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

No. 104   July 1973

Men are disturbed not by things,
but by the view which they take of things.
...Epictetus (c.A.D. 50-120)

LICENSING AND REGULATION COURSE TO BE OFFERED IN THE AUTUMN

The ALI-ABA course of study *Atomic Energy Licensing and Regulation-IV*, will be offered in Washington, D.C. (Washington Hilton), September 20-22, 1973. The registration fee is $225.00.

For further information write or call Paul A. Wolkin, Director, or Donald M. Maclay, Assistant Director, ALI-ABA Joint Committee on Continuing Legal Education, 4025 Chestnut Street, Philadelphia, Pennsylvania 19104, or telephone (215) 387-3000.

COMPILATION FROM CERN AVAILABLE

Compilation of Cross Sections - I,π^- and π^+ Induced Reactions (CERN/HERA 72-1) by E. Bracci, J. P. Droulez, E. Flaminio, J. D. Hansen, and D. R. O. Morrison is a compilation of cross sections of reactions produced by negative and positive pions on targets of protons, neutrons, and deuterons. This is an updated version of CERN-HERA 70-5 and 70-7 and contains 40 per cent more data values than the earlier publications. Graphs of the variation of cross section with incident laboratory momentum are plotted. Values of the rate of decrease of cross section with incident momentum are given. The compilation is available in the Western Hemisphere and Far East from Lawrence Berkeley Laboratory, Berkeley, Calif. 94720; users elsewhere should order from CERN, Geneva, Switzerland.

CHANGES TO THE COMPUTER CODE COLLECTION

The following codes have been added to the collection. Requests should be accompanied by a full reel (2400') of magnetic tape and a statement as to how the tape should be written (density, whether blocked or unblocked, number of tracks).

CCC-210/NUGAM 2&3   Monte Carlo Prediction of Photon Transport Distributions, contributed by NUS Corporation, Rockville, Maryland, and NASA Goddard Space Flight Center, Greenbelt, Md. FORTRAN IV, IBM-360. Reference: NUS-786 Vols. 1, 2, 3.

CCC-211/EMERALD   Calculation of Activity Releases and Potential
Doses from a Pressurized Water Reactor Plant,
contributed by Pacific Gas and Electric Company,
San Francisco, California. FORTRAN IV, IBM-360.

PERSONAL ITEMS

Gerald P. Lahti, formerly of NASA-Lewis Research Center, has recently
accepted a position with Sargent and Lundy, Engineers, in Chicago. He has
joined the Nuclear Safeguards and Licensing Division, which is responsible
for the shielding, radiological safety, and licensing of nuclear power plants.

Ralph Best, formerly with Nuclear Fuel Services, is now with Allied
Gulf Nuclear Service, Barnwell, S. C.

Oadis Jenkins, formerly manager of Liquid Metals Information Center
(LMIC), is starting an information system at Burns and Roe, Oradell, N. J.,
as part of their LMFBR project.

Louise Hicks is the Oak Ridge Associated Universities (ORAU) summer
student this year at RSIC. She comes to us from Talladega College,
Talladega, Alabama.

Mary Nicholson, RSIC information specialist for the past two years,
has accepted a library research position with the Tennessee Valley
Authority (TVA) in Knoxville, Tennessee.

VISITORS TO RSIC

Visitors to RSIC during the month of June were: J. C. Courtney,
Louisiana State University, Baton Rouge; H. Goldstein, Columbia University,
New York, N. Y.; J. Pop-Jordanov, University of Belgrade, Yugoslavia;
J. R. A. Lakey, Royal Naval College, London, England; S. Pearlstein,
Brookhaven National Laboratory, Upton, N. Y.; J. G. Royen, OECD European Nuclear
Energy Agency, Paris; R. E. Rexroad, U.S. Army Ballistic Research Labs,
Aberdeen Proving Ground, Md.; L. Stewart, Los Alamos Scientific Laboratory,
Los Alamos, N. M.; B. Wehring, University of Illinois, Urbana.

JUNE 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, Dept. of Commerce, Springfield, Virginia 22151.

