RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE DEPARTMENT OF ENERGY

POST OFFICE BOX X •
OAK RIDGE, TENNESSEE 37830

No. 157 *January 1978*

Such things and deeds as are not written down are covered with darkness, and given over to the sepulchre of oblivion. . . . *Ivan Bunin*

★ We Wish You a Prosperous and Happy New Year ★

The RSIC Staff

MULTIGROUP CROSS SECTION SEMINAR TO BE HELD IN MARCH

A 3-day RSIC Seminar-Workshop on Multigroup Cross Sections is planned for March 14–16, 1978, in Oak Ridge, Tennessee. The format, which was influenced by responses of readers to a survey last fall, is as follows:

The seminar portion will be a one-day meeting on Tuesday, March 14, 1978, at the Department of Energy Museum of Atomic Energy in Oak Ridge. The meeting will consist of contributed papers on multigroup cross section preparation theory and techniques, and processing code and data library descriptions. The proceedings of the seminar will be published as an RSIC report.

The workshop portion will be divided into two parts, each lasting one day. They will be held in conference rooms at the Oak Ridge Associated Universities facilities in Oak Ridge, adjacent to the Museum. The first portion will instruct the user in handling processed multigroup cross section libraries of the type which are now available from RSIC as part of the Data Library Collection. These will include libraries in discrete ordinates format (i.e., ANISN or DTF-IV), but will concentrate on the more generalized AMPX and CCCC interface formats. The emphasis will be to acquaint the user with the various retrieval codes which perform self-shielding energy-group collapsing, and other functions that can help derive more application-dependent libraries. Likely candidates for discussion are libraries such as DLC-40/LIB-IV, DLC-41/VITAMIN-C, DLC-42/CLEAR, and DLC-43/CSRL (see the February, July, and December 1977 RSIC Newsletters).

The second portion, scheduled for Thursday, March 16, will be on AMPX-II, the most recent version of the Oak Ridge general purpose cross-section processing system. Neutron, gamma-ray production, and gamma-ray interaction cross-section processing will be discussed as well as other features of the AMPX-II system.

Contributors of papers for the seminar should supply a title as soon as possible and an abstract by February 1, 1978. The full paper is due at the beginning of the seminar. Author instructions for manuscript preparation will be supplied to contributors.

There will be a reception at cost to participants on Tuesday evening following the seminar.

The Diplomat, Ridge Inn, and Scottish Inn motels are all within a one-mile radius of the planned meeting sites.

Please return the last page of this newsletter as soon as possible if you are interested in participating in the Multigroup Cross-Section Seminar-Workshop.

EDISON ELECTRIC INSTITUTE MAY ASSIST RSIC IN COST RECOVERY

Readers of the RSIC Newsletter (see issues 147–148, March and April 1977) are aware of the problems encountered by RSIC in providing support to the utilities, architect-engineers, and others in the nuclear power industry. At present, RSIC costs are completely supported by our government sponsors: the Department of Energy, Nuclear Regulatory Commission, and Defense Nuclear Agency. Realizing that the

primary purpose of these agencies in supporting RSIC and the industry is the same, (i.e., advancing the state of the art of radiation transport and analysis) we have been encouraged to serve the private sector and to find a way to implement a reasonable means of cost recovery.

In recent discussions with the Edison Electric Institute (EEI), an organization of the US private-investor owned utilities, it appeared that EEI might be able to organize a group of RSIC users and provide a channel for the users to provide cost recovery funds by annual subscription. Participation would enable the member firms to access all RSIC information, publications, computer codes, data, and trouble-shooting aids. With such funds we would be in a position to increase our evaluation and documentation efforts and to supply the reels of tape on which the computing and data packages are written. We believe that most firms are aware of the value of the RSIC products (e.g., computer codes requiring 5-10 man years of developing and testing and multigroup data sets requiring 1-5 man years to generate and validate) and will find the cost of participation to be nominal.

In this mode of operation, one should be aware that in organizing additional activities for the Nuclear Regulatory Commission, we now conceive of RSIC as being one activity of a function having wider scope. For example, we are undertaking the management and distribution of a very large computing software system called SCALE (Standard Cask-Analysis for Licensing Evaluation). The SCALE system includes computer programs for cross-section processing, Monte Carlo transport and reactivity calculations, fission product and actinide inventory, and will eventually include shielding, heat transfer, and structural analysis. Another activity beginning here is the Measured Data Repository of the NRC LWR LOCA blowdown heat transfer tests (See issued 146 and 149, February and May 1977). In short, NRC desires that the RSIC information analysis center methodology be applied to computing technology and data developed for the NRC. We anticipate that SCALE is only the beginning.

We encourage comments and questions. Please send them to us or to Mr. Gordon Olson, Assistant Director of Engineering, Edison Electric Institute, 1140 Connecticut Avenue, NW, Washington, D.C. 20036.

FIFTH VOLUME OF RSIC SHIELDING BIBLIOGRAPHY TO BE ISSUED

The *Bibliography, Subject Index, and Author Index of the Literature Examined by Radiation Shielding Information Center (Reactor and Weapons Radiation Shielding),* September 1977, has been sent to the printers. The bibliography lists literature selected by the Radiation Shielding Information Center since the previous volume was published in 1974 in the area of radiation transport and shielding against radiation from nuclear reactors, X-ray machines, radioisotopes, nuclear weapons (including fallout), and low energy accelerators (e.g., neutron generators). The bibliography was typeset from data processed by computer from magnetic tape files. In addition to lists of literature titles (accessions 3501–4950) by subject categories, author and keyword indexes are given. Most of the literature selected for Vol. V was published in the years 1973–1976.

The literature was selected, reviewed, and categorized by: D. K. Trubey, R. W. Roussin, J. Gurney, and A. B. Gustin, but we are pleased to acknowledge the support of the entire RSIC staff. We are grateful to J. G. Jones and R. O. Green of the Union Carbide Corporation Nuclear Division, Computer Sciences Division (CSD), who did the programming of the RSIC Storage and Retrieval Information System (SARIS) and to Janice Paylor (also of CSD), who continues to update and maintain the program. Janice provided the programming needed to retrieve the data from the SARIS data base.

Only a limited number of copies will be printed. If you need a copy, please send us a request. Later only microfiche copies will be available.

MORE ON MAN-REM AND COLLECTIVE DOSE

In response to an inquiry, Dr. Harold O. Wyckoff, Chairman of the International Commission on Radiation Units and Measurements, has written as follows:

> The "collective dose equivalent" is defined in paragraph 22 of ICRP Publication 26; the "dose equivalent commitment" in paragraph 25; and the "commited dose equivalent" in paragraph 26. Similar

terms for absorbed dose are defined in Annex A of the 1977 UNSCEAR Report. I have not yet seen this report, but I understand that there will be a footnote that will read something like "The collective dose is not a dose in the sense of absorbed dose as defined in ICRU Report 19. It is rather an integral of the distribution of absorbed doses over (usually) a large population. Whenever possible, the actual population exposed should be specified." It is also my understanding that the term "collective dose commitment" will also be defined in Annex A.

It is my understanding that the term "population dose" is now obsolete because it could be confused with the "average dose to the population". I believe the new term for this concept is "collective dose" and similarly "collective dose equivalent".

