RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

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Accidents are the price we pay for motion. *. . . Eddie Rickenbacker*

ANS R P & S DIVISION ANNOUNCES CANDIDATES

The American Nuclear Society Radiation Protection and Shielding Division is in the process of balloting for the 1978–79 officers and executive committee. The candidates are:

Chairman: Siegfried A. W. Gerstl, Los Alamos Scientific Laboratory
Vice Chairman/Chairman Elect: William E. Kreger, Nuclear Regulatory Commission
Nancy B. Willoughby, Bechtel Corporation
Secretary: David E. Bartine, Oak Ridge National Laboratory
Stephen E. Binney, Oregon State University
Treasurer: Gerald P. Lahti, Sargent and Lundy
Executive Committee: Joyce P. Davis, Consolidated Edison Company
John L. Kamphouse, Gilbert Associates, Inc.
Thomas C. Crites, Lawrence Livermore Laboratory
Paul G. Voilleque, Science Applications, Inc.
Leland L. Carter, Hanford Engineering Development Laboratory
Warren F. Miller, Los Alamos Scientific Laboratory

Results of the balloting will be available at the June 18–23 meeting of the American Nuclear Society in San Diego.

SENSITIVITY–UNCERTAINTY SEMINAR–WORKSHOP PLANS UNFOLD

Plans continue to develop for the seminar-workshop on the "Theory and Application of Sensitivity and Uncertainty Analysis." The meeting will be held at the Royal Scotsman Inn in Oak Ridge, Tennessee, August 22–24, 1978. A block of rooms has been set aside for attendees. Please contact the motel directly for reservations. (Royal Scotsman Inn, 420 S. Illinois, Oak Ridge, TN 37830, Phone 615-483-4371)

An application form for participation in the seminar-workshop is attached to this issue of the newsletter. We urge those interested in the subject area and in attending the sessions to return the form immediately. In particular, we need suggested titles from those persons who wish to contribute a paper to the seminar.

A 200-word abstract of papers to be given in the seminar is required by **June 1, 1978.** Camera-ready manuscripts for publishing in the proceedings are required at the start of the meeting (August 22). Instructions for preparation of the papers will be mailed to the lead author in each case. Each talk will be allotted 15 minutes of presentation and 15 minutes of discussion. Questions are encouraged during the talks and a roundtable informal discussion atmosphere is what is desired. In attempting to assess the state of the art, some mechanism, such as a summary paper, panel discussion and report, or other techniques will be used to draw conclusions as a result of the presentations given at the meeting.

The workshop will begin on Wednesday, August 23, and will continue through Thursday, August 24. At least one system for performing sensitivity studies will be described and demonstrated. Plans have been made to cover the ORNL FORSS system and possibly others. Because of limited staff and facilities, it is probable that the total number of attendees will be limited. Therefore, your prompt response is urged.

NEW CHART OF THE NUCLIDES AVAILABLE

The popular General Electric wall *Chart of the Nuclides* has been revised and is now available. It is the Twelfth Edition, revised to April 1977, and compiled by F. William Walker, George J. Kirouac, and Francis M. Rourke of the Knolls Atomic Power Laboratory, Schenectady, N.Y. The Twelfth Edition is dedicated to Francis Rourke who contributed to the nuclear data evaluation before his death in 1977.

The chart is available from Educational Relations, General Electric Company, Schenectady, N.Y. 12345.

NEW CALIBRATION STANDARDS PROPOSED

ANSI Subcommittee N42.2 is seeking approval of these proposed American National Standards from the Institute's Board of Standards Review:

- "The Calibration and Usage of Dose Calibrator Ionization Chambers for the Assay of Radionuclides" (N42.13)
- "Calibration and Usage of Germanium Detectors for Measurement of Gamma-Ray-Emission Rates of Radionuclides" (N42.14)

These documents were formerly designated "N713" and "N716" and were recently approved by American National Standards Committee N42, "Nuclear Instruments." C. W. Seidel (New England Nuclear) heads the N42.2 effort, while F. X. Masse (Massachusetts Institute of Technology) is chairman for N42.13 and G. Martin (General Electric) for N42.14.

COOPERATIVE EFFORT ON SHIELDING-FACTOR CODES

Yigal Gur of the Soreq Nuclear Research Institute, Israel, spent several weeks at RSIC in March and April developing and implementing several codes which compute multigroup neutron cross sections and Bondarenko shielding factors from ENDF/B data. These codes are NANICK (flux-weighted infinite-dilution multigroup cross sections), NASIF and NARES (shielding factors). They will be made available at completion of packaging and documentation.