REACTOR AND WEAPONS SHIELDING

AE-464
  Measurements and Analysis cf Gamma Heating in the
  R2 Core.
  Carlsson, R.; Larsson, L.G.
  January,1973
  Dep., NTIS (U.S.Sales Only)

AECL-4080
  Guide to Making Statistical Tests with Small Samples.
  Jarvis, R.G.
  February,1973
  Dep., NTIS (U.S.Sales Only) $4.25, AECL $1.50

AECL-4453
  Yields in Thermal Neutron Fission. Some Results and
  Recommendations Based on a Recent Evaluation.
  Walker, W.H.
  March,1973

ANL-7807
  Survey of Thermonuclear-Reactor Parameters.
  Persiani, P.J.; Lipinski, W.C.; Hatch, A.J.
  October,1972
  Dep., NTIS

ANL-8001
  A Review of the Chemical, Physical, and Thermal
  Properties of Lithium that are Related to Its Use in
  Fusion Reactors.
  Maroni, V.A.; Cairns, E.J.; Cafasso, F.A.
  March,1973
  NTIS

AREAEE-153
  Numerical Formulation of Multigroup and Discrete Sn
  Methods for Reactor Analysis.
  Nasser, S.F.
  1972
  Dep., NTIS (U.S. Sales Only) $4.00

BNL-17649; CONF-730302-6; SM-170/50
  Interaction Between the National Neutron Cross Section
  Center, the Cross Section Evaluation Working Group, and
  the User Community.
  Ozer, O.
  1972
  Dep., NTIS

BNWL-SA-4449(Dr)
  Statistical Study of Radiation Dose for Fishermen.
  Beetle, T.M.
  December,1972
  NTIS

BRL-CR-100
    Coupling of Forward and Adjoint Calculations to Solve
Three-Dimensional Deep Penetration Problems.
    Slater, C.O.; Robinson, J.C.
    March, 1973
    Director, USA Ballistic Research Lab., ATTN: AMXBR-XM-SE,
Aberdeen Proving Ground, Maryland 21005

CEA-CONF-2190 (In French); CONF-721018-20 (In French)
    Behavior under Neutron Irradiation of Materials
Intended for the Protection Shielding of Nuclear Reactors.
    Yvars, M.; Degas, P.; Quetier, M.; Rousseau, G.
    1972
    Dep., NTIS (U.S. Sales Only)

CEA-CONF-2191 (In French); CONF-721018-19 (In French)
    Particular Properties of Protective Shielding Concrete
Influencing the Attenuation Process of Radiations.
    Dubois, P.
    No Date
    Dep., NTIS (U.S. Sales Only)

CEA-CONF-2217 (In French); CONF-721018-9 (In French)
    Present Day Methods of Testing of Shielding Against
Gamma Rays.
    Fourcade-Cancelle, N.; Parct, L.
    No Date
    Dep., NTIS (U.S. Sales Only)

CONF-691067
    Problems in Construction of Radiation Protection.
IV. Reports Presented at a Meeting on Radiation Protection,
Karlsruhe, Germany, October 6-7, 1969.
    Schultz, H. (Ed.)
    1970
    Munich; Verlag Karl Thiemig KG(1970) DM 20.00

CONF-700450
    Problems in Construction of Radiation Protection. V.
Reports Presented at a Meeting on Radiation Protection,
Berlin, April 21-22, 1970.
    Schultz, H. (Ed.)
    1971
    Munich; Verlag Karl Thiemig KG(1971) DM 9.80

CONF-730302-10
    Gamma-Ray Spectrum Catalogue: A User Data File.
    Heath, R.L.
    No Date
    Dep., NTIS

DP-1322
    Neutron Spectra from Californium-252 Wire Sources.
    Herold, T.R.
    March, 1973
    Dep., NTIS

GULF-RT-A-10998
    Fast Reactor Spectrum Measurements. Technical Summary
  Report, February 1,1971 - January 31,1972.
        Young, J.C.; Neill, J.M.; Verbinski, V.A.
        October 30,1972
        NTIS

GULF-RT-A-12456; DNA-2401-3
    Time-Dependent Fast-Neutron and Secondary Gamma-Ray
  Spectrum Measurements in Concrete - Vol.3.
        Harris, L., Jr.; Kendrick, H.
        December 21,1972
        Gulf Radiation Technology, P.O.Box 81608, San Diego,
  California 92138

HEDL-SA-383
    Three-Dimensional Analysis of the FTR Shield Mock-Up
  Experiment.
        Boulette, E.T.; Bunch, W.L.; Marr, D.R.
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        NTIS

INDC(CCP)28-U
    Nuclear Data Requirements for Reactor Shielding
  Calculations.
        Abagyan, A.A.; Dubinin, A.A.; Suvorov, A.P.
        1972
        NTIS

