshop on the SCALE Code System

April 1986, at Oak Ridge, Tennessee

Name: _____

Citizenship: _____

Organization: _____

Full Mailing Address: _____

_____

_____

Phone: Commercial: _____ FTS: _____

Please indicate your level of experience/background in the following areas:

	Criticality safety	Shielding analysis	Heat transfer analysis and/or theory	Computer operating systems	Multigroup x-sect processing and use
Little/none	_____	_____	_____	_____	_____
some	_____	_____	_____	_____	_____
substantial	_____	_____	_____	_____	_____

Code Systems Experience/Background

	SCALE	AMPX	XSDRNPM	MORSE	KENO	ORIGEN	HEATING
Little/none	____	____	_____	____	____	_____	_____
some	____	____	_____	____	____	_____	_____
substantial	____	____	_____	____	____	_____	_____

Indicate the areas of application and the amount you use, or will potentially use, SCALE.

	Criticality analysis	Shielding analysis	Heat transfer analysis
Little/none	_____	_____	_____
some	_____	_____	_____
substantial	_____	_____	_____

Provide below the areas or modules of SCALE that you would like specifically covered in the workshop.