The "man-rem" is then a unit of collective dose equivalent; however, if this document is to use the International System of Units (joule per kilogram or gray for absorbed dose) one should also indicate the unit for dose equivalent. While gray has been approved by the General Conference of Weights and Measures as a special name for joule per kilogram, it has not yet considered a special name for dose equivalent. The World Health Organization plans to use joule per kilogram for the unit of dose equivalent until the General Conference makes a decision on this matter. As you probably know, the ICRU and ICRP have agreed that the special name, sievert, could be used for this unit.

BENCHMARK PROBLEMS SOUGHT BY ANS GROUP

The objective of the American Nuclear Society Standards Committee Working Group ANS-6.2 is to compile in convenient form a limited number of well-documented problems in radiation transport and their solutions which will be useful in testing computational methods used in shielding. The original set of problems and supplements have been issued as ORNL-RSIC-25 (ANS-SD-9).

The new chairman of ANS-6.2, Jack Celnik, asks that problem specifications and, if possible, solutions be submitted for consideration by the group. Problems of interest to the LWR radiation analysis and shielding community are particularly desired. It is recognized that dedicated work for the purpose of generating benchmark problem data is difficult to justify, but it is felt that spin-off from R & D and QA applications should be available if a small increment of effort is made to prepare the results in the necessary form.

It is felt that there will be an increasing emphasis on computer code validation and data testing in the future and benchmark problems can be extremely useful for those purposes. A useful catalog of problems can be assembled only if there is a widespread effort.

Present members of the Working Group are D. J. Dudziak (LASL), H. Goldstein (Columbia), A. A. O'Dell (LLL), W. C. Price (Princeton), W. M. Herwig (B & W), F. J. Rahn (EPRI), G. L. Simmons (SAI), and J. T. West (UCND-CSD-ORNL).

Suggestions and problem descriptions should be sent prior to March 1 to J. C. Celnik, Burns and Roe, Inc., 633 Industrial Ave., Paramus, NJ 07652, telephone 201-967-2626.

CURRENT WORK AND PROBLEMS

Dr. M. Weinert of Wehrwissenschaftliche Dienststelle der Bundeswehr für ABC-Schutz writes as follows:

Concerning the activities at our installation one may translate the name of our establishment with "Armed Forces Scientific Laboratory for NBC-Defence". We have to develop and to prove measuring systems, procedures, and tools (soft- & hardware) for protecting the Bundeswehr, i.e., the Armed Forces, against NBC threat and to solve the problems in fire-fighting techniques.

I am responsible for the computing facilities, that is mainly a terminal to a Telefunken computer TR 440 (comparable to IBM 370/155). Besides this I am somewhat concerned with radiation transport [see for instance Nuclear Science and Engineering, 63(4), 493-500]. Our main activities in radiation shielding

are conducted by Dr. Ludwig Schanzler.

Dr. Herbert Rief, who now manages the European Shielding Information Service at EURATOM JRC–Ispra, Italy, provided the following summary of shielding work at Ispra:

a. Performance of a shielding benchmark experiment at the EURACOS II facility, interpretation of the measured results and comparison with other benchmarks. In this context, measurements of neutron transmission in iron layers of up to 1.3 m thickness will be performed. The theoretical interpretation will be based on neutron transport methods (ANISN, DOT and Monte Carlo codes) using the EURLIB standard nuclear data library, which in turn will be adjusted by a recursive parameter estimation procedure. This method has the advantage that it will generate a covariance matrix which results from the interpretation of the integral experiments.
b. Generation and updating of the EURLIB standard library in close cooperation with the IKE-Stuttgart.
c. Code assessment under the aspect of maintaining and updating of existing shielding programmes and implementation of a few carefully selected new ones. (e.g., MORSE-SCG, TRIPOLI). Completion of a 3D-Monte Carlo sensitivity code.
d. Nuclear data evaluation for some elements important for shielding in close collaboration with the IRK–Vienna.
e. Technical support to reactor design, as for example, the fast test reactor PEC.
f. Updating of the Shielding Data Bank and editing of the ESIS Newsletter.

Dr. Alexander Desi and Dr. Michael F. Nagy, of the Technical University, Budapest, Training Reactor Staff, report that the training reactor at the university has been completed and the 50-person staff is engaged in a number of activities. The reactor is light-water moderated and cooled and has a power of 10 kw. In addition to offering training courses to Hungarian and foreign students, the staff plans experimental and theoretical investigations, primarily in the field of neutron and gamma-ray spectroscopy. Courses include: reactor physics, radiation protection, nuclear measuring techniques, and reactor neutron activation analysis.

FODERARO PHOTON SHIELDING MANUAL CORRIGENDUM

A. Foderaro would like to call to the attention of owners of the early printings of *The Photon Shielding Manual* the following typographical errors:

Page 22

Change $(e^{-b}4 - e^{-b}5)$ to $(e^{-b}4 + e^{-b}5)$

Change $(e^{-b}4i - e^{-b}5i)$ to $(e^{-b}4i + e^{-b}5i)$

Pages 78 and 82

The polynomial expressions for $\mu_s Z$ on these two pages should be interchanged. The polynomial expression for the sphere has terms to X^5, for the cylinder terms to X^3.

Page 108

In the Klein-Nishina equation change πr_0^2 to $\pi r_0^2/2$.

Page 110

The right side of the long equation for the total Compton cross section should be multiplied by another π. That is, the first term should be $\pi^2 r_0^2$ and not πr_0^2.

Users of *The Photon Shielding Manual* should also be aware that the study by E. E. Morris and A. B. Chilton [Nuc. Sci. & Eng., 40, 128 (1970)] indicates that the Goldstein-Wilkins exposure buildup factors overestimate the total dose in water for photon source energies of 1.0 MeV and lower. The overestimate increases with increasing optical depth. For 1.0 MeV source photons, the G-W water buildup factors appear to be high by about 3% at 2 mfp, 8% at 7 mfp, and 15% at 20 mfp. For 0.5 MeV source photons, the G-W

water buildup factors appear to be high by about 5% at 2 mfp, 18% at 7 mfp, and 33% at 20 mfp.

The Photon Shielding Manual, designed to be used with hand calculators, is available from the Pennsylvania State Bookstore, McAllister Building, The Pennsylvania State University, University Park, PA 16802 for $4.50 plus postage.

NEWS OF UPCOMING CONFERENCES

Topical Meeting on Advances in Reactor Physics, April, 9–12, 1978, Gatlinburg, Tenn. This meeting will be sponsored by the ANS Reactor Physics Division, the ANS Oak Ridge Section, Oak Ridge National Laboratory, the University of Tennessee, and the U.S. Energy Research and Development Administration (now Department of Energy). Contact: General Chairman, Fred Maienschein, ORNL, P.O. Box X, Oak Ridge, Tenn. 37830, phone 615/483-8611, ext. 3-6601; or Technical Program Chairman, Philip B. Hemmig, Physics Branch, Division of Reactor Development and Demonstration, USDOE, Washington, D.C. 20545. A copy of the scheduled program for this meeting is attached to the back of this newsletter.

