RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE U.S. DEPARTMENT OF ENERGY

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The power of imagination makes us infinite. . . . *John Muir*

RSIC STAFF CHANGES

David B. Simpson has joined the Technology Resources Group (TRG) to work with RSIC and with other TRG elements. He will carry primary responsibility for The Measured Data Repository of the NRC/RSR Data Bank System for safety research and will help to establish the NRC Standardized Computing Technology Center announced in this issue of the newsletter. He will also serve as a technical advisor to the RSIC Codes Section. He began part-time work in ORNL Engineering Physics Division reactor physics and shielding analytical projects in 1972 while a student at the University of Tennessee; joined the staff on a full-time basis in 1974 to work on CRBR reactor physics; and most recently was associated with the safety analysis data base project, SACRD. He has a masters degree in nuclear engineering and continues studies for a doctoral degree at the University of Tennessee.

Gary L. Sonnier has returned to the University of Southwestern Louisiana after spending the summer with RSIC. He has succeeded in implementing the SARS computer-based information storage and retrieval system written at the OECD Nuclear Energy Agency Computer Programme Library (now part of the NEA Data Bank) to maintain the master files of computer codes and retrieve codes for requesters. The master files of The Technology Resource Group, of which RSIC is a part, contain approximately 800 code and data packages.

Mahmoud Metghalchi has joined the RSIC staff for a two-year period on assignment from the Atomic Energy Organization of Iran. Following completion of undergraduate studies in chemistry at the National University of Iran and three years of graduate studies at London University, he joined the Nuclear Research Centre in Tehran. He plans to continue shielding research and development when he returns to Iran.

Jean R. Gonnord, staff member of the Shielding Laboratory (LEP) of the Reactor and Applied Mathematics Studies Service (SERMA) of CEA/CEN/Saclay, France, has joined RSIC for a one-year assignment in shielding methods development. Following completion of his doctoral studies at Orsay University in 1974, he has been involved in the development of Monte Carlo methods (TRIPOLI) at Saclay. He will serve RSIC as a technical advisor on Monte Carlo methods as represented by TRIPOLI, will give technical support to other RSIC activities, and will participate in work with discrete ordinates methods.

SEMINAR–WORKSHOP ON SENSITIVITY AND UNCERTAINTY ANALYSIS WELL ATTENDED

The RSIC Seminar-Workshop on the *Theory and Application of Sensitivity and Uncertainty Analysis,* held August 22–24, 1978, was well attended, and the format seemed successful in promoting discussions and exchanges of ideas among participants. Seventy-six persons registered for the meeting, eight of whom were from foreign countries (one each from England, France, and Italy; two from Germany; and three from Israel).

The presentations for the seminar, including a discussion session on Tuesday evening and a panel on Wednesday afternoon, were taped. The transcription will be used in an attempt to summarize the present status of the field. The 19 papers which were presented orally and several others which were contributed will be published in an RSIC report. The report, which will also include an extensive summary of the meeting, will serve the dual role of the meeting proceedings and a state-of-the-art review of the subject area.

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

The workshop concentrated on the ORNL FORSS Sensitivity and Uncertainty Analysis Code System. Wednesday afternoon and Thursday morning sessions consisted of presentations of the various modules of the system. The Thursday afternoon session dealt with further discussions of the system including a demonstration of its use via the instrument of sample problems.

The FORSS system and some associated data libraries containing multigroup sensitivity profiles and covariance matrices are presently being made a part of the RSIC collection. Their availability will be announced in future RSIC newsletters.

NRC STANDARDIZED COMPUTING TECHNOLOGY CENTER ESTABLISHED

The ORNL Engineering Physics Division Technology Resources Group, the umbrella organization under which RSIC functions, has established a center for extending the "open code/data package" concept of working with a user community to the Nuclear Regulatory's (NRC) standardized computing technology in selected application areas to serve the NRC staff, its licensees, its contractors and others as a national technology resource in support of nuclear regulation and licensing programs. The program will be guided by a select committee of NRC staff members and administered by the Deputy Director of the Division of Technical Information and Document Control within the Office of Administration. A name for the new center has not been formalized and suggestions from our readers will be welcomed.

The initial effort will include meteorological (atomospheric) and other environmental transport computing technology and the SCALE system.

