RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE DEPARTMENT OF ENERGY

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No. 158 *February 1978*

You gain strength, courage and confidence by every experience in which you really stop to look fear in the face. *. . . Eleanor Roosevelt*

PLANS SET FOR SEMINAR-WORKSHOP ON MULTIGROUP CROSS SECTIONS

Plans for the **March 14–16, 1978 RSIC Seminar-Workshop on Multigroup Cross Sections** are being finalized (see January 1978 RSIC Newsletter for original announcement). The seminar portion will begin on Tuesday morning (March 14) in the auditorium of the Department of Energy Museum of Atomic Energy in Oak Ridge. Registration will precede the opening session on Tuesday morning. A reception/buffet will be held on Tuesday evening following the seminar. A participation fee of $15.00 will cover all activities and a copy of the Proceedings which will be published as an RSIC report.

The workshop portion will be divided into two parts, each lasting one day. They will be held on March 15–16 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. Libraries to be discussed include 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.

If you plan to attend the Seminar-Workshop, please inform us by March 1, 1978. A registration form was attached to the January 1978 RSIC Newsletter for that purpose. **It is very important that we know how many people will be attending the Wednesday, March 15 Workshop on Multigroup Cross Section Handling and the Thursday, March 16 Workshop on AMPX-II so that appropriate plans can be made to accomodate as many participants as is practical.** Advance material to help prepare them for the topics to be covered will be mailed to those who have pre-registered.

A partial list of the authors preparing papers for the seminar portion (March 14) and the titles of their presentations, when known, follow.

The Preparation and Status of ENDF/B-V – S. Pearlstein, National Nuclear Data Center (Brookhaven National Laboratory).

AMPX: A Modular System for Multigroup Cross-Section Generation and Manipulation – N. M. Greene, W. E. Ford, III, L. M. Petrie, B. L. Diggs, C. C. Webster, J. L. Lucius, J. E. White, R. Q. Wright, and R. M. Westfall (Oak Ridge National Laboratory).

NJOY: A Comprehensive ENDF/B Processing System – R. E. MacFarlane, *et. al.* (Los Alamos Scientific Laboratory).

The MACK/MACKLIB System for Nuclear Response Functions – M. A. Abdou and Y. Gohar (Argonne National Laboratory).

IF YOU CHANGE YOUR ADDRESS, please notify us (including Building and Room No. where needed). *Third Class Mail* is returned to us at our expense if the addressee has moved. If your mail is returned, your name will be deleted from our distributions until we hear from you.

Resolved Resonance Processing in the AMPX Modular Code System – R. M. Westfall, L. M. Petrie, N. M. Greene, and R. Q. Wright (Oak Ridge National Laboratory).

Cross Section Probability Tables in Multigroup Transport Calculations – D. E. Cullen, E. F. Plechaty, and R. J. Doyas (Lawrence Livermore Laboratory) and C. R. Weisbin and J. E. White (Oak Ridge National Laboratory).

Analytical Inequalities Satisfied by the Cross-Section Self-Shielding Factors: Best Upper and Lower Bounds – D. G. Cacuci (Oak Ridge National Laboratory).

Code Implementation of Partial-Range Angular Scattering Cross Sections: GAMMER and MORSE – J. T. Ward, Jr. (University of Virginia).

The Comparison of the CTR Fine Group Cross-Section Library for Iron with Multigroup Cross Sections Generated by the VIM Monte Carlo Code – N. Hertel and B. Wehring (University of Illinois) and R. Johnson (Purdue University).

An Analytic Angular Integration Technique for Generating Multigroup Transfer Matrices – J. A. Bucholz (Oak Ridge National Laboratory).

We do not yet have titles for the papers under preparation by the following authors: R. E. Miles (Louisiana State University), E. Kujawski and C. Cowan (General Electric – Sunnyvale), and R. Johnson (Purdue University).

For additional information contact Eddie Bryant (Registration), D. K. Trubey (Seminar Proceedings), or R. W. Roussin.

RSIC FY USER 1977 STATISTICS

RSIC user statistics show an increasing number of activities for the period October 1, 1976 – September 30, 1977, over the prior year. Information dissemination activities were as follows.

