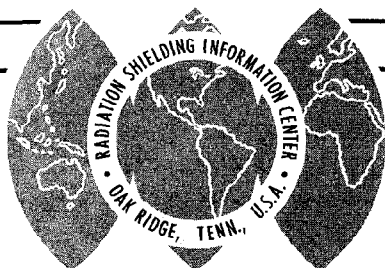


# RSIC Newsletter



RADIATION SHIELDING INFORMATION CENTER

**OAK RIDGE NATIONAL LABORATORY**

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

POST OFFICE BOX X •  
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## AN EDITORIAL

We realize that the technical language must be constantly changing, but we deplore the tendency to use different words to mean the same thing. In particular, we dislike the use of the phrase "direct-beam flux" to mean the same thing as "uncollided," "unscattered," or "virgin flux." The phrase "direct-beam flux" was probably coined during ANP days to describe those neutrons arriving at a detector within the solid angle subtended by the reactor source. Many of these neutrons were indeed uncollided in the air and hence the use of the phrase to mean "uncollided flux." In the interest of clarity and the unique use of the phrase, we recommend that "direct-beam flux" be used only to describe all the particles arriving at a detector within the solid angle subtended by the source. In some cases, of course, the complete reactor-shield assembly might be regarded as the source.

There are other words which should be standardized. For example, there are the terms "mean free path" and "relaxation length." A mean free path is the mean distance in a material between collisions for a particle of a certain energy. A "relaxation length" or "e-folding length" is the distance for a function to be reduced by a factor of e. Only for a monoenergetic, monodirectional, uncollided flux would the mean free path equal the relaxation length. Comments from our readers will be welcome.

## RSIC COORDINATORS TO CONVENE AT GATLINBURG ANS MEETING

The RSIC Coordinators who will be attending the ANS meeting in Gatlinburg will hold an informal session on Wednesday, June 23, at 1:30 p.m. in Conference Room No. 2 at the Holiday Inn.

## ORNL TO PRESENT O5R SEMINAR

The Neutron Physics Division of ORNL will present a seminar and workshop to describe the O5R Monte Carlo neutron transport code system. The seminar, July 26, will describe the theory, operating mechanics, and data preparation. The workshop, July 27-28, will enable those interested to prepare data and place a problem on either the CDC-1604 A or IBM-7090 computer. Invitations were sent to the RSIC computer code distribution list.

## VISIT RSIC AFTER ANS MEETING

If you are attending the ANS meeting in Gatlinburg, you are invited to visit RSIC and ORNL. Come June 24 or later as the entire staff will probably be in Gatlinburg until then. You may browse in the literature files or discuss shielding problems with the RSIC staff if you desire.

## RECENT RSIC VISITORS

During the past month the following people visited RSIC: Roger J. Cloutier, ORINS, Oak Ridge; M. Kinosbata, JAFC Japan, Oak Ridge; Gerfried Hehn, Stuttgart, Germany; Wolfgang K. Etzel, Siemens-Schuckertwerke Ag. RE 11, Germany; Matthew Barrett, Nuclear Utility Services, Washington; and Donald B. Srygléy, Consultant, Advanced Scientific Instruments, College Park, Maryland.

## TRAVELING WITH RSIC

Two members of the RSIC staff recently visited several installations in the New Mexico area. These included Kirtland Air Force Base, Sandia Corporation, ACF Industries, and Los Alamos Scientific Laboratory.

The following groups were contacted in the Air Force Weapons Laboratory: (1) Nuclear Power Branch of the Development Division - WLDN (Lt. Col. John W. Talley, Capt. Al Cupka, Capt. Jerry L. McKenzie, Lt. Nelson S. DeMuth), (2) Biophysics Branch of the Research Division - WLRB (Lt. Raymond Lee, Lt. Duane Adams, Lt. Robert Stovall, Lt. George Radke), (3) Vulnerability Branch of the Applications Division - WLAV (Capt. Richard W. Enz, Capt. Larry L. Tew), and (4) Theoretical Branch of the Research Division - WLRT - Computer Center (Mr. David Lane, Lt. Schumacher and Lt. Gramillion).

The persons contacted at Sandia were T. S. Edrington - Nuclear Safety, David Kitzinger - Nuclear Analysis, Bert Lindsay - Research, and Clarence Mehl - Reactor.

Robert T. Johnson at ACF Industries met with the staff members to describe the work with which he is involved.

The following groups at Los Alamos were contacted: (1) K-1 Division (George Best, M. E. Battat, Donald Dudziak, Ralph LaBauve), (2) T-1 Division (Bengt Carlson), and (3) N-2 Division (Glen Graves, Richard Malenfant, and Clayton Watson).

