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 •
OAK RIDGE, TENNESSEE 37831

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CODE PACKAGE TRANSMITTAL

The transmission of computer codes by RSIC is generally accomplished by mailing magnetic tapes because card decks for these codes are usually very bulky. Therefore, a request to RSIC for a code in the collection should be accompanied by a tape reel which will be returned.

In the past, when the requestor indicated a need for prompt transmittal of a code package the RSIC staff made use of tape reels borrowed from the local computing facility. Several have not been returned. We must account for them periodically and therefore must have them returned as soon as possible. Early processing and return of RSIC tapes will be appreciated.

L-05 REVISION

Modifications have been received for code package CCC-9/L-05 from USAF NARF, General Dynamics, Fort Worth, Texas. According to C. W. Austin the following subroutines have been revised: TFORM, ALP7, ALP11, DBPRZ, SCRP, DUMP and CDAT.

The modifications are available from RSIC. The code package now being distributed reflect the changes.

Additions to the L-05 data library have been made by Radiation Research Associates of Fort Worth.

LOCKHEED SPACE SHIELDING CODES IN RSIC

Dr. Frances S. Alsmiller, Mrs. Hemma E. Francis, and Mrs. Betty F. Maskewitz recently spent two days at the Lockheed-Georgia Company, Marietta, Georgia, in a conference on the Lockheed space shielding codes. C. W. Hill, W. B. Ritchie, and K. M. Simpson of the Nuclear Analysis Department discussed the codes described in their reports ER-6643 and ER-7777. This group has, in cooperation with M. O. Burrell, NASA George C. Marshall Space Flight Center, Research Projects Division, Huntsville, Alabama, contributed the codes to the RSIC computer code collection.

The code packages, now in RSIC routine processing, include a dose calculation with a geometry and a geometry test routine, a mission flux program (B-L coordinates) and mission trajectory, a range and stopping power calculator,

a proton penetration code with a nuclear constants routine, a source spectrum code, an electron Bremsstrahlung code, a multi-slab gamma code, and an inelastic gamma production code.

An announcement will be made when the packages are available for distribution.

NEW CODES RECEIVED AND BEING PROCESSED

P-36: MAC-RAD
NEUTRON GAMMA-RAY ATTENUATION CODE, SPINNEY (REMOVAL-DIFFUSION) CALCULATION IN PLANE GEOMETRY, contributed by Nuclear Energy Plants, AEC, Frankfurt, Germany, and European Atomic Energy Community-EURATOM, Joint Nuclear Research Center, Ispra Establishment, Italy
Fortran, IBM-7090
References: KERNENERGIEANLAGEN Bericht No. 116 (ORNL-tr-610), and EUR 2152.e
ENEA Computer Programme Library, Abstract No. 006

P-38: ARIEL (Space)
PHOTOPRODUCTION REACTIONS IN HYDROGEN, contributed by Istituto Superiore di Sanita, Physica Laboratories, Rome, Italy
FORTRAN IV, IBM-7040 and IBM-7090
(Reference: ISS-64/21 (ORNL-tr-624)

P-39: OGRE SYSTEM
GAMMA RAY DOSE RATE CALCULATION, contributed by Oak Ridge National Laboratory, Oak Ridge, Tennessee
FORTRAN/FAP, IBM-7090 and FORTRAN/CODAP, CDC-1604
(Reference: to be published)

P-40: SPARES/SPACE RADIATION ENVIRONMENT AND SHIELDING CODES:
TRAJECTORY AND ENVIRONMENT AND PRIMARY PROTON DOSE, contributed by Air Force Weapons Laboratory (WLRB-1), Kirtland Air Force Base, New Mexico, and The Boeing Company, Seattle, Washington.
Fortran, IBM-7090
(References: D2-90684-1, WL-TDR-64-71, Vol. I and Vol. II)

