

RSIC Newsletter



RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

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

POST OFFICE BOX X •
OAK RIDGE, TENNESSEE 37830

No. 186

June 1980

The great achievements have always been individualistic. Indeed, any original achievement implies separation from the majority. Though society may honor achievement, it can never produce it. . . George Charles Roche

ANS/RP&S HONORS LABAUVE AND MUCKENTHALER

At its June 1980 meeting in Las Vegas the American Nuclear Society Radiation Protection and Shielding Division presented awards for outstanding technical achievement to **Raphael J. LaBauve** of Los Alamos Scientific Laboratory and **Francis J. Muckenthaler** of Oak Ridge National Laboratory.

The citations were presented by William E. (Bill) Kreger, Chairman of the ANS Radiation Protection and Shielding Division, and read as follows:

On behalf of the American Nuclear Society, the Radiation Protection and Shielding Division is pleased to present to

Raphael J. LaBauve

its award for technical achievement in recognition of his contributions to the advancement of radiation transport, analysis particularly through his activities in the Cross Section Evaluation Working Group (CSEWG) to develop adequate nuclear data bases for radiation protection and shielding applications.

His interests include a wide range of areas in physics and engineering. He has made contributions in fields ranging from health physics and optics to reactor design calculations and cross sections. During his early years at LASL, he worked in high-speed photography and on the TURRET-UHTREX reactor projects. He is best known for his contributions to the Cross Section Evaluation Working Group (CSEWG).

He has been an active member of CSEWG since its inception, has designed and calculated benchmark experiments as a member of its Data Testing Subcommittee, and has served as Chairman of the Shielding Subcommittee and the Codes and Formats Subcommittee. Besides his activities in the design of formats and processing codes for handling neutron and photon-production files, he has been closely associated with the evaluation and data testing activities of the CSEWG. Moreover, he has been responsible for providing ENDF/B data in formats appropriate for use in discrete ordinates and Monte Carlo calculations.

Recently his interests have turned to fission-product decay-energy spectra and data for activation analyses. In the midst of all these activities, he has found time to participate on national and local committees of the ANS.

His list of over 50 publications and reports indicates that he has been active professionally and has been a valued collaborator with many people.

The Radiation Protection and Shielding Division is pleased to recognize his many years of hard work in the reactor and shielding communities, bringing out the best in others individually and collectively through inspiration and encouragement.

On behalf of the American Nuclear Society, the Radiation Protection and Shielding Division is pleased to present to

Francis J. Muckenthaler

its award for technical achievement in recognition of his contributions in the development of radiation detection systems, particularly neutron detection systems, and of his leadership in performing large-scale deep-penetration radiation shielding experiments. The experiments, conducted at the Oak Ridge National Laboratory Tower Shielding Facility (TSF), have provided direct confirmation of specific radiation shield designs and also have produced a large data base

against which shield analysis methods and neutron cross sections could be tested. His accomplishments include the following.

He modified and improved the Hornyak button as a "point" detector capable of defining the shape of neutron fluxes across small regions. He also helped to develop an integrated neutron detection methodology that utilizes several detection systems with overlapping capabilities to provide detailed dose rate and spectral data for large-scale shielding experiments. This work has included the modification of Bonner ball detectors to spherical configurations and energies up to 15 MeV, the adaptation of thermoluminescent dosimeters to large-shield energy deposition measurements, and (in pre-TSF work) the development of a proton-recoil counter, threshold detectors, and an ^6LiI detector.

He has had the primary responsibility for the conduct of numerous TSF experiments that are widely used for testing radiation transport calculations for bulk shields, including several that have been cited as ANS shielding benchmarks. Other experiments have tested the validity of designs for specific systems, in particular, the FFTF, the CRBR, and the GCFBR.

In the 1950s he participated in the measurements that led to the Simon-Clifford theory for neutrons streaming through pipes with bends and in the 1960s served as a member of the BREN team that studied the penetration of radiation from a "fast-burst" reactor. He also performed experiments at the Lid Tank Shielding Facility to aid in the design of shields for military vehicles.

Without question, the sophisticated computer-based shield design methods in use today could not be applied with such confidence if they were not founded on and supported by the evidence provided by experimentalists such as Francis J. Muckenthaler and his associates.

