RSIC Newsletter

No. 118   September 1974

The man with a new idea is a crank,

until the idea succeeds.

...Mark Twain

MEETINGS OF INTEREST

First Annual Symposium on Nuclear Power

The First Annual Symposium on Nuclear Power, sponsored by the Nuclear Division of the American Society for Quality Control, will be held October 1, 2, and 3, 1974 in Philadelphia, Pa., at the Bellevue Stratford Hotel. Sessions are planned on the topics Instruments and Controls, Electrical Systems, Start-up, Test and Operations, Structures, Mechanical Systems, and Nuclear Steam Supply Systems. A Panel Round-up and Discussion will be held and the Symposium will conclude with a General Nuclear Division Meeting. Advance registration fee ($55.00) should be mailed to Frank C. Dengler, Symposium Registrar, Fischer & Porter Co., County Line Road, Warminster, Pa. 18974.

International Symposium on Nuclear Power Technology and Economics

January 13-20, 1975 are the planned dates for this international symposium to be held in Taipei, Republic of China. Sponsored by the National Science Council, the symposium is envisaged to be an effective and timely means of assembling the latest unclassified information on various applications of nuclear power. It is anticipated that the program will mainly consist of the following topics: Integration of Nuclear Power Plants into Existing Network, Fuel Enrichment and Reprocessing, Fuel Fabrication, Fuel Management and Economic Analysis, Nuclear Safety and Environmental Effects, Radioactive Waste Disposal, Future Reactor Systems, and Fusion Reactors.

Additional information concerning program content or participation may be obtained by writing to: Professor Paul Y. Feng, Chairman, Executive Committee, International Nuclear Power Symposium, c/o National Science Council, Taipei, Taiwan 108, Republic of China (376335); or the U.S. Organizers of this Symposium, Professors Sow-Hsin Chen and Sidney Yip, Department of Nuclear Engineering, Massachusetts Institute of Technology, Cambridge, Mass. 02139 (617-253-3810 or 253-3809).

CALL FOR PAPERS

Conference on Nuclear Cross Sections and Technology

The purpose of the conference, to be held March 3-7, 1975, at the Shoreham Americana Hotel, Washington, D.C., is to summarize the present status of Nuclear Cross Sections and Technology, to discuss future cross section needs, and to provide opportunities for the exchange of information between nuclear scientists and engineers. Although contributions on all aspects of nuclear data are invited, the emphasis will be on the use of nuclear cross sections for applied purposes.

Original papers describing significant contributions in the following or related areas are invited: Applications of Nuclear Data to Fission Reactors, Applications of Nuclear Data to Fusion Reactors, Microscopic Data and Measurement Techniques, Standards, Benchmark Experiments and Sensitivity, Nuclear Data for Materials Analysis, Nuclear Material Safeguards and Management, Nuclear Data for Environmental Protection, Biomedical Applications of Nuclear Data, and Other Applications of Nuclear Data. Abstracts of proposed contributed papers must be no more than 200 words in length and must conform to the format standards set forth in the Bulletin of the American Physical Society. The abstract will be used as a basis for paper selection. It should include concise statements of results and interpretation of the significance of the work. The abstract must be sent by December 6, 1974 to Professor W. W. Havens, Jr., Division of Nuclear Science and Engineering, Columbia University, 520 W. 120 St., New York, N. Y. 10027. The conference is sponsored by American Nuclear Society, Reactor and Shielding Divisions; American Physical Society, Nuclear Physics Division; International Union of Pure and Applied Physics; National Bureau of Standards; and the United States Atomic Energy Commission.

Topical Meeting on Computational Methods in Nuclear Engineering

Papers are invited for the above meeting to be held April 15-17, 1975, in Charleston, S. C., jointly sponsored by the Mathematics and Computation Division and the Savannah River Section of ANS, and the Savannah River Operations Office of the U.S. Atomic Energy Commission. Papers should describe innovative mathematical and computational methods for solving practical problems in nuclear engineering. Suggested topics are as follows: Multidimensional Radiation Transport, Multidimensional Static Diffusion Theory, Multidimensional Diffusion and Transport Theory Neutron Dynamics, Reactor Thermal-Hydraulics and Hydrodynamics, Application of Optimal Control Theory to Nuclear Reactors, Code Systems and Systems Software, and Environmental and Economic Modeling of Nuclear Plants. The topics should describe new methods/innovations or first-of-a-type codes or code systems that have not previously been reported. Last date for 400-600-word summaries: October 15, 1974. For further information contact the Technical Program Chairman, W. M. Stacey, Jr., Applied Physics Division, Building 208, Argonne National Laboratory, Argonne, Ill. 60439.