Current work in progress includes radiological assessment (GASPAR and LADTAP, dose factor codes; GALE, which computes effluents from PWR and BWR radwaste systems; and XOQDOQ for the meteorological evaluation of effluent releases from nuclear power plants) and a focus on the SCALE (Standardized Computing-Analysis for Licensing Evaluation) System, methodology developed at ORNL to provide analytical capabilities (criticality safety, radiation shielding, heat transfer) to be applied in safety analyses of equipment and facilities proposed for licensing by NRC.

The initial version of the automated SCALE system expected to be released in early FY 1979 will consist of a system driver, functional modules, a numeric nuclear data base, a materials information processor, and system control modules. Advanced versions of SCALE will include heat transfer analysis, more sophisticated control modules, and CRT interactive input capabilities. It is also expected that, in the long term, a compilation of the card image input and a retrieval code for all the critical experiment analyses used to validate the data libraries in the system will also be made available.

Neither of the above code systems is currently ready for dissemination. Availability will be announced in future issues of the RSIC Newsletter and through other communications media. Current users of any of the technology listed above are urged to write the NRC-SCTC Coordinator in RSIC in order to establish a distribution list for information on new technology.

At an early NRC request, stand-alone computer codes expected to form a base of the SCALE System were collected, tested, packaged, and are available as follows. To differentiate from the RSIC Code Collection, the term "SCALE" is attached to the package numbers. This series is expected to be terminated with the release of standardized modules of the SCALE system.

ANS-10 REVISES SCOPE

The American Nuclear Society Standards Subcommittee on Mathematics and Computation, ANS-10, sponsored by the ANS Mathematics and Computation Division, revised its scope at the San Diego meeting in June. It now reads as follows:

> The scope of the ANS-10 Subcommittee includes the development of standards which will promote effective utilization and enhance reliability of computer programs throughout the nuclear community. The intent of such standards is to improve ease of use, facilitate the exchange, and simplify the conversion of programs.
>
> Principal areas of interest include: programming practices, and program design, documentation,

verification, and modification. The committee will participate in standards activities in relevant areas performed by groups outside ANS.

The standards developed by the ANS-10 Subcommittee primarily address computer programs in the areas of design and analysis used in the nuclear community. However, these standards may apply and be utilized in other applications areas and in other industries.

ICRP MODIFIES COMMITTEE STRUCTURE

The International Commission on Radiological Protection (ICRP), at its meeting in November 1977, decided to modify its former system of committees, and to plan its work for 1977–1981 with the following committee structure:

Committee 1 on Radiation Effects

Committee 1 will assess the risk and severity of stochastic effects and the induction rates of the non-stochastic effects of irradiation. It will consider the modifying influence of exposure parameters such as dose rate, fractionation of dose, RBE, spatial distribution of dose and any synergistic effects of chemical and physical factors.

Committee 2 on Secondary Limits

The basic function of Committee 2 is to develop values of secondary limits, based on the Commission's recommended dose-equivalent limits. For the immediate future the committee will be fully concerned with the preparation of secondary limits for internal irradiation; because of this, matters to do with the derivation of secondary limits for external irradiation will, for the time being, be considered by Committee 3.

Committee 3 on Protection in Medicine

The Commission considers that its relationship to the International Congress of Radiology and its traditional contacts with the medical profession warrant the establishment of a committee specifically concerned with radiation protection in medicine. Matters requiring particular attention by the committee include protection of the patient in radiodiagnosis and radiotherapy and protection in nuclear medicine. Committee 3 will temporarily be concerned with the development of secondary standards for external radiation.

Committee 4 on the Application of the Commission's Recommendations

Committee 4 will continue its role of providing advice on the Commission's system of dose limitation, and on protection of the worker and the public. The committee will also serve as a major point of contact with international organizations concerned with radiation protection.

Recent Publications include:

Protection Against Ionizing Radiation From External Sources, ICRP Publications 15 and 21, Pergamon Press, Oxford (1976).

Report of the Task Group on Reference Man, ICRP Publication 23, Pergamon Press, Oxford (1975).

Radiation Protection in Uranium and Other Mines, ICRP Publication 24, Pergamon Press, Oxford (1977).