NOMINEES SELECTED FOR ANS BEST PAPER AWARD

The Radiation Protection and Shielding Division of the American Nuclear Society has selected four papers for consideration for the Division's Best Paper Award. The papers were presented at the June 1980 ANS meeting in Las Vegas, as follows:

"A Novel Wide-Range Environmental Gamma-Ray Dosimeter," by W. R. Johnson, W. H. Rasin, G. E. Carlson, and M. Pope (University of Virginia).

"Corrosion Product Transport Modeling in the BWR Primary System," by C. C. Lin, R. C. Pao, J. S. Wiley, and W. R. DeHollander (General Electric).

"Evaluation of Flux Extrapolation Models for Discrete Ordinates Shielding Analysis," by E. T. Tomlinson and W. A. Rhoades (ORNL).

"Radioactive Inventories and Material Recyclability in a Tokamak Power Reactor," by J. Jung and M. A. Abdou (ANL).

The final decision on the award, based on relevance, content, and presentation, will be announced in the next issue of the *RSIC Newsletter*.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in May.

CCC-277/MORSE-SGC

MORSE-SGC, a super-grouped cross-section version of the MORSE code, was updated to correct an error in Subroutine GG. Two statements: **LRI=2** and **GO TO 1496** were added immediately preceding statement 1480. This error was called to RSIC attention by C. Ross Hirning, Defence Research Establishment, Ottawa, Ontario, Canada, and Jim West, UCCND, Computer Sciences Division at Oak Ridge National Laboratory.

CCC-315/FALSTF

The FALSTF multigroup code package, which uses response functions to calculate activities for detectors located at points external to a shielding configuration, has been extended to include a CDC version (B), contributed by Century Research Center Corporation, Tokyo, Japan. The original, version (A), written

for the IBM 360 computer, was contributed by UCCND, Computer Sciences Division at the Oak Ridge National Laboratory. FORTRAN IV; IBM 360 and CDC.

CCC-370/DCHAIN

This one-point depletion code system which solves the coupled equations of radioactive growth and decay for a large number of nuclides was contributed by Japan Atomic Energy Research Institute, Tokai-mura, Ibaraki-ken, Japan. A library of data for 1170 fission products is included in the package. The code can treat any type of transmutation through decays of neutron-induced reactions. Multiple decays and reactions are allowed for a nuclide. Unknown decay energy in the data library can be estimated. Variable dimension arrays are used, and there is little limitation in number of nuclides or length of a chain. Reference: JAERI 1250. FORTRAN IV; FACOM 230/75.

CCC-375/FANTOM

FANTOM, a Monte Carlo calculation of the response of an external detector of a photon source in the lungs of a heterogeneous phantom, was contributed by the hospital unit of Bhabha Atomic Research Centre, Bombay, India. The response of a 20-cm-diameter phoswich detector (3-mm thick NaI(Tl) primary detector) to a source of low-energy photons distributed in the lungs of a heterogeneous (Medical Internal Response Dose (MIRD)) phantom, approximating ICRP Reference Man, is calculated. Monte Carlo techniques are employed to generate photons and trace their fates in the thorax of the phantom. The calculations yield the exit photon energy spectrum which is then smeared with an experimentally determined Gaussian resolution function to convert into the pulse-height spectrum observable with the detector. There are provisions for incorporating the effects of the iodine K x-ray escape as well as the variable intrinsic efficiency of the detector. Reference: *Health Physics* 37:145-59, 1978. FORTRAN IV; BESM-6.

CCC-376/KIM

The KIM Monte Carlo code system, which solves the steady-state linear neutron transport equation for a fixed-source problem, was contributed by The CNEN Dipartimento Ricerca Tecnologica di Base ed Avanzata, Bologna, Italy via the OECD NEA Data Bank. By successive fixed-source runs, it solves the eigenvalue problem in a two-dimensional infinite thermal-reactor lattice. Fluxes and reaction rates are calculated and from these, power distribution and few-group averaged cross sections are derived. In addition to combinatorial geometry, capability for complex configurations represented by a discrete set of points is included. Reference: CNEN-RT/FIMA(80)2. FORTRAN IV and assembler language; IBM 360.