CHANGES TO THE CODE COLLECTION

Several changes were made to the code collection during the month.

CCC-203/MORSE-CG

E. A. Straker (SAI, Huntsville) and M. B. Emmett (CSD, Union Carbide Nuclear Div.) suggest changes in subroutine EUCLID in the CCC-203A (UNIVAC 1108) and CCC-203B (CDC 6600) versions to be consistent with the CCC-203C (IBM 360) version. M. B. Emmett also suggests that for the CCC-203A and -203B versions, subroutine INPUT2, card 410 should read
$$K = NSIGL + 14*I - 13 \quad .$$
The RSIC packages reflect these changes.

CCC-209/DOT III

The two-dimensional discrete ordinates code package has been updated by the addition of an IBM 360 version of the DUCT code, which calculates the scalar fluxes perturbations caused by the presence of ducts filled with coolant. The results of the DOT III calculation for the idealized (ductless) shield are utilized for the DUCT calculation. The UNIVAC version was contributed by Gulf Rad Tech in 1971 and converted to run on the IBM 360 at ORNL. Ref.: GULF-RT-10654.

CCC-228B/SPAR

Calculation of Stopping Powers and Ranges for Muons, Charged Pions, Protons, and Heavy Ions was converted to run on the CDC 6600/7600 computers at Los Alamos Scientific Laboratory, Los Alamos, N. M., and contributed to the Radiation Shielding Information Center. FORTRAN IV. Ref.: ORNL-4869.

CCC-233/CRYSTAL BALL

Neutron Spectra Determination from Activation Measurements has been contributed by Operations Division of Oak Ridge National Laboratory. FORTRAN IV; IBM 360/91/75. Ref.: ORNL-TM-4601.

CCC-234/SCORE-3

Multigroup Removal Diffusion Theory Shielding Code for X-Y and R-Z Geometries with Inset Boundaries has been contributed by the Nuclear Energy Agency's Computer Programme Library,Ispra, Italy. FORTRAN IV; IBM 370.

PSR-64/DOMINO

The general purpose code for coupling discrete ordinates and Monte Carlo radiation transport calculations has been updated by the addition of special routines, input, and output results for a MORSE (CCC-203C package) run which utilizes the DOMINO output results. Ref.: ORNL-4853.

PSR-75/AXMIX

A generally useful program for mixing, stripping, modifying, updating, etc., cross section libraries in the ANISN multigroup format. The program combines

many of the operations now performed by codes such as the ANISN Library Generation Routine (CCC-82 package) and JRMACRO (DLC-11). Contributed by the Neutron Physics Division, ORNL. IBM 360/75/91.

PSR-76/EURCYL   A finite element 3-dimensional mesh generator for cylinder-cylinder intersections. Designed for use with stress analysis and structure temperature programs. Contributed by EURATOM-Ispra through the OECD NEA Computer Programme Library. Ref.: EUR 5030e.

CHANGES TO THE DATA COLLECTION

DLC-27/AMPX01(104,22) The 104 neutron, 22 gamma-ray group coupled cross section library has been updated by regenerating a new data set for potassium. Tomas Lefvert, Research Institute of National Defence, Stockholm, Sweden, noted an error in the gamma-ray production for neutron-to-gamma-ray group transfers σ 17→109, σ 19→109, σ 20→110, and σ 21→110. The errors were due to a bug in the processing code, since corrected. The new version is designated DLC-27B. A reel of magnetic tape should accompany requests for the updated library.

PERSONAL ITEMS

We welcome *Carol Coker* who joined the RSIC staff July 1, 1974 to assist in filling requests for codes and data and to help in the many tasks at RSIC involving the use of computers and remote terminals.