The Handling, Storage, Use and Disposal of Unsealed Radionuclides in Hospitals and Medical Research Establishments, ICRP Publication 25, Pergamon Press, Oxford (1977).

Recommendations of the International Commission on Radiological Protection, ICRP Publication 26, Pergamon Press, Oxford (1977).

Problems Involved in Developing an Index of Harm, ICRP Publication 27, Pergamon Press, Oxford (1977).

The following are publications in preparation: *Principles Concerning Emergency and Accidental Exposures; Limits for Intakes of Radionuclides by Workers; Planned and Unplanned Releases of*

Radioactive Materials; and *Biological Effects of Inhaled Radionuclides.*

The reports and recommendations of the ICRP are now available in the form of a new review journal, **Annals of the ICRP.** Subscribers to the journal will be assured of receiving each new report as soon as it appears, thus ensuring that they are kept abreast of the latest developments in this important field, and can build up a complete set of ICRP reports and recommendations.

Single issues of the journal will be available separately. Please order through your bookseller, subscription agent, or, direct from the publisher at your nearest Pergamon Press office.

ERROR REPORTED IN GE WALL CHART OF NUCLIDES

It was reported by Magdi M. H. Ragheb of the University of Wisconsin, (presently at Oak Ridge National Laboratory), that an error exists in the publication, *Chart of the Nuclides,* Knolls Atomic Power Laboratory, Naval Reactors, U.S. Department of Energy, Twelfth Edition—Revised to April 1977, both in the wall chart and the booklet. The correction is as follows.

The half-life should be corrected for the element ^{95}Nb from 3.5 days to 35 days.[1-2] The references are: (1) E. M. Lederer, J. M. Hollander, and I. Perlman, *Tables of Isotopes,* Sixth Edition, John Wiley and Sons (1967) (this reference reports the values 35.0 d, 35.6 d, 35 d); and (2) D. C. Kocher, *Nuclear Decay Data for Radionuclides Occurring in Routine Releases from Nuclear Fuel Cycle Facilities,* ORNL/NUREG/TM-102 (1977) (this reference reports the value: 35.15 d).

PERSONAL ITEMS

William G. Price, Jr. has advised that he is leaving the Plasma Physics Laboratory at Princeton University to work for Mathtech, Inc., an operations research company located in Princeton, New Jersey.

Bill W. Colston has been elected president and chief executive officer of GAS-Cooled Reactor Associates in La Jolla, Calif. He was formerly vice president of project management for San Diego Gas & Electric, responsible for the activities of the Nuclear Department and of the Mechanical Engineering, Plant Construction, and Licensing and Environmental Departments.

Professor **Albert Simon,** University of Rochester, has been named chairman of mechanical and aerospace sciences at the university. Al was an associate of Everett Blizard at ORNL in the early 1950s, developing shielding theory, especially shield optimization. His name is associated with the well-known Simon-Clifford theory of neutron duct streaming.

Morio Takemura has transferred from Kawasaki Heavy Industries, Ltd. to Power Reactor & Nuclear Fuel Development Corporation. He is in the Heavy Water Critical Experiments Section, O-arai Engineering Center, engaged in experiment and analysis of reactor physics of the heavy water critical assembly.

VISITORS TO RSIC

The following persons came for an orientation visit and/or to use RSIC facilities during the month of August:

Tahereh Asgarian, Embassy of Iran, Washington, D.C.; John E. Baublitz, U.S. DOE Office of Fusion Energy, Washington, D.C.; J. Celnik, Burns & Roe, Inc., Paramus, N.J.; A. B. Chilton, University of Illinois, Urbana; Clyde B. Fulmer, Physics Division, ORNL; Ellen K. Herwig and William M. Herwig, Babcock & Wilcox, Lynchburg, VA; R. J. Howerton, Lawrence Livermore Laboratory,Livermore, CA; Reza Khazaneh, Atomic Energy Organization of Iran, Teheran, Iran; Wolf Mannhart, PTB Braunschweig, Germany; Margarete Mattes, IKE, University of Stuttgart, Germany; Hans Penkuhn, CCR Euratom, Ispra, Italy; Joseph Pidkowicz, U.S. DOE, Oak Ridge Operations, Oak Ridge, TN; and Ashley D. Williamson, Health and Safety Research Division, ORNL.