INDC(HUN)-10
    Compilation of (n, 2n) Cross Sections Measured at
  About 14 MeV for Nuclides 6<Z<93.
        Boedy, Z.T.
        January,1973
        Dep., NTIS (U.S. Sales Only) $8.50

IS-T-563 (Thesis)
    Beta Decay of Gaseous Fission Products.
        Halbig, J.K.
        February,1973
        Dep., NTIS $9.75

LA-5116
    Linear Functions, Differing Weights, and Nonlinear
  Least Squares.
        Moore, R.H.
        April,1973
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LA-5145-MS
    Laser CTR Systems Studies.
        Williams, J.M.
        March,1973
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LA-5187
    Velocity Distributions by Correlation Techniques.
        Allen, L.D.P.
        April,1973
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LA-5277-MS
    Specification of a Generally Useful Multigroup
  Structure for Neutron Transport.
    Weisbin, C.R.; LaBauve, R.J.
    May,1973
    NTIS

LA-UR-73-479
    Triangular Mesh Methods for the Neutron Transport
  Equation.
    Reed, W.H.; Hill, T.R.
    No Date
    NTIS

LBL-1262; CONF-730302-8
    Survey of Nuclear Data Use in Applied Fields.
    Lederer, C.M.; Hollander, J.M.
    February,1973
    Dep., NTIS

LYCEN-7263
    Inelastic Scattering in the Continuum. I. DWBA
  Analysis of Angular Distribution.
    Demeyer, A.; Chevarier, A.; Chevarier, N.;
  Hollinger, G.; Pertosa, P.
    October,1972
    NTIS

NP-19709 (Thesis)
    Neutronic Calculations in a Simulated Fusion Reactor
  Blanket.
    Barbee, S.G.
    November,1972
    Texas University, Austin

ORNL-RSIC-31(Vol.1)
    Abstracts of Peripheral Shielding Code Packages
  Assembled by the Radiation Shielding Information Center.
    Maskewitz, B.F.
    1973
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ORNL-TM-3096
    Conceptual Design of the Blanket and Shield Region
  and Related Systems for a Full Scale Toroidal Fusion
  Reactor.
    Fraas, A.P.
    May,1973

ORNL-TM-4140
    An Estimation Technique for Monte Carlo Calculations
  of Dose from an Internal Source of Photons.
    Warner, G.G.
    April,1973
    Dep., NTIS

ORNL-TM-4169
    The ORNL Benchmark Experiment for Neutron Transport
  in Iron and Stainless Steel.
    Maerker, R.E.; Muckenthaler, F.J.
    April,1973
    NTIS

ORNL-TM-4177
    Analysis of a Bench-Mark Calculation of Tritium
    Breeding in a Fusion Reactor Blanket: The United
    States Contribution.
        Steiner, D.
        April,1973
        Dep., NTIS $4.00

ORNL-TM-4193
    Integral Neutron Scattering Measurements on Iron
    from 1 to 20 MeV.
        Morgan, G.L.; Love, T.A.; Perey, F.G.
        June,1973
        NTIS

ORNL-TM-4196
    The Development and Application of a Discrete
    Ordinates Adjoint Difference Method for One-Dimensional
    Shield Weight Optimization.
        Childs, R.L.; Engle, W.W.,Jr.; Robinson, J.C.;
    Mynatt, F.R.
        June,1973

ORNL-TM-4204
    Report to the U.S. Nuclear Data Committee.
        Perey, F.G.
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ORO-3443-42
    Lectures on Mathematical Foundations of the Finite
    Element Method.
        Babuska, Ivo; Aziz, A.K.
        October,1972
        NTIS

PRNC-160 (Thesis)
    Computer Aided Decomposition of Gamma Spectra Emitted
    by Certain Radioactive Nuclides.
        Gileadi, A.E.; Kuppusamy, N.
        January,1973
        Dep., NTIS $6.00

RDT-E-2-4-T(4-73)
    Shield Plug and Closure Cap for Penetrations: LMFBR
    Reactor Vessel Head.
        Division of Reactor Development and Technology (AEC),
    Washington, D.C.
        April,1972
        RSO

RRA-T7211
    Radiation Distributions for Shielding Calculations.
        Mooney, L.G.
        December,1972
        Radiation Research Associates, Inc., 3550 Hulen St.,
    Fort Worth, Texas 76107

RT/FI-(72)33
    Solutions to the Monenergetic Neutron Transport
 Equation.
        Boffi, V.C.
        August,1972
        Dep., NTIS (U.S. Sales Only)

