RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

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

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"Such things and deeds as are not written down are covered with darkness, and given over to the sepulchre of oblivion."...Ivan Bunin

MEETING OF CROSS SECTION EVALUATION WORKING GROUP HELD AT BROOKHAVEN NATIONAL LABORATORY

A meeting of the Cross Section Evaluation Working Group (CSEWG) was held January 16-17 at the National Neutron Cross Section Center (NNCSC) of Brookhaven National Laboratory. The meeting was chaired by Sol Pearlstein, Acting Director of NNCSC. Status reports showed that there are now evaluated data files available for 66 nuclides in ENDF/B format. Format revisions have been approved to accomodate shielding data based on the format proposals given by Don Dudziak and committee in the report ENDF/B Format Requirements for Shielding Applications, LA-3801 (ENDF 111) (Dec. 1967).

Members of the Shielding Subcommittee met briefly with the new chairman, Keith Penny. The session was primarily devoted to discussion of photon data.

SECOND CONFERENCE ON NEUTRON CROSS SECTIONS AND TECHNOLOGY

A number of papers of interest to shielders will be presented at the Conference on Neutron Cross Sections to be held in Washington, March 4-7, 1968. The proceedings will be published by the National Bureau of Standards. For further information, contact Mr. F. J. Shorten, National Bureau of Standards, Washington, D. C. 20234.

ANS MEETING IN TORONTO, JUNE 9-13, 1968

The American Nuclear Society will meet jointly with the Canadian Nuclear Association, June 9-13, 1968, in Toronto, Ontario. In addition to three

informal shielding sessions, the Shielding Division will hold sessions devoted to High Energy Radiation Protection, Monte Carlo Methods in Shielding Technology, and Detectors for Shielding Research.

Other sessions of interest to shielders include a Status report on the Evaluated Nuclear Data File (ENDF), application of Monte Carlo Techniques to Reactor Physics and four invited papers on Aerospace Shielding.

INTERPOLATION CODE FOR BERTINI CASCADE DATA

CC-47/LEP, low energy intranuclear cascade code package, has been updated to include NCDATA, an auxiliary routine written in FORTRAN IV to do data interpolation. A description of the code is given in ORNL-4220, "NCDATA - Nuclear Collision Data for Nucleon-Nucleus Collisions in the Energy Range 25-400 MeV", by R. G. Alsmiller, Jr., and J. Barish, December, 1967. For those who already have the CCC-47/LEP code package and/or the Bertini data, the routine can be sent separate from the original package.

NCDATA interpolates between analytic fits to intranuclear-cascade data and gives for either neutrons or protons, in the energy range 25 to 400 MeV, incident on a nucleus of atomic weight A (between 12 and 238):

1. the nonelastic cross section as a function of energy,
2. the cascade neutron- and proton-emission spectra in the angular intervals 0-30°, 30-60°, 60-90°, and 90-180°,
3. the evaporation neutron- and proton-emission spectra (assumed isotropic), and
4. the cascade neutron- and proton-emission spectra integrated over all angles.

In addition to numerical values for each of these quantities, the code also gives the values of the coefficients that occur in an analytic expression for each of these quantities.

NRN CROSS SECTION LIBRARY AVAILABLE

The CCC-54/NRN computer code package has been updated to include a compilation of data in the required format. The data was taken from AWRE 0-23(1965) and BNL-325(1964). Goran Olsson, AB Atomenergi, Studsvik, Sweden supplied the compilation. The library alone, or the complete code package, may be requested. The requester should send to RSIC a full reel of magnetic tape.

PERSONAL ITEMS

Charles Huddleston, former director of the Physics and Mathematics

Division of the Naval Civil Engineering Laboratory, is now at the Naval Radiological Defense Laboratory, participating in the technical management of the shielding research program of the Office of Civil Defense.

Clay Zerby, formerly head of Union Carbide's Defense and Space Systems Department in New York, is now general manager of Korad Corporation of Santa Monica, California. The Korad Corporation is a subsidiary of Union Carbide Corporation.

Lloyd Burns has left the General Electric NMPO, Cincinnati, and is now with General Electric at San Jose, California.

Leif Hjarne is now with the IAEA Nuclear Data Unit in Vienna.

John Carver formerly at General Electric, Vallecitos, is now with North American Rockwell at Downey, California.