UPCOMING CONFERENCES

The annual American Law Institute-American Bar Association (ALI-ABA) Course of Study on **Atomic Energy Licensing and Regulation**—September 28–30, 1978, at the Dulles Marriott Hotel near Dulles International Airport in Washington, D.C. Contact Donald M. Maclay, Director, Office of Courses of Study, ALI-ABA, 4025 Chestnut Street, Philadelphia, PA 19104.

Californium-252 Utilization Meeting—October 3–5, 1978, Sheraton-Biltmore Hotel, Atlanta, Georgia 30308. Contact Californium-252 Information Center, Savannah River Laboratory, Aiken, South Carolina 29801.

International Symposium on Fast Reactor Physics—September 24–28, 1979, Aix-en-Provence, France, co-sponsored by the International Atomic Energy Agency and the OECD Nuclear Energy Agency. Contact John H. Kane, Special Assistant for Conferences, Technical Information, U.S. Department of Energy, Washington, D.C. 20545.

International Symposium on Physics and Chemistry of Fission—May 14–18, 1979, Jülich, FR Germany, sponsored by the International Atomic Energy Agency. Contact John H. Kane, Special Assistant for Conferences, Technical Information, U.S. Department of Energy, Washington, D.C. 20545.

TRAINING COURSES OFFERED

The Atomics International Division of Rockwell International Nuclear Training Center in Los Angeles, California, has announced the following two training courses for fall 1978 and calendar year 1979. For further information, contact C. A. Parker, Nuclear Training Center, Atomics International, P. O. Box 309, Canoga Park, California 91304.

The course in **Radiation Protection Technology** (Dates: September 18–22, 1978, May 7–11, 1979, September 17–21, 1979) is designed to help prepare Health Physics Technicians for the written examination given by the National Registry of Radiation Protection Technologists. The lectures cover the three general areas of Health Physics Technology: Fundamentals, Health Physics Measurements, and Operational Health Physics. A practical approach, including extensive problem solving, will be emphasized. This course will also meet the needs for formalized training of Health Physics Technicians for nuclear power utilities or related organizations.

The course in **Health Physics** (Dates: November 6–17, 1978, February 12–23, 1979, June 4–15, 1979, October 15–26, 1979) is designed to help prepare nuclear utility, university and laboratory health physicists to pass the American Board of Health Physics Certification examination. This program is offered to the health physics community as an intensive training course at the professional level.

Another training course in **Radioactive Waste Management for Nuclear Power Reactors** (Date: October 9–13, 1978) is offered under the auspices of the American Society of Mechanical Engineers (ASME). This course is designed for working engineers affiliated with utilities, architectural engineering companies, radwaste equipment maufacturing companies, and research laboratories and regulatory agencies. Contact Ms. Joy Collier, The Professional Development Program, ASME, 345 East 47th St., New York, New York 10017.

CHANGES IN THE COMPUTER CODE COLLECTION

Three radiation transport code systems, a cross-section processing code system, and a gamma-ray spectra analysis code were packaged; two, through the OECD NEA Data Bank, from Italy and the United Kingdom, and one each from Poland, Israel, and Japan.

CCC-311/MARC-PN

A code system, which includes neutron diffusion theory (MARC) and neutron transport theory using a spherical harmonics formulation (P_N) with most geometries of interest, has been contributed by UKAEA

Central Technical Services, Risley, Warrington, England, through the OECD NEA Data Bank. Reference: TRG Report 2911 (R); FORTRAN IV and Assembler Languages; IBM 360.

CCC-315/SAMSY

This one-dimensional multigroup multilayer neutron removal-diffusion and gamma-ray point kernel (buildup factor) code system was contributed by the Shielding Group of the Institute of Nuclear Research (INR) Reactor Engineering Department, Swierk-Otwock, Poland. Based on the Spinney method for neutron transport and on multilayer buildup factors for gamma-ray fields, SAMSY represents a revised version of the PROSAMSY code (INR 1529/IX/PR/B) with two optional approaches to buildup factor evaluation. The first approach is based on a single layer buildup factor conception (as in CCC-221/MAC-RAD, EUR-2152.e); the second on the modified Harima-Nishiwaki formula for buildup factors in multilayered media. References: INR 1689/IX/PR/A, INR 1690/IX/PR/A, and INR 1691/IX/PR/A. FORTRAN IV; CDC CYBER 73.