RT/FI-(72)34
    Transport Theory of Monoenergetic Neutrons in Finite
 Convex Bodies.
        Boffi, V.C.; Molinari, V.G.; Premuda, F.; Trombetti, T.
        August 2,1972
        NTIS

RT/FIMA-(72)7
    Algorithms for Discrete Geometry in Monte Carlo
 Transport Problems.
        De Matteis, A.; Guzinski, W.
        October 24,1972
        Dep., NTIS (U.S. Sales Only) $3.25

RT/PROT-(72)7
    Nomograms for the Computation of the Atmospheric
 Diffusion of a Radioactive Pollutant.
        Fritelli, L.
        November 23,1972
        NTIS

RT/PROT-(72)38 (In Italian)
    Handmade Concrete Containers for Radioactive Waste.
 Relations Between Intensity of Exposure at Contact,
 Contained Activity, and Characteristic Geometry in the
 Case of Low and Intermediate Levels of Activity.
        Moccaldi, A.; Rossi, M.
        November 23,1972
        Dep., NTIS (U.S. Sales Only) $3.25

SLA-73-174
    Reduction of Neutron Damage in Silicon by Thick Shields
 Shields of Iron, Tungsten, and Polyethylene.
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        March,1973
        Dep., NTIS

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    Computing as a Language of Physics.   Lectures Presented
 at Trieste, 2-20 August 1971.
        IAEA
        1972
        IAEA $21.00

STI/PUB-308; CONF-720304
    Neutron Inelastic Scattering, 1972. Proceedings of a
 Symposium, Grenoble, France, 6-10 March,1972.
        IAEA
        1972
        IAEA $30.00

STI/PUB-338; CONF-711225
    National and International Radiation Dose
Intercomparisons. Proceedings of a Panel Held in
Vienna, 13-17, December 1971.
    IAEA
    January,1973
    IAEA $6.00

TID-25951; BOOK, 800 p.
    Reactor Shielding for Nuclear Engineers.
    Schaeffer, N.M. (Ed.)
    1973
    Dep., NTIS $13.60

UCID-16242
    Nuclear Detection of Buried Land Mines.
    Waggoner, J.A.
    1967
    Dep., NTIS

UCID-16258
    Status Report to USNDC.
    Anderson, J.D.; Browne, J.C.
    April 25,1973
    Dep., NTIS

UCRL-50021-71(Rev.1)
    Laser-Fusion Program Semiannual Report, July-December,
    1971.
    Kachen, G.I.,Jr.; Clements, W. (eds.)
    February 11,1972
    Dep., NTIS

UCRL-74259
    Utilization of Scientific Data Bases at LLL Using the
"Master Control" Computer Program.
    Hampel, V.E.; Wade, J.
    October,1972
    NTIS

UCRL-74622; CONF-730301-4
    Atlas of Photoneutron Cross Sections Obtained with
Monoenergetic Photons.
    Berman, B.L.
    1973
    Dep., NTIS $6.25

USNDC-3
    Reports to the U.S. Nuclear Data Committee. Meeting
at National Bureau of Standards October 24-26,1972.
    Jackson, H.E.
    1973
    Dep., NTIS

ZJE-134
    Using the Method of Spherical Harmonics for the
Calculation of Shielding. Part 3: Generalized Pn
Approximation.
    Valenta, V.; Veverka, O.
    1972
    Dep., NTIS (U.S. Sales Only) $6.00

Acta Phys. Austr., 33(3-4), 251-262 (In German)
    Treatment of a Cylindrical Gap by Transport Theory.
    Haring, G.
    1971

Acta Phys. Austr., 34(4), 301-312
    Perturbation Calculations in Transport Theory Applied
    to Local Perturbations.
    Timischi, W.
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    Empirical Formula, Continucus in Field Parameters and
    Depth, for the Axial Dose for 60-Co Gamma Radiation.
    Benassi, M.; Paoluzi, R.
    June,1972

Health Phys., 24(4), 411-415
    Measurements of Induced Radioactivity in Dust Around
    a 400 MeV Linac.
    Lucci, F.; Merolli, S.; Pelliccioni, M.
    April,1973

Health Phys., 24(4), 369-374
    Variation of Relative Biological Effectiveness with
    Dose Rate for Different Radiation Qualities.
    Berry, R.J.; Cavanagh, J.; Cliver, R.; Winston, B.M.
    April,1973