## STAFF MEMBERS ATTEND ARGONNE CONFERENCE

Two RSIC staff members attended the Conference on the Application of Computing Methods to Reactor Problems at Argonne National Laboratory, May 17-19, 1965. Mrs. Betty F. Maskewitz presented an invited paper which described RSIC and in particular its computer code section. The meeting was very well planned and the quality of the papers was quite high. Many useful contacts were made at this meeting and in particular the contacts made with the European computer people will be quite useful.

## REPORTS RECENTLY DECLASSIFIED

A number of reports containing useful shielding data have recently been declassified. All these reports were originated by the General Electric Company at Cincinnati, Ohio. We are grateful to S. T. Friedman of Allison Division, General Motors, for his declassification efforts and his prompt notification so that we are able to publish this list.

- APEX-700 - "Data Report of Gamma Spectra Behind Various Thicknesses of Beryllium, Beryllium Oxide and Lithium Hydride," P. W. Schreiber  
 DC 58-11-125 - "Relative Sub-Cadmium and Epi-Cadmium Flux Through Various Shielding Materials about TSM-G Core," E. H. Brooks

- XDC 59-1-30 - "Shielding Test Performed in the GE-OTT in the Period March-June, 1958," S. T. Friedman
- XDC 59-5-17 - "Porous Shield Tests in GE-OTT, Data Report I," F. Johnson
- XDC 59-5-220 - "Data Report and Postanalysis of Battelle Source Plate Plug Tests," A. W. Casper
- XDC 59-8-182 - "Porous Plug and Multilayer Shield Experiments," G. A. Luce, D. M. Wheeler
- XDC 59-10-69 - "Data Report and Analysis of Measurements Made in Water Behind Arrays of LiH and Li<sup>6</sup>H," A. W. Casper
- XDC 60-1-17 - "Data Report and Analysis of Fast Neutron Attenuation Within LiH," D. L. West
- XDC 60-1-123 - "Neutron Activation Foil Data, OTT II and III," L. K. Zoller
- XDC 60-2-64 - "Comparison Between Calculated and Measured Nuclear Heating Rates in BSF Experiments, Second Series," R. J. Maier.
- XDC 60-2-104 - "Porous-Plug and Multilayer-Shield Experiments (OTT-V)," W. A. Hehs, B. E. Morris
- XDC 60-2-166 - "Lid Tank Data July, 1957 to February, 1958," J. A. Belcher
- XDC 60-6-61 - "OTT IV and V Foil and Chemical Dosimeter Data," E. White
- DC 60-6-155 - "...Comparison of Calculated and Measured Fast Neutron and Gamma Dose Rates Outside the Shields of the ASM-IIIIE and SSR-1 Critical Assemblies," N. Vieli
- XDC 61-1-14 - "Measured and Calculated Radiation Levels Within and Behind Beryllium Oxide," P. W. Schreiber, F. D. Kodras
- DC 61-2-98 - "OTT IV and V Activation Tape Data," E. White
- DC 61-2-100 - "Laminated-Shield Configuration Data, OTT IV and V," L. K. Zoller
- DC 61-2-101 - "Porous Shield Tests in the GE-OTT, Calculations and Analysis of Test Data - I," F. Johnson
- XDC 60-3-33 - "OTT-III Chemical Dosimeter Data," L. H. Scherer
- APEX 502 - "XMA-1 Shielding Tests Using Slabs of Advanced Shielding Materials," R. H. Clark

## MAY ACCESSION LIST OF LITERATURE

The following accession list consists of literature which the RSIC obtained through its usual scanning procedures. This literature will be examined for assignment to various files or for possible rejection. The accession list is divided into three fields of (1) reactor and weapons shielding, (2) space and accelerator shielding, and (3) shielding computer codes.

Reactor and Weapons Shielding

EUR-2197-D

Shielding Experiments at the Reactor Station Geesthacht Annual Report, 1963  
E. Bagge - 1964

AFWL-TR-64-151

Formulation of Radiation Transport Solutions for Shielding Applications,  
Including Integral Transform Methods, Matrix Techniques, and Asymptotic  
Approximations  
J. M. Norwood and R. E. Beissner - March 1965

AFWL-TR-64-140

The Interactions of 14.6 MeV Neutrons in Iron, Lithium-7, and Carbon  
G. T. Western, R. C. Baid, F. L. Gibbons, and J. R. Williams - March 1965

LA-DC-6675

Prompt Neutrons from Fission  
James Terrell - 1964

UCRL-11810

Shielding Doors  
Lee R. Glasgow and James M. Haughian - March 2, 1965

SM-69/50

Fission Data and Nuclear Technology  
G. C. Hanna - February 1965

Atomkernenergie 9, 11/12, 451-456 (1964) Translation requested

The Use of Build-Up Factors in Calculating Gamma Radiation from Plane  
Sources Behind Absorber of Finite Extension  
Von A. Rudloff, Bad Godesberg