INFO '78, Nuclear Power and the Public, a conference on nuclear power and public policy sponsored by the Atomic Industrial Forum, will be held February 21–24, 1978, in the Century Plaza Hotel, Los Angeles, California. Session titles are: The National Overview, The Changing State Scene, Cultivating Grass Roots, Political Action, Energy Film Theatres, Timely Media Strategy, and Preparing for the Year Ahead. Contact: Conference Office, AIF, 7101 Wisconsin Ave., Washington, D.C. 20014, phone 301/654-9260.

1978 IEEE Annual Conference on Nuclear and Space Radiation Effects, July 18–21, 1978, Albuquerque, New Mexico, sponsored by the IEEE/NPSS Radiation Effects Committee in cooperation with the University of New Mexico and cosponsored by the Defense Nuclear Agency, JPL/NASA, and Sandia Laboratories. The conference will be held on the campus of the University of New Mexico in Albuquerque. It will cover experimental and theoretical studies of nuclear and space radiation effects on materials, devices, circuits and electronic systems. The program will consist of six to eight sessions of contributed papers and several invited papers. A poster session is also planned. Papers describing significant findings in the following or related areas are solicited: Radiation Effects on Integrated Circuit Technologies (I^2L, SOS, NMOS, MNOS, CMOS, etc.); Basic Mechanisms of Radiation Effects on Materials and Devices; Radiation Effects on LSI Circuits (Microprocessors, Memories, etc.); Ionizing Radiation Effects on MOS and Bipolar Devices; Radiation Hardening Techniques for Devices, Circuits, and Systems; Space Radiation Effects and Spacecraft Charging; Hardness Assurance and Measurement Standards; SGEMP, IEMP, EMP; Radiation-inclusive Integrated Circuit Modeling; Facilities and Techniques for Radiation Effects Simulation; and Energy Deposition, Dosimetry, and Radiation Transport.

Authors must submit the *original and eight copies* of the 2- to 4-page summary by *March 1* to the 1978 Technical Program Chairman: J. R. Srour, Northrop Research and Technology Center, One Research Park, Palos Verdes Peninula, CA 90274.

TRAINING COURSE OFFERED

The Atomics International Division of Rockwell International, 8900 De Soto Avenue, Canoga Park, California 91304 is offering the following course in February. Complete information concerning the course is available from E. M. Rex, AI's Nuclear Training Center, telephone 213-341-1000, Ext. 2811.

HEALTH PHYSICS, February 13–24, 1978: a two-week course structured to help prepare nuclear utilities, university and laboratory health physicists for the American Board of Health Physics Certification Exam. This program is offered to the health physics community as an intensive training course at the professional level. Twenty-two health physics categories will be covered including sample problem solving in each area. Fee: $835.00.

DO YOU HAVE THE LATEST ASTM STANDARDS?

The increased use of nuclear energy to generate electricity has made it imperative for engineers, designers and scientists concerned with nuclear reactors to have reliable standards. Operators and utilities are equally concerned. Now ASTM provides its standards in a single, 6 x 9 hard cover volume, containing 1125 pages, which can be of immense value. Part 45 of the 1977 Annual Book of ASTM Standards contains all ASTM Standards dealing with nuclear materials and materials related to nuclear reactors. There are 132 standards in the book of which 19% are new, revised or changed in status since 1976. One hundred and seven have also been approved by ANSI. The volume is listed as Publication Code No.: 01-045077-35, and is priced at $39.00.

Among the new standards in this book are: Design Criteria for Plutonium Gloveboxes, Method for Nondestructive Assay of Special Nuclear Materials Contained in Scrap and Waste, and Recommended Practice for Aqueous Corrosion Testing of Samples of Zirconium and Zirconium Alloys. The standards in Part 45 cover: Concrete Products For Nuclear Applications; Graphite Products For Nuclear Applications; Metal Products For Nuclear Applications: Nickel and Nickel Alloys, Steel, Tantalum, Titanium and Titanium Alloys, Zirconium and Zirconium Alloys; Nuclear-Grade Materials; Radiation Effects in Organic Materials; Radioactivity, Inorganic Materials in Water; Analysis, Dosimetry and Radiation Effects in Metals; and Temperature Measurement.

To obtain your copy write to: American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, ATTN: Sales Service Department.

PERSONAL ITEMS

Dr. G. G. Simons has left the Argonne National Laboratory, Applied Physics Division, where he was a group leader and reactor manager to teach and perform research within the Department of Nuclear Engineering at Kansas State University, Manhattan, Kansas.

VISITORS TO RSIC

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

Francois Kertesz, formerly Information Center Coordinator, ORNL, Oak Ridge, Tenn.; and Pauline Baker, Dames & Moore, Oak Ridge, Tenn.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in the computer code collection during the month of December:

CCC-303/INDRA

INDRA is a code system for calculating the neutronics and photonic characteristics of a fusion reactor blanket contributed by the Max-Planck-Institut für Plasmaphysik, 8046 Garching bei Munchen, Federal Republic of Germany. The system incorporates 19 different codes and 5 data libraries. Several of the codes are packaged separately in RSIC; some have been modified to permit transfer of information between modules in the system. Nine new codes were developed for the system to increase its flexibility and to facilitate the handling of calculational results. Radiation transport methodology is mainly one-dimensional discrete ordinates. Reference: IPP 4/137 (January 1976).

PSR-112/MAME (Miscellaneous AMPX-I Modules from Everywhere)

The AMPX-I code package (PSR-63) was designed for the IBM 360 computer and was never converted in its entirety to run on other hardware. Members of the user community returned to RSIC those modules which they converted for use in their own programs. To make these specific modules generally available and to give due credit to our contributors, we offer this unique code package (PSR-112) as a collection of non-IBM routines for performing radiation transport calculations and manipulating cross sections in AMPX

format. PSR-112A contains CDC versions contributed by the UCND Computer Sciences Division at Oak Ridge, the Control Data Corporation in Rockville, Maryland, the Westinghouse Fusion Power Systems Division in Pittsburgh, and Battelle Northwest Laboratory in Richland, Washington. PSR-112B contains UNIVAC versions contributed by the University of Wisconsin at Madison and the Argonne National Laboratory in Illinois. The routines included are: PSR-112A: AIM (with subroutines for AIM from AMPX), NITAWL, XSDRNPM, Segmentation directives for XSDRNPM; and PSR-112B: AIM, MALOCS, CHOX, GIPR, NITAWL, TAPEMAKER, Routines for NITAWL.

