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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The time has come to take a hard look at what has been and is being done. We have many past errors to learn from. A mistake is only the evidence that someone tried to do something. A mistake repeated is the evidence of irresponsibility.

... Robert J. Howerton

RSIC SUPPORT OF NUCLEAR POWER INDUSTRY FORMALIZED

The Electric Power Research Institute (EPRI) is now an official sponsor of the Radiation Shielding Information Center (RSIC) to ensure RSIC coverage of the information needs of the public and private utilities, the reactor manufacturers, and the architect-engineering and consulting firms who serve the nuclear power industry. EPRI joins the Energy Research and Development Administration (ERDA) divisions of Reactor Research and Development (RRD) and Controlled Thermonuclear Research (CTR) and the Defense Nuclear Agency (DNA) in enabling RSIC to cover all information concerned with the transport of and protection from ionizing radiation. The multiagency sponsorship ensures benefits to each agency and its contractors or members, at minimum cost, from an operation which covers a wide range of research, information, data, and computing technology in the area of radiation protection and analysis. RSIC provides for information and technology transfer between communities of users who otherwise might not be aware of each other's work and thus prevents duplication of effort.

EPRI is a California-based institute, supported by most of the nation's electric utilities to improve the efficiency and quality of electricity production. Many of these utilities are on RSIC's routine Selective Dissemination of Information (SDI) and the RSIC Newsletter distribution. In addition, in FY 1975, RSIC received more than 500 separate letters of request from this community of users. The requests varied from the simple to the highly complicated which often required a number of RSIC activities to satisfy the requests. This usage accounted for more than 17% of the total number of requests received by RSIC during this past year.

Under EPRI sponsorship, we plan to survey the nuclear power industry to review the state of shielding and radiation protection analysis capabilities and to ascertain specific requirements in this area. In addition, we will review fission product and "crud" release and transport computing technology.

The EPRI sponsorship will also enable RSIC to give more attention to the information and data needs of the nuclear power industry in the area of radiation protection and shielding, particularly with respect to cross sections and other nuclear data, computer codes, and published literature. In order that RSIC may give a more effective service to this community of users, it is important to have its cooperation. We will welcome comments and suggestions as to how to improve our information store and services. We solicit your comments on information which you have received from RSIC and invite your full cooperation in the surveys mentioned above.

RSIC coverage of this important area of information will add to our effectiveness in serving the nuclear industry in general and add to our capability as a national technology resource in our subject area.

APPOINTMENTS TO NCRP STAFF

The National Council on Radiation Protection and Measurements (NCRP) has announced the appointments of Captain James Dowling and Dr. Thomas Fearon as Staff Assistants for Scientific Committees.

Captain Dowling earned the B.S. degree in 1948 at the University of Idaho, the M.S. degree in biochemistry at Purdue University in 1951, and, in 1959, the M.S. degree in physics from the U.S. Naval Postgraduate School. He has held appointments as Head of Radiation Physics groups at important Navy installations, and from 1972 to 1975 he served as Head, Radiation Safety Branch, Navy Department, Bureau of Medicine and Surgery in Washington, D.C. Captain Dowling will work with several NCRP scientific committees concerned with internal emitters, serving as liaison between the Secretariat and each of these committees which are engaged

in the preparation of recommendations on radiation safety and measurement. He will also coordinate the activities of these committees so as to prevent duplication of effort and assure adequate treatment of areas under study.

Dr. Fearon earned the B.A. degree in 1969 at Catholic University and, in 1974, the Ph.D. degree at the University of Rochester. While in Rochester, he held a fellowship award from the Rochester AEC Laboratory Graduate Participant Program. At the NCRP, Dr. Fearon will also be a liaison between the Secretariat and various scientific committees, being particularly involved in the work of committees concerned with the assessment of population exposure and with the release of radionuclides from the nuclear fuel cycle.