PIONEER is now a subsidiary of FLUOR CORPORATION and has a new name: FLUOR PIONEER INC., 2 North Riverside Plaza, Chicago, Ill. 60606.

THE RALPH M. PARSONS COMPANY, POWER DIVISION, is now located at 100 West Walnut Street, Pasadena, California 91124.

Gary L. Bennett, formerly with the Space Nuclear Systems Division, USAEC, is now a Technical Assistant in the office of the Assistant Director for Water Safety Research, Division of Reactor Safety Research, USAEC. *Frank L. Bouquet* is now at the Jet Propulsion Laboratory, Pasadena, Calif. *Rudolph J. Henninger* moved from the Swiss Federal Institute for Reactor Research to Argonne National Laboratory, Argonne, Ill. *Nick Tsoulfanidis* has joined General Atomic after several years on the Nuclear Engineering staff at the University of Missouri, Rolla. *Ernest L. Murri* has left Consumers Power Company, Jackson, Michigan, to join Nuclear Environmental Services, Idaho Falls, Idaho. *Ralph R. Fullwood* has moved from Science Applications, Inc., Arlington, Va., to SAI Services in Palo Alto, Calif.

A. Wolf, formerly at the Nuclear Research Centre-Negev, Beer Sheva, Israel, has joined the Weizmann Institute, Rehovot. S. A. W. Gerstl, formerly with the Applied Physics Division at Argonne National Laboratory, has now joined the Los Alamos Scientific Laboratory. New responsibilities at LASL will be concentrated on radiation transport calculations and methods development for fusion reactor blanket and shielding analysis. Frank H. Mistretta is Operations Manager at the Nuclear Science and Technology Facility, State University of New York, Buffalo. Odelli Ozer, formerly of the National Neutron Cross Section Center, Brookhaven National Laboratory, is now at Electric Power Research Institute at Palo Alto, California. He coordinates the EPRI program for improvement in performance of neutron cross sections, interacts with the Cross Section Evaluation Working Group committee, will integrate benchmark data and variables needed for analysis of power reactors, and will keep the utility industry informed of the Cross Section Evaluation Working Group's activities and encourage their participation in data testing. Mohamed Abdou is joining Argonne National Laboratory, Illinois, after graduate and postgraduate work in CTR neutronics at the University of Wisconsin Nuclear Engineering Department. James W. Gordon has left Kaman Sciences to join Los Alamos Scientific Laboratory. Lambros Lois is now with the Environmental Protection Agency in Washington, D.C.

VISITORS TO RSIC

Visitors to RSIC during the month of August were: J. R. Courtney, R. C. McIlhenny, F. Iddings, N. English, C. J. Bergeron, W. G. Aubert, R. Kracht, P. A. Russell, C. Hartman, J. E. Morel, J. Rosso, J. R. Landry, J. Robert, Louisiana State University, Baton Rouge; N. E. Banks, Ballistic Research Laboratories, Aberdeen Proving Ground, Md.; D. M. Bartell and R. S. Moneymaker, ORTEC, Inc., Oak Ridge, Tenn.; S. J. Cipollo, Creighton University, Omaha, Neb.; R. J. LaBauve, Los Alamos Scientific Laboratory, N. M.; W. J. Roberts, Tennecomp, Oak Ridge, Tenn.; T. J. Yule, Argonne National Laboratory, Argonne, Ill.; N. Packan, Metals & Ceramics Div., ORNL.

AUGUST 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 (NTIS), Department of Commerce, Springfield, Virginia 22151.

RSIC maintains a microfiche file of the literature entered into SARIS, and duplicate copies of out-of-print reports may be available on request. Naturally, we cannot fill requests for literature which is copyrighted (such as books or journal articles) or whose distribution is restricted.