CCC-319/DOT 3.5E

A revision of the two-dimensional discrete ordinates radiation transport code system (CCC-276) was extended to include exponential supplementary equations, a contribution of ENEL, Centro di Ricera Termica e Nucleare, Milan, Italy, through the OECD NEA Data Bank. This DOT version is a diversion from the ORNL code series and is, therefore, packaged separately. A user's manual is included in the package. FORTRAN IV; IBM 370.

PSR-84/BOB7–SERIES

The code package, (originally only BOB73) designed for the analysis of Ge(Li) gamma-ray spectra, has been extended to include BOB75, whose distinctive feature is in the introduction of a taperwise step function as the base line under the peak. A new user's manual for the BOB7 series has also been contributed by the code originators. A contribution of the Japan Atomic Energy Research Institute (JAERI), Tokai Establishment, the BOB7-series treats the problem of γ-ray spectra analysis by combining peak-searching and peak-fitting processes. PSR-85/NAISAP, for NaI(Tl) detectors, is a companion code system from the same contributors. References: JAERI 1227 (1973) and JAERI-M-7017 (1977). FORTRAN IV; FACOM 230-60.

PSR-121/NASIF–NARES

A code system for the computation of multigroup shielding factors from resolved and statistical resonance parameters in ENDF format (ENDF/B-III) was contributed by the Soreq Nuclear Research Center of the Israel Atomic Energy Commission, Rehovoth, Israel. NASIF computes shielding factors with variable number of side resonances (up to 24) while NARES computes with 24 side resonances, of which the contributions of 22 resonance wings is approximated by a parabola. Reference: IA-1292. FORTRAN IV; IBM 360.

CODES AVAILABLE IN THE PRE–PRELIMINARY SCALE SERIES

Four code packages in the SCALE series are now available.

SCALE-1/HEATING 5

A generalized heat conduction code system which includes several plotting routines contributed by UCND Computer Sciences Division at ORNL, Oak Ridge, TN. Reference: ORNL/CSD/TM-15 (1977). FORTRAN IV; IBM 360/370.

SCALE-2/KENO IV

A multigroup Monte Carlo criticality code system, contributed by the UCND Computer Sciences Division at ORNL, Oak Ridge, TN. References: ORNL-4938 and CTC-5. FORTRAN IV; IBM 360/370 (Version A) and CDC 6600 (Version B). The B version is a contribution of Control Data Corporation, Minneapolis, MN.

SCALE-3/TRUMP

A calculational system for transient and steady-state temperature distributions in multidimensional systems, including a plotting routine contributed by the UC Lawrence Livermore Laboratory and converted to run on standard operating systems by UCND Computer Sciences Division at ORNL, Oak Ridge, TN. Reference: UCRL-14754 Rev. 3. FORTRAN IV and Assembler Language; IBM 360/370.

SCALE-4/SUPERDAN

A code system for calculating the Dancoff factor of spheres, cylinders, and slabs for use in the determination of flux reduction in resonance integral calculations, contributed by UCND Computer Sciences Division at ORNL, Oak Ridge, TN. Reference: ORNL/NUREG/CSD/TM-2. FORTRAN IV; IBM 360/370.

Other code and data packages from which SCALE modules will be constructed are packaged in RSIC as follows:

PSR-117/MARS—includes several routines: BONAMI for resonance self-shielding; ICE for mixing AMPX interfaces; XSDRNPM, transport calculation and group collapsing; NITAWL for resonance calculation and cross-section data handling.

CCC-277/MORSE-SGC—a Monte Carlo super-group neutron and gamma-ray radiation transport code with both KENO and combinatorial geometry options.

CCC-217/ORIGEN—isotope generation and depletion code system, and data libraries packaged as DLC-38/ORYX-E.

DLC-43/CSRL—P_3, 218-neutron group cross-section data library generated by AMPX module XLACS from ENDF/B-IV data for 65 nuclides of primary interest in criticality safety calculations.

Others will be announced when available.

AUGUST ACCESSION OF LITERATURE

The following literature cited has been ordered for review, and that selected as suitable will be placed in the RSIC Information Storage and Retrieval Information System (SARIS). This early announcement is made as a service to the shielding community. Copies of the literature are not distributed by RSIC. They may generally be obtained from the author or from a documentation center such as the National Technical Information Service (NTIS), Department of Commerce, Springfield, Virginia 22151.