DECEMBER 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

AECL-5523
Techniques to Reduce Radiation Fields.
Montford, B.
July 1976
NTIS (U.S. Sales Only)

AED-Conf-77-013-025, pp.99-102 (In German)
Measurement and Calculation of the Gamma-Field Induced in Iron by Fission Neutrons.
Jiang, S.H.; Werle, H.
1977
ZAED
Short communication only

AED-Conf-77-013-072, pp.290-293 (In German)
Comparison Between Experimental and Theoretical Activity Values for the Determination of the Neutron Fluence on the Wall of a PWR Pressure Vessel.
Spicka, M.; Whitmarsh, C.L.
1977
ZAED
Short communication only

ANL/NDM-28
TITANIUM-II: An Evaluated Nuclear Data File.
Philis, C.; Howerton, R.; Smith, A.B.
June 1977
Argonne National Laboratory, Argonne, Illinois 60439

BNWL-1953
Shielding Analysis for the Sealed Storage Cask Concept.
Zimmerman, M.G.
October 1975
NTIS

CONF-760715-P1, pp.13-62
Recent Advances in Neutron Physics.
Feshbach, H.
In: Proceedings of the International Conference on the Interactions of Neutrons with Nuclei. (Held at the University of Lowell, Lowell, Mass., July 6-9, 1976)
1976
NTIS

CONF-760715-P2, pp.893-925
Neutron Installations and Facilities.
Cierjacks, S.W.
1976
NTIS

CONF-760715-P2, pp.926-941
Accclerator-Produced Neutrons.
Cranberg, L.
1976
NTIS

CONF-760715-P2, pp.945-971
Fast Neutron Detectors and Instrumentation.
Zeitnitz, B.
1976
NTIS

CONF-760715-P2, pp.975-1026
Technological and Industrial Applications of Neutrons.
Weitkamp, C.
1976
NTIS

CONF-760715-P2, pp.1127-1160
The Importance of Neutron Data in Fission Reactor Applications.
Bohn, E.M.; Henryson, H.,II; Hardy, J.,Jr.; Roussin, R.; Weisbin, C.
1976
NTIS

CONF-760715-P2, pp.1162-1185
Neutron Sources for Medical Applications.
Scheer, K.E.; Hover, K.H.; Schmidt, K.A.
1976
NTIS

EPA-520/3-75-019
Radionuclide Production, Transport, and Release from Normal Operation of Liquid-Metal-Cooled Fast Breeder Reactors.
Erdman, C.A.; Kelly, J.L.; Kirbiyik, M.; Reynolds, A.B.
November 1975
Dept. of Nuclear Engineering, Virginia Univ., Charlottesville, Va.

EPRI-ER-451, Vol.1, pp.5-1~5-28
Nuclear Design and Analysis.
Rose, R.P. (Principal Investigator)
In: Fusion Driven Actinide Burner Design Study.
May 1977
Dep., NTIS

EUR-5452(Vol.1), pp.97-126
Microdosimetric Spectra and Parameters of Fast Neutrons.
Caswell, R.S.; Coyne, J.J.
In: Proceedings of Fifth Symposium on Microdosimetry. Verbania Pallanza, 22-26 September 1975
March 1976
Commission of the European Communities, Brussels (Belgium)

EUR-5602; CONF-760631
Proceedings of the 9th Symposium on Fusion Technology.
Schmitter, K.H. (Ch.)
1976
Pergamon Press $45.00
Held at Garmisch-Partenkirchen (FRG), June 14-18, 1976

EUR-5602, pp.453-458; CONF-760631, pp.453-458
Radioactivity and Afterheat of FINTOR and Related Problems of Maintenance and Waste Disposal.
Farfaletti-Casali, F.; Peter, R.; Rocco, P.
1976
Pergamon Press

EUR-5602, pp.551-556; CONF-760631, pp.551-556
Survey on Experimental Neutron Physics of CTR Blankets in the KFA.
Hecker, R.; Cloth, P.; Filges, D.
1976
Pergamon Press

EUR-5602, pp.563-568; CONF-760631, pp.563-568
Low Activity Blanket Designs and Heat Transfer for Experimental Power Reactors.
Fillo, J.; Tichler, P.; Lazareth, O.; Powell, J.
1976
Pergamon Press

EUR-5602, pp.569-575; CONF-760631, pp.569-575
Neutron Multiplication Effect of CTR Blankets Containing Beryllium.
Cloth, P.; Filges, D.; Herzing, R.; Kirch, N.
1976
Pergamon Press

EUR-5602, pp.583-588; CONF-760631, pp.583-588
Determination of Neutron Spectra and Cross-Section Sensitivity of Tritium Production in a Lithium Sphere.
Kappler, F.; Rusch, D.; Werle, H.; Wiese, H.W.
1976
Pergamon Press

EUR-5602, pp.589-595; CONF-760631, pp.589-595
Nuclear Data Measurements for FR-Wall and Structural Materials.
Qaim, S.M.; Molla, N.I.
1976
Pergamon Press

EUR-5602, pp.597-604; CONF-760631, pp.597-604
DPF Julich II - Test Bed for Developing a Plasma Neutron Source.
Cloth, P.; Conrads, H.; Giesen, B.; Schongen, F.
1976
Pergamon Press

EUR-5602, pp.623-628; CONF-760631, pp.623-628
Radiation Effects in Graphite Related to Its *Application in Fusion Reactors.*
Veringa, H.J.; Van Witzenburg, W.
1976
Pergamon Press

EUR-5602, pp.629-634; CONF-760631, pp.629-634
Activation from D-T Fusion Neutrons and Resulting Dose Rates in JET.
Brockmann, H.; Ohlig, U.
1976
Pergamon Press

EUR-5602, pp.649-655; CONF-760631, pp.649-655
A Neutronic Study of the Culham Conceptual Tokamak Reactor MK II.
Constantine, G.; Pickett, D.
1976
Pergamon Press

EUR-5602, pp.657-663; CONF-760631, pp.657-663
Poloidal Distributions of Radiation Heating and 14 MeV Neutron Flux at First Wall.
Kasai, M.; Kondo, S.; An, S.
1976
Pergamon Press

EUR-5602, pp.665-671; CONF-760631, pp.665-671
Neutron Streaming Problems in the "FINTOR 1" Design.
Burn, K.; Canali, U.; Cuniberti, R.; Nicks, R.; Ponti, C.; van Heusden, R.
1976
Pergamon Press

FEI-541 (In Russian)
Optimum Two-Layer Shield Form and Experimental Verification of the Optimization.
Petrov, Eh.E.; Regushevskij, V.I.; Yatsenko, A.M.
1975
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSR, Obninsk, Fiziko-Ehnergeticheskij Inst.

GA-A14540
Transport Calculations for a Wall-Confined Liner-Compressed Plasma.
Waltz, R.E.
September 1977
NTIS

GA-A14635
A U-233 Fusion-Fission Power System Without Reprocessing.
Schultz, K.R.; Brogli, R.H.; Hopkins, G.R.; Jonzen, M.; Shirley, G.W.
September 1977
NTIS $6.00

INDC(CCP)-109/U
Adjustment of Evaluated Microscopic Data on the Basis of Evaluated Integral Experiments.
Usachev, L.N.; Kazanskij, Yu.A.; Dulin, V.A.; Bobkov, Yu.G.
August 1977
IAEA Nuclear Data Section, Kartner Ring 11, A-1010 Vienna

INIS-mf-3242 (In Bulgarian)
Neutron Spectra and Doses in the Experimental Channels of the IRT-2000 Reactor in Sofia.
Gelev, M.; Mishev, I.; Stojkova, B.
January 1976
INIS
Published in summary form only

INIS-mf-3285 (In Serbian)
Application of Collision Probability and Monte Carlo Methods on Analysis of Neutron Spectra Transformed by a Fission Converter.
Milosevicj, M.; Kocicj, A.; Altiparmarkov, D.
1976
Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)

JAERI-M-6221
Evaluation of ^{241}Am Nuclear Data.
Lgarasi, S.I.
September 1976
Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken, Japan

