RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ATOMIC ENERGY COMMISSION

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ACCOMPLISHMENT

What one has to do, usually can be done

- Eleanor Roosevelt

CURRENT WORK AND PROBLEMS

With this issue of the Newsletter we reactivate the *CURRENT WORK AND PROBLEMS* feature which reports in brief on work in progress at various installations. Many of our customers responded to our request for information on the work that they were doing by filling out the questionnaire attached to the back of the February 1971 Newsletter; we are grateful to them. We are hopeful that some of you who have not yet responded will send us a note shortly.

We hope that some of you will read this section not only to find what others are doing which may help you, but also to find where you might be able to give a little helpful advice. If you have any suggestions, especially concerning areas where a need for work is felt, send a note to the person who has expressed the need. It will be appreciated.

Not all the responses received are summarized here, but others will be reported in subsequent issues. For this issue we chose to report current work and problems of some of our customers in Canada, Europe, and Asia.

THE DEFENCE RESEARCH ESTABLISHMENT, Ottawa, Canada (F. P. Szabo), is measuring and calculating neutron spectra transmitted through rectangular barriers of iron. Sources include Am-Be, Van de Graaff accelerator and generator (~14 MeV) neutrons. NE213 scintillation counters and the FERDOR unfolding procedure are used. For this the 05S, RESPMG, and SMOOTHIE codes are required. The 05R and MORSE codes were adapted to the SIGMA-7 for comparative calculations of the measured spectra. ANISN may also be used. Accurate measurements of the response functions for NE213, NE218, and stilbene detectors are planned. On-line data acquisition is expected to improve with the delivery of a PDP-8 computer.

Immediate needs are adequate evaluated iron cross sections and scintillation counter systems with thresholds such that the resonance region can be investigated.

THE ARBEITSGRUPPE FÜR BAUTECHNISCHEN STRAHLENSCHUTZ, Hannover, Germany H. Schultz, A. Falk, W. Futtermenger, E. Voelz, H. G. Vogt, and C. D. Wüneke of Hannover Technical University are working on several problems including atmospheric diffusion of radioactivity and environmental safety-analysis. They are concerned with problems of shielding components from gamma radiation and problems of neutron and gamma-ray streaming through gaps and ducts in reactor shields. Time dependent neutron and gamma-ray transport is also being done.

They feel that effort should be put into development of variance reduction techniques, especially for three-dimensional problems. Also they would like improved secondary gamma-ray production data.

CENTRAL RESEARCH INSTITUTE FOR PHYSICS, Budapest, Hungary (L. Koblinger, S. Makra). Work involves various types of Monte Carlo calculations. Included are dosimeter reading and neutron and gamma-ray dose distribution calculations in phantoms. Also being calculated are neutron spectra for various sources and shields, and this latter project has high priority. Nuclear accident dosimeter research (calculations and design) also has high importance. Neutron dosimetry by activation techniques is being studied. Calculations are also made of dose fractions attributed to various neutron energy groups of reactor spectra which have passed through different materials.

THE NUCLEAR ENGINEERING RESEARCH LABORATORY, FACULTY OF ENGINEERING, University of Tokyo (I. Kataoka), is constructing a Fast Source Reactor (see RSIC Newsletter No. 54) that was expected to be critical at the end of March. The reactor will provide shielding researchers with its various facilities for shielding experiments, including large cavities adjoining the lead-reflector in both vertical and horizontal directions. It is outfitted with a small fast core-source itself as well as a lead pile to form an intermediate energy neutron field and a graphite thermal column.

Following the test run of the reactor, a series of radiation streaming experiments will be started with this facility this summer as its first work on the radiation shielding for fast reactors.

THE SWISS INSTITUTE FOR NUCLEAR RESEARCH, Zurich, Switzerland (C. S. Perret) is performing calculations and engineering design of shielding for a meson factory. Problems considered are calculation of component activation, measurement and calculation of radiation damage, and design of safety and remote handling devices.

The earthshine calculation for very thick and dense shielding walls is considered to need immediate effort.

PROGRAM SET FOR ANS TOPICAL MEETING ON NEUTRON SOURCES

The program of the National Topical Meeting of the American Nuclear Society, NEUTRON SOURCES AND APPLICATIONS, to be held in Augusta, Georgia, April 19-21, is now available. Sponsored by the Savannah River Section, Isotope and Radiation Division, and the Southern Interstate Nuclear Board, Savannah River Operations Office, AEC, the meetings will be held in the new Augusta Town House.