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.

REACTOR AND WEAPONS RADIATION SHIELDING LITERATURE

ANL/NDM-39
Fission Cross Section of ^{239}Pu Relative to ^{235}U from 0.1 to 10 MeV.
Meadows, J.W.
March 1978
Dep., NTIS

ANS-6.4
Guidelines on the Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants.
ANS Standards Committee
1977
American Nuclear Society, 555 North Kensington Ave., La Grange Park, Illinois 60525 $38.00

CINDA 78 - Suppl.4 to CINDA 76/77
An Index to the Literature on Microscopic Neutron Data.
IAEA
June 1978
IAEA, Austria

CLM-P-510
The Distribution of Fission Product Decay Heat.
Turland, B.D.; Peckover, R.S.
November 1977
UKAEA Research Group, Culham Laboratory, Abington, Oxfordshire, England

CONF-770321-7
Neutron Yields and Dosimetry for Be(d,n) and Li(d,n) Neutron Sources $E_d = 40$ MeV.
Saltmarsh, M.J.; Ludemann, C.A.; Fulmer, C.B.; Styles, R.C.
1977

NTIS

CONF-770321-8
U-235 Neutron Fission Cross Section from 0.1 to 20.0 MeV.
Poenitz, W.P.
1977
NTIS

CONF-771209-12; IAEA-SM-222/06
Radiation Protection Instrumentation Test and Calibration.
Selby, J.M.; Larson, H.V.; Bartlett, W.T.; Mulhern, O.R.; Fleming, D.M.
1977
Dep., NTIS

CONF-780329-1
Analytic Angular Integration Technique for Generating Multigroup Transfer Matrices.
Bucholz, J.A.
1978
Dep., NTIS

ECN-24
Impact of Integral Measurements on the Capture Cross Section Evaluations of Individual Fission Product Isotopes.
Gruppelaar, H.; Dekker, J.W.M.
September 1977
Dep., NTIS (U.S. Sales Only)

ECN-25
Cross Section Library DOSCROS77 (in the SAND-II Format).
Zijp, W.L.; Nolthenius, H.J.; van der Borg, N.J.C.M.
August 1977
Dep., NTIS (U.S. Sales Only)

ECN-26
Fast Neutron Spectrum Measurements with a Proton Recoil Spectrometer in the Fast-Thermal Coupled Critical Facility STEK.
Montizaan, J.; Ames, H.
September 1977
Dep., NTIS (U.S. Sales Only)

ECN-37
Nuclear Data Guide for Reactor Neutron Metrology.
Zijp, W.L.
February 1978
Netherlands Energy Research Foundation (ECN), 3 Westerduinweg, Petten (NH), The Netherlands

ECN-77-134 (Restricted Distribution)
Neutron Metrology in the L.F.R. Neutron Flux Density Spectrum in the Inner Graphite Reflector of the L.F.R.
Zsolnay, E.M.
October 1977
Stichting Energieonderzoek Centrum Nederland (ECN), Voortzetting van de Stichting Reactor Centrum (RCN), Westerduinweg 3, Petten (NH), The Netherlands

EML-332
New Developments in Field Gamma-Ray Spectrometry.
Gogolak, C.V.; Miller, K.M.
December 1977
NTIS $4.50

ERDA-tr-297
Use of Perturbation Theory in the Physics of Nuclear Reactors.
Stumbar, E.A.
August 1977
Dep., NTIS

ERDA-tr-285/1, pp.150-152
Calculation of Dose Rates in the Gastrointestinal Tract of Small Laboratory Animals.
Rasin, I.M.; Sarapul'tsev, I.A.; Vedernikov, V.P.
1977
Dep., NTIS

EPRI-NP-425(Vol.1)
Analysis of Post LOCA Gamma Ray Effects in Representative Light Water Reactors. Volume 1. Final Report.
Steinberg, H.; Lichtenstein, H.; Cohen, M.O.
December 1976
NTIS

EPRI-NP-672, Volume 1
Spatial Distribution of Fission Product Gamma-Ray Energy Deposition in Light Water Reactor Fuel Elements. Final Report.
Bass, R.B.; Johnson, W.R.
April 1978
University of Virginia, School of Engineering and Applied Science, Charlottesville, Va. 22901

FEI-508 (In Russian)
Some Methods of Neutron Spectra Reconstruction According to Results of Measurements by Multispherical Spectrometer. Part 2. Program of Reconstruction of Neutron Spectra for a Multispherical Spectrometer.
Semenov, V.P.; Trykov, L.A.; Tyufyakov, N.D.
1975
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk.
Fiziko-Ehnergeticheskij Inst.