P-41: PRØTØS
THE MIGRATION OF PROTONS, contributed by the Research Institute of National Defense, Stockholm, Sweden
FORTRAN for IBM-7090
(Reference: FOA RAPPORT 4 A-4411-411)

P-42: PROGRAM 18-1
Contributed by General Electric, Nuclear Materials and Propulsion Operation, Cincinnati, Ohio
FORTRAN for IBM-7090
(Reference: GEMP-272)

P-43: GEM
MONTE CARLO NEUTRONICS CALCULATIONS – COMPLEX GEOMETRIES, contributed by UKAEA, Authority Health and Safety, Safeguards Division, Risley, Warrington, Lanc.
FORTRAN for IBM-7090
(Reference: document incomplete)

P-44: FPIC
FISSION PRODUCT INVENTORY CODE, contributed by Lockheed-Georgia Company, Nuclear Analysis Department, Marietta, Georgia
FORTRAN, IBM-7090/7094
(Reference: ER-6906)

P-45: LIPRECAN I
MONTE CARLO NEUTRON PENETRATION AND ENERGY DEPOSITION IN LIQUID HYDROGEN – TWO DIMENSIONAL, contributed by Missile and Space Systems Division, Douglas Aircraft Company, Inc., Santa Monica, California
Fortran, IBM-7090
(Reference: SM-43594)

P-46: CLOUD
GAMMA-RAY DOSE RATE FROM A RADIOACTIVE CLOUD, contributed by Atomics International, Canoga Park, California
Fortran-II, IBM-7090
(Reference: NAA-SR-MEMO-4822)

THE SHIELDING COMMUNITY NEEDS YOUR INFORMATION

It is obviously impossible for RSIC to be aware of every piece of shielding literature or of available computer codes for shielding calculations. Therefore, to ensure that your information is made known to the shielding community through RSIC, we request that you assume the responsibility of informing us about it, either by mailing us a copy of your report or by advising us by letter.

MISCELLANEOUS POLICIES AND SERVICES OF RSIC

RSIC is not a documentation center. The literature selected by RSIC may be obtained in general elsewhere.

RSIC maintains files of preliminary or informal publications which generally are not selected to be placed in RSIC bibliographies. These publications include proceedings of symposia, transactions of societies, letters to the editor, progress reports, strictly internal reports, etc. Also, RSIC maintains an archival microfiche file of all the shielding literature (except classified literature) and files of full-size copies of the literature, although no attempt is made to ensure complete coverage since the microfiche file does ensure complete coverage.

SEPTEMBER 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

GEAP-3114

Neutron and Gamma Streaming in Void Channels
P. J. Aline - January 31, 1959

German Patent 1,184,026

Device for Radiation Shielding of Ducts through Shielding Walls
Wilhelm Lehner - December 23, 1964

German Patent 1,183,419

Method of Producing Construction Elements of Concrete, Artifical Stone, Stone Wood or Similar Construction Materials Containing Lead
Heinrich Drath - December 10, 1964

British Patent 981,279

Apparatus for Carrying Out a Nuclear Reaction
John E. Bounden - January 20, 1965

British Patent 980,947

Neutron Generator
Reuben Redstone, Peter D. Lomer, et al. - January 20, 1965

BRL R 1284

A Method for Calculating Secondary Gamma Ray Transmission through Single-Material Slabs
Alfred J. Budka - April 1965

GEMP-360

Gamma Ray Production Cross Sections (Supplement No. 1)
W. E. Edwards - August 26, 1965

BOOK

Concrete for Radiation Shielding (Second Edition)
American Concrete Institute - 1962

Magazine of Conc. Res., 16(49), 211-220 (December 1964)

An Investigation of the Unit Weight of Concrete
Sandor Popovics

Nucleonics, 23(8), 119-122 (August 1965)

Two-Parameter Formula for Point-Source Buildup Factors
A. B. Chilton

NAA-SR-MEMO-3800 (App.)