A total of 3307 separate letters/telephone calls (about 13.2 each working day) requesting a variety of services (11,923 total) were processed during fiscal year 1977.

On an average, the following dissemination of activities took place each working day.

2.8	code packages were shipped to requesters.
1.0	data package was shipped.
25.6	shielding documents (RSIC reports, handbooks, code and data documentation in addition to those included in above packages) were mailed.
17.8	responses to inquiries for information: citing possible solutions to problems; recommendations of calculational methods, computer codes, nuclear data sets, or literature specimens for study; trouble-shooting problems when requester had difficulties using RSIC materials; and miscellaneous consultation and advisory services.
0.3	special retrospective searches.
47.5	total of separate activities required daily to satisfy the 3307 letters of request.

In addition to the above daily activities, the following special products or services were given.

The routine Selective Dissemination of Information SDI prior to discontinuance, serviced 240 people, and one mailing was made during the year.

The RSIC Newsletter was mailed each month to a peak of 1626. Maintenance of the RSIC-user directory resulted in 3339 changes during the year.

A total of 96 people (23 foreigners) came for an orientation visit and/or to use the Center's facilities during the year.

The increasing workload over the last two years may be seen in the following comparison table.

INCREASE IN DEMAND FOR SERVICES BY USER COMMUNITY

	FY 76	FY 77
Total Requests Received	3200*	3300
Average/Working Day	12.8	13.2
Activities Performed To Satisfy Requests	7940*	11920
Average/Working Day	31.5	47.5
Increase Over Prior Year	30%	50%

*Adjusted to 12 months

ALARA—A NEW OBJECTIVE FOR NUCLEAR POWER PLANTS

We are grateful to TVA's Glenn German and the ANS Oak Ridge Section for this article lifted from ***The Acorn*** *Newsletter.*

Within the last three years a new acronym has come into the nuclear power field. This is ALARA which has come to represent the engineering, construction, and operating efforts made to keep occupational radiation exposure within the nuclear power plants As Low As Reasonably Achievable.

In reality ALARA is a new name for an old job. Such activities are as old as the nuclear power industry. The results achieved have, in general, been quite good. No operating plants have ever been consistent offenders. Some early plants had specific personnel radiation dose problems, but timely corrective efforts have reduced these difficulties to acceptable levels and have also created precedents and momentums which now have culminated in the Nuclear Regulatory Commission's (NRC) ALARA regulations.

The publication of Regulatory Guides 8.8 and 8.10 have now formalized this task. Regulatory Guide 8.8 establishes the foundation for this effort. It, first of all, requires a commitment by the licensee that his nuclear plant will have design features, policy documents, written operating procedures and close and continuing management follow-up that result in keeping occupational radiation exposures at acceptably low values. It next specifies the qualifications and training for the licensee's Radiation Protection Manager who has the responsibility for ensuring that the policies cited above are implemented. This regulatory guide then lists a set of design features which have been shown in the past to be effective dose reduction measures. These issues must be satisfactorily resolved to receive a construction permit for the power plant. The last section in Regulatory Guide 8.8 contains a set of procedures which must be prepared to receive a license to operate a nuclear plant. Regulatory Guide 8.10 complements these because it is concerned with plant operating philosophy. It describes an operating philosophy which the NRC believes all licensees should follow to keep occupational radiation exposures at acceptably low levels. The applicant is required to follow these practices or acceptable alternatives.

The current attention to in-plant personnel radiation exposure reductions may be quite appropriate because feedback from operating plants is coming in. Most of the high dose operations seem to be recognized now and various approaches to eliminate them seem to be receiving attention. Recently dose reduction efforts and plant availability improvement efforts have, at times, been coupled and shown to be mutually beneficial.

This formalization of the radiation dose reduction efforts is expected to cause a more systematic and comprehensive effort in the industry to keep occupational doses ALARA. In the nuclear power plant design

field it is envisioned that each system designer will have the obligation to estimate personnel access frequency into plant radiation zones and stay time per access for a typical operating year. Once this is done, radiation exposures for that system will be calculated and compared with those allocated for each system to assure that the overall annual dose objectives for the entire plant is being met. Appropriate system adjustments will be made if the system is above its allocation. After this is done, the system designer will then have the obligation to list specific radiation dose reduction measures he could also introduce into his system and show whether or not such improvements are cost/beneficial. A possible cost/benefit ratio of $5000/man-rem has been suggested for this task. Should these calculations show that it would cost less than this value to implement, the designer would implement this particular feature into his system.