VISITORS TO RSIC

Visitors to RSIC during the month of January are: R. J. Knies, Brown Engineering Company, Huntsville, Alabama; David Hinkley, Catholic University of America, Washington, D. C.; Peter D. Raft, Physicist, U.S.A.E.C./HASL, New York, New York; Burton G. Bennett, Physicist, U.S. A.E.C./HASL, New York, New York.

JANUARY ACCESSION LIST OF LITERATURE

The RSIC is now aware of the literature cited in the following list. This literature has either been obtained by RSIC or has been placed on order. When received, this material will be examined and assigned to various files if suitable for our information system. The accession list is divided into three fields of (1) reactor and weapons shielding, (2) space and accelerator shielding, and (3) shielding computer codes. These titles are announced before processing and indexing so that there will be no delay and can serve as a prompt announcement of current literature.

RSIC is not a documentation center. Copies of the literature cited must generally be obtained from the author or from a documentation center such as the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151.

RSIC maintains a microfiche file of literature entered into its

information system. Computer searches of this system (which produces a special bibliography) and duplicate microfiche copies of literature in our file are available upon request. Naturally we cannot supply copies of literature which is copyrighted (such as books or journal articles) or whose distribution is restricted. Neither service is yet available for the codes literature.

Reactor and Weapons Shielding

ABS-THH-1029 (ORNL-tr 1856)

Determination of the Dose Buildup Factors for Gamma-Rays in the Energy Region of 0.5-15 MeV in Laminated Shields of Iron and Water
H. G. Vogt
January 1967

AD 653 965 (N67-34009)

A Program for Calculating Radiation Flow and Hydrodynamic Motion
H. L. Brode
April 1967

AEC-tr-6722

Design of Nuclear Plants
A. N. Komarovskii
1965
CFSTI

BNL-11903

Radiative Capture of Neutrons in and Between Resonances
R. E. Chrien
November 7, 1967

BNL-50005

Health Physics Problems of High Energy Accelerators
F. P. Cowan
May 18, 1966

EUR 3632i, (Italian)

Applicazione Del Metodo Delle Caratteristiche All' Equazione Integro-Differenziale Lineare Di Boltzmann
European Atomic Energy Community
Italy
European Scientific Data Processing Center
August 10, 1967

EURFNR-397 (EUR-367e; KFK-628)

The Group Cross-Section Set KFK-Sneak: Preparation and Results
H. Bachmann, H. Husche, et. al.
October, 1967

FOA-4-4320-23

A Study of the Neutron Induced Gamma Activity in Mn Containing Steel and the Reduction of the Gamma Radiation by Boron Shielding
R. Jansson, L. Beckman
October 1967

GA 7820

Radiative Capture Cross Section Measurements
W. M. Lopez, S. J. Friesenhahn, F. H. Froehner
February 20, 1967

K-DP-2623

Some Characteristics of Secondary Gamma Ray Transport in Symmetric Snap Shields
F. R. Mynatt

KAPL-P-3364

The Use of Monte Carlo Techniques in the Iterative Method of Solving the Neutron Transport Equation
Jack P. Friedman and Bruce W. Crawford
1967

KFK-635

Some New Measurements and Renormalizations of Neutron Capture Cross Section Data in the MeV Energy Range
W. P. Ponitz, D. Kompe, et. al.
October, 1967

LA-3740-MS

The Data of Nuclear Reactor Physics: A Bibliography
Jean Furnish
December 1, 1967

LA-3765

Elastic and Inelastic Scattering of Fast Neutrons from ^{6}Li and ^{7}Li
John C. Hopkins, D. M. Drake, et. al.
November 21, 1967

LA-3801 (ENDF III)

ENDF/B Format Requirements for Shielding Applications
Los Alamos Scientific Laboratory
University of California
Los Alamos, New Mexico
December 1967

LA-3810

The Effect of Basic Neutron Reaction Cross Sections of Nitrogen (n,'n) (n 2n), (n,gamma), (n,p), and (n, alpha) on High Energy Neutron Penetration in Air
G. E. Hansen, H. A. Sandmeier
October 1, 1967

LA-DC-8878

A Calculation of the H(n,n) Differential Cross Section in the Energy Range 1 to 20 MeV
J. C. Hopkins
1967