JAERI-M-6811
Response Distributions of ^{6}LiF and ^{7}LiF Thermoluminescence Dosimeters in Lithium Blanket Assemblies.
Maekawa, H.; Kusano, J.; Seki, Y.
November 1976
Division of Technical Information, Japan Atomic Energy Research Institute, Tokai-mura, Naka-gun, Ibaraki-ken, Japan

Juel-1268
Dose Rate Calculations for a Fusion Ignition Experiment.
Brockmann, H.; Ohlig, U.
February 1976
IAEA

Juel-1271
Approximation of Arbitrary Order Applied to the One-Dimensional Transport Equation Using Characteristic Coordinates.
Lindenmayr, G.
February 1976
IAEA

KFK-2337
The Total Neutron Cross Section of ^{58}Fe in the Energy Range 7 to 325 KeV.
Beer, H.; Hong, L.D.; Kappeler, F.
August 1976
Kernforschungszentrum Karlsruhe

LA-6043-MS
Calculated Neutron Spectrum from 800-MeV Protons Incident on a Copper Beam Stop.
Perry, D.G.
October 1975
NTIS

LA-NUREG-6336-MS
Cross-Section Methodology in SIMMER.
Soran, P.D.
May 1976
NTIS $3.50

LA-UR-77-839
Neutral Hydrogen Transport in a Two-Dimensional Toroidal Plasma Using Multigroup, Discrete Ordinates Methodology.
Wienke, B.R.; Miller, W.R.,Jr.; Seed, T.J.; Rood, P.L.
1977
Theoretical Div., Univ. of Calif., Los Alamos Scientific Laboratory, Los Alamos, New Mexico 87545

LA-UR-1028; CONF-770523-8
Neutron Cross Section Programs in the Energy Region from 1 to 24 MeV at the LASL Van de Graaff Facilities.
Auchampaugh, G.F.; Drake, D.M.; Vesser, L.R.
1977
Dep., NTIS

NASA-TR-R-453
The Photon Gas Formulation of Thermal Radiation.
Ried, R.C.,Jr.
November 1975
NTIS

NIIAR-P-245 (In Russian)
Solution of the Neutron Transport Equation and the Nucleus of the Integral Equation of Fission Neutron Sources a One-Dimensional Multi-Region Cylindrical Reactor in the M-Group P_1 -Approximation.
Kormushkin, Yu.P.; Polivanov, I.F.
1974
Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)

ORNL/ENG/TM-9
Safety Analysis Report for Packaging. The ORNL HFIR Unirradiated Fuel Element Shipping Container.
Evans, J.H.; Boulet, J.A.M.; Eversole, R.E.
November 1977
NTIS $6.50

ORNL/TM-6085
Nuclear Performance Calculations for the ELMO Bumpy Torus Reactor (EBTR) Reference Design.
Santoro, R.T.; Barnes, J.M.
December 1977
NTIS $4.50

ORNL/TM-5873; Thesis
In-Phantom Spectrometry of Medical Diagnostic X-Rays.
Stansbury, P.S.
October 1977
NTIS

RD/B/M-3733
A Brief Description of ENDF/B-IV Format for Inventory and Decay Heating Calculations.
Tobias, A.
July 1976
Central Electricity Generating Board, Berkeley (UK), Berkeley Nuclear Labs.

TNO-RD-1-7602-172 (In Dutch)
Results of the Euratom Programme for Comparison of Individual Dosemeters.
Julius, H.W.
1976
Gezondheidsorganisatie TNO, Arnhem (Netherlands)

UCID-17227
Nonlinear Radiation Transport Problems Involving Widely Varying Mean Free Paths.
Chapline, G.,Jr.; Wood, L.
July 30, 1976
NTIS $3.50

UCRL-79453; CONF-770523-9
Review of Neutron Data: 10 to 40 MeV.
Haight, R.C.
April 1977
Dep., NTIS

ZJE-197
Neutron and Gamma-Ray Spectra Measurement on the Model of the KS-150 Reactor Radial Shielding.
Holman, M.; Hogel, J.; Marik, J.; Kovarik, K.; Franc, L.; Vespalec, R.
1977
Skoda Works, Nuclear Power Construction Department, Information Centre, Plzen - Czechoslovakia

Ann. Nucl. Energy, 3(2/3), 65-72
Benchmark Data for the Penetration of 6 MeV Gamma Photons Through Steel and Lead.
Bishop, G.B.; Smitton, C.; Packwood, A.
1976

Health Phys., 33(4), 287-300
Structure Shielding in Reactor Accidents.
Burson, Z.G.; Profio, A.E.
October 1977

IEEE Trans. Nucl. Sci., Vol.NS-23(3), 1224-1236
Thermoluminescence Dosimetry: Environmental Monitoring Near Nuclear Reactor Sites.
Burke, G. de Planque
June 1976

IEEE Trans. Nucl. Sci., NS-23(4), 1411-1413
Fluence-to-Dose Equivalent Conversion Factors in Mixed Radiation Fields.
Freytag, E.
August 1976

J. Brit. Nucl. Energy Soc., 15(4), 297-303
The Use of Census Data in Predicting Spatial Distributions of Collective Dose.
Clarke, R.H.; Henning, M.J.
October 1976

J. Fac. Eng., Univ. Tokyo, Ser.B, 33(3), 417-425
Radiation Effects on Iron and Iron Alloys.
Igata, N.; Kohno, Y.
March 1976

J. Math. Anal. Appl., 50(1), 42-65
Formulation of a Ritz-Galerkin Type Procedure for Approximate Solution of Neutron-Transport Equation.
Kaper, H.G.; Leaf, G.K.; Lindeman, A.J.
1975

J. Nucl. Sci. Technol., 13(10), 531-540
Fission Spectrum Averaged Cross Sections of Some Threshold Reactions Measured with Fast Reactor "Yayoi".
Kimura, I.; Nakazawa, M.; Akiyama, M.
October 1976

J. Nucl. Sci. Technol., 13(11), 663-675
Measurements of Streaming Neutrons on Nuclear Ship "Mutsu" by a Two-Detector-Method.
Kobayashi, I.; Yamazaki, H.; Ryufuku, H.
November 1976

J. Nucl. Sci. Technol., 14(1), 31-42
Spatial Distribution of Bremsstrahlung in Water and Water-Iron by 22-MeV Electron Bombardment Measured with Activation Detectors.
Nakamura, T.; Nishimoto, T.; Hirayama, H.
January 1977

J. Nucl. Sci. Technol., 14(2), 75-87
Nuclear Characteristics of D-D Fusion Reactor Blankets. (I) Survey Calculation.
Nakashima, H.; Ohta, M.; Seki, Y.
February 1977

J. Nucl. Sci. Technol., 14(2), 97-107
Absolute Fission-Rate Distributions in Lithium and Hybrid Fusion Blanket Assemblies. (I) Experimental Method and Results.
Maekawa, H.; Seki, Y.
February 1977

J. Nucl. Sci. Technol., 14(7), 489-501
Spherical Harmonics Solutions of Multidimensional Neutron-Transport Equation by Finite Fourier Transformation.
Kobayashi, K.
1977

J. Physics D, Appl. Phys., 9(5), L53-L56
Why Use Kermas for Nuclear Heating Calculations?
Beynon, T.D.; Taylor, N.P.
April 1976