FODERARO PHOTON SHIELDING MANUAL CORRIGENDUM

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

Page 47

The linear attenuation coefficient of normal air at 5.4 MeV should be 3.19×10^{-5} cm^{-1}, not 3.96×10^{-5} cm^{-1}.

PERSONAL ITEMS

Michael J. Kolar, formerly with Gilbert Commonwealth Associates, Jackson, Michigan, joined the staff of the Electric Power Research Institute at the beginning of February.

NEW PUBLICATIONS ANNOUNCED

Book of ASTM Standards

The 1977 Annual Book of ASTM Standards, Index, Part 48, Subject Index, Alphanumeric List, 300 pages, is available in hard cover at the price of $5.00. It was published in November 1977; Publication Code No.: 01-048077-42. The combined Index covers all of the 5,600 ASTM Standards and Tentatives, as well as proposed methods and other related material, appearing in all Parts of the Annual Book of Standards. The combined Index comprises a Subject Index and an Alphanumeric List.

The Subject Index lists each standard or other document under all headings that are pertinent to its contents; cross references enable the user to find all documents related to the area of search. The Alphanumeric List includes the complete designation, with the dates of latest revision and reapproval; and lists all current documents as well as those that have been discontinued or replaced. Both sections of the combined Index show the Part number(s) of the Annual Book of Standards in which the referenced document appears. Complementary to the Parts of the Annual Book of ASTM Standards in your particular field of interest, the combined Index is a basic key to the entire body of ASTM Standards. Related standards in other parts can be located and, if desired, ordered as separate reprints. This material may be ordered from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, ATTN: Sales Service Department.

NCRP Reports

The National Council on Radiation Protection and Measurements (NCRP) announced the publication of NCRP Report No. 56, *Radiation Exposure from Consumer Products and Miscellaneous Sources*. This report is the second in the series of reports resulting from a program designed to assess the contribution of the many sources of ionizing radiation to the overall exposure of the U.S. population. The assessment includes exposure to the population from natural background, occupational exposure, medical examinations, nuclear power and consumer products. NCRP Report No. 45, *Natural Background Radiation in the United States*, was the first in the series. Report No. 56 considers consumer products that emit ionizing

radiation which is incidental or extraneous to the intended purpose or operation. Quantitative data on the exposure of individual members of the population as well as the average annual population dose equivalent are provided in the report.

A delineation of products into three major headings – electronic products, radioactive materials, and miscellaneous exposure sources – is presented. Products considered under these general headings include: television receivers, static eliminators, radioactive luminous devices, dental prostheses, electron microscopes, airport luggage scanners, smoke detectors, nuclear stimulated natural gas, wristwatches, clocks, and combustible fuels.

A summary of the number of people exposed to each source, an estimate of the resulting dose equivalent to the exposed population, and an estimate of the average annual population dose equivalent are presented.

Single copies of the new report can be purchased for $4.00. Individuals and organizations already on the NCRP standing order list will receive copies of the new reports automatically and be invoiced for their order. Others may purchase copies of the new reports or place their names on the standing order list by directing their order to: NCRP Publications, P.O. Box 30175, Washington, D.C. 20014.

UPCOMING CONFERENCES

The Sixth Annual National Data Communications Conference and Exposition, Interface '78, will be held March 6–9, 1978, in the Las Vegas Convention Center, Nevada. Information may be secured from Data Communications Interface '78, 160 Speen St., Framingham, MA 01701.

The 5th Energy Technology Conference and Exposition entitled "Energy Crossroads" will be held at the Sheraton-Park Hotel, Washington, D.C. on February 27–March 1, 1978. The program highlights energy use and new technologies. Information is available from ET5 Headquarters, 4733 Bethesda Ave., N.W., Washington, D.C. 20014.

Advances in Reactor Physics topical meeting will be held at the Sheraton-Gatlinburg Hotel, April 9–12, 1978. Preregistration forms are available from J. D. Jenkins, Oak Ridge National Laboratory, P. O. Box Y, Oak Ridge, TN 37830. The program and other information was published in the January issue of the RSIC Newsletter.

