RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

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No. 146 *February 1977*

See everything, overlook a lot, correct a little. *...Pope John XXIII*

NEWS ON THE FIFTH INTERNATIONAL CONFERENCE ON REACTOR SHIELDING

Plans continue to progress for the Fifth International Conference on Reactor Shielding to be held April 18-23 in Knoxville.

The technical program was published in the December *RSIC Newsletter* and in the January *Nuclear News*. If you do not have the full packet of information on the conference, please let us know. Hotel reservations should be made promptly as they may run short during Knoxville's annual Dogwood Arts Festival. More than 200 people have already indicated they plan to attend.

It has been decided to ask participants to pre-register if possible and we include a form in this issue for that purpose. This will save us all time and hassle at the time of the conference. Please check the items in which you wish to participate and send us a check made to Fifth ICRS. Note that some events will have a limited attendance. Pre-registering will assure your reservation. We will refund your money, of course, if you cannot attend.

Plans are being made for the Saturday all-day tour of the Tennessee Valley Authority facilities near Chattanooga. The facilities include (1) the Power Distribution Center, where the power generating plants of the largest utility in the world are controlled, (2) the Sequoyah PWR nuclear plant (80% completed), and (3) the Training Center which has computer control rooms duplicating PWR and BWR plants. Participants and guests will wind up at the Chattanooga Choo-Choo, a beautiful restored Victorian-era railroad station, for lunch and shopping. The Choo-Choo has a model railroad museum, formal gardens and 1900-period shops with hand-crafted dolls, leather goods, blown glass, books, paintings, antiques, pottery, and hand-crafted jewelry. The only cost is the lunch but tickets are limited. Please pre-register to assure your reservation.

The Friday afternoon ORNL tour will have options which include the Oak Ridge Linear Accelerator, Tower Shielding Facility, High Flux Isotope Reactor, Graphite Reactor (a national historic landmark), and others. Union Carbide Corporation will host a reception following the tour and participants will be able to tour the new American Museum of Atomic Energy. The free tickets are limited; please pre-register to assure your reservation.

The steamboat, Julia Belle Swain, normally based in Chattanooga, has been engaged for a dinner cruise on the Tennessee River.

The luncheon speakers include: William D. Rowe, Deputy Assistant Administrator for Radiation Programs, Environmental Protection Agency; James M. Williams, Assistant Director for Development and Technology, Division of Magnetic Fusion Energy, Energy Research and Development Administration; Aubrey J. Wagner, Chairman Board of Directors, Tennessee Valley Authority; Harold R. Denton, Director Division of Site Safety and Environmental Analysis, Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission; and Betty F. Maskewitz, Director Radiation Shielding Information Center, Oak Ridge National Laboratory.

ANS RADIATION PROTECTION AND SHIELDING OUTSTANDING SERVICE AWARDS

The American Nuclear Society Radiation Protection and Shielding Division presented Outstanding Service Awards to Keran O'Brien and Norman Schaeffer in acknowledgment of their contributions toward the understanding and advancement of knowledge in radiation transport and shielding. Citations were presented at the 1976 winter Washington meeting. The citations for O'Brien and Schaeffer read as follows:

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

NORMAN M SCHAEFFER

its Award for his leadership in the field of radiation shielding technology and his many contributions to shielding through service to the Society. In particular:

1. He has spent many years in industrial organizations working in the area of radiation shielding; first, with General Dynamics, Fort Worth from 1953 to 1963 on the nuclear aircraft propulsion program; since that time as an organizer and president of Radiation Research Associates.
2. He has served the Shielding and Dosimetry Division as a member of the Executive Committee from 1960 to 1962. He has been chairman of the Nominating Committee (1974-75). Most importantly, he chaired the Society's ANS-6 (shielding) Standards Committee from 1967 to 1971, during which time the effort of standardization in the radiation shielding field was seriously begun.
3. He has authored a number of important publications but will be remembered longest for his editorship of the very useful text, "Reactor Shielding for Nuclear Engineers" published by the AEC (TID-25951, 1973).

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

KERAN O'BRIEN

its Award for Outstanding Service to the Society, to the Division, and to the radiation transport community worldwide.

