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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No. 107 October 1973

Thinking isn't to agree or disagree - that's voting.
...Robert Frost

COMPUTING FACILITY INFORMATION NEEDED

Appended to this issue of the Newsletter is a form for your use in furnishing to RSIC information concerning the computing hardware and software being used at your installation. With this knowledge, the RSIC staff can better service the requests from your installation and can more suitably advise on operability of any given code package at your installation. PLEASE RETURN the completed form to the Radiation Shielding Information Center, Oak Ridge National Laboratory, P. O. Box X, Oak Ridge, Tennessee 37830.

AMERICAN NUCLEAR SOCIETY TO MEET IN SAN FRANCISCO

The ANS winter meeting will be in San Francisco, November 11-15, 1973. Sessions sponsored by the Shielding and Dosimetry Division or of special interest to shielding people include: *Development of Data for Dosimetry Measurements* (Monday AM, all papers invited), *Experimental Radiation Shielding* (Monday PM), *Development of Standardized Spectra, Cross Section Data, and Calculational Techniques for Materials Dosimetry* (Monday PM),*Environmental Radiation Dosimetry I and II* (Tuesday), *Finite Element Methods for Solution of Neutron Diffusion and Transport Problems* (Tuesday PM), *Shielding Cross Sections* (Wednesday AM), *Neutronics of Fusion Reactors* (Wednesday AM), *Reactor Radiation Shielding* (Wednesday PM), *Cross Section Processing and Applications* (Wednesday PM), *Weapons Radiation Shielding* (Thursday AM), *Monte Carlo and Transport Methods* (Thursday PM) *Photon and Charged Particle Transport* (Thursday PM).

The Shielding Standards Subcommittee, ANS-6, will meet Monday Afternoon at 4:00 PM in the Terrace Room of the Hilton. New business includes forming two new working groups on standards for design stage estimates of radiation from nuclear power plants and radiation level zoning in nuclear power plants. All those interested are invited to attend.

MACHINE INDEPENDENT FORTRAN RANDOM NUMBER GENERATOR AVAILABLE

David Irving of Science Applications, Inc.,La Jolla, California, has developed a FORTRAN random number generator which is machine independent. Heretofore, FORTRAN or Assembly Language random number generators for Monte Carlo codes have been machine dependent and lead to some nuisance in translating codes from one machine to another. The subroutine is available from RSIC upon request.

CHANGES TO THE DATA LIBRARY COLLECTION

Two data packages have been changed during the month of September:

DLC-5/HALLMARK — Discrete Ordinates and Monte Carlo Results of Neutron and Secondary Gamma-Ray Transport in Air-Over-Ground Geometry data package has been extended by Science Applications, Inc., Huntsville, Ala., and Oak Ridge National Laboratory. We have added 22 neutron, 18 gamma-ray group cross sections for air and ground which were used in CCC-89/DOT to generate part of the DLC-5/HALLMARK data. These can be used as a reference set of data for those who wish to perform similar calculations or perhaps augment the results which were published by E. A. Straker in ORNL-4289, Vol. II. The data are available on cards (614) upon request.

DLC-10/AVKER — Neutron Kerma Response Function Data Library Package has been updated to correct an error in Subroutine AVKER. The dimensions of the variables DUME and DUMKER must be increased from 120 to be ≥ 500 (perhaps as high as 816). This error was discovered by Gerald P. Lahti, Sargent and Lundy, and was verified by M. Solomito. The RSIC package reflects this change as of 9-6-73.

COMPUTER CODE COLLECTION CHANGES

Several changes were made to the code collection during the month, including additions, modifications, and corrections.

CCC-107/ETRAN — The Monte Carlo Code System for Electron and Photon Transport Through Extended Media Code Package has been extended to include 18G, a code version designed to handle cylindrical targets. The package now includes 16D (one dimensional ETRAN), 18G (cylindrical),and auxiliary codes INCLUDE and DATAPAC 6 (cross section handling code), a data library, DATATAPE 2, and input and output from running sample problems. FORTRAN IV, IBM 360. Reference: NBS-9836, -9837, and Informal Notes. Contributor: Center for Radiation Research, National Bureau of Standards, Washington, D.C.

CCC-120/SPACETRAN — The package, Dose Calculations at Detectors at Various Distances from the Surface of a Cylinder, has been extended by the addition of SPACETRAN III: Integration of DOT III Surface Angular Fluxes. In addition, the package contains SPACETRAN I: Integration of ANISN Leakage Data and SPACETRAN II: Assumed Powers of Cosine Angular Distribution. FORTRAN IV, IBM 360. References: ORNL-TM-2592 and CTC-INF-952. Contributor: Oak Ridge National Laboratory.