The Fifth Annual Energy Conference and Exhibition (WATTec), focusing on "Energy in the Tennessee Valley Region" will be held at the Hyatt Regency in Knoxville, TN on February 23–25, 1978. Details are available from WATTec, P. O. Box 629, Oak Ridge, TN 37830.

A short course on *Nuclear Power Safety* is being offered by Georgia Institute of Technology (GIT) and the ANS Atlanta Section for March 13–17, 1978, at the Institute. Full details are available from Dr. James H. Rust, School of Nuclear Engineering, GIT, Atlanta, GA 30332.

The British Nuclear Energy Society has announced a conference on *Radiation Protection in Nuclear Power Plants and the Fuel Cycle* to be held November 27 – December 1, 1978, in Bristol, England. Synopses of up to five hundred words should be sent by February 13, 1978, for consideration by the Organising Committee. The topics to be covered will include: Design/Licensing Criteria for the Protection of Operators; Shielding to Protect Operators; Shielding Against Radiation Damage to Plant Components; Control of Coolant Activity; Contamination Control; Use of Instrumentation to Protect Operators; Maintenance Strategy, Including Remote Facilities for Handling Inspection and Maintenance; Access Control; Optimisation of Plant Design; and Occupational Exposure. Abstracts of proposed papers and other communications may be sent to Miss J. H. Green, British Nuclear Energy Society, The Institution of Civil Engineers, 1–7 Great George Street, London SW1P 3AA.

The International Association for Radiation Research announces that the *Sixth International Congress of Radiation Research* (ICRR) will be held in Tokyo, Japan, May 13–19, 1978. The sessions (in English) will cover a wide range of topics in radiation physics, chemistry, biology, medicine, and related interdisciplinary areas. Information is available from Professor S. Okado, Secretary-General, 6th ICRR, Hongo P. O. Box

152, Bunkyo-ku, Tokyo 113-91, Japan.

The 1978 National Computer Conference will be held in the Anaheim Convention Center, CA June 5–8. The program will be concerned with "New Frontiers in Information Processing." Further information is available from AFIPS, 210 Summit Avenue, Montvale, NJ 07645.

RSIC GRAB BAG

We offer the following extra copies of documents on a first-come, first-served basis. We will honor requests until the supply is exhausted. If you want to add to your reference shelf, please order by report number.

ORNL-TM-3148 – *Nonelastic Interactions of Nucleons and π-Mesons with Complex Nuclei at Energies Below 3 GeV*, Hugo W. Bertini, Miriam P. Guthrie, and Arline H. Culkowski (March 1972).

ORNL-TM-3429 – *Preparation of Data Sets in ENDF Format for Na, Mg, Cl, and K for Use in Shielding Calculations*, R. W. Roussin, S. K. Penny, V. A. Singletary, and J. B. Wright (May 1971).

ORNL-TM-4648 – *Vehicle Code System (VCS) User's Manual*, W. A. Rhoades, M. B. Emmett, G. W. Morrison, J. V. Pace, III, and L. M. Petrie.

ORNL-TM-4664 – *Development of a Code System for Determining Radiation Protection of Armored Vehicles (The VCS Code)*, W. A. Rhoades.

ORNL-TM-4791 – *Operating Instructions for the Heavy-Ion Code HIC-1*, R. T. Santoro, H. W. Bertini, T. A. Gabriel, N. M. Larson, and O. W. Hermann.

ORNL/TM-5829 – *Cross Sections for the Nb(n,xn) and Nb(n,x,γ) Reactions Between 1 and 20 MeV*, G. L. Morgan and F. G. Perey.

NASA TM X-2440 – *Proceedings of the National Symposium on Natural and Manmade Radiation in Space*, E. A. Warman (March 1971).

ENDF-202 – *Cross Section Evaluation Working Group Benchmark Specifications*, Brookhaven National Laboratory (November 1974).

LA-4901 – *Evaluated Neutron-Induced Gamma-Ray Production Cross Sections for* ^{239}Pu *and* ^{240}Pu, R. E. Hunter and L. Stewart (July 1972).

CHANGES IN THE COMPUTER CODE COLLECTION

The following changes were made in the collection during January.