UPCOMING CONFERENCES

The Third Annual Conference on Nuclear Power and Environmental Assessment, Special Theme: Plutonium Utilization, will be held Monday through Friday, September 8 to 12, 1975 on the Berkeley Campus. This course ($350) is intended for engineers, scientists, environmentalists, and administrators who are interested in the possible utilization of plutonium as a fuel in nuclear power reactors. Emphasis of the program will be on current-generation reactor types: light-water reactors and high-temperature gas-cooled reactors. The goal is to provide a framework for policy decisions through comparison of the differences between present nuclear fuel cycle operations and those with several alternative methods of plutonium utilization. The program content will include a review of the present nuclear fuel cycles; discussions of the biological effects of radiation, emphasizing plutonium; interpretation of Federal standards, requirements, and attitudes toward plutonium utilization; plutonium utilization in BWRs, PWRs, and HTGRs; considerations in fuel fabrication, processing, transportation, waste handling, and storage; safeguards and security considerations; and environmental measurements, transport and ecological effects. The instructional staff has been selected for its experience in evaluating the impacts on nuclear power generation of possible plutonium utilization and for its knowledge of regulatory requirements. Location: 145 Dwinelle Hall, University of California, Berkeley. Contact: Continuing Education in Engineering, University Extension, and The College of Engineering, University of California, Berkeley.

The Sixth Symposium on Engineering Problems of Fusion Research will convene in San Diego, California November 18–21, 1975. The program will include papers on: magnet and coil engineering, energy storage and supply, vacuum engineering, instrumentation and data handling, engineering problems of future fusion reactors, systems engineering, energetic plasma and particle sources, and plasma heating systems. The meeting will be at Sheraton Inn–Airport. Sponsors include GA, ERDA, IEEE (NPSS), and the ANS TGCF. Further information may be secured from: A. A. Schupp, General Atomic, P.O. Box 81608, San Diego, California 92138.

A Monte Carlo course, designed specifically for the practicing engineer engaged in shield design, will be presented by the Nuclear Engineering Department of the University of Tennessee during the week of September 8–12. The course will describe the theoretical basis of Monte Carlo methods and their specialized application to shield design. The versatile Monte Carlo computer code, MORSE (CCC-203), will be used to demonstrate program analysis and computational time reduction techniques. The availability of Monte Carlo codes and cross-section data will also be discussed. For information, write or phone F. N. Peebles, Dean of Engineering, The University of Tennessee, Knoxville, Tennessee 37916, phone 615-974-5321.

LSU HANDBOOK OUT OF PRINT

LSU's Jack Courtney has notified RSIC that **The Radiation Shielding Handbook**, produced by Louisiana State University, is temporarily out of print. However, more copies will be available in August, to be mailed out at the beginning of September, for those who have requested the Handbook but have not yet received one. It is not necessary to repeat your request.

CHANGES TO THE DNA WORKING CROSS SECTION LIBRARY

All materials in the DNA Working Cross Section Library have been updated with new photon interaction cross sections (file 23) and coherent scattering form factors and incoherent scattering functions (file 27). The new file 23 and file 27 data were taken from DLC-7E. (See July 1975 RSIC Newsletter.) Users are advised that it is not suggested that the updated DNA Library be obtained in order to access this new

photon cross section data. It would be more economical to obtain DLC-7E which contains these data for elements 1-82, 83, 86, 90, 92, and 94.

In addition, some cosmetic changes were made to DNA evaluations which became part of ENDF/B-IV. For consistency, they were made to correspond to the versions distributed by NNCSC because of the minor changes required to place them into ENDF/B-IV. Where applicable, the DNA MAT numbers have been changed to correspond to the ENDF/B-IV MAT plus 3000. Again, these are not significant changes and users holding recent versions of the DNA Library are **not advised** to obtain the new versions until additional MODs are incorporated which would appreciably alter the results obtained by processing the data.