Health Phys., 24(4), 423-427
    Fluence and Dose Equivalent Determination in a
    Neutron Field by Means of Moderating Spheres Containing
    Fission Track Recorders.
    Mijnheer, B.J.; Pauw, H.; Van Herk, G.,Jr.;
    Aten, A.H.W.,Jr.
    April,1973

Health Phys., 24(4), 445-446
    A Proposed Unit for Patient Radiation Exposure from
    Diagnostic X-Rays.
    Jennings, W.A.
    April,1973

Health Phys., 24(5), 571-572
    Isotropic Incident Flux in Monte Carlo Calculations.
    Ritchie, R.H.
    May,1973

Health Phys., 24(6), 619-625
    The Experience of the Central Electricity Generating
    Board in Monitoring the Envircnment of its Nuclear
    Power Stations.
    Jones, J.K.; Lewis, G.; Orchard, H.C.; Overs, M.J.;
    Skelcher, B.W.
    June,1973

IEEE Trans. Nucl. Sci., 20(1), 36-42
    Environmental Radiation Dosimetry for Nuclear
Facilities and Problems.
    McLaughlin, J.E.; Beck, H.L.
    February,1973

J. Nucl. Energy, 26(4), 177-188
    Neutron Flux Discontinuities Due to Inelastic
Scattering.
    Beynon, T.D.
    April,1972

Kernenergie, 16(2), 47-52 (In German)
    Solution of Stationary Radiation Transport Problem for
Energy Scattering Using Matrix Functions.
    Melcher, H.; Gerth, E.
    1973

Nucl. Instrum., 109(1), 25-27
    Thermoluminescence in Concrete Measurements for
Determining Gamma-Ray Transmission Curve and Buildup
Factors.
    DeFranceschi, L.; Gentili, A.; Sabbatini, V.
    1973

Nucl. Sci. Eng., 51(2), 102-112
    Gamma-Ray Attenuation in Basement Ceilings.
    Reynolds, R.S.
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    Gamma-Ray Spectra from the Interaction cf 14-MeV
Neutrons with Copper, Zirconium, and Antimony.
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    June,1973

Nucl. Sci. Eng., 51(2), 148-156
    The Application of Phase-Space Finite Elements to
the One-Dimensional Neutron Transport Equation.
    Miller, W.F.,Jr.; Lewis, E.E.; Rossow, E.C.
    June,1973

Nucl. Sci. Eng., 51(2), 157-165
    One-Speed Neutron Transport Problems - Part I: Exact
Transfer Matrix Formulation.
    Aronson, R.
    June,1973

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    One-Speed Neutron Transport Problems - Part II: Slab
Transmission and Reflection and Finite Reflector
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    Caroll, G.; Aronson, R.
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    Experimental Fast-Neutron Albedo from Plane Scatterers.
    Segal, Y.; German, U.; Notea, A.
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Nonelastic Neutron Angular Distributions.
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    June,1973

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    Evaluation of the Second-Order Perturbation Terms by
the Generalized Perturbation Method.
    Seki, Y.
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    Atomic Photoelectric Effect Above 10 keV.
    Pratt, R.H.; Ron, A.; Tseng, H.K.
    1973

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    Nuclear Studies with Neutron-Capture Gamma-Rays.
    Arad, B.; Bendavid, G.
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    Spectrum of Gamma-Ray Scattering at Small Distances
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    July,1970

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    Calculation of Buildup Factors for Gamma-Radiation from
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    Seleznev, N.A.
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COMPUTER CODES LITERATURE

AECL-4217   January 1973   GAMAN
    GAMAN: A Computer Program for the Qualitative and
    Quantitative Evaluation of Ge(Li) Gamma-Ray Spectra
    Felawka, L.T.; Molnar, J.G.; Chen, J.D.; Boase, D.G.
    Atomic Energy of Canada Ltd., Pinawa, Manitoba
    FORTRAN;   CDC 6600

AED-Conf-72-373-012   1972   RSYST
    Development of Calculation Methods and Codes and
    Their Application to Space Reactor Shielding
    Amin, E.; Hehn, G.; Klumpp, W.; Ruehle, R.
    Stuttgart Univ., Germany

ANCR-1022   April 1973   RAFFLE
    The RAFFLE General Purpose Monte Carlo Code
    Vesely, W.E.; Wheeler, F.J.; Marsden, R.S.
    Aerojet Nuclear Co., Idaho Falls, Idaho
    FORTRAN IV;   IBM 360
    AVAIL: NTIS