CCC-112B/SAND II

The code package was extended to include a set of 620 group total cross sections in ENDF format, SAND II group structure, for self-shielding corrections contributed by the National Nuclear Data Center at Brookhaven National Laboratory. Materials included are Li-6, B-10, Na-23, Co-59, Au-197, Th-232, U-235, U-238, NP-237, Pu-239, and Cu-63. SAND II is used for neutron flux spectra determination by multiple foil activation by an iterative method. Originally developed by Atomics International (AI) for the Air Force Weapons Laboratory (AFWL), SAND II technology continues to advance through usage and user modifications. The current code package contains contributions from AI, AFWL, TRW Systems Group and BMI Pacific Northwest Laboratory. References: AFWL-TR-67-41, Vols. I, II, IV; BNWL-855 and -1312; NCEL-TR-551. FORTRAN IV; IBM 360.

CCC-132/ATTOW-KB

This multigroup two-dimensional removal diffusion shielding code package was updated with a more recently frozen version contributed by the CNEN Centro di Calculo, Centro di Bologna, Italy, through the OECD Nuclear Energy Agency's Computer Programme Library, Ispra, Italy. This work is based on the

Karlsruhe version (ATTOW-K) and an earlier CNEN version (ATTOW-B). ATTOW was originally developed by the UKAEA Risley Establishment, Warrington, England. FORTRAN IV, IBM 370.

CCC-204/SWANLAKE

The code package was extended to include a CDC 6600 version contributed by Energy Incorporated of Idaho Falls. SWANLAKE utilizes ANISN radiation transport calculations for cross section sensitivity analysis. The original version (A) was designed for the IBM 360 at ORNL. The new version, which presently contains only the source program, may be requested as CCC-204 B. Reference: ORNL-TM-3809 and ORNL-4664.

CCC-299/REBEL 2

The code package for making adjoint Monte Carlo calculations of radiation in dwelling rooms contributed by the Central Research Institute of Physics, Budapest, Hungary, has been extended to include another hardware version (CDC 6600) provided by the U.S. Department of Energy's Environmental Measurement Laboratory, N.Y., NY. The ICL 1905 version is available as CCC-299A; the CDC version as CCC-299B. Reference: KFKI-76-65 and -57.

CCC-308/SPHERE

This spherical-geometry multimaterial electron/photon Monte Carlo transport code was contributed by Sandia Laboratories. It is the third in a series of transport models, each of which is designed for a specific geometrical class of problems: TIGER (CCC-245), for a 1-D multislab model; CYLTRAN (CCC-280), for 2D cylinders; and this model SPHERE was developed for the pulsed electron beam fusion program for the design and analysis of experiments involving spherical target pellets. It may also be used in applications in space shielding, in the radiation transport from dispersed radioactive sources, and in the study of local effects of particle loading and other inhomogeneities on radiation transport. Reference: SAND 77-0832. FORTRAN IV; CDC 6600.

CCC-309/EPRI-CINDER

A newly packaged general point-depletion and fission product code and a four-group fission product neutron absorption chain data library generated from ENDF/B-IV for thermal reactors was contributed by the Electric Power Research Institute and Los Alamos Scientific Laboratory. References: EPRI NP-356 Part 1 (LA-6745-MS) and EPRI NP-356 Part 2 (LA-6746-MS). FORTRAN IV; CDC 6600. EPRI-CINDER calculates the time-dependent concentrations of nuclides coupled in any physically possible sequence of radioactive decays and neutron absorptions in a specified neutron flux spectrum.

PSR-93/PUFF

The code package for the determination of multigroup covariance matrices from ENDF/B uncertainty files has been updated to correct errors called to RSIC attention by Douglas Muir of Los Alamos Scientific Laboratory. Both versions in RSIC (A, IBM; B, CDC) have been corrected. A statement of the corrections may be requested from RISC by those currently using PUFF.

PSR-101/HYPERMET

The code package for the automatic analysis of gamma-ray spectra from germanium detectors was enlarged to include a new hardware version (FACOM-M 190) contributed by the Department of Physics, Kyushu University, Fukuoka, Japan. The new version is designated as PSR-101 C. Versions A (CDC 3800) and B (IBM 360) were developed and contributed by the Radiation Technology Division, Naval Research Laboratory, Washington, D.C. Reference: NRL MR 3198.