PERSONAL ITEMS

We have been informed of the death of **Y. Higashihara**, a radiation shielding specialist and group leader, Technology Development Group, Nuclear Power Engineering Department, Kawasaki Heavy Industries, Ltd., Tokyo, Japan. His work is being continued by **Morio Takemura**. Mr. Higashihara is well remembered in RSIC for an extended visit to Oak Ridge National Laboratory's Neutron Physics Division ten years ago, and for his many communications through the years from the Power Reactor and Nuclear Fuel Development Corporation where he was employed for five years and from his most current position.

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in the computer code collection during the month.

CCC-108/SPECTRA

The code package for unfolding of neutron spectra from activation measurements was extended to include a CDC 173-14 version (C). SPECTRA was contributed originally by Sandia Laboratories, Albuquerque, New Mexico. This new version was contributed by INRS-Energy, Quebec, Canada. FORTRAN IV.

CCC-203A/MORSE-CG

Users of combinatorial geometry in the UNIVAC version of MORSE may possibly have round-off or precision problems related to the RPP body. (Such a problem has been reported by R.S. Hubner of Sargent and Lundy.) The following changes can be made to Subroutine GG to correct these problems:

1. The card following statement number 1701 is replaced by WPA = FPD(JV) − XB(I). (The variable A will no longer be defined here.)
2. Insert the following card after statement 1710.
   WPA = VP + A
3. The card following statement 1712 is replaced by
   IF(−WPA) 1798,1798,1799
4. The card labelled GG 2590 would read
   DZ = WPA/W
5. Statement number 1740 would read
   1740 DY = WPA/W

This applies only to the UNIVAC version because the precision in combinatorial geometry in the CDC and IBM versions is sufficient to prevent such problems.

CCC-292/TIMED

The TIMED code package, a calculation of cumulated activity of a radionuclide in the organs of the human body at a given time after deposition, was extended to include modified versions of LUNG and MATRIX, two subroutines included in the original package. A contribution of Battelle Pacific Northwest Laboratories, the modified TIMED will control the amount of subcompartment redistribution allowed during calculation. Comparison of these results with results from CCC-273/DACRIN demonstrated that these models are identical if no redistribution is allowed in the modified TIMED program. Modified TIMED is a tool for evaluation of refined redistribution data as they become available, but may not represent the ideal model. The conclusion drawn from studies based on the altered TIMED is that the methods used to calculate dose commitment from inhaled radionuclides today are satisfactory for the state of the art, at least for the decay chain presented in the study. The original code package was contributed by ORNL. References: ORNL/CSD/TM-17 and James Martin Langsted's thesis (Master of Science in Radiological Sciences), University of Washington, 1977, entitled "Investigations of Several Task Group Lung Model Modifications to More Accurately Describe Pulmonary Clearance of *In Vivo* Produced Daughter Products." FORTRAN IV and Assembler Language; IBM 360.

CCC-314/ANISN-E

The modified version of the ANISN code (CCC-254) allows use of the exponential mesh model instead of standard models (linear, step, WTD) for flux calculations. It includes the new options of weighted neutron cross sections stored on tape in standard ANISN-DOT arrangement; weighted neutron and gamma-ray production cross sections stored on tape in standard DOT (CCC-276) arrangement; gamma-ray distributed source stored on tape for ANISN gamma-ray calculations; and distributed source input from tape. ANISN-E was contributed by Ente Nazionale per l'Energia Elettrica, Milano, Italy, through NEA-CPL (now NEA Data Bank), and Oak Ridge National Laboratory. FORTRAN IV; IBM 360.

PSR-13C/SUPERTOG-III

The package for generating neutron fine-group constants and P_n scattering matrices from ENDF/B was updated and extended to include version C (Mod III) which requires 50K words less fast core storage than earlier versions. Running time is increased only slightly. The Mod III is essentially the same code as Mod II except for the reduction in storage requirements. ORNL contributed all versions and modifications of SUPERTOG. FORTRAN IV; IBM 360.

PSR-96A/1DX

The one-dimensional neutron diffusion code package for producing energy-group-collapsed and self-shielded cross section was updated to include PUPX. PUPX is a cross-section handling code designed to handle data in the Bondarenko form (Russian format) for the PSR-96/1DX program. It controls reading and printing of all input data except cross-section data; prints error messages; sets an array of a given length equal to a specified constant; reads both floating point data and integer data in generalized format; reads cross-section data in the Russian format from either cards or tape; prints cross-section data in the Russian

format; checks the data for consistency; and computes f-factors for temperature-dependent isotopes and writes the cross-section data on tape in the proper order. Battelle Pacific Northwest Laboratory, Richland, Washington, through the Argonne Code Center (ACC), contributed the UNIVAC 1108 version of 1DX and PUPX to the RSIC collection. RSIC converted 1DX to the IBM 360 computer. PUPX has not been converted, but is being included in the IBM package for the information of the user who wishes to convert for himself.