A Derivation of the Equations Used to Assess the Specific Activity in the Coolant of a Nuclear Reactor System
C. A. Goetz - May 4, 1959

NAA-SR-MEMO 4264

Parameter Survey of the Average Nuclear Power Generation in the HNPF Rare Earth Control Rod Poison Column Assembly
R. Karcher - August 20, 1959

NAA-SR-MEMO 3830

Sodium-24 Specific Activity in HNPF U-Mo and U-C Reactor Systems
P. Spiegler - May 21, 1959

NAA-SR-MEMO-4124

Shielding Requirements for the Hemispherical Dome Portion of the Piqua Containment Shell and for Points of Shell Penetration
P. Spiegler - September 16, 1959

ORNL-TM-1205

A Determination of Intermediate-Energy Neutron Albedo Data for Concrete Using Monte Carlo
W. A. Coleman - September 1965

APEX-525

Particle Escape from the Ends of Cylindrical Tubes
John R. Terrall - March 1958

Atomkernenergie, 10, 11-22 (Jan.-Feb. 1965) (Translation requested)

Shielding of a Boiling Water Ship Reactor
H. G. Fendler, A. L. Snellen and K. Werner

Kerntechnik, 7, 105-108 (March 1965) (Translation requested)

Calculation of Irradiated-Fuel Shielding
F. Rohloff

Kernenergie 8(3), 141-162 (March 1965) (Translation requested)

Radiation Streaming through Ducts and Voids in Shields
K. W. Kruegger and U. E. Michaelis

AECL-2210

Spent Nuclear Fuel as a Source of Gamma Radiation
W. M. Campbell and R. C. Hawkins - February 1965

AFWL-TR-64-134

X-Ray Absorption in Dose-Equated Materials
B. C. Clark and J. F. Janni - May 1965

USNRDL-TR-832

Computer Correction for Shifts in Gain and Baseline in Gamma-Ray Scintillation Pulse Height Spectra
D. F. Covell - February 2, 1965

GA-6177

Resonance Cross Sections
L. W. Nordheim - May 17, 1965

IA-1003

Calculation of Gamma Ray Energy Response for a Flat Silver Metaphosphate Glass Dosimeter
Y. Feige, J. Sever, et al. - January 1965

R62FPD20

Shadow Shield Design for Space Power Plants
G. A. Englesson - January 9, 1962

KAPL-M-6452

O^{16} Fast Neutron Cross Sections and Legendre Moments Below 15.0 Mev
E. L. Slaggie and J. T. Reynolds - April 30, 1965

BNWL-SA-79

Neutron Attenuation Mechanisms in Concretes
J. Greenborg - June 3, 1965

NAA-SR-MEMO-10881

Analytic Techniques for the Calculation of the ORNL Tower Shield Experiments. Part III. Annex-3
R. S. Huber - January 5, 1965

AAEC/TM-288

Absolute Calibration of Radioactive Neutron Sources
D. R. Davy - April 1965

AERE-M-1590

Attempts to Determine the Fast-Neutron Spectrum in a Thermal Reactor by Means of Li-6 and Hc-3 Semiconductor Spectrometers
M. G. Silk - May 1965

ANL-6751

Neutron-Flux Studies in the EBWR during Power Operation
W. G. Knapp - March 1965

ORNL-TM-1184

Propagation of Neutron Waves through Heterogeneous Multiplying and Nonmultiplying Media (Thesis)
V. R. Cain - August 1965

SORA-872

Two-Dimensional S_4 Calculations by the 2DXY on the Fast Pulsed Reactor Sora with Two Wheels
T. Asaoka - 1965

SORA-870

One-Dimensional S_N Calculations for the Evaluation of the Performances of the Source Reactor Sora
B. Quiquemelle - 1965

SORA-868

S_n Calculations on a Current Design of the SORA Reactor Part I - One-Dimensional Survey Calculations, Part II - Two-Dimensional Detailed Calculations
T. Asaoka - 1965