LA-DC-9092

Development of the Sn Discrete Ordinates Method
Bengt G. Carlson
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NDL-TR-84

Measurement of Neutron Spectrum,Age, and Diffusion Lengths in Concrete
M. G. Lin, T. G. Williamson, W. R. Johnson
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NIJS-R-505

Gamma-Ray Spectra from the Radiative Capture of 14 MeV Neutrons by 28-Si and 40-Ca
F. Cvelbar, A. Hudoklin, M. V. Mihailovic
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ORNL-CD-2, UC-41 Health and Safety

Indexes to 780 Unclassified Documents on Civil Defense
Joanne Levey, Ann Klein, Joanne Nelson
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The Effects of Neutron Radiation on Structural Materials
M. Kangilaski
June 30, 1967

RRA-M-67 (CONF-661001-50)

The Effect of Cutoff Energy on Monte Carlo Calculated Gamma-Ray Dose Rates in Air
J. D. Marshall, M. B. Wells
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Calculated Gamma-Ray Dose Distributions in a Phantom Exposed to Fallout and Simulated Fallout
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Absolute Determination of 14 MeV Neutron Yields
T. R. Fewell
August 1967

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Application of the Method of Discrete Ordinates to Photon Transport Calculations
Kenneth G. Adams
June 1967

UCRL-50243, Vol. 1, 2, 3

The Fission Produce Decay Chains (239-Pu with Fission Spectrum Neutrons)
Edward H. Fleming
Lawrence Radiation Laboratory
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UCRL-70493 (CONF-671102-8)

The Configuration and Design Philosophy of the Livermore Neutron Shielded Chemistry Cells
M. S. Coops, C. L. Hanson
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USNRDL-TR-67-120

The Moments Method Used to Determine the Energy Albedo of Gamma Rays from Cesium-137 Impinging on Aluminum and Iron Barriers
C. V. Smith, N. E. Scofield
September 6, 1967

USNRDL-TR-67-124

Spectral Measurements of Scattered Photons from a Point Source Near the Air-Ground Interface
A. L. Frank
October 10, 1967

USNRDL-TR-929 (AD-625747)

Total Neutron Cross Sections of Copper, Iron, and Aluminum Near 14 MeV
J. C. Albergotti and J. M. Ferguson
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WAPD-T-2016

A Round-Off Free Solution of the Boltzmann Transport Equation in Slab Geometry
Lambros Lois, J. Certaine
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WAPD-T-2057

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L. Lois
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Reactor and Shield Subsystems for Morl and Lunar Base Power Plants
J. D. Gylfe
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The Foundations of Neutron Transport Theory
R. K. Osborn, Sidney Yip
1966

Amer. Inst. Chem. Eng., p. 12

Guide for Design and Operation of Shipping Containers for Irradiated Solid Fuel from Nuclear Reactors
American Standards Association
1965

Atomkernergie 12: 259-66 (German)

Calculation of Space-Dependent Neutron Spectra in Iron/Water/Iron Shield Arrangements
R. Fiebig
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Depth Doses Due to Fission Neutron Spectrum in a Tissue-Equivalent Material
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Calculations of Monoenergic Neutron Leakage from Two-Dimensional XY Small System by Collision Probability Method
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H. S. Davis
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Service Behavior of Concrete for Radiation Shielding
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Energy and Dose Buildup Factors for Various Concretes
F. H. Clark and D. K. Trubey
January 1968

Nuclear Data 3: 4-6, 367-645

Compendium of Thermal-Neutron-Capture γ-Ray Measurements
G. A. Bartholomew, A. Doveika, et. al.
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Nucl. Energy, 104-5

Neutron Flux Variation of the Axis of a 14 MeV Neutron Generator
K. G. Darrall, G. Oldham
July-August 1967)

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Buildup Factors for Point Isotropic Gamma Ray Sources in Infinite Medium of Ordinary Concrete
A. B. Chilton
October, 1967

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Thermal Neutron Capture Gammas Measured with Ge(Li)-Spectrometers and Internal Reactor Targets
S. E. Arnell, et. al.
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Solution of the Linear Transport Equation by Finite Fourier Transforms
A. Bhattacharjie
May 11, 1966

Shipping Techniques Laboratory, Vol. 2, No. 6: 311-316 (ORNL-tr-1857)