Kernenergie, 19(2), 60-64 (In German)
Transmission and Reflection Properties of Iron, Water and Concrete Shields in Neutron Fields of Different Spectral Composition.
Doerschel, B.
1976

Kerntechnik, 18(8/9), 370-373
Build-Up Factors of Different Materials for 14.1 MeV Neutrons.
Deimel, E.; Deimel, P.
August-September 1976

Med. Phys., 3(6), 397-402
Dose Levels Due to Neutrons in the Vicinity of High-Energy Medical Accelerators.
McGinley, P.H.; Wood, M.; Mills, M.; Rodriguez, R.
November 1976

Nucl. Instrum. Methods, 131(3), 529-533
Monte Carlo Calculation of Energy Response Functions for a Lithium Glass Scintillator for Neutrons Between 1 and 6 MeV.
Weaver, D.R.
December 1975

Nucl. Technology, 36(2), 193-199
A Neutron-Gamma Chemonuclear Fusion Reactor.
Dang, Vi-Duong; Steinberg, M.
December 1977

Nucl. Technology, 36(3), 249-261
Comparison of Measured and Calculated Nitrogen-16 Activity in Water for Application to Nuclear-Ship Reactor Designs.
Sun, J.B.; Warren, H.D.
Mid-December 1977

Nucl. Technology, 36(3), 336-346
Damage Function for the Mechanical Properties of Steels.
Alberman, A.; Genthon, J.P.; Salon, L.; Allegraud, G.
Mid-December 1977

Phys. Lett., B, 65(1), 78-80
Uniqueness of the 'T Hooft-Polyakov Magnetic Monopole Solution.
Cremmer, E.; Schaposnik, F.; Scherk, J.
October 25, 1976

Radiats. Tekh., No.9, 62-71 (In Russian)
Approximate Formula for Buildup Factor of Two-Layer Shielding.
Zharkov, V.A.; Lyapunov, N.A.; Kolesnikov, A.F.
1973

Radiats. Tekh., No.9, 310-327 (In Russian)
Experimental Investigations of Parameters of Gamma-Radiation Scattered by Curved Barriers.
Bulatov, B.P.; Egelev, I.M.; Ivanov, M.I.; Pleshakov, L.D.; Stojcheva, T.A.; Filin, L.N.
1973

Soviet J. At. Energy(English Transl.), 40(1), 45-49
Nonsteady-State Space-Energy Spectrum of Neutrons in a Heavy, Weakly Inhomogeneous Medium, Allowing for Neutron Capture.
Metelkin, E.V.
January 1976

Soviet J. At. Energy(English Transl.), 40(4), 403-404
Asymptotic Neutron Distribution in a Nonmultiplying Two-Zone Cylindrical Medium.
Polyachenko, A.L.
April 1976

Soviet J. At. Energy(English Transl.), 41(2), 741
Gamma-Ray Field Initiated by a Monodirectional Neutron Source in Air.
Zhemerev, A.V.; Medvedev, Yu.A.; Stepanov, B.M.
August 1976

Soviet J. At. Energy(English Transl.), 41(2), 742-743
Basic Laws for the Formation of Tissue Doses from Colimated Beams of Monoenergetic Neutrons.
Ivanov, V.N.
August 1976

Soviet J. Nucl. Phys., 22(3), 238-240
Comparison of the Prompt Gamma-Ray Spectra in Thermal-Neutron Fission of ^{233}U, ^{235}U, ^{238}Pu, and ^{239}Pu and in Spontaneous Fission of ^{252}Cf.
Teterev, E.N.; Val'skii, G.V.; Petrov, G.A.; Pleva, Yu.S.
1975

Thesis
Application of Space-Angle Synthesis to Two-Dimensional Neutral-Particle Transport Problems of Weapon Physics.
Roberts, R.M.
Air Force Inst. of Tech., Wright-Patterson AFB, Ohio
1975
University Microfilms Order No.76-10,088

Thesis
Iterative Solution of the Diffusion and P_1 Finite Element Equations.
Tomlinson, E.T.
University of Tenn., Knoxville, Tenn.
1976
University Microfilms Order No.76-17,747

BOOK
RADIATION SPECTRA OF RADIONUCLIDES.
Metcalfe, T.B.
1976
Noyes Data Corp., Park Ridge, N.J.

COMPUTER CODES LITERATURE

AD-A-034754 ..... FLAIR
FLAIR: A Scaling and Folding Code for the Generation of Photon Transport Results in Air. Final Report.
Scott, W.H.; Colborn, B.L.
Science Applications, Inc., La Jolla, California
December 1976
AVAIL: NTIS

BNWL-B-389(Suppl.). ..... DACRIN
DACRIN: A Computer Program for Calculating Organ Dose from Acute Chronic Radionuclide Inhalation: Modification for Gastrointestinal Tract Dose.
Strenge, D.L.
Battelle Pacific Northwest Laboratories, Richland, Washington
February 1975
AVAIL: NTIS

BNWL-BA-5523 ..... FOOD
FOOD: An Interactive Code to Calculate Internal Radiation Doses from Contaminated Food Products.
Baker, D.A.; Hoenes, G.R.; Soldat, J.K.
Battelle Pacific Northwest Laboratories, Richland, Washington
February 1976
AVAIL: NTIS

EPRI NP-356 ..... EPRI-CINDER
Fission Product Data for Thermal Reactors. Part 1: A Data Set for EPRI-CINDER Using ENDF/B-IV.
England, T.R.; Wilson, W.B.; Stamatelatos, M.G.
Los Alamos Scientific Laboratory, New Mexico for EPRI, Palo Alto, California
December 1976

EPRI NP-356 ..... EPRI-CINDER
Fission Product Data for Thermal Reactors. Part 2: Users Manual for EPRI-CINDER Code and Data.
England, T.R.; Wilson, W.B.; Stamatelatos, M.G.
Los Alamos Scientific Laboratory, New Mexico for EPRI, Palo Alto, California
December 1976

EURFNR-1442; KFK-2387/3 ..... KEDAK
KEDAK Program Compendium. Part III. KEDAK Data Retrieval.
Stein, E.
Kernforschungszentrum Karlsruhe, Institute fuer Neutronenphysik und Reaktortechnik, Germany
April 1977

EURFNR-1450; KFK-2387/5 ..... KEDAK
KEDAK Program Compendium. Part V. KEDAK Evaluation Aids.
Froehner, F.H.
Institute fuer Neutronenphysik und Reaktortechnik, Kernforschungszentrum Karlsruhe, Germany
April 1977

GA-6511 ..... GADOSE; DOSET
GADOSE and DOSET: Programs to Calculate Environmental Consequences of Radioactivity Release.
Lee, E.; Mack, R.J.; Sedgley, D.B.
General Atomic, San Diego, California
April 1966
AVAIL: NTIS

IAE-2395 ..... SCORE-3
Solution of the Kinetic Equation in the P_3-Approximation for a Cylindrical Geometry.
Konyaev, S.I.
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow
1974
ALGOL-60