PSR-114/MISSIONARY

A packaged set of procedures for automatic translation of ENDF/B formatted data into the UKAEA Nuclear Data Library (NDL) format was contributed by Ministry of Defense, Atomic Weapons Research Establishment (AWRE), Aldermaston, Reading, England through the OECD Nuclear Energy Agency's Computer Programme Library (NEA-CPL), Ispra, Italy. Reference: AWRE-O-17/76. Assembler Language and FORTRAN IV; IBM 360/370.

PSR-115/SUPERTOG-JR

This code for generating transport group constants, energy deposition coefficients and atomic displacement constants from ENDF/B-IV was contributed by Japan Atomic Energy Research Institute (JAERI), Tokai, Japan. SUPERTOG-JR generates (a) the neutron cross sections for neutron transport calculations and (b) the energy deposition coefficients and the atomic displacement cross sections. The function (a) is the same as in SUPERTOG-3 (PSR-13) except that elastic scattering transfer matrices can be calculated from either tabular or Legendre representation. In addition, an optional routine generating the inelastic scattering matrix in the level density model is provided. The newly developed function (b) treats both in nearly the same mathematical formulae except for the conversion scheme of kinetic energy of neutrons onto the material atoms. The displacement cross section is calculated with the Lindhard model. To perform these additional calculations several new subroutines were developed. Reference: JAERI-M 6935. FORTRAN IV; FACOM 230-75.

PSR-116/GAMLEG-JR

This multigroup cross-section generator for photon transport calculations was contributed by the Japan Atomic Energy Research Institute (JAERI). Based on the original work at Los Alamos Scientific Laboratory, GAMLEG-JR was modified by JAERI to simplify input data preparation and to produce additional data such as kerma factors. FORTRAN IV, FACOM 230/75. Reference: JAERI-M 6936. GAMLEG-JR is also packaged as a module of CCC-300/RADHEAT-V3.

ERRORS DISCOVERED IN DATA PACKAGES

Errors have been found in the following data packages and there is work in progress to make corrections. Current users are alerted to the problem areas and are urged to watch the RSIC Newsletter for completion of the updates to the data packages.

DLC-37/EPR

An error has been discovered in the 100 neutron, 21 gamma-ray cross section library in ANISN format. The data set for tin (Sn) has gamma-ray production data for neutron capture that is a factor of 10 too high for some neutron energies. The neutron cross sections are not affected. The error was introduced in a data set prepared by RSIC which had a keypunch error in the job to extend the γ-production down to 1.E-5eV prior to processing by LAPHNGAS. A new data set is being generated to replace the current one and its availability will be announced in a future newsletter.

DLC-47/BUGLE

Two errors have been found in the DLC-47/BUGLE data package of 45-neutron, 16-gamma-ray-group cross sections in ANISN format. First, the data set for tin (Sn) has been found to have gamma-ray production data for capture which is too high by a factor of 10. The neutron cross sections are not affected. A new set of tin data will be added to the package to correct the error and its availability will be announced in a future newsletter.

The other error occurs in the tapelist and the document. Two data sets for iron were mislabeled. The correct identification is as follows; ANISN IDS 363-366, refer to the iron data set which was self-shielded for stainless steel; ANISN IDS 387-390 refer to the iron which was "essentially" $1/\sigma_t$ weighting.

CHANGES IN THE DATA LIBRARY COLLECTION

Two new data sets were packaged and work proceeded to correct errors in an existing package.

DLC-50/I-R-MAN

This package of photon interaction data on ICRP Reference Man was contributed by Radiation Physics and Medicine Departments of St. Bartholomew's Hospital, London, England, United Kingdom. The data set

consists of a tabulation of mass attenuation and energy absorption coefficients for 69 ICRP reference man organs and tissues generated by D. R. White, D. Ingram, and M. C. Fitzgerald. Documentation includes a suggested computer program for reading, testing, and the data listing. FORTRAN IV.

DLC-51/JSD 100/120

Infinitely dilute neutron multigroup (100) cross sections and coupled neutron (100) and gamma-ray (20) effective multigroup cross sections for use in LWR and LMFBR shield design and analysis were contributed by Japan Atomic Energy Research Institute, Tokai Research Establishment. Two cross-section libraries are included in the package.