SORA-867

Comparison Between S_N Results and Experiments
T. Asaoka - 1965

DP-986

Radiation Properties of Californium - 252
Dean H. Stoddard - June 1965

ORNL-3822

Vol. IV. Differential Fast-Neutron Albedoes for Concrete. IV. Results of Monte Carlo Calculations for an Incident Angle of 60 deg.
Vol. V. Differential Fast-Neutron Albedoes for Concrete. V. Results of Monte Carlo Calculations for an Incident Angle of 75 deg.
Vol. VI. Differential Fast-Neutron Albedoes for Concrete. VI. Results of Monte Carlo Calculations for an Incident Angle of 75 deg.
R. E. Maerker - July 1965

AEC-tr-6604

Radiation Physics. II. Neutron and Gamma Dosimetry
E. M. Kashlinskii, D. Ya. Gubatova, K. K. Shvarts, Ya. Zh. Kristapson (Eds.)

LA-DC-7139

Neutronic Isolation Characteristics of Concrete, Lead, Wood, Polyethylene and Beryllium
Thomas McCreless, Jr. - 1965

LA-3286

Integral Gamma and Neutron Measurements on the Kiwi B4D-202 and Kiwi B4E-301 Reactor
A. R. Dreisner - April 16, 1965

LA-3349-MS

Diffusion of Neutrons from a Point Source in an Exponential Atmosphere
Marshall Rosenbluth - August 12, 1965

LA-3304

Integral Gamma and Neutron Measurements on the Kiwi TNT
P. K. Lee and F. C. V. Worman - May 3, 1965

AWRE O-13/65

A Review of Evaluations of Neutron Cross Sections Available at November 1964
K. Parker - March 1965

SSD-TR-65-74

A Model of the Boltzmann Collision Integral for Mixtures of Light and Heavy Particles
Melvin Epstein - June 1965

GMAD-3078-26 (C)

MCR Critical Assembly Shield Experiments
R. Schamberger, G. Grochowski, et al. - May 3, 1965

GMAD-3078-28

MCR Small Source Experiments
R. Schamberger and J. Celnik - May 3, 1965

KFK-297 (Translation requested)

Solution of the Transport Equation by the Monte Carlo Method
Ulrich Moller - February 1965

KFK-298 (Translation requested)

Subprograms for Solving Problems in Neutron Physics by the Monte Carlo Method
Ulrich Moller - February 1965

N64-29787 (NASA-CR-52958) (GEMP-190d)

Introduction to Nuclear Propulsion Lectures 5 and 6. Shield Physics
John Moteff - 1963

APEX-502

XMA-1 Shielding Tests Using Slabs of Advanced Shielding Materials
R. H. Clark - July 1958

NAA-SR-MEMO-10853

Analysis of Neutron Transmission through Slabs of Lithium Hydride
T. S. Hubner - January 4, 1965

Health Physics, 11(6), 537-549 (June 1965)

Ground Roughness Effects on the Energy and Angular Distribution of Gamma Radiation from Fallout
C. M. Huddleston, Q. G. Klinger, Z. G. Burson, R. M. Kinkaid

Icarus, 4(2), 119-127 (May 1965)

Inverse Problems in Radiative Transfer-Layered Media
R. E. Bellman, H. H. Kagiwada, R. E. Kalaba, and S. Ueno

Soviet Physics-JETP, 20(6), 1387-1389 (June 1965)

Angular Distribution of Gamma Rays Produced in the Fission of U-235, U-233, and Pu-239 by Thermal Neutrons
G. A. Petrov

J. Math. Anal. Appl., 10(2), 234-45 (April 1965)

Existence and Uniqueness Theorems in Invariant Imbedding. I. Conservation Principles
R. Bellman, K. L. Cooke, et al.