The award is made in recognition of his achievements in radiation protection, particularly as regards high-energy radiation shielding. Since his first publications on the subject of radiation transport in Radiation Research and Nuclear Science and Engineering in 1958, which originated in dose calculations made during nuclear weapons testing, he has made numerous presentations in the literature and at many meetings of the Society. The work over the years has aided greatly in systematizing the knowledge in:

1. High-energy neutron spectrometry in stray radiation fields and resulted in the use of spectral unfolding at various laboratories in the United States and around the world;
2. Beta-ray transport and dosimetry for man-made and natural sources;
3. High-energy accelerator shielding calculations that were employed at a number of multi-GeV machines;
4. The extension of high-energy shielding calculations to cosmic-ray particles in the earth's atmosphere, because these particles contribute significantly to man's environment, as well as to special problems in the atmospheres of Venus and Titan;
5. The calculation of cosmogenic nuclide production to provide a basis for interpreting the importance of these nuclides when released from nuclear operations; and
6. The determination of organ doses resulting from man's exposure to naturally radioactive sources.

The theoretical calculations that were developed on a sound physical and experimental basis, have proved to be a reliable means for the prediction of dose in many problem areas in the nuclear business and have been employed at most of the large laboratories that operate particle accelerators. O'Brien's work has led to his appointment as a charter member of the Advisory Panel for Accelerator Radiation Safety established by the Atomic Energy Commission 1965 and to service in various capacities within the Division in recognition of the increasing importance of basic dosimetry as an integral part of other radiation protection activities.

NRC SPONSORS RSIC AND PLANS NEW PROGRAMS

The U. S. Nuclear Regulatory Commission (NRC) has become an official sponsor of RSIC this fiscal year through an interagency agreement with ERDA. The relationship recognizes formally RSIC's support of NRC programs since its inception.

In addition to sponsorship of RSIC's basic information analysis center activities, NRC personnel have expressed interest in utilizing the RSIC experience in areas other than shielding. The ORNL Neutron Physics Division's Technology Resource Group (TRG), the administrative umbrella under which RSIC operates, is studying the feasibility of establishing (1) an NRC Measured Data Repository (MDR) for the results of the local Blowdown Heat Transfer Testing Programs, and (2) a computing technology information analysis center in which the "Open Code/Data Package Concept" (RSIC model) would be applied to specific NRC programmatic areas.

The NRC-MDR is expected to begin operations in FY 1978.

It has been proposed that the initial NRC support be directed towards the safety analysis of nuclear fuel shipping casks. Methodology for this analysis is being developed as the Standardized Cask-Analysis for Licensing Evaluation (SCALE) system. A modular computing system is planned to include shielding analysis, heat transfer studies, criticality studies, and accompanying cross section and other data processing technology. It is anticipated that in the long term, the system will also include structural analysis.

To initialize the feasibility study, RSIC has accepted responsibility for disseminating KENO-IV, the multigroup Monte Carlo criticality code package, announced this month as CCC-288 and will work with the user community and the code developers to advance the technology via the open code package concept. KENO-IV calculated $k^{effective}$, lifetime and generation time, energy-dependent leakages and absorptions, energy- and region-dependent fluxes and region-dependent fission densities. Criticality searches can be made on unit dimensions or on the number of units in an array.

CCC-288/KENO-IV is not currently packaged by RSIC standards in that cross sections required by the packaged sample problems are in binary form. An effort underway will include standardization of packaging and other procedural changes to encourage interchange and feedback of user experience. An auxiliary effort will be to collect and make available state-of-the-art cross sections for use in KENO-IV applications.

CROSS SECTIONS IN MORE VERSATILE FORMATS ADDED TO THE RSIC DATA COLLECTION

User needs have dictated the more flexible form of two libraries which have been added to the collection this month. They contain more versatile retrieval capability to allow the user to do his own self shielding and temperature correction, group collapsing, etc. Pertinent details to obtain these are given in the Data Section of the Newsletter. A general description of each follows.

First Version of CTR Processed Library Released

An 171-neutron, 36-gamma-ray-group cross section library for 36 materials has been designated DLC-41/VITAMIN-C (Versatile Integrated Techniques for Using AMPX and MINX Interfaces for Neutronics Studies with Coupled Libraries). This library was generated on behalf of ERDA-DMFE contractors as a task of RSIC in its role as a Data Center for ERDA-DMFE.

Specifications for a general-purpose CTR Processed Multigroup Cross Section Library were developed by collaboration between ERDA-DMFE neutronics contractors and RSIC. To obtain the flexibility sought, the neutron cross section processor MINX was used to generate the neutron cross sections, and modules of AMPX were used for the gamma-ray cross sections,. The primary output format chosen was the AMPX master interface for neutron and gamma-ray cross sections with appropriate AMPX modules for manipulating self shielding and merging into coupled cross section libraries.