INIS-mf-3677 ..... NEUTRAL MESONS
Program for Preliminary Data Processing of Experimental Results on Photoproduction of Neutral Mesons with a Help of the "SARATOV" Computer.
Dudkin, G.N.; Isakov, P.Ya.; Krechetov, Yu.F.; Sablin, N.I.
Ministerstvo Vysshego i Srednego Spetsial'nogo Obrazovaniya SSSR, Moscow
1975

Isotpoenpraxis, IPRXA, 12(10), 367-70
..... ACTIVATION ANALYSIS
Instrumentation for the Automation of Activation Analysis.
Ivanets, V.N.; Ivanov, I.N.
Vsesoyuznyj Nauchno-Issledovatel'skij Inst. Radiatsionnoj Tekhniki Moscow, USSR
October 1976

J. Appl. Phys., 47(10), 4697-98
..... SANDYL
Optimization of the Statistical Accuracy of the SANDYL Transport Code and Comparison with an Experiment by Motz.
Albright, N.W.
Physics International Company, San Leandro, California
October 1976

K-1752 ..... EXREM; INREM
EXREM and INREM Computer Codes for Estimating Radiation Dose with Nuclear Explosives.
Turner, W.D.; Kaye, S.V.; Rohwer, P.S.
Oak Ridge National Laboratory, Oak Ridge, Tennessee
September 1968
AVAIL: NTIS

KFK-2210 ..... ISOLA II
ISOLA II - A FORTRAN IV Code for the Calculation of the Long-Term Alpha- and Beta-Dose Distributions in the Vicinity of Nuclear Installations.
Huebschmann, W.; Nagel, D.
Kernforschungszentrum Karlsruhe, Germany
December 1975
AVAIL: INIS

N-76-27161; NASA-TM-X-3388
..... PROTON DOSIMETRY
Computer Subroutines for the Estimation of Nuclear Reaction Effects in Proton-Tissue-Dose Calculations.
Wilson, J.W.; Khandelwal, G.S.
NASA, Langley Station, Virginia
June 1976
AVAIL: NTIS

NUS-329 ..... EXGAM
EXGAM: A Code to Calculate Gamma Photon Dose from an Airborne Radioactive Release.
Steyn, J.J.; Kim, Y.S.
NUS Corporation
November 1966
AVAIL: NTIS

ORNL/TM-5228 ..... FANG
The FANG Angular Folding Code for Channel Theory Analysis.
Williams, M.L.; Sadler, F.B.
Oak Ridge National Laboratory, Oak Ridge, Tennessee
August 1977

RISO Report No. 353
..... RADIATION ASSESSMENT
Development of a Model for the Assessment of Radiation Fields Around Nuclear Power Plant Components.
Lauridsen, K.
Research Establishment Riso, Denmark
January 1977

TRG-Report-2849(R)
..... SPHERICAL HARMONICS
Further Work on the Solution of the Static Multigroup Neutron Transport Equation Using Spherical Harmonics.
Fletcher, J.K.
Central Technical Services, United Kingdom Atomic Energy Authority, Risley
August 1976

ZJE-205 ..... REMUR
REMUR: A Program for the Fast Neutron Spectra and Criticality Calculations.
Stech, S.
Skoda Works, Nuclear Power Construction Department, Information Centre, Plzen, Czechoslovakia
1977
FORTRAN-1900 ODRA 1305

RADIATION SHIELDING INFORMATION CENTER SEMINAR-WORKSHOP

Multigroup Nuclear Cross-Section Preparation And Data Library Manipulation Techniques

March 14, 15, 16, 1978
Oak Ridge, Tennessee

A registration fee to cover non-official activities will be collected at final registration on March 14, 1978.

☐ **I plan to attend the seminar on Multigroup Cross-Section Preparation (March 14).**

☐ **I plan to attend the workshop on Multigroup Data Library Manipulation Techniques (March 15).**

☐ **I plan to attend the workshop on the AMPX-II Processing System (March 16).**

☐ **I plan to contribute a paper to the seminar. I will send a title and a 200-word abstract by February 1, 1978. I understand later papers may not be accepted. I will bring a camera-ready manuscript of the full paper to the conference.**

☐ **Please send me more information on Oak Ridge motels.**

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RETURN TO: *Radiation Shielding Information Center*
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P. O. Box X
Oak Ridge, Tennessee 37830

Topical Conference
ADVANCES IN REACTOR PHYSICS
April 10-12, 1978
Gatlinburg, Tennessee

Technical Program Committee

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H.W.Graves, Consultant
P.B.Hemmig, DOE

SESSION I, MONDAY, A.M.

NUCLEAR DATA FOR DESIGN

Chairman: *P. Greebler (GE)*

1. Assessment of Evaluated Nuclear Data Files via Benchmark Calculations
   L. LeSage, ANL [Invited]
2. An Attempt to Explain the Uranium 238 Resonance *Integral Discrepancy*
   H. Tellier, Centre d'Etudes Nucleaires de Saclay
   Marc Grandotto, Centre d'Etudes Nucleaires de Cadarache
3. Application of Two-Dimensional Reactor Sensitivity *and Uncertainty* Analysis to the Advanced Fuels Critical Experiments
   R.L.Childs, J.H.Marable, R.Q.Wright and R.W.Peelle, ORNL
4. An Evaluation of Fast Integral Data Related to ^{233}U and Thorium
   C.L.Beck, M.J.Lineberry, R.W.Schaefer, S.F. Carpenter and D.C.Wade, ANL
5. Some Integral Tests on ENDF/B-VC Based on Conservation Principles
   J.R.Liaw and T.R.England, LASL
6. Assessment of Iron and Steel Cross Section Data for Shielding by Integral Experiment Measurement and Analysis
   C. McCombie, K. Gmur, M. Jermann, R. Richmond, U.Schmocker, S. Seth, Swiss Federal Institute for Reactor Research
7. Sensitivity Studies of the NISUS Facility
   D. Azimi-Garakani, U. of Tehran
8. Sensitivity Analyses for the Advanced Fuels Program Carbide Benchmark Critical Assembly
   R. D. McKnight, ANL
9. Projection of ENDF/B Version V Performance for *Fast and Thermal Reactors Using Sensitivity* Coefficients
   C.R.Weisbin, ORNL; J.H.Marable, ORNL; J.Hardy, BAPL; and R.McKnight, ANL [Invited]

SESSION II, MONDAY, P.M.

DESIGN METHODS

Chairman: *A. Henry (MIT)*

1. Computational Procedures for Multidimensional Core Analysis
   K.D.Lathrop, LASL [Invited]
2. The Relationship between Point Kinetics Calculations and Space-, and Energy-Dependent Reactor Kinetics Calculations
   J.Dorning, U. of Illinois and G. Spiga, Laboratorio di Ingegneria Nucleare, U. di Bologna
3. *A Nodal Diffusion Method with Legendre Polynomials*
   C. Maeder, Swiss Federal Institute for Reactor Reasearch
4. Mesh Size and Symmetry Effects in the QUABOX Coarse-Mesh Method
   R.A. Rydin and T. M. Sullivan, U. of Virginia
5. Coarse Mesh Techniques for Multidimensional Core Analysis
   A. Ancona, Nuclear Associates, International; M.Becker, M. Beg, D. Harris and A. Dac Menezes, RPI
6. TRIDENT: A New Triangular Mesh Discrete Ordinates Code
   T. J. Seed, W. F. Miller, Jr. and G. E. Bosler, LASL
7. On the Assignment of a Prescribed Neutron Spectrum to *a Given Point of a Critical Assembly*
   M.Hamidi, Atomic Energy Organization of Iran

SESSION III, TUESDAY, A.M.