The first, JSD 100, consists of 100 neutron groups (GAM-II structure) cross sections generated from ENDF/B-IV using SUPERTOG-JR (PSR-115). These data are infinitely dilute, P_5, cross sections for H, C, N, O, Na, Mg, Al, Si, K, Ca, Cr, Mn, Fe, Ni, Cu, Zr, Mo, Cd, Pb, B-10, B-11, U-234, U-235, U-236, Pu-238, U-238, Np-237, Pu-239, Pu-240, Pu-241, Pu-242, Li-6, Li-7, and F. Reaction cross sections for Al-27 (n,p and n,α), Fe-54 (n,p), Fe-56 (n,p), Co-59 (n,γ), Ni-58 (n,p), and In-115 (n,n')are also included.

The second, JSD 120, consists of 100 neutron, 20 gamma-ray group cross sections prepared using data from JSD 100, gamma-ray production cross sections from POPOP-IV, and gamma-ray interaction cross sections generated by GAMLEG-JR (PSR-116). The cross-sections are "effective" cross sections which for heavy nuclides in resonance energy regions have been adjusted using self-shielding factors from the JAERI-Fast Reactor Group Constants System. Data are provided for water, Na, Graphite, paraffin, polyethelene, Al, air, Fe, Cu, Cr, Ni, Pb, 25-Al, SS41, SUS27, SUS32, pressure vessel, Sb-42, Zircaloy-4, ordinary concrete 1, ordinary concrete 2, heavy concrete, perpantine concrete, insulation (chrysotile), fuel pin (PWR), fuel pin (BWR), inner core (homogenized), outer core (homogenized) dilution blanket 1 (homogenized), dilution blanket 2 (homogenized) and B_4C + Al.

A retrieval code is provided to manipulate the data into forms used by the RADHEAT-V3 system (CCC-300). Transmittal requires one 9 track, blocked tape or more if written 7 track channel. (130,000 records)

VISITORS TO RSIC

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

Vic Cain, Science Applications, Inc., Oak Ridge, TN; Juan Quintanilla, University of Mexico, Mexico City, Mexico; R. L. Knight, Oak Ridge, TN; Laurence F. Miller, University of Tennessee, Knoxville, TN; Ilana Siman-Tov, Oak Ridge National Laboratory, Oak Ridge, TN; Robert Schamberger, Nuclear Regulatory Commission, Washington, D.C.; Dan Cacuci, Oak Ridge National Laboratory, Oak Ridge, TN; and Lee Simmons, Science Applications, Inc., La Jolla, Ca.

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.

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

AAEC/E-398
Resolution Unfolding with Limits Imposed by Statistical Experimental Errors.
Lang, D.W.
February 1977
Dep., NTIS (U.S. Sales Only) $6.50

AAEC/E-399
Neutron Energy Spectra from the Thick Target $^{9}Be(d,n)^{10}B$ Reaction.
Whittlestone, S.
December 1976
Dep., NTIS (U.S. Sales Only) $4.00

AED-Conf-75-779-000, pp.203-214 (In German)
Standardization of the Experimental Conditions for the Measurement of Relaxation Lengths and Attenuation Factors to Calculate the Shielding of Fast Neutrons.
Friedrich, W.; Sauermann, P.F.
April 1976
ZAED

AI-ERDA-13188
A Neutron Fluence Map for the Rotating Target Neutron Source.
Kneff, D.W.; Farrar, H.,IV; Van Konynenburg, R.A.; Heinrich, R.R.
December 31, 1976
NTIS $4.50

ANL/NDM-26
Evaluation of the ^{115}-In(n,n)^{115}m-In Reaction for the ENDF/B-V Dosimetry File.
Smith, D.L.
December 1976
NTIS $4.00

ANL/NDM-32
Evaluated Fast Neutron Cross Sections of Uranium-238.
Poenitz, W.; Pennington, E.; Smith, A.B.; Howerton, R.
October 1977
Argonne National Laboratory

BNL-NCS-50,717
Panel on Reference Nuclear Data and Surveys of Reference Data Requirements.
Burrows, T.W.; Pearlstein, S.
September 1977
NTIS

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