Output will also be provided in CCCC neutron cross-section formats for users who wish to work in that system. Computer codes are provided for self-shielding the CCCC neutron data and merging them with the AMPX gamma-ray data to obtain coupled cross sections. This was possible by sharing production costs and computing technology with the Shielding and Reactor Physics Analysis Section at ORNL in their ERDA-DRDD sponsored cross section library generation work. In order for the user to utilize the full flexibility offered, various retrieval and manipulation programs were developed for merging and coupling the AMPX and CCCC interfaces. In addition, codes for converting, collapsing and self-shielding the CCCC

interfaces are also available. These were developed at LASL and Westinghouse-ARD and made operational at ORNL on the IBM 360/91. It is expected that the (126,36) DRDD library, which was derived from the (171,36) library and has undergone extensive testing on CSEWG fast reactor benchmarks and LMFBR core and shield analysis, will be released next month.

A validation effort in support of the DMFE data package was appropriate because of the new types and quantities of data and retrieval programs which were written, adapted and/or modified in the course of this development. A meeting, attended by representatives from ANL, BNWL, LASL, LLL, ORNL, PPPL, the University of Wisconsin, and Westinghouse FPS, was held at ORNL to discuss procedures for such a validation effort. The goals of the effort were to test the validity of the output of the neutron and gamma-ray processing codes and to demonstrate the various retrieval programs that support the library. No attempt was made to separate processing approximations from nuclear data deficiencies in the basic ENDF/B Library. A preliminary version of the library was distributed to six installations, made operational, and used to calculate the sample problems, and then applied to other selected problems. The participants performed one or more calculations, provided feedback on problems encountered with codes or data, and made comparisons with calculations using other data libraries. The results are included in documentation to accompany the final version of the library.

LIB-IV, A Library of Group Constants for Nuclear Reactor Calculations

This 50-neutron-group, 101-isotope library of multigroup constants has been designated DLC-40/LIB-IV. The library was generated on behalf of ERDA-DRDD by LASL. It is a rather complete and tested multigroup library based on the latest version of the Evaluated Nuclear Data Files (ENDF/B-IV) and generated using the MINX nuclear cross-section processing code. This library is being issued in the CCCC-III interface format and is intended for use by the nuclear community for fast-reactor design calculations.

The Committee for Computer Code Coordination (CCCC) interface system is part of an ambitious attempt by the Division of Reactor Research and Development (DRRD) of the United States Energy Research and Development Administration (ERDA) to facilitate the exchange of codes and data for reactor design among the laboratories and companies involved in the DRRD program. LIB-IV contains three CCCC-III files: ISOTXS (isotope constants, cross sections, and matrices), BRKOXS (self-shielding factors), and DLAYXS (delayed neutron yields and spectra by time group). The DLAYXS file was generated from ENDF/B-IV using the new NJOY processor.

Retrieval codes for conversion, merging, and group collapsing were also developed as part of this effort at LASL and are included with the library.

The library has been successfully applied to several CSEWG benchmark criticals. Results are included in the documentation.

UPCOMING CONFERENCES

An international specialists symposium on **Neutron Standards and Applications** will be held March 28-31, 1977, at the National Bureau of Standards. The purpose of the meeting will be to assess progress in neutron standards, to review the spectrum of applications of neutron standards and to establish direction for future work.

For further information, European scientists should contact: Dr. Horst O. Liskien, 014/58.94.21, Central Bureau Voor Nucleaire Metingen, B-2440 Geel, Steenweg Naar Retie, Belgium. Other participants should contact: Dr. Charles D. Bowman or Dr. Allan D. Carlson, RAD P B119, National Bureau of Standards, Washington, D. C. 20234, Telephone: 301-921-2234.

The Sixth International Congress of Radiation Research will be held in Tokyo from May 13 to May 19, 1979. The congress will have plenary sessions, symposia and sessions for proferred papers on the subjects of radiation research and related areas. The first circular will be distributed in summer of 1977.

For further information, contact Dr. S. Okada, Secretary General of the 6th ICRR, Hongo P. O. Box 152, Bunkyo, Tokyo 113-91, Japan, Cable: SIXICRR Tokyo, Telephone: 03-812-2111, Ext. 7729 or 3696.

1977 IEEE Annual Conference on Nuclear and Space Radiation Effects will be held in Williamsburg, Virginia July 12-15, 1977. The conference is sponsored by the IEEE/NPSS Radiation Effects Committee in cooperation with the College of William and Mary.