J. Brit. Nucl. Energy Soc., 4, 119-134 (April 1965)

Neutron Flux in the Shield of the Dounreay Fast Reactor
J. Adamson, A. M. Judd, and N. I. McNair

Health Physics, 11, 185-92 (March 1965)

Spatial Dose Distribution in Air-Over-Ground Geometry
F. F. Haywood

Health Physics, 11, 369-383 (May 1965)

Gamma-Ray Energy and Angular Distributions Above Fallout
R. L. French

Nucl.Struc.Eng., 1(3), 347-351 (March 1965)

High-Density Slag Concrete
T. E. Northrup

Nucl.Struc.Eng., 1(3), 324-331 (March 1965)

Nomogram for Determining Shield Thickness for Point and Line Sources of Gamma Rays
C. Jönemalm

Nucl.Sci.and Techn., 2(3), 99-103 (March 1965)

The Effect of Cylindrical Holes in a Moderator on the Passage of Virgin Neutrons from a Point Source
H. Murase, T. Sekiya and T. Suita

Nucl. Phys., 65, 130-44 (May 1965)

Photoneutron Reactions in Thallium up to 105 MeV
J. Moffatt and D. Teitmann

Energia Nucl.(Milan), 12,26-32 (January 1965)

A Statistical Model of U-235 Fission
E. Erba, U. Facchini, E. Saetta-Menichella, et al.

J.Math.Anal.Appl. 10, 161-165 (Feb. 1965)

On a Problem in Neutron Transport Theory
Kennard W. Reed, Jr.

Nucl.Struc.Eng., 1(5), 476-492 (May/June 1965)

An Analytical Solution of Multi-Group Removal-Diffusion Equations, in Plane Multi-Layered, Reactor Shield System
L. W. Szymendera

Space and Accelerator Shielding

CONF-651-56

Proton Flux, Dosage and Damage Estimates in the Van Allen Belt
S. Russak and K. Richardson

BNL-888

Nature of Matter. Purposes of High-Energy Physics
Luke C. L. Yuan - January 1965

CONF-640301 (p. 182-218)

Studies of the Giant Dipole Resonances with (p,γ) Reactions
S. S. Hanna

REIC-37

The Space-Radiation Environment and Its Interactions with Matter
E. R. Leach, B. P. Fairand, et al. - January 15, 1965

AWRE 0-23/65

Neutron Cross Sections of the Proton in the Energy Range 0.0001 eV - 20 MeV
A. Horsley - July 1965

AD-603599

Time Behavior of Charged Particles Injected by 1962 High-Altitude Russian Nuclear Tests
George Albert Kuck - August 1964

CONF-650-13

The Saclay Design Study of Proton Linear Accelerators
M. Prome - July 1964

DI/HP/5

Fast Neutron Radiation on the CERN Site
J. Baarli, J. Dutrannois, K. Goebel, K. Shaw, and A. Sullivan - July 18, 1962

DI/HP/6

High Energy Flux Measurement Using Plastic Scintillators
K. Shaw - July 24, 1962

NIRL/M/30

Neutron Surveys Around the Rutherford Laboratory 50 MeV Proton Linear Accelerator
R. H. Thomas, K. B. Shaw, P. Simpson, and J. F. MacEwan - March 1962

Health Physics, 11(5), p. 353-61 (May 1965)

Radiation Dosimetry for Protection Purposes Near High-Energy Particle Accelerators
J. Baarli and A. H. Sullivan

Energia Nucl. (Milan) 12, 98-99 (Feb. 1965) (Translation requested)

Measurement of Skyshine Neutrons Around the Frascati Synchrotron
M. Ladu, M. Pelliccioni, et al.