It should be noted that the previous and current DNA evaluations for nitrogen, oxygen, gold, and the tungsten isotopes have some changes that have not yet been incorporated into ENDF/B-IV. Also the current DNA evaluations for iron and tantalum use resonance parameters (as do the ENDF/B-IV) while the previous DNA evaluations used point cross section representation.

The current designation of the DNA Working Cross Section Library is summarized in the following table.

Current Designation of the DNA Working Cross Section Library and Its Relationship to ENDF/B-IV August 1, 1975

			DNA Evaluations Essentially Equivalent to ENDF/B-IV		
MATERIAL	**ENDF/B-IV TAPE(REV.)**	**-MAT**	**Previous DNA(MAT,MOD)**	**Current** DNA(MAT,MOD)**	**COMMENTS*****
Nitrogen	408(Rev.1)	-1275	(4133,7)	(4275,0)	DNA corrects MF=33 bugs
Oxygen	408(Rev.1)	-1276	(4134,4)	(4276,0)	DNA corrects MF=33 bugs
Aluminum	405	-1193	(4135,3)	(4193,0)	
Lead	408(Rev.1)	-1288	(4136,5)	(4288,0)	
Hydrogen	404	-1269	(4148,2)	(4269,0)	
Silicon	405	-1194	(4151,3)	(4194,0)	
Calcium	401	-1195	(4152,3)	(4195,0)	
Beryllium	404(Rev.1)	-1289	(4154,3)	(4289,0)	
Sodium	403	-1156	(4156,1)	(4156,2)	
Tritium	401	-1169	(4169,1)	(4169,2)	
Tantalum	411(Rev.1)	-1285	(4179,4)	(4285,0)	Current DNA version has resonance parameters and also electron production in MF=18, 19, 20, 21
Iron	406(Rev.1)	-1192	(4180,3)	(4192,0)	Current DNA version has resonance parameters
U-238			(4187,1)	(4187,2)	
U-235			(4188,1)	(4188,2)	
Carbon	408(Rev.1)	-1274	(4274,1)	(4274,2)	
Gold	411(Rev.1)	-1283	(4283,0)	(4283,1)	DNA has γ-production, ENDF/B doesn't
Deuterium			(4502,0)	(4502,1)	
He-4	401	-1270	(4504,0)	(4270,0)	
Fluorine	411	-1277	(4509,1)	(4277,0)	
Magnesium	405	-1280	(4512,1)	(4280,0)	
Copper	410	-1295	(4529,1)	(4295,0)	
Pu-239			(4539,0)	(4539,1)	
Pu-240			(4540,0)	(4540,1)	
W-182	401*	-1128	(4582,2)	(4582,3)	DNA has later thermal γ-production
W-183	401*	-1129	(4583,3)	(4583,4)	
W-184	401*	-1130	(4584,3)	(4584,4)	
W-186	401*	-1131	(4586,2)	(4586,3)	

*Later ENDF/B revisions are available for W isotopes, but they do not incorporate the updated thermal γ-production given for the DNA versions.

**The current DNA evaluations have file 23 photon cross sections and file 27 scattering functions taken from DLC-7E.

***More complete information on DNA updates is given in recent RSIC Newsletters.

CHANGES IN THE DATA LIBRARY COLLECTION (DLC)

DLC-34/LENDL

The Livermore Evaluated Neutron and Secondary Gamma-Ray Production Cross Section Library in ENDF format, LENDL, was contributed by Lawrence Livermore Laboratory, California. Reference: UCID-16727. Seven unblocked tapes or one blocked tape will be required to obtain the entire library.

CHANGES TO THE COMPUTER CODE COLLECTION

CCC-75/G^3-6th Ed.

The IBM 360 version of this kernel integration code (multigroup gamma-ray scattering) has been updated to include modifications made by Southern Services, Inc., Atlanta, Georgia. A timing routine and additional sample problems were added to the code package. The original LASL contribution, CDC 6600/7600, is packaged as CCC-75A; this version, CCC-75B.