The conference will be held on the campus of the College of William and Mary, within the colonial village of historic Williamsburg, Virginia, July 12-15, 1977. This conference is cosponsored by the Defense Nuclear Agency and JPL/NASA. The conference will cover theoretical and experimental studies of nuclear and space radiation effects on materials and components, circuits, and electronic systems. The program will consist of six to eight sessions of contributed papers, including a poster session, and a number of invited papers by recognized authorities in radiation effects and allied fields. Papers describing significant contributions in the following or related areas are solicited:

* Radiation Effects on LSI Circuits Including Microprocessors, Memories, and Peripherals
* Space Radiation Effects and Spacecraft Charging
* Basic Mechanisms of Radiation Effects on Materials and Components
* Surface and Interface Effects in MIS Structures (MOS, CCD, and Bipolar)
* Hardness Assurance Methodology and Process Controls
* Circuit and Systems Hardening Techniques
* Electromagnetic Pulse Effects (i.e., Free Field, Internal and Systems Generated)
* Radiation Transport, Energy Deposition, and Dosimetry
* Simulators

Summaries must be submitted by February 15, 1977 to the Technical Program Chairman: R. B. Oswald, Associate Technical Director (Actg.) Harry Diamond Laboratories, 2800 Powder Mill Road, Adelphi, MD 20783, Phone: 202-394-2208.

Acceptance letters will be mailed early in April. Registration forms, programs, and additional conference information will be distributed in June 1977. Conference Chairman: H. L. Hughes, Code 5216, Naval Research Laboratory, Washington, DC 20375, Phone: 202-767-2429.

NEW PUBLICATIONS AVAILABLE

The International Commission on Radiation Units and Measurements (ICRU) announces two new publications: **ICRU Report 24, Determination of Absorbed Dose in a Patient Irradiated by Beams of X or Gamma Rays in Radiotherapy Procedures**, and ICRU Report 25, **Conceptual Basis for the Determination of Dose Equivalent.**

ICRU Report 25 is concerned with the physical quantities employed in radiation protection, their applicability to various irradiation conditions, and their interrelationships. Contains major sections on dose equivalent, quantities and their interrelationships, the index quantities and their utilization, and the determination of dose equivalent index. Also includes appendices covering the hierarchy of radiation quantities, the specification of absorbed dose, and the effect of angular distribution of the incident radiation. (Paperbound, 19 pages. 1-9 copies, $5 each; 10-99 copies, $4.50 each; 100 or more copies, $4 each. From ICRU Publications, P. O. Box 30165, Washington, D. C. 20014.)

Radiation Protection for Medical and Allied Health Personnel, NCRP Report No. 48, addresses the problem of providing information about the possible biological effects and safe levels of radiation to individuals involved in the use of radiation in the healing arts. The report includes sections on biological considerations, the x-ray department, radioactive nuclides, laboratories, the morgue, and disposal of radioactive waste, as well as nine appendices covering such topics as maximum permissible doses and dose limits, radiation detecting devices, physical data for commonly used radionuclides, caution signs, warnings and labels, emergency procedures, and a glossary. (Paperbound $4.50 per copy in orders of 1-99; $4 per copy, 100-999; $3.50 per copy, 1000 or more. From NCRP Publications, P. O. Box 30175, Washington, D. C. 20014.)

Structural Shielding Design and Evaluation for Medical Use of X Rays and Gamma Rays of Energies up to 10 MeV, NCRP Report No. 49, supersedes Report No. 34, published in 1970. The new report contains recommendations and technical information; discussion of factors to consider in selection of shielding materials and in calculation of barrier thickness; specific values of parameters used in formulation of tables, some of which have been revised with updated data; and curves giving attenuation in, or transmission through, various shielding materials for radiation of various energies. (Paperbound 1-99 copies, $3.50, each; 100-999 copies, $3.25 each; 1000 or more copies, $3 each. From NCRP Publications, P. O. Box 30175, Washington, D. C. 20014.)

Environmental Radiation Measurement, NCRP Report No. 50 presents a systematic consideration of environmental radiation measurements, studies the role of measurements in the assessment of dose to man through critical pathways, and includes information on the properties of widely distributed radionuclides and typical radiation fields in the environment, and methods for their measurement. (Paperbound $5 each, 1-99 copies; $4.75 each, 100-999 copies; $4.50 each, 1000 or more. From NCRP Publications, P. O. Box 30175, Washington, D. C. 20014.)

The ANSI Standard, N652-1976, A Guide for Acquisition and Documentation of Reference Power Reactor Physics Measurements for Nuclear Analysis Verification (ANS-19.4), is now available. Order from American Nuclear Society, 244 E. Ogden Ave., Hinsdale, Illinois 60521, price: $14.00.

U.S. INTERPRETATION OF SI UNITS

The Metric System of Measurement–Interpretation and Modification of the International System of Units for the United States was addressed by a recent notice authorized by the Department of Commerce. The notice is consistent with the Metric Conversion Act of 1975, which declares that the policy of the U.S. shall be to coordinate and plan the increasing use of the metric system in the U.S.

Tables of recommended units and associated materials on the SI system for domestic use are provided in the notice. Included among "already well established" units that can be used, subject to future review, are the barn, bar, curie, roentgen, and rad. Superseded is a prior notice published in the **Federal Register** by the National Bureau of Standards (NBS) on June 19, 1975.