REACTOR AND WEAPONS SHIELDING

AAEC/E-304
    Investigation of the Energetics of Binary and Ternary
Fission in 252-Cf and 236-U.
    Musgrove, A.R.de L.
    March,1974
    Australian Atomic Energy Commission Research
Establishment, Lucas Heights

AE-485
    Optical Model Calculations of Fast Neutron Elastic
Scattering Cross Sections for Some Reactor Materials.
    Etemad, M.A.
    February,1974
    Dep., NTIS (U.S. Sales Only)

ANCR-1154
    Production of 14 MeV Neutrons by Heavy Ions.
    Brugger, R.M.; Young, R.C.; Miller, L.G.
    May,1974
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ANCR-1160
    Dynamic Gamma Attenuation Density Measurements.
    Piper, T.C.
    May,1974
    NTIS $4.00

ANL-8081
    Approximation Procedure for the Neutron Transport
Equation Based on the Use of Surface Harmonic Tensors.
    Kaper, H.G.; Leaf, G.K.; Lindeman, A.J.
    February,1974
    Dep., NTIS $4.00

AREAEE-187
    Evaluation of Thermal Neutron Gamma-Ray Techniques
for Nondestructive Analysis of Geological Samples. I.
    El-Kady, A.A.; Hamouda, I.
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AWRE-0-31/73
    The Use of Spherical Proportional Counters for Neutron
Spectrum Measurements.
    Kemshall, C.D.
    September,1973
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BLG—465
    Evaluation of Microscopic Integral Cross Sections
Averaged in the Uranium—235 Thermal Fission Neutron
Spectrum (for 29 Nuclear Reactions Relevant to Neutron
Dosimetry and Fast Reactor Technology).
    Fabry, A.
    May,1974
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BNWL—SA—4988; CONF—740402—P1, pp.588—598
    Some Safety Considerations of Hybrid Reactors in
Comparison with Fission and Fusion Reactors.
    Wolkenhauer, W.C.; Stewart, C.W.; Werner, R.W.;
Lee, J.D.
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BNWL—SA—5016; CONF—740229—1
    Convergence of the Discrete Ordinates Method for the
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    Anselone, P.M.; Gibbs, A.G.
    1974
    Dep., NTIS $4.50

BNWL—TR—120; CONF—740529—5
    Action Thresholds and Health Physics (Radiation
Protection).
    Delpla, M.; Vignes, S.
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BNWL—TR—121
    Health Physics (Radiation Protection): Risks and
Consequences.
    Delpla, M.; Hebert, J.
    June 12,1974
    Dep., NTIS $4.00

CERN—74—10
    On Preconditioning and Convergence Acceleration in
Sparse Matrix Problems.
    Axelsson, O.
    May,1974
    European Organization for Nuclear Research, Geneva

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    Half—Value Thickness Measurements of Ordinary Concrete
for Neutrons from Cyclotron Targets.
    Butler, H.M.; Wallace, K.M.; Fulmer, C.B.
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   Proceedings of the First Topical Meeting on the
Technology of Controlled Nuclear Fusion — April 16—18,
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   Hopkins, G.R.(Ed.)
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   NTIS $13.60

CONF—740402—P1, pp.21—37
   Preliminary Design of A Minimum Size Technical
Feasibility Tokamak Fusion Reactor.
   Bertolini, E.; Brunelli, B.; Engelmann, F.; Gasparotto,
M.; Hoffman, M.A.; Merzagora, N.; Biggio, M.; Casini, G.;
Cuniberti, R.; Farfaletti Casali, F.; Peter, F.; Bobbio,
S.; Coccorese, E.; Greco, O.; Sacerdoti, G.; Ricci, M.V.;
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   The Conceptual Design of a Takamak Fusion Power Reactor,
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   Kulcinski, G.L.; Conn, R.W.
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   Technological Implications for Tokamak Fusion Reactors
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   Conn, R.W.; Kulcinski, G.L.
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   A Conceptual Laser Controlled Thermonuclear Reactor
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Frank, T.
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   A Laser Fusion Reactor Concept Utilizing Magnetic Fields
for Cavity Wall Protection.
   Frank, T.; Freiwald, D.; Merson, T.; Devany, J.
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   The Preliminary Design of a Suppressed Ablation
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   Hovingh, J.; Maniscalco, J.; Peterson, M.; Werner, R.W.
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Modular Concept of a Fusion Reactor.
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Geometry and Performance of a Theta—Pinch Power Breeder.
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A Modular Fission—Fusion Hybrid Blanket.
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CONF—740402—P1, pp.223—237
Neutronics Analysis of a 2500 MW(th) Fast Fission
Natural Uranium Blanket for a DT Fusion Reactor.
Lee, J.D.
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CONF—740