ANU-P/349

A Conversion Function for Calculating Elastic Scattering Angular Distributions
J. Nurzynski - 1965

SM-46257 (NP-15125)

Radiation Protection for Manned Orbiting Space Stations
T. M. Jordan and E. F. Koprowski, et al. - September 1964

Trans. Am. Nucl. Soc., 8(1), 196 (May 1965)

Space Craft Activation by Solar-Flare Protons
D. H. Rusling

R62FPD20

Shadow Shield Design for Space Power Plants
G. A. Englesson - January 9, 1962

A65-25363

Proton Measurements on a Vertical Probe into the South Atlantic Radiation Anomally
Russel G. Herron

Research in Geophysics, 1, 43-63 (1964)

Solar Flares
M. A. Ellison and J. H. Reid

Nucl. Instr. Methods, 33, 261-267 (March 1965)

Shielding Measurements on 4.8-GeV Bremsstrahlung
G. Bathow, E. Freytag, et al.

Rev. Roumaine Phys, 9, 977-986 (1964)

The Cross Section for Photoneutron Production in Co, Ni, Cu, and Ga
G. Gaciu, A. Bonazzola, et al.

Nucl. Phys., 66, 595-608 (May 1965)

Photoproduction of Charged Pions from Nuclei, Part III
G. Ramachandran and V. Devanathan

IVA (Ingeniorsventenskapsakad.) Medd., No. 138, 21-28 (1964)

Dose Measurements at the Electron Accelerator Facility at Riso
Gunnar Thaarup

Geochim. Cosmochim. Acta, 29, 43-48 (January 1965)

On Some Tantalum Abundances in Meteorites and Tektites
William D. Ehmann

Shielding Computer Codes

FOA RAPPORT-4 A-4436-411 July 1965 PRØTØS

Program Description and User's Manual for Protos, A Computer Program for Treating Proton Slowing Down Due to Atomic Collisions
by C. Johansson
Fortran II for IBM-7090 computer

AEG-KERNENERGIEANLAGEN-BERICHT NR. 116
ORNL-tr-610 October 1963 MAC-RAD

A Multigroup Attenuation Code for Plane Geometry
by H. Preusch and H. Ilsemann
Fortran for IBM-7090 computer

BNWL-35 March 1965 GAMTEC II

A Code for Generating Consistent Multigroup Constants Utilized in Diffusion and Transport Theory Calculations by L. L. Carter, C. R. Richey, and C. E. Hughey
Fortran II for IBM-7090

ER-6906 May 1964 FPIC

A Fission Product Inventory Code by K. O. Koebberling, W. E. Krull, J. H. Wilson
Fortran for IBM-7090/7094 Computer

NAA-SR-8884 June 1965 CURIE
DOSE
THUNDERHEAD

A Digital Computer Program for External and Internal Radiation Dose Calculations
by G. P. Kenfield, W. R. Lahs, W. B. Sayer, R. M. MacAdams, N. A. Harris
Fortran for 7094 Computer

NAA-SR-10951 DTF-II

A One-Dimensional, Multigroup Neutron Transport Program by W. W. Engle, M. A. Boling, B. W. Colston
Fortran II for IBM-7090 computer

NAA-SR-MEMO-4822 May 1959 CLOUD

An IBM 709 Program for Computing Gamma-Ray Dose Rate from a Radioactive Cloud by D. S. Duncan, A. B. Speir, G. H. Anno, D. C. Kolesar
Fortran II for IBM-709 Computer

ORNL-TM-1175 August 1965 05R-BLITZFLUX

The Determination of Neutron Flux in Nuclear Reactors by the Uncollided Flux Estimator Applied to Monte Carlo Collisions by J. Wallace Webster
Fortran 63 for CDC-1604 computer

RRA-T53 June 1965 05R-SOURCE

Cylindrical Volume Source Routine for 05R by L. G. Mooney
Fortran 63 for CDC-1604A computer

SM-43594 April 1963 LIPRECAN I

A Monte Carlo program for Two Dimensional Neutron Penetration and Energy Deposition to Liquid Hydrogen by R. H. Karcher
Fortran for IBM-7090 computer

USNCEL-TR-379 June 1965 UNIGEOM
for ADONIS

A Monte Carlo Calculation of Neutron Streaming Through Two-Legged Duct Entranceways by Leonard B. Gardner and Alan J. Mettler
Fortran for IBM-7090 computer