Metric units, symbols, and terms that are not in accordance with this "Interpretation and Modification" are no longer accepted for continued use in the U.S. For more information regarding SI units, contact the Office of Technical Publications, NBS, U.S. Department of Commerce, Washington, D.C. 20234. (FR 12/10/76)

IS YOUR ADDRESS CORRECT?

As you return your questionnaires we are attempting to update your addresses so your mail department can function more smoothly and promptly in delivering your mail. A great deal of our correspondence to you is returned with messages such as "Addressee unknown", "Addressee terminated", sometimes when you are still there. Please take time to scan your address on this mailing to determine if it is current and complete. If it is not, sit down right now while it is fresh on your mind and dictate a letter updating your address. It will help us serve you better. If any of your friends no longer receive the newsletter, it is possible their mail was returned and thus their name has been removed. This is costly to us and inconvenient for our patrons and friends.

As you change jobs or locations, please remember to keep us informed. If your newsletter is now being sent to a company or a library, please give us the name of a contact. We will gladly change your contact whenever necessary.

Also, we use our directory internally for both addresses and telephone numbers. Please let us know your current *commercial telephone number* and your new *FTS number (if applicable)*; it would be a real favor to us.

PERSONAL ITEMS

John A. Mayer, Jr., associate professor of mechanical engineering at Worcester Polytechnic Institute, has been selected by the American Society of Mechanical Engineers to become an ASME Congressional Fellow for 1977. He was one of two engineers chosen nationally to work with Congress and Congressional committees to provide engineering expertise necessary for developing technically sound public policies.

Walter Meyer, chairman of the nuclear engineering program at the University of Missouri-Columbia, has been elected vice chairman of the Nuclear Engineering Division of the American Institute of Chemical Engineers.

Dan Ingersoll has joined the ORNL Neutron Physics Division staff. He was previously at the University of Illinois, Urbana.

W. H. (Bill) Harless of General Electric has been transferred to the G.E. Fast Breeder Reactor Division.

VISITORS TO RSIC

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

Albert Rainis, Ballistics Research Laboratory, Aberdeen Proving Ground, Maryland; Kenneth Carter, King College, Bristol, Tennessee.

ORIGEN DATA ERROR ALERT

CCC-217/ORIGEN

It has been discovered that the atomic abundance of ^{124}Sn has been inserted into the library of light elements as the atomic abundance of ^{123}Sn. All users should be advised of this as the error is contained in the original data files transmitted with ORIGEN. We are now in the process of updating our master files.

NOTICE TO AMPX USERS

If the following statements do not appear in your SMUG module, please add them.

```
BLOCK DATA
COMMON/DEGD/CM,R,PC,PI
DATA CM, R, PC, PI/.510977,2.817502E-13,4.135407,3.141593/END
```

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made during January.

CCC-245/TIGER

This one-dimensional multilayer electron/photon Monte Carlo transport code package was extended to include an IBM 360 version (B). Sandia Laboratories, Albuquerque, New Mexico contributed the CDC version; RSIC converted the CDC package to run on the IBM machine.

CCC-274/TIMEX

This one-dimensional time-dependent multigroup explicit discrete ordinates code package was extended to include the UNIVAC 1106 version (C), which was contributed by Ciudad University, Madrid, Spain. Los Alamos Scientific Laboratory contributed the IBM 360 and the CDC 6600 versions of TIMEX.

CCC-287/PROB

This multi-group one-dimensional transport code collision probability method was contributed by the National Commission of Atomic Energy, Department of Reactors, Buenos Aires, Argentina through the NEA-CPL, Ispra (Varese) Italy. Reference: CNEA-RE-58 (June 1972), FORTRAN IV; IBM 360.

CCC-288A/KENO IV

This multigroup Monte Carlo criticality code package was contributed by the Computer Sciences Division, Union Carbide Nuclear Division, Oak Ridge, Tennessee. References: ORNL-4938 and CTC-5. FORTRAN; IBM 360.

CHANGES IN THE DATA LIBRARY COLLECTION

The following changes were made in January.

DLC-40/LIB-IV

The 50-group, 101-isotope library of multigroup constants for nuclear reactor calculations, contributed by Los Alamos Scientific Laboratory, is now available from RSIC as well as the National Neutron Cross Section Center at Brookhaven National Laboratory. The library was generated from ENDF/B-IV using the MINX and NJOY programs and the output is in CCCC Version III interface formats. There are three files: ISOTXS (isotope constants, cross sections, and matrices), BRKOXS (self-shielding factors) and DLAYXS (delayed neutron yields and spectra by time group). The materials available are those found in ENDF/B-IV. Retrieval codes are provided for merging, BCD Binary Conversion, and exact energy group collapsing. IBM versions were supplied by ORNL. References: LA-6260-MS, LA-6219-MS, LA-6287-MS. Transmittal can be made on two full reels of magnetic tape (blocked). CDC 7600 and IBM 360/91.