CCC-129/TWOTRAN-SPHERE — Multigroup Two Dimensional Discrete Ordinates Transport Code in Spherical Geometry, a modification of the general-geometry TWOTRAN program, contributed by the Los Alamos Scientific Laboratory, Los Alamos, New Mexico. FORTRAN IV, CDC 6600/7600. References: LA-4567 and -4432.

CCC-144/TIMOC — The code package, Monte Carlo Three-Dimensional Neutron Transport Code System, has been updated to reflect more recent code development named TIMOC-72. The cross section handling code, CODAC, handles early ENDF formats and a replacement has been requested but not yet received. FORTRAN IV, IBM 360/370. References: EUR-4519.e and EUR-4521.e. Contributor: CCR Euratom, Ispra (Varese), Italy, through the OECD Nuclear Energy Agency's Computer Programme Library.

CCC-203/MORSE-CG — The IBM 360 package, MORSE-CG (CCC-203C), has been extended by the addition of DOMINO, a general purpose code for coupling discrete ordinates and Monte Carlo calculations. DOMINO is also packaged as a stand-alone code package (PSR 64). CCC-203 contains the general purpose Monte Carlo neutron and gamma-ray transport code MORSE with MAGI's combinatorial geometry. Input and output from sample problems run through the entire system are also packaged. DOMINO is described in ORNL-4853. Contributor: Oak Ridge National Laboratory.

CCC-218/EZTRAN — Monte Carlo Code System for Electron and Photon Transport Through Slabs, contributed by Sandia Laboratories, Albuquerque, New Mexico. References: SC-DR-71 0598, NBS Reports 9836 and 9837. EZTRAN represents Sandia modifications and extensions made on the base of the NBS ETRAN 15 Monte Carlo Code and DATAPAC 4 to perform deep penetration electron transport studies. FORTRAN IV, CDC 6600.

CCC-219/PIPE — Numerical Gamma-Ray Transport Code for Plane/Spherical Geometry based on the BIGGI series of code development has been contributed by CCR Euratom, Ispra (Varese) Italy, through the OECD NEA Computer Programme Library. FORTRAN IV, IBM 360/370. Reference: ISPRA-1437.

CCC-220/LUIN — Analytical Straight-Ahead Transport Code - Calculation of Gamma-Ray Spectra, Fluxes and Ionization in the Earth's Atmosphere - contributed by the USAEC Health and Safety Laboratory, New York, New York. FORTRAN IV, CDC 6600. Reference: HASL-275.

CCC-221/SLDN — A Code System for Shielding Calculations by the Method of Invariant Imbedding operable on the GE-series (635 and 685) computers has been contributed by Tokyo Shibaura Electric Co., Ltd. and the Power Reactor and Nuclear Fuel Development Corporation through the Japan Atomic Energy Research Institute, Ibaraki, Japan. The GE series of programs are available as CCC-221A. Conversion to the IBM 360 computers is currently underway in RSIC. The codes in the system can be operated independently. The reflection and penetration of neutrons and gamma rays, including gamma rays produced by (n,γ) reactions, through multilayer slabs can be calculated based on the multigroup cross sections generated from ENDF/B with an appropriate combination of the programs. They are: SLDN-LTA-2: Neutron Multigroup Constant Generator; SLDN-LTB-2: Generator of Elastic Scattering Kernel of Neutrons and Gamma Rays; SLDN-SL-2: Calculation of the Reflection and Transmission Functions of Radiations for Homogeneous Slabs; SLDN-ML-2: Calculation of Penetration of Radiation for Multilayer Slabs; SLDN-DF-2: Neutron Multigroup One Dimensional Diffusion Code for Shielding Calculations. References: J201 71-08, J201 71-09, J201 71-10, J201 71-11, J201 71-12, and J201-72-06,all written in English.

CCC-222/TWOTRAN II — Two Dimensional Multigroup Discrete Ordinates Transport Code in (x,y),(r,θ) and (r,z) Geometries, contributed by Los Alamos Scientific Laboratory. Both regular and adjoint, inhomogeneous and homogeneous problems subject to vacuum, reflective, periodic, white or input specified boundary flux conditions are solved. General anisotropic scattering is allowed and anisotropic inhomogeneous sources are permitted. FORTRAN IV, CDC 7600 and IBM 360 versions. Other code development in the TWOTRAN series available: CCC-129/TWOTRAN-SPHERE and CCC-195/TWOTRAN-(PN, FC, VW) - for spherical harmonics, first collision source, and variable weight respectively. References: LA-4848 MS, LA-4774, LA-4600. LA-4567, LA-4432, and LA-4058.

PSR-15/UKE III — Cross Section Format Translator - UKNDL to ENDF/B - revised to translate UK data library into Version III of ENDF format, contributed by UCND Computer Sciences Division and Oak Ridge National Laboratory. FORTRAN IV; IBM 360. Reference: ORNL-TM-2880 (Rev.)