PSR-110/DOQDP

The package for calculating discrete ordinates quadratures (double precision) was extended to include general purpose two-dimensional quadratures. These quadratures include half-symmetric, R-θ, and biased sets as well as fully symmetric sets. ORNL contributed the original code and this extension.

CHANGES IN THE DATA COLLECTION

The following changes were made during April.

DLC-30C/DECAYREM

The list of radioactive decay spectra in EXREM format was updated to include additional nuclides, particularly daughters of some long-lived odd-mass transuranics which were not previously included. The data files now contain all radionuclide decay data as listed in ORNL/NUREG/TM-102. ORNL contributed the original data and this revision. FORTRAN IV; IBM 360.

DLC-41/VITAMIN-C

An error was discovered in the most recent version of the 25-nuclide BCD AMPX master neutron cross sections. The BCD master was written with a new version of AIM which did not supply all the data required for transfer arrays. We are grateful to D. Chapin at Westinghouse Fusion Power Systems, Pittsburgh, Penn., for alerting us to this problem. The master was remade with the version of AIM in PSR-117/MARS. A single full reel of magnetic tape is required for transmittal. To obtain the latest version, refer to the April 1978 version of the 25-nuclide AMPX master.

VISITORS TO RSIC

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

Chuck Alexander and H. F. Soard, ORNL Chemical Technology Division; Brad Clark, University of Arizona, Tucson; Richard Demas, Tennessee Tech, Cookeville; Bernd Luers, Columbia University, New York, NY; Nigel Tubbs, OECD Nuclear Energy Agency, Paris, France; Hans Häggblom, Studsvik AB Atomenergi, Sweden; and Fritz Schmidt, University of Stuttgart, Germany.

UPCOMING MEETINGS

The *American Nuclear Society* will meet at San Diego, Calif., June 18–22, 1978. There will be a number of sessions of interest to specialists in radiation transport and shielding. Among these sessions are: Radiation Protection and Shielding Division—Dosimetry and Spectrometry, Shielding and Radiation Transport Applications, Recent Developments in In-Plant Radiation Monitoring, Advances in Radiation Transport Methods and Data for Shielding, Iodine Spiking During Reactor Transients, Fusion Reactor Neutronics and Shielding; Mathematics and Computation Division—Transport and Diffusion Computational Methods-I, Selected Topics in Environmental Data Bases, Methods in Fluid Dynamics and Heat Transfer, Transport and Diffusion Computational Methods-II; Controlled Nuclear Fusion Division—Fusion Systems Studies and Nonelectrical Applications, Inertial Confinement Fusion, Blanket Engineering and Fusion Technology, Doublet III and MFTF Programs; Reactor Physics Division—Review of Integral and Differential Data for U-233 and Th-232, Physics of Fast and Thermal Reactors, Review of ENDF/B-V Content and Performance, The Effect of Alternative Fuel Cycles on Reactor Design, Nuclear Data, Physics of Accelerator Breeding, Reactor Theory and Applications–I, Reactor Theory and Applications–II, Measurement and Calculation of

Reactor Parameters–I, Measurement and Calculation of Reactor Parameters–II; and Environmental Sciences Division—Comparison of Environmental Impacts of Nuclear and Non-Nuclear Energy Sources, Environmental Surveillance and Modeling, Selected Topics in Environmental Data Bases, Advances in Nuclear Techniques for Uranium Exploration–I: Active Borehole Logging, Operating Plant Environmental Update, Environmental Aspects of High-Level Radioactive Waste Disposal in Deep Geologic Formations, Advances in Nuclear Techniques for Uranium Exploration–II: Passive Methods, Special Viewpoints in Reactor Siting. All sessions will be held in the Town and Country Hotel, 500 Hotel Circle, P. O. Box 80098, San Diego, Calif. 92138.

The *Tenth Symposium on Fusion Technology*, sponsored by Associazione EURATOM/CNR, Universita di Padova, will be held at Padova, Italy, on September 4–8, 1978. This conference is the tenth of the Series on Fusion Technology that began at Harwell in 1960. The aim of this type of symposia is to communicate and discuss technological information on problems associated with thermonuclear research. Background information can be found in the proceedings of the previous symposia edited by the Commission of the European Communities. For further information, contact Dr. Pier Luigi Mondino, Secretariat Organizing Committee 10th SOFT, 1-35100 Padova, Instituto di Elettrotecnica, Via Gradenigo 6/A, Italy.

APRIL 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.

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