DLC-41/VITAMIN-C

This 171-neutron, 36-gamma-ray-group 36-material cross-section library was contributed by Oak Ridge National Laboratory. It was generated from ENDF/B-IV using the ORNL version of MINX for the neutron cross sections and self shielding factors and the AMPX system for the gamma-ray production and interaction cross sections. The materials included are ^{1}H, ^{2}H, ^{6}Li, ^{7}Li, ^{9}Be, ^{10}B, ^{11}B, ^{12}C, ^{14}N, ^{16}O, F, ^{23}Na, Al, Mg, Si, K, Ca, V, Cr, ^{55}Mn, Fe, Ni, Cu, ^{93}Nb, Mo, Pb, ^{234}U, ^{235}U, ^{236}U, ^{238}U, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu, and ^{241}Am. Data are available in neutron, gamma-ray production, and gamma-ray interaction files in AMPX interface format. Retrieval codes from the AMPX system are provided for merging, editing, checking, BCD binary conversion, coupling, energy group collapsing, and production of working librarys in XSDRNPM, ANISN, and other formats. References: ORNL-RSIC-37, ORNL/TM-3706. Transmittal can be made on three full reels of magnetic tape (blocked). IBM 360/91.

JANUARY 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.

Special bibliographies and selected computer-printed abstracts of the literature in the RSIC system are available upon request. The Selective Dissemination of Information (SDI) Service is available by submitting a list of subject categories defining the recipient's interests.

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-5522
Predicting Radiation Fields Around Reactor Components.
Lister, D.H.
June 1976
NTIS (U.S. Sales Only)

AECL-5530
The Effect of Neutron Irradiation on the Tensile Properties and Growth of Zirconium 8.6 wt. % Aluminum.
Rosienger, H.E.
September 1976
NTIS (U.S. Sales Only)

ANS/SD-76/14
Handbook of Radiation Shielding Data.
Courtney, J.C. (Ed.)
July 1976
NTIS

ARH-SA-275; CONF-760935-17
Fusion Reactor Radioactive Waste Management.
Kaser, J.D.; Postma, A.K.; Bradley, D.J.
August 26, 1976
Dep., NTIS $3.50

BNL-21469
INDOSE: Program for Calculating Radial Energy Deposited Due to Scattered Particles.
Varma, M.N.; Meo, J.; Kuehner, A.V.; Baum, J.W.
May 1976
Dep., NTIS $3.50

BNL-50453
Neutron Scattering for the Analysis of Biological Structures.
Schoenborn, B.P. (Ed.)
Report of Symposium Held June 2-6, 1975
1976
NTIS $13.50

BNWL-1915
Dose-to-the-Population Exposure Estimates for Use of Plutonium-238-Powered Artificial Hearts.
McKee, R.W.; Clark, L.L.; Cole, B.M.
September 1976
Dep., NTIS $9.00

BNWL-1933
Assessment of Materials Needs for Fusion Reactors.
Allison, G.S. (Comp.)
July 1976
NTIS

BNWL-2105
Carbon-14 Production in Fusion Reactors.
Scheele, R.D.; Burger, L.L.
September 1976
Dep., NTIS $4.00

BNWL-SA-5750; CONF-760935-19
Quality of Fissile Fuel Bred in a Fusion Reactor Blanket.
Leonard, B.R.,Jr.; Jenquin, U.P.
August 1976
Dep., NTIS $3.50

CEA-N-1822 (In French)
Library of Data for Fission Products. Fourth Version.
Blachot, J.; Devillers, C.; de Tourreil, R.; Nimal, B.; Fiche, C.; Noel, J.P.
October 1975
INIS

CINDA 76/77, Suppl.1
An Index to the Literature on Microscopic Neutron Data.
IAEA
December 1976
International Atomic Energy Agency, Vienna

CONF-760310
Management of Radioactive Wastes from the Nuclear Fuel Cycle.
IAEA
Proceedings of a Symposium Held in Vienna, 22-26 March 1976
1976
International Atomic Energy Agency, Vienna

EGG-1183-2311
Uncollided Flux Ratios and Fluxes as Functions of Angles Subtended by Various Geometrical Configurations.
Artuso, J.F.
March 1975
Dep., NTIS $5.50