The following topics will be covered at the meeting: Neutron Sources, Medical and Forensic Uses of Neutrons, Exploration and Protection of Natural Resources, and Industrial Uses of Neutron Sources. The topics will be presented by rapporteurs who will summarize and synthesize more than 70 contributed papers. All the contributed papers will be printed in full in the proceedings. RSIC staff member, H. Clyde Claiborne, will give an invited paper entitled "Latest Developments in Shielding Neutron Sources" and will be a member of the Panel on Neutron Sources and Applications.

Information concerning the meeting may be secured from the general chairman, Clark H. Ice, Savannah River Laboratory, or by writing to ANS Topical Meeting, P. O. Box 85, Aiken, S. C. 29801.

SDI PROFILES UPDATED

This month 30 customer profiles for the Reactor-Weapons shielding system have been updated. Thirty-eight new profiles have been entered into the system. We welcome constructive suggestions from both our new and former participants.

NEW POLICY FOR DISTRIBUTING ABSTRACTS AND BIBLIOGRAPHIES

In the past, subscribers indicating a desire to be placed on our routine distribution for mailings in the fields of Shielding Computer Codes, Reactor and Weapons Shielding, and/or Space and Accelerator Shielding have been provided automatically with copies of the volumes of Bibliographies and Abstracts of the Literature Examined by RSIC in the indicated fields of interest. However, since the supplies of these volumes are at present limited, we will now send them only upon a direct request.

THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, INC.

NUCLEAR AND SPACE RADIATION EFFECTS

JULY 20-23, 1971

THE NEW ENGLAND CENTER FOR CONTINUING EDUCATION AND THE UNIVERSITY OF NEW HAMPSHIRE

DURHAM, NEW HAMPSHIRE

PRELIMINARY PROGRAM

Learning Center

Adams Residential Tower

TECHNICAL SESSIONS

- DISPLACEMENT EFFECTS IN MATERIALS
- RADIATION EFFECTS IN DEVICES
- SURFACE EFFECTS AND CHARGE BUILDUP
- CIRCUIT AND SYSTEM ANALYSIS
- IONIZATION EFFECTS
- DOSIMETRY AND ENERGY DEPOSITION

INVITED SPEAKERS

"Charge State Effects in Displacement Damage"
James W. Corbett, General Electric Research and Development Center

- "Radiation Effects in Gallium Arsenide and Optical Devices"
  Charles E. Barnes, Sandia Laboratories
- "Sorption on IV-VI Single Crystal Films - A View of Chemical Sensing"
  Jay N. Zemel, Moore School of Electrical Engineering, University of Pennsylvania
- "Adequacy of Mathematical Models for Microcircuits"
  Fred A. Lindholm, University of Florida
- "A Comparison of Color Centers in Oxides and other Materials"
  William A. Sibley, Oklahoma State University

"Electron Slowing Down and Cascade Spectra in Solids"
Rufus H. Ritchie, Oak Ridge National Laboratory

Registration forms, programs, and other material will be distributed in May. Meanwhile, additional information on the Conference may be obtained from:

CONFERENCE CHAIRMAN
R. E. McCoskey
ATTN: AMXDO-RBG
Harry Diamond Laboratories
Washington, D.C. 20438

CONFERENCE COORDINATOR
Dr. Frank Carter, Jr.
New England Center for Continuing Education
Durham, N.H. 03824

PUBLICITY CHAIRMAN
Mr. Donald Hamman
Battelle Columbus Laboratories
505 King Avenue
Columbus, Ohio 43201

UPDATE TO CCC-70/CHARGE CODE PACKAGE

Y. R. Yucker, Advance Propulsion Department, Research and Development, McDonnell Douglas Astronautics Company Western Division, has updated the CCC-70/CHARGE code package by supplying a new version, CHARGE II, which agrees with the published report, DAC-62231 (April 1969). RSIC now has available a CDC-6500 version of CHARGE II and an IBM 360/75/91 corresponding version. Requesters should ask for CCC-70A (IBM 7090), B (CDC 6600), or C (IBM 360). It should be noted that version A represents the original program and does not contain the more recent additions to the program. A reel of tape should accompany a request for the package with instructions as to how it should be written.

CHARGE II is a FORTRAN IV program designed for the analysis of primary electron and proton or heavy charged particle passage through plane or spherical shields containing up to 100 regions and the attendant generation and transmission of electron-induced X-Rays (bremsstrahlung) and proton-induced secondary protons and neutrons.

UPDATE TO CCC-82/ANISN

The ANISN code has been updated to allow the collapsing of fine group cross sections using results of an ANISN adjoint calculation as the weighting function. In order to properly do the adjoint weighting, modified versions of subroutines PLSNT, FEWG, and WATE are required. The modified subroutines have been added to both the IBM 360 (CCC-82C) and CDC 6600 (CCC-82D) versions of the code, although they have not as yet been used on the CDC 6600. A small magnetic tape will be sufficient for transmitting the modified subroutine.