ANL-7951   September 1972   VENUS II
    VENUS-II: An LMFBR Disassembly Program
    Jackson, J.F.; Nicholson, R.B.
    Argonne National Lab., Argcnne, Ill.
    FORTRAN;   IBM 360
    AVAIL: Dep., NTIS

HEDL-TME-72-134   December 1972   3DP
    3DP: A Three Dimensional Perturbation Theory Code
    Hardie, R.W.; Little, W.W.
    Hanford Engineering Dev. Iab., Richland, Wash.
    FORTRAN;   UNIVAC 1108
    AVAIL: NTIS

IBK-654   June 1968   MULTI
    MULTI: Multigroup or Multipoint P-3 Programme for
    Calculating Thermal Neutrcn Spectra in a Reactor
    Cell
    Matausek, M.V.
    Institut za Nuklearne Nauke Boris Kidric,
    Belgrade, Yugoslavia
    AVAIL: Dep., NTIS (U.S. Sales Only)

JUL-887-PC   September 1972   CORA
    CORA: A Program for Calculation of Isotope
    Formation by Reactor Irradiation Under Changing
    Neutron Flux
    Kurz, U.; Michael, H.
    Kernforschungsanlage, Julich, Germany

KFKI-73-2   November 1972   O5R
    An ICL Version of the O5R Program System
    Lux, I.; Koblinger, L.
    Central Research Institute for Physics,
    Budapest, Hungary
    FORTRAN IV;   ICL-1905

LA-5110   January 1973   EXOTIC
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    Exotic Atoms
    Koch, J.H.; Sternheim, M.M.
    Los Alamos Scientific Lab., Los Alamos, N. Mex.
    FORTRAN;   CDC 6600

LA-5157-MS   March 1973   MCG;MCP
    Monte Carlo Photon Codes: MCG and MCP
    Cashwell, E.D.; Neergaard, J.R.; Everett, C.J.;
    Schrandt, R.G.; Taylor, W.M.; Turner, G.D.
    Los Alamos Scientific Lab., Los Alamos, N. Mex.
    FORTRAN IV;   CDC 6600
    AVAIL: NTIS

NT-02-24   May 1971   MONA 1
  Transmission of Electrons by Dense Flat Shields
  Bourrieau, J.; Schuttler, R.
  DERTS, Toulouse, France

ORNL-TM-3809   May 1973   SWANLAKE
  A Computer Code Utilizing ANISN Radiation Transport
  Calculations for Cross Section Sensitivity Analysis
  Bartine, D.E.; Mynatt, F.R.; Oblow, E.M.
  Oak Ridge National Lab., Oak Ridge, Tenn.
  FORTRAN IV; IBM 360
  AVAIL: NTIS

ORNL-TM-4196   June 1973   SHAPE
  The Development and Application of a Discrete
  Ordinates Adjoint Difference Method for One-
  Dimensional Shield Weight Optimization
  Childs, R.L.; Engle, W.W.; Robinson, J.C.;
  Mynatt, F.R.
  Oak Ridge National Lab., Oak Ridge, Tenn.
  FORTRAN IV; IBM 360
  AVAIL: NTIS

ORNL-4628   May 1973   ORIGEN
  ORIGEN: The ORNL Isotope generation and Depletion
  Code
  Bell, M.J.
  Oak Ridge National Lab., Oak Ridge, Tenn.
  FORTRAN IV; IBM 360
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ORNL-4869   May 1973   SPAR
  SPAR: A FORTRAN Program for Computing Stopping
  Powers and Ranges for Muons, Charged Pions, Protons,
  and Heavy Ions
  Armstrong, T.W.; Chandler, K.C.
  Oak Ridge National Lab., Oak Ridge, Tenn.
  FORTRAN IV; IBM 360
  AVAIL: NTIS

RISO-M-1460   April 1972   GAMP 1
  Double-P-1 Calculation of Gamma-Ray Transport
  in Semi-infinite Media
  Kirkegaard, P.
  Danish Atomic Energy Commission, Riso, Denmark
  B-6700

RT/FI-(72)42   October 1972   UNREC
  Code UNREC for the Calculation of Effective
  Cross Sections and the Resonance Integrals in
  the Unresolved Resonance region
  Lesca, L.; Menapace, E.
  CNEN, Rome, Italy
  AVAIL: Dep., NTIS (U.S. Sales Only)

BOOK   1972   EERIE
  Prediction of Environmental Releases From
  Nuclear Reactors Under Normal and Accident
  Conditions
  MacDonald, H.F.; Clarke, R.H.
  Central Electricity Generating Board, Berkeley, England