ERDA-tr-125
Questions on the Physics of Reactor Shielding. Vol.6.
Egorov, Yu.A.; Mashkovich, V.P.; Pankrat'yev, Yu.V.; Suvorov, Ya.P.; Tsypin, S.G.
1974
NTIS $9.25

EUR-5684.e
The Angular Gamma Flux in an Iron Shield Due to a Thin Slab Source.
Penkuhn, A.
1976
Joint Research Centre, Ispra Establishment - Italy

EUR-CEA-FC-851
Observation of Photonuclear Processes in the TFR Tokamak.
September 1976
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, France

GA-A-13992
Conceptual Design Study of a Noncircular Tokamak Demonstration Fusion Power Reactor.
Bourque, R.; Chen, W.; Dalessandro, J.; Hager, E.; Harder, R.; Kearney, D.; McHarg, B.; Mintz, M.; Rosenwasser, S.; Schultz, K.; Thomas, R.
November 1976
NTIS $8.00

GA-A-13993
Nuclear Analysis of the 4000 MW(t) Gas Turbine HTGR.
Hamilton, C.J.; Hackney, R.
September 1976
Dep., NTIS $5.00

GEAP-13822-5(Suppl.1)
Comparison of Rod Versus Slab-Type Core Neutron Shields for LMFBR Applications. Supplement 1.
Weiss, M.L.; Harless, W.H.
March 1974
ERDA, TIC, P.O. Box 62, Oak Ridge, Tenn. 37830

GNE/PH-5-14; AD-A-017180; Thesis
A Simple Description of an Ascending Nuclear Fireball and a FORTRAN Solution.
Waltman, D.D.,Jr.
March 1975
NTIS $5.00

HASL-309
Energy Spectra from Coupled Electron-Photon Slowing Down.
Beck, H.L.
August 1976
NTIS

HASL-311
Modification of an Iterative Code for Unfolding Neutron Spectra from Multisphere Data.
Sanna, R.S.
October 1976
Dep., NTIS $4.00

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FIFTH INTERNATIONAL CONFERENCE ON REACTOR SHIELDING
HYATT REGENCY HOTEL, KNOXVILLE, TENNESSEE, USA
APRIL 17–23, 1977

Preliminary Schedule of Events

Sunday, April 17	4:00-8:00 p.m.	Registration and social hour John Sevier Foyer, Hyatt Regency
Monday, April 18	8:00 a.m.	Registration
	9:30 a.m.	Opening of Conference, Cumberland Ballroom (Carolina/Georgia)
	9:15 a.m.	Keynote, Fred C. Maienschein
	9:45 a.m.	Forum Session A ..... Overview: Methods and Design
	2:00 p.m.	Forum Session B ..... Sensitivity Analysis
	3:00 p.m.	Poster Session P1 ..... Methods I
	5:05 p.m.	Reception, Regency Park
	6:15 p.m.	Dinner*, West Town Shopping Mall
	8:00 p.m.	Tour of lighted Dogwood Trail
Tuesday, April 19	9:00 a.m.	Forum Session C ..... Design Experience
	2:00 p.m.	Session D ..... Radiation Damage and Streaming
	3:00 p.m.	Poster Session P2 ..... Methods II
	5:05 p.m.	Cash Bar* and Exhibits, Regency Lobby
	6:30 p.m.	Banquet, Cumberland Ballroom (Kentucky/Mississippi) Norman Rasmussen, speaker
Wednesday, April 20	9:00 a.m.	Forum Session E ..... Occupational Exposure
	1:30 p.m.	Bus tour to Great Smoky Mountains*, Picnic*
	2:00 p.m.	Public MiniConference on Radiation Protection**
Thursday, April 21	9:00 a.m.	Forum Session F ..... Corrosion and Fission Products
	2:00 p.m.	Group Photo, Regency Park
	2:30 p.m.	Forum Session G ..... Information Resources and Standards
	3:00 p.m.	Poster Session P3 ..... Integral Experiments
	6:30 p.m.	Dinner aboard Riverboat Julia Belle Swain (Fort Loudoun Lake)*
Friday, April 22	9:00 a.m.	Forum Session H ..... Fusion and Advanced Reactors
	1:30 p.m.	Bus tour to Oak Ridge National Laboratory
Saturday, April 23	7:00 a.m.–6:00 p.m.	Bus tour to TVA sites (Continental breakfast on bus)*
Daily:	12:20 p.m.	Luncheons with speaker, Kentucky Room*

*Costs not covered by registration fee.
**Dogwood Arts Festival event.