UPDATE TO PSR-13/SUPERTOG

A revised version of SUPERTOG-II has been given to RSIC by R. Q. Wright of ORNL and is now available as PSR-13C/SUPERTOG. This version of the neutron multigroup generating code will read ENDF/B Version II format. In the unresolved resonance treatment, the channel radius is now computed using the formula in the ENDF procedures manual, BNL-50066 (ENDF-102), Rev., Vol. I. Also, a first order correction for interference between resonances in a given (L,J) state with resonances in other (L,J) states has been made. Some coding changes in subroutines INELAS, TMF5, and LFONE were made to allow the processing of the Penny-Kinney iron evaluation (MAT=1124).

CORRECTION TO ENDF/B PHOTON INTERACTION LIBRARY (DLC-7)

Bob Howerton of Lawrence Radiation Laboratory, Livermore, has recommended that the ENDF/B Photon Interaction Library be updated by increasing, by 3-5%, the pair production cross section at 4 MeV for all elements. In addition, some corrections should be made to the incoherent scattering cross sections at 0.8 MeV for some elements in a limited range (Z=31 to 44). We are grateful to John Hubbell of the National Bureau of Standards for pointing out the error and for providing the revised values. These changes require that the total cross sections also be revised.

The RSIC designation for the revised library is DLC-7D.

Tables of the corrected values are available upon request. If users wish to update their tapes, RSIC will provide input data cards for the CRECT code which is available from the Argonne Code Center. (CRECT corrects an ENDF/B BCD card image tape - BNL 13582 (ENDF-110)). If users cannot run CRECT at their installation, or prefer that we correct or provide a new library, they are asked to mail tape and request to RSIC.

PERSONAL ITEMS

John G. Picarelli, of the Air Force Weapons Laboratory, Kirtland Air Force Base, Albuquerque, New Mexico, was recently promoted to the rank of Captain.

Ralph Best, formerly of Battelle Memorial Institute, Columbus, Ohio, is now employed by Nuclear Fuel Services, Rockville, Maryland.

Dr. Iwao Kataoka left the Nuclear Ship Division, Ship Research Institute, in January, and is now with the Engineering and Development Division, Mitsubishi Atomic Power Industries, Inc. He is responsible for the development and design of fast reactor shields. Concurrently, he holds a position at the Faculty of Engineering, University of Tokyo, lecturing on radiation shielding and planning radiation shielding research for the Fast Source Reactor (see *CURRENT WORK AND PROBLEMS*, this issue).

VISITORS TO RSIC

Visitors to RSIC during the month of March were:

M. K. Drake, Brookhaven National Laboratory, Upton,L.I., N.Y.; R. LaBauve and L. Stewart, Los Alamos Scientific Laboratory, Los Alamos, N.M.; M. P. Fricke, Gulf Radiation Technology, San Diego, Calif.; G. Longo, CNEN, Bologna, Italy; D. C. Kaul, DASA, Washington, D.C., V. Konshin, International Atomic Energy Agency, Vienna, Austria; V. Saverio, OECD/CCDN, Gif-Sur-Yvette, France; L. Schaenzler, Erprobungsstelle 53 der Bundeswehr, Munster, Germany; K. W. Seemann, Knolls Atomic Power Laboratory, Schenectady, N. Y.; B. Sturm, CCR EURATOM, Ispra, Italy.

MARCH ACCESSION LIST OF LITERATURE

The RSIC is now aware of the literature cited in the following list. These titles are announced before processing and indexing so that there will be no delay and can serve as a prompt announcement of current literature.

RSIC maintains a microfiche file of literature entered into its information system. Computer searches of this system (which produces a special bibliography) and duplicate microfiche copies of the literature in our file are available upon request. Naturally, we cannot supply copies of literature which is copyrighted (such as books or journal articles) or whose distribution is restricted.

REACTOR AND WEAPONS SHIELDING

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H. Albinsson, L. Lindow

AAEC/E-198, Suppl. 1 — *August 1970*

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A. R. de L. Musgrove

AAEC/TM-550 — *July 1970*

The Measurement of ^{46}Sc in Titanium Wire Fast Neutron Monitors
R. A. Greig, S. J. Bone, R. E. J. Porritt
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Safeguards Applications for Isotopic Neutron Sources
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C. Devillers

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Automatic Transfer of Material from the Reactor Core and Various Associated Problems
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Measurement of Neutron Flux by the Fluctuation Method
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Gamma Rays Emitted by the Fissionable Nuclides and Associated Isotopes
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Dep.; NTIS (U.S. Sales only)

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F. W. Krueger

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Fast Neutron Spectrum Measurements in the MTR Scandium and Iron Filtered Beams
J. E. Powell, J. W. Rogers

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