NUCLEAR DATA FOR DESIGN

Chairman: *G. Campbell (Winfrith, U.K.)*

1. Use of Integral Data in the Development of Design Methods for Fast Reactors
   R.A.Doncals, WARD [Invited]
2. A Comparison Between Physics Parameters in Conventional and Heterogeneous LMFBR's Using Results from ZPPR
   P.J.Collins, C.L.Beck, H.F.McFarlane, M.J. Lineberry and S.G.Carpenter, ANL
3. Comparative Analysis of Homogeneous and Heterogeneous Core Critical Experiments
   E. Kujawski, A. K. Hartman and S. L. Stewart, GE
4. Sensitivity of the Analysis of Heterogeneous Core Critical Assemblies to Cell Modeling
   A.K. Hartman, E. Kujawski, and S. L. Stewart, GE
5. Uncertainties in the Breeding Ratio of a Large LMFBR
   J. H. Marable and C. R. Weisbin, ORNL
6. An Assessment of the ENDF/B-IV and FGL5 Neutron Capture Date of Structural Materials for Fast Reactors
   S. Seth, K. Gmur, M. Jermann, C. McCombie, R. Richmond and U. Schmocker, Swiss Federal Institute for Reactor Research
7. Biases for Current FFTF Calculational Methods
   P.A.Ombrellaro, R. A. Bennett, J. W. Daughtry, R. D. Dobbin, R. A. Harris, J. V. Nelson, R. E. Peterson and R. B. Rothrock, HEDL
8. Recent Developments in Cross Section Adjustment Procedures
   M. Salvatores, CEA, France [Invited]

SESSION IV, TUESDAY, P.M.

DESIGN METHODS

Chairman: *R. Hellens (CE)*

1. **Feedback of Reactor Operating Data to Methods Development**
   R. Crowther, GE [Invited]
2. **Transient Experiments in Simulated CANDU Reactor Cores**
   F. N. McDonnell and D. H. Walker, AECL; A. P. Baudouin, Hydro-Quebec
3. **A Nodal Method of Flux-Mapping**
   J. Kocias, MIT and F. N. McDonnell, AECL
4. **Design Analyses Using Coupled Neutronic and Thermal-Hydraulic Models**
   S. G. Wagner, P. E. Rohan and J. J. Youngblood, CE
5. **The Background Cross Section Method as a General Tool for Reactor Analysis**
   R. E. MacFarlane and R. B. Kidman, LASL; M. Becker, RPI
6. **Use of Fast Reactor Methods to Generate Few Group Cross Sections for Thermal Reactors**
   H. Aminfar, M. J. Driscoll and A. A. Salehi, MIT
7. **Fuel Cycle Cost Sensitivity Analysis for Water Reactors**
   M. Becker, D. R. Harris, A. Parvez, B. Quan and J. M. Ryskamp, RPI
8. **Three-Dimensional Diffusion Theory Analysis of the Power Burst Facility**
   D. W. Nigg and A. J. Scott, EG&G

BANQUET SPEAKER

A. M. Weinberg
Institute for Energy Analysis

SESSION V, WEDNESDAY, A.M.

DESIGN APPLICATIONS TO THERMAL AND INTERMEDIATE SPECTRUM POWER REACTORS

Chairman: *A. M. Perry*
(Oak Ridge Associated Universities)

1. **Physics Developments in the Design of Alternate Fuel Systems**
   R. C. Dahlberg, GA [Invited]
2. **Analysis of Promising Low Proliferation Gas Core Reactor Concepts**
   D. E. Wessol, G. R. Imel and J. A. Close, EG&G
3. **Two and Three Dimensional Reactor Physics Calculations for HTR Reactors With the Finite Element Method**
   F.A.R. Schmidt, R. Fremd, H. Pflieger and D. Worner, U. of Stuttgart
4. **The Physics and Applications of Fuel-Self-Sufficient Light Water U-Pu Lattices**
   E. Greenspan, A. Misolovin and A. Schneider, Ben-Gurion U. of the Negev
5. **MUSIC: A Mesh Unrestricted SImulation Code**
   R. A. Bonalumi, Ontario Hydro; B. Rouben, A. R. Dastur and C. S. Dondale, AECL
6. **Control Rod Experiments in MARIUS HTR Critical Facility and ZEPHYR Neutron Transport Calculations**
   P. Bioux and G. Gambier, Electricite de France; R. Bosser and L. Erradi, Commissariat a l'Energie Atomique-Cadarache, M. Mordant, Commissariat a l'Energie Atomique-Limeil

SESSION VI, WEDNESDAY, A.M. & P.M.

DESIGN APPLICATIONS TO FAST SPECTRUM POWER REACTORS

Chairman: *H. Kusters (Karlsruhe, FRG)*

1. **Physics Aspects in the Design of Heterogeneous Cores**
   W. P. Barthold and J. C. Beitel, ANL [Invited]
2. **Physics Studies of Neutronic Problems Related to the Heterogeneous Fast Reactor Core Concept: Experimental Program Pre-Racine Performed on Masurca**
   Y. H. Bouget, A.Desprets, P. Hammer, G. Humbert, F. Lyon, CEA, France; R. Conversano, M. Cosmi and M. Martin, CNEN, Italy
3. **Nuclear Data Sensitivity Coefficients for a (^{233}U-^{232}Th) Fueled LMFBR**
   Ronald B. Turksi and R. D. McKnight, ANL
4. **Conclusions Drawn from Subcritical Multiplication Results in ZPPR**
   S. G. Carpenter, H. F. McFarlane, M. J. Lineberry and C. L. Beck, ANL
5. **Present Status of Sodium Void Reactivity Predictions in Conventional and Unconventional Fast Reactor Core Designs**
   H. Kusters and S. Ganesan, Kernforschungszentrum
6. **Comparative Safety Physics Parameters in the Advanced Fuels Critical Assemblies**
   S. K. Bhattacharyya, D. C. Wade, R. G. Bucher, W. R. Robinson and R. W. Schaefer, ANL
7. **The Purdue University Fast Breeder Blanket Facility**
   K. O. Ott, F. M. Clikeman, P. J. Fulford, R. C. Borg, R. H. Johnson and O. H. Gailar, Purdue University
8. **Criticality Studies on Partially Inserted Rod Configurations**
   B. W. Lee, L. L. Indreboe and S. L. Stewart, GE
9. **Nuclear Characteristics of Large LMFBR's — Homogeneous and Heterogeneous Designs**
   Y. S. Lu, C. L. Cowan and H. S. Bailey, GE
10. **Performance Potential of (Th, U) Carbide and (Th, U) Nitride Fuel in 1200 MWe LMFBR's**
    S. A. Caspersson and M. R. Kulwich, CE
11. **Alternative Fuel Cycles for Breeder Reactors**
    D. Bartine, T. Burns and J. White, ORNL; J. Kallfelz and D. Rowland, Georgia Tech. [Invited]