MMPP-FRPC-64-1

Recent Applications of Neutron Transport Theory  
P. F. Zweifel - 1964

AERE-R-4525

A Fast Neutron Dose Equivalent Rate Monitor  
J. W. Leake - January 1965

ANS-SD-2

Proceedings on the Special Session on Fast Neutron Spectroscopy, December 1,  
1964  
February 15, 1965

Space and Accelerator Shielding

LNF-64/54

Mean Levels of Internal Radiation in the Linear Accelerator and the Storage  
Ring  
M. Bernardini - October 27, 1964

NSAM-914

Radiation Exposure in Solar Particle Beams Behind Very Low Shielding  
Hermann J. Schaefer - February 1965

Space Aeronautics - May 1964

Simulating Space Radiation  
E. Alfred Burrill, High Voltage Engineering Corp., Mass.

MTP-M-RP-61-12

The Shielding of Space Vehicles  
J. Warren Keller - May 16, 1961

DL-82-0117

Proton Lifetimes in the Van Allen Radiation Belts  
Harold Liemohn - June 1961

AFSWC-TN-59-15

Composition of Radiation Trapped in the Geomagnetic Field at Altitudes  
up to 1,000 Kilometers  
Francis E. Holly and Dr. Richard G. Johnson - March 1959

J. Geophys. Res., 65(10), 3107-3115 (October 1960)

The Radiation Belt Produced by Neutrons Leaking Out of the Atmosphere  
of the Earth  
Wilmot N. Hess

J. of Geophys. Res., 65(5), 1377-1383 (May 1960)

Particle Fluxes in the Inner Radiation Belt  
Stanley C. Freden and R. Stephen White

Phys. Rev. Letters, 501, 11-13 (July 1, 1959)

Van Allen Belt Protons from Cosmic-Ray Neutron Leakage  
Wilmot N. Hess

NASA TN D-2125

Recommendations and Evaluations of Materials - Research Areas of Importance  
to Missile and Space Vehicle Structures  
Jack B. Esgar, Norris F. Dow, and William R. Micks - October 1963

NASA TN D-412

The Flux and Energy Spectra of the Protons in the Inner Van Allen Belt  
John E. Naugle and Donald A. Kniffen - August 1961

NASA TN D-1717

Energy Spectrum of Electrons in the Outer Radiation Belt  
Wilmot N. Hess and John A. Poirier - March 1963

NASA TN D-681

Radiation Shielding for Manned Space Flight  
Lewis E. Wallner and Harold R. Kaufman - July 1961

Paper presented at the Amer. Astronautical Soc. Lunar Flight Symposium, New York,  
December 27, 1960

Radiation Shielding of Lunar Spacecraft  
T. G. Barnes, E. M. Finkelman and A. L. Barazotti

D2-11608

Analysis of Solar-Flare Hazard to Manned Space Systems  
E. L. Chupp, D. L. Dye, B. W. Mar, L. A. Oncley, and R. W. Williams

X-611-62-122

Solar Proton Manual  
G. E. Fichtel, D. E. Guss, H. H. Malitson, K. G. McCracken, K. W. Ogilvie,  
and W. R. Webber

NASA TN D-2746

Model Solar Proton Environments for Manned Spacecraft Design  
Jerry L. Modisette, Terence M. Vinson, and Alva C. Hardy - April 1965

LTV Report No. O-71000/5R-13

Investigation of Electron Interactions with Matter. Vol. I. Bremsstrahlung  
Production in Aluminum and Iron  
W. E. Dance and L. L. Baggerly - May 1965

LTV Report No. O-71000/5R-12

Investigation of Electron Interactions with Matter. Vol. II. Electron  
Scattering in Aluminum  
D. H. Rester and W. J. Rainwater, Jr. - May 1965

Shielding Computer Codes

XDC-60-11-138	November 1960	GAMMA-P
Production Cross Sections for Gamma Rays by M. S. Ferry FORTRAN for IBM-7090		
NAA-SR-TDR-10922	January 1965	SHØE
A Shield Weight Optimization Code by R. L. Bernick FORTRAN for IBM-7094		
WAPD-TM-501	April 1965	RAM-1
A Fortran Program to Transform and Average Cross Sections from the ROC Library Tape for Use in Multigroup Neutron Transport Programs by D. R. Harris, C. B. Noll, and A. V. Vota FORTRAN for Philco 2000		
LA-3267	April 1965	GAMLEG
A Fortran Code To Produce Multigroup Cross Sections for Photon Trans- port Calculations by K. D. Lathrop FORTRAN for IBM-7030		