CCC-187/SAM CE

The Monte Carlo time-dependent complex geometry, combinatorial, code system for the solution of the forward neutron and forward and adjoint gamma-ray equations, contributed by Mathematical Applications Group, Inc. (MAGI) has been in the computer code collection since 1971. The code packages were analyzed during the month, a number of pending updates were implemented, older versions were removed from the collection as obsolete, leaving in the package MAGI's Revision B (DNA 2830F) as follows: IBM 360 version, CCC-187A, and the CDC 6600 version, CCC-187B. Users of the code system are urged to give feedback to RSIC indicating the state-of-the-art of your current version. We are particularly interested in learning of improvements/extensions to the system.

NOTE: RSIC has recently received a copy of report DNA 2830F—Revision C, and expects to receive the newest frozen version from MAGI in the near future. Watch the Newsletter for availability.

CHANGE IN ORIGEN TRITIUM FISSION PRODUCT YIELD

A message to users of CCC-217/ORIGEN code package is hereby forwarded from ORNL developer-user, Charles W. Kee.

It has been called to my attention that the tritium fission product yield from U-235 (thermal) is outdated. The value of 1.3×10^{-2}% was a calculated number which was superseded by a measurement (circa 1972) of 0.85×10^{-2}%. ORIGEN users should change this number in their data libraries.

The change has been implemented in the RSIC open code package.

PERSONAL ITEMS

E. A. Straker has transferred from Huntsville, Alabama to the La Jolla, California office of Science Applications, Inc.

Peter Stiller, formerly with IKE, Stuttgart, Germany, is now employed in EIR, Wurenlingen, Switzerland.

A. Bertrand Brill has returned to Vanderbilt University School of Medicine following a three-month assignment in Argentina.

D. V. Gopinath has left the Health Physics Division, BARC, Bombay, India to assume responsibility as head of the Safety Research Laboratory, Reactor Research Center, Kalpakkam, Tamil Nadu.

The UK National Radiological Protection Board Center at Sutton, Surrey was closed last December and all its functions were transferred to the NRPB Center at Harwell, Didcot, Berkshire.

VISITORS TO RSIC

Visitors to RSIC during the month of July were:Herb Henryson, Argonne National Laboratory, Argonne, Illinois; Franklin Chen, Massachusetts Institute of Technology, Boston, Massachusetts; K. D. Chou, ORNL Health Physics Division, Oak Ridge, Tennessee; Claude L. Yarbro, Jr., ERDA–Oak Ridge Operations, Oak Ridge, Tennessee; David Auton, Defense Nuclear Agency, Washington, D. C.; and E. Robert Schmidt and Rosalind Huang, NUS Corporation, Rockville, Maryland.

JULY 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.

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Use of Li(d,n) Neutrons for Simulation of Radiation Effects in Fusion Reactors.
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Neutron and Alpha Particle Energy Spectrum and Angular Distribution Effects from Beam-Plasma D-T Fusion.
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Paris University, Orsay, France
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Snyder, W.S.; Ford, M.R.
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Heat Transfer Analysis of a First Wall Radiation Shield for a Fusion Reactor.
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Neutron-Coupled Gamma-Ray Cross-Section Requirements for Gas-Cooled Fast Breeder Reactors.
Nagel, M.; Cerbone, R.J.
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Germogenova, T.A.; Ignatov, A.A.; Isaev, N.V.; Nikolsev, M.N.
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Evaluation of Gamma-Ray Production Cross Sections from Neutron-Induced Reactions on Tungsten.
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Lammer, M. (Ed.)
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Experiment for Accurate Measurements of Fission Product Energy Release for Short Times after Thermal-Neutron Fission of ^{235}U and ^{239}Pu.
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Engineering Operations Report: Shielding Requirements for RNS Nuclear Propulsion Module. Project 110, Work Statement Paragraph 7.
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