GUEST PROGRAM

Fifth International Conference on Reactor Shielding
Guest Headquarters: Andrew Jackson Room, Hyatt Regency Hotel
Knoxville, Tennessee, April 17—23, 1977

Sun., April 17	4:00–8:00 pm	Registration and social hour, John Sevier Foyer, Hyatt Regency
Mon., April 18	9:00 am	Registration, Andrew Jackson Room (Guest Headquarters)
	9:30 am	Welcome to East Tennessee, Speaker: Kathy Lassiter
	10:15 am	Get acquainted over coffee and rolls
	10:45 am	Walking tour: Blount Mansion and Craighead Jackson House
	12:30 pm	Lunch and Fashion Show
	5:05 pm	Reception, Regency Park
	6:15 pm	West Town Mall shopping and dinner
	8:00 pm	Bus tour: Lighted Dogwood Trail
Tues., April 19	9:00 am	Bus tour: Norris (first "planned" new town), Norris Dam, Oak Ridge: Museum of Atomic Energy, Children's Museum
Wed., April 20	9:00 am	Walking tour: James White Fort, Presbyterian Churchyard or free time
	1:30 pm	Bus tour to Great Smoky Mountains, Picnic
	2:00 pm	Public MiniConference on Radiation Protection: Radiation and You
Thurs., April 21	9:30 am	Knoxville Zoological Park and Student's Museum
	6:30 pm	Dinner aboard Riverboat Julia Belle Swain, Fort Loudoun Lake
Fri., April 22	9:30 am	Bus trip: Pigeon Forge for browsing and lunch and Gatlinburg for shopping
	7:30 pm	Carousel or Clarence Brown Theatre, University of Tennessee
Sat., April 23	7:00 am –6:00 pm	Bus trip Chattanooga: Choice of Chattanooga Choo-Choo shopping or Tennessee Valley Authority Facilities (lunch at Choo-Choo)

Daily: Coffee and conversation, Guest Headquarters (Andrew Jackson Room).
Daily: Inside swimming facilities, University of Tennessee. Transportation will be arranged.
Daily: Antique show and other Dogwood Arts Festival attractions in Civic Coliseum (across street from Hyatt Regency).
Daily: City bus transportation to Market Square Mall, the hub of Dogwood Arts Festival activities.

GUEST PROGRAM EVENTS

Tickets for the following events will be available upon arrival at the conference. The following costs are preliminary. Please do not remit at this time.

(7) Blount Mansion, Jackson House (Mon., 10:45 am)	
(8) Lunch and Fashion Show (Mon., 12:30 pm)	$5
(9) Tour: Norris and Oak Ridge (Tues., 9:00 am)	$5 (lunch extra)
(10) James White Fort (Wed., 9:00 am)	$1
(11) Tour: Knoxville Zoological Park, Student's Museum (Thurs., 9:30 am)	$1 (transportation extra)
(12) Tour: Pigeon Forge and Gatlinburg (Fri., 9:30 am)	$10 (includes lunch)
(13) Theatre: University of Tennessee (Fri., 7:30 pm)	$4 (transportation extra)

In addition, all Special Events are open to guests except ORNL tour. See Registration Form B for prices.

REGISTRATION FORM B

Fifth International Conference on Reactor Shielding

Please Print Clearly

Name _____

Company/ Institution _____

Mailing Address _____

_____

_____

Citizenship _____

Hotel ☐ Regency ☐ other _____ Room Number ___

Please print your name and check appropriate boxes.

Name _____

REGISTRATION FEES

TOTAL PACKAGE (Participant)*	☐ **$105 ($4 Savings)**
REGISTRATION ONLY (check one):	
Full Conference (includes banquet and proceedings)	☐ $60*
One-Day Attendence (no banquet or proceedings)	☐ $25
Student (includes ☐ banquet OR ☐ proceedings)	☐ $25
Guest (adult—permits participation in guest activities; children do not register; cost for children: meals only)	☐ $10
	Total $_____

Proceedings (if not included in registration) Number: ☐ $14* per copy

Total $ _____

SPECIAL EVENTS

(1) Banquet (Tues., 6:30 pm)	☐ $10*
(2) Luncheons (daily, 12:20 pm) M-☐ T-☐ W-☐ T-☐ F-☐	$ 5* each
(3) Mountain Tour (Wed., 1:30 pm includes picnic)	☐ $12*
(4) Riverboat Dinner Cruise (Thurs., 6:30–9:30, limited attend.)	☐ $12*
(5) Tour: ORNL (Fri., 1:30 pm, limited attendence) (Union Carbide reception 6:00 pm in Oak Ridge)	☐ free
(6) Tour: TVA (Sat., 7:00 am, continental breakfast on bus, limited attendence)	☐ free (lunch approx. $5) total $ _____

Grand Total $ _____

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*Total Package includes full registration, proceedings, and all Special Events 1–4.