PSR-63A/AMPX — Modular Code System for Generating Coupled Multigroup Neutron Gamma-Ray Cross Section Libraries from ENDF/B, contributed by UCND Computer Sciences Division and Oak Ridge National Laboratory. The AMPX system combines DRIVER (supervisor module), XLACS (neutron processor), SMUG (gamma-ray interaction processor), CHOX (interface module), NITAWL (resonance self-shielding and data generation), LAPHNGAS (gamma-ray production processor), XSDRNPM (1-D S_n transport for spatial weighting), and subroutines needed for anisotropic matrices. Two sample problems are packaged. FORTRAN IV; IBM 360 and CDC 6600. Reference: ORNL-TM-3706 (AMPX-1).

PSR-64/DOMINO — General Purpose Code for Coupling Discrete Ordinates and Monte Carlo Radiation Transport Calculations, contributed by the Oak Ridge National Laboratory. DOMINO is considered to be a useful stand-alone discrete ordinates - Monte Carlo coupling code and, therefore, is also available separate from MORSE. FORTRAN IV; IBM 360. Reference: ORNL-4853.

PSR-65/APSAI — Activity Calculations and Plotting of Neutron or Gamma-Ray Spectra Generated by Discrete Ordinates Code ANISN (CCC-82), contributed by Oak Ridge National Laboratory and Karadeniz Technical University, Trabzon, Turkey. FORTRAN IV, IBM 360. Reference: ORNL-TM-4273.

PERSONAL ITEMS

The following changes of address have been received by RSIC: F. Eric Haskin from the Department of Nuclear Engineering, University of Arizona, to Bechtel Associates Professional Corp., Ann Arbor, Mich.; John H. Weiler from the Essex Service Co., Houston, Texas, to Offshore Power Systems, Jacksonville, Fla.; Steven J. Nathan from Ralph M. Parsons Company, Los Angeles, to NUS Corporation, Rockville, Md.

VISITORS TO RSIC

Visitors to RSIC during the month of September were: L. C. Byrd, K-25 Operations Division, UCND; T. J. DeRosa, Picatinny Arsenal, Dover, N. J.; Young Ku Yoon, Korea Atomic Energy Research Institute, Seoul, Korea; F. J. Patti, Burns & Roe, Inc., Hempstead, N.Y.

SEPTEMBER ACCESSION OF LITERATURE

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A UKAEA Evaluation of Displacement Damage Models for Iron.
Etherington, E.W.; Bramman, J.I.
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ANL-7925
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Results of Monte Carlo Calculations for ZPPR Assembly 2.
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Bhat, M.R.; Goldberg, M.D.; Kinsey, R.R.; Prince, A.; Takahashi, H.
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1973

Thesis
The Transmission of Neutrons through Straight Cylindrical Ducts in Reactor Shields.
Gibbs, D.C.C.
Available in 1973 - Mf RSIC
Royal Naval College; Greenwich, London

BOOK (In Russian)
LECTURES ON NEUTRON TRANSPORT THEORY.
Smelov, V.V.
1972
Moscow; Atomizdat (1972)

RADIATION SHIELDING INFORMATION CENTER
INSTALLATION COMPUTING FACILITIES SUMMARY

Name and Mailing Address of Installation:

_____

_____

_____

_____

_____

(City) (State) (zip code)

Telephone:

_____ - _____
(area code)

Extension_____

FTS_____

1. MAIN PROCESSOR (computer manufacturer, model, any non-standard features):

2. ASSOCIATED EQUIPMENT -
   a. SATELLITE OR OFF-LINE PROCESSORS (computer manufacturer, model, mode of operation, any non-standard features):

   b. INPUT/OUTPUT CHANNELS:

   c. MEMORY UNITS (number, manufacturer designation, capacity together with word-size or unit used, access time, cycle time or transmission rate):
      (1) CORE:

      (2) DRUM AND DISK STORAGE:

      (3) DATA CELL OR OTHER MASS STORAGE:

d. PERIPHERAL UNITS (number, manufacturer designation, speed; for magnetic tape units give density, number of channels, transmission rate):
(1) MAGNETIC TAPE UNITS:

(2) UNIT RECORD EQUIPMENT (card readers, punches, line printers, paper tape readers, punches, typewriters, communication terminals, data transmission equipment; give cpm, lpm, char/sec or appropriate measure of performance):

e. DISPLAY AND RECORDING EQUIPMENT (number, manufacturer designation, capacity, speed, for alphanumeric and graphic display devices, film and hard copy recorders):

3. SOFTWARE (Programming language compilers and versions in use, operating system used, special features):

4. OTHER INDEPENDENT OR SPECIAL-PURPOSE COMPUTER FACILITIES AVAILABLE TO YOUR INSTALLATION:

PREPARED BY:_____ DATE:_____