PSR-152/HAUSER*5

A code system for calculating nuclear cross sections was contributed by Hanford Engineering Development Laboratory, Richland, Washington. It can accurately predict nuclear cross sections over most energy ranges less than ~ 60 MeV. It is based on three models of nuclear reactions: the statistical model (Hauser-Feshbach), the pre-equilibrium model, and the statistical model for direct reactions. Reference: HEDL-TME 78-83. FORTRAN IV; UNIVAC.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in May.

DLC-23/CASK

The documentation for this 40-group coupled neutron and gamma-ray cross-section data package was updated to correct an error called to RSIC attention by Mike Strayer, Control Data Corp., Minneapolis, Minnesota. In table 3 (page 35 of document), gamma-ray group 9, flux to dose conversion factor was changed to read correctly 2.412-3. This value was incorrectly shown as 2.412-4.

DLC-74/PUDK

Measured beta- and gamma-ray spectra due to thermal neutron fission of Pu_{239} was contributed by the Oak Ridge National Laboratory. Samples of mass 1 to 5 microgram were irradiated for 1, 5, or 100 sec. using the fast pneumatic-tube facility at the Oak Ridge Research Reactor. For the gamma-ray data, the spectra were obtained using the NaI detector while for the beta-ray data the spectra were obtained using the NE-110 detector with an anticoincidence mantle. The final integral data are given in tabular and graphical forms, including a complete analysis of uncertainties. Retrieval codes are provided for tabulating the data. Reference: ORNL/NUREG-34. IBM 360.

VISITORS TO EPIC

The following persons came for an orientation visit and/or to use EPIC facilities during the month of May.

Vic Cain, Science Applications, Inc., Oak Ridge, TN; **Michihisa Ikeda**, Century Research Center Corp., Tokyo, Japan; **Stanley A. Jones**, Goodyear Atomic Corporation, Piketon, OH; **Leo B. Levitt**, Atomics International Division of Rockwell International, Canoga Park, CA; **Claes Nordborg**, OECD NEA Data Bank, Paris, France; **C. Philis**, CEA/Bruyeres Le Chatel, Paris, France; **George Salaita**, Southern Methodist University, Dallas, TX; **Kenji Sumita**, Osaka University, Osaka, Japan; and **John T. Ward, Jr.**, Combustion Engineering Co., Windsor, CT.

EPA-NRC RULE MAKING

The following report was given by W. E. Kreger, ANS Radiation Protection and Shielding Division Chairman, in the recent Division newsletter:

Division members who have been following the activities of EPA and NRC regarding various regulation changes may be interested in the latest predictions about rule making or rule implementation. For the Clean Air Act Amendments of 1977, EPA and NRC are working on the memorandum of understanding that follows EPA's finding of November 8, 1979 that radionuclides are hazardous air pollutants. EPA has established priorities for setting radionuclide emission standards under the Act, and has assigned a low priority for setting standards for NRC-licensed facilities because of the relatively low levels of risk caused by radionuclide emissions from these facilities, and because EPA believes that issuing standards for other sources will provide a greater risk reduction.

The joint EPA-NRC-OSHA hearing on occupational dose limits now looks to be as far off as January 1981.

CALL FOR PAPERS

The following call for papers has been issued.

Waste Management '81—will be held February 23-26, 1981 at the Tucson Community Center, Tucson, Arizona. The conference is sponsored by the American Nuclear Society Divisions of the Nuclear Fuel Cycle and Environmental Science, the Arizona Section of the ANS, the University of Arizona, and the U.S. Department of Energy. The conference, which is one of a continuing series of symposia on waste management held annually in Tucson, will have sessions of both invited and contributed papers on regulatory issues, waste isolation issues, waste repository criteria, public communication problems, alternate waste forms and waste packages, alternatives for low level waste disposal, international approaches to waste management, and workshops on transportation, public confidence (how to gain it), wastes from fusion facilities, national waste management policy, and closing and decontamination of nuclear facilities. Titles and abstracts (up to 300 words) of contributed papers should be submitted by September 15, 1980 to the Publications Chairman, J. G. McCray or to the Technical Program Chairman, M. E. Wacks, Department of Nuclear Engineering, The University of Arizona, Tucson, Arizona 85721. Authors will be notified of paper acceptance by October 15, 1980. Completed papers are required by January 15, 1981. Poster Sessions are also planned and the Program Committee will select appropriate papers for these sessions.