A Method to Determine the Compton Scattering Angle from its Cumulative Probability in the Monte Carlo Calculation
Hisao Yamakoshi, Masaya Nakata

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A V^o Importance Function for the Monte Carlo Calculation of the Deep Penetration of Gamma Rays
T. W. Armstrong
University of Tennessee
December 1967

Space and Accelerator Shielding

ANS-SD-3

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American Nuclear Society
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R. Biancastelli, P. Stein
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Gatlinburg, Tennessee
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Nucl. Sci. and Eng. 28: 353-358, 1967

The Absorbed Dose Rate from Both the Uncollided and the Once-Collided Flux of Gamma Rays at the Center of a Spherical Shell Shield Bombarded by an Isotropic Flux Spectrum of Protons
Richard Madey and Harold Shulman

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Monte Carlo Procedure for Analysis of Radiation in Ducts (RAID)
J. A. Moore, J. B. Eggen, and F. O. Leopard
FORTRAN IV for CDC 6600

EUR 3636e October 1967 SABINE

SABINE - A One Dimensional Bulk Shielding Program
C. Ponti, H. Preusch, and H. Schubart
FORTRAN IV for IBM 7090 or 360

GA-8069 August 1967 NEFIRS

NEFIRS - A Computer Program for Exploratory Studies of Neutron Flux Distributions in Reactor Shields
C. A. Goetzmann
FORTRAN IV for UNIVAC 1108

ANL-7306 May 1967 SAD DRIVER

Programs for Analysis of Scattering Angular Distributions
E. M. Pennington, J. C. Gajniak, and R. A. Mewaldt
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NASA-MSC-3066 May 1965 K019

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C. Forrest Malone
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BNWL-CC-773 August 1966 GAMMAX

PROGRAM GAMMAX
L. J. Page and H. S. Zwibel
UNIVAC 1107

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TACS - A Code to Calculate Fast Reactor Group Cross Sections from Point Data for Primary Use in S/sub N Transfer Codes
O. L. Smith
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AUTOJOM - A Computer Program to Generate Coefficients for Quadratic Equations
Ronald J. Cahill
FORTRAN for CDC 6600

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Investigation of one Concept of Thermal Shield for the Room Housing a Molten-Salt Breeder Reactor
W. K. Crowley and J. R. Rose
FORTRAN for CDC-1604

DAC-60654 October 1967 NUCLEFF-16, FLORA

Program for the Calculation of the Contributions of Flourescence Radiation
B. Barnett, J. R. Hobart, and J. A. Belcher
FORTRAN

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Subroutine HEITLER
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A Users Manual for DOT
F. R. Mynatt
FORTRAN IV for IBM 7090, 7094

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SAP - A Neutron and Gamma Ray Albedo Model Scatter Shield Analysis Program
L. D. Stephenson, F. Planinsek, A. Killinger, and B. J. Sapovchak
FORTRAN IV for IBM 7094

RP/TN 119 June 1967 GMCM

GMCM - A General Monte Carlo Programme for Neutrons
B. McGregor
FORTRAN for IBM 360

AEEW-M 774 September 1967

The Format of Binary Tapes of the U.K.A.E.A. Nuclear Data Library
G. Doherty and D. S. Norton
KDF9

ORNL-4130 December 1967 CSP-I

CSP-I - A Neutron Cross-Section Averaging Package for Use with the O5R Data Tape
K. J. Yost and N. M. Greene
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TO-B 65-43 July 1965 IRENE

Ionization Resulting from a Neutron Point Source in an Exponential Atmosphere
Dominic J. Raso and Stanley Woolf
FORTRAN for IBM 704, 709, or 7094

BE-TN RL-251 December 1967 QAD-5K

QAD-5K Operating Manual
T. W. Smith and R.J. Knies
FORTRAN IV for IBM 7094, 7090, and IBM 360/75

RTI R-OU-266 May 1967 CONSTRIP III

Radiological Recovery Requirements, Structures, and Operations Research - Introduction and Summary
F. A. Bryan, Jr.

RTI-R-OU-266, Vol. 1 May 1967 CONSTRIP III

Radiological Recovery Requirements, Structures, and Operations Research Volume 1 - Calculational Technique for Determining Importance of Limited Strip Decontamination Procedures
W. O. Doggett and F. A. Bryan, Jr.
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