FEI-550 (In Russian)
Method for Solution of Transport Equation Using Singular Integral Equations.
Korneev, V.A.; Markov, A.V.
1975
Dep., NTIS (U.S. Sales Only)

FEI-628 (In Russian)
Modeling of Indicatrix with Ellipsoidal Anisotropy by the Monte Carlo Method.
Usikov, D.A.
1975
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.

FEI-656 (In Russian)
To the Problem on Dispersion of an Estimate of Perturbations with the Monte Carlo Method.
Usikov, D.A.
1976
Dep., NTIS (U.S. Sales Only)

FOA-C-40047-A3 (In Swedish)
Primary Data for Estimation of Absorbed Doses at an Atmospheric Dispersion of Radioactive Nuclei.
Svensson, L.
June 1977
Dep., NTIS (U.S. Sales Only)

HEDL-TME-77-13
Decay Heat for the Fast Test Reactor (FTR).
Schmittroth, F.
May 1978
NTIS $5.25

IAE-2473 (In Russian)
Galerkin Method for Solving Diffusion Equations. IV. Two-Group Multizone Problem in the (x,y,z) Geometry.
Lebedev, V.I.; Tsapelkin, E.S.
1975
Dep., NTIS (U.S. Sales Only)

IAE-2513 (In Russian)
Solution of the Kinetic Equation in the P_3-Approximation in a Plane Geometry.
Vlasov, Yu.A.
1975
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii

IAE-2514 (In Russian)
Solution of the Kinetic Multi-Group Equation Accounting for Thermalization in the P_3-Approximation for a Plane Geometry.
Vlasov, Yu.A.
1975
Gosudarstvennj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii

IAE-2588 (In Russian)
Solution of the Neutron Transport Equation in a Plane Layer.
Vlasov, Yu.A.
1975
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii

IAE-2594 (In Russian)
Program for Calculation of Efficiency of Neutron Detection with Stilbene Cristal.
Chulkov, L.V.
1975
Dep., NTIS (U.S. Sales Only)

IAE-2619 (In Russian)
Calculation of Neutron Spectrum in the Thermal Range by Means of Differential Models of Thermalization.
Sidorenko, V.D.
1976
Dep., NTIS (U.S. Sales Only)

IEA-468
Half-Space Analysis Basic to the Linearized Boltzmann Equation.
Siewert, C.E.
February 1977
Dep., NTIS (U.S. Sales Only)

IEA-479
Inverse Problem in Transport Theory.
Siewart, C.E.; Ozisik, M.N.; Yener, Y.
May 1977
Dep. NTIS (U.S. Sales Only)

INDC(CCP)-112/LN
Review of Experimental Work by Soviet Scientists in the Field of Nuclear Data Acquisition.
Kulakov, V.M.
June 1977
Dep., NTIS (U.S. Sales Only)

INDC(CCP)-113/U
Translation of Selected Papers Presented at the Fourth All-Union Conference on Neutron Physics.
IAEA
1977
Dep., NTIS (U.S. Sales Only)

INDC(CCP)-121/U
Measurement and Analysis of Fast Neutron Radiative Capture Cross Sections.
IAEA
Translation of Three Selected Papers Presented at the Fourth USSR Conference on Neutron Physics

held in Kiev, 18-22 April 1977.
June 1977
IAEA Nuclear Data Section, Karntner Ring 11, A-1010 Vienna

INDC(CCP)-121/U, pp.1-6
Fast Neutron Radiative Capture Cross-Sections and Mean Resonance Parameters for Even-Even Isotopes of Neodymium, Samarium, Gadolinium and Erbium.
Kononov, V.N.; Yurlov, B.D.; Poletaev, E.D.; Timokhov, V.M.
June 1978
IAEA

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