ATMOSPHERIC TRANSPORT PROCESSES SYMPOSIUM SCHEDULED

A symposium on *Intermediate Range Atmospheric Transport Processes and Technology Assessment* will be held October 1-3, 1980 in Gatlinburg, Tennessee. The symposium is sponsored by the U. S. Department of Energy, the National Oceanic and Atmospheric Administration, and the Oak Ridge National Laboratory. It is designed to bring together experts concerned with observing and modeling atmospheric transport processes 10 to 100 km downwind of point and area sources of pollution. The purpose of this meeting is to assess the state of the art in this field, and to identify areas for future effort. Further, it is hoped that this interchange of information will result in recommendations concerning the most appropriate methods to use in technology assessment activities.

The sessions will consist of contributed papers, invited papers, and a panel discussion. The panel discussion will be concerned with models and methods to be used for technology assessment purposes and with data and research needs. Papers are solicited for sessions on technology assessments involving intermediate range atmospheric transport that have been performed; models for intermediate range transport; deposition, transformation, and complex terrain considerations; data bases available for studying intermediate range transport; and model validation studies.

For further information contact: Dr. Charles W. Miller, Technology Assessments Section, Health and Safety Research Division, Oak Ridge National Laboratory, Bldg. 7509, Post Office Box X, Oak Ridge, Tennessee 37830; Telephone (615) 576-2102.

6TH INTERNATIONAL SMiRT CONFERENCE ANNOUNCED

The *6th International Conference on Structural Mechanics in Reactor Technology (SMiRT)* will be held August 17-21, 1981 in Paris, France. SMiRT-6 is undertaken under the main sponsorship of the Commission of the European Communities and of the International Association for Structural Mechanics in Reactor Technology (IASMiRT). General responsibilities are assumed by the Societe Francaise d'Energie Nucleaire (SFEN) which includes the main French organizations in nuclear energy. A local organization committee assists SFEN in this task.

The 1st and 2nd SMiRT conferences were held in Berlin in 1971 and 1973, the 3rd in London in 1975, the 4th in San Francisco in 1977, and the 5th in Berlin in 1979. They provided a most useful meeting ground for reactor technologists, mechanical and civil structural engineers and engineering mechanics scientists from all over the world. The 6th SMiRT conference holds promise of maintaining the high level of contribution from engineers and researchers from many countries, and of increasing the interaction between fundamental and applied workers in this vital field.

For further information contact: SMiRT-6 Organization Committee, c/o SFEN-48, rue de la Procession, F-75724 Paris CEDEX 15, France.

RPI 1980 SUMMER PROGRAMS SCHEDULED

The Rensselaer Polytechnic Institute will offer a three-week comprehensive study program in nuclear power plant technology, operations, safety, maintenance, reload analysis, computer codes, and related areas. The overall program consists of three separate self-contained course modules: Basic Nuclear Power Technology, July 7-13; Nuclear Power Plant Design, July 14-18; and Analytical Methods & Computer Codes, July 21-25. For further information, call 518-270-6442 or write to the Office of Continuing Studies, Rensselaer Polytechnic Institute, Troy, New York 12181.

GEORGIA TECH OFFERS RADIATION PROTECTION COURSE

The Georgia Institute of Technology's Department of Continuing Education will offer a ten-day short course on *Radiation Protection* August 4-15, 1980. The course will place emphasis on radiation protection, interaction of radiation with matter, measurement techniques for specific radionuclides, biological effects of radiation, personnel monitoring, operation of field and laboratory instruments, public health and environmental considerations, appropriate standards, and rules and regulations. It is designed for those in industry, government (federal, state, and local) and academic institutions having an interest in and need for basic radiological health training. Completion of this course will satisfy most radionuclide-use requirements of federal and state regulatory agencies.

Georgia Tech's School of Nuclear Engineering and Office of Interdisciplinary Programs are the co-sponsors of this course.

The course fee will be \$750 and registration deadline is July 24, 1980. For further information contact the Department of Continuing Education, Georgia Institute of Technology, Atlanta, GA 30332; Telephone (404) 894-2400.

MAY 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

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Program, Div. of Technical Information and Document
Control, U.S. Nuclear Regulatory Commission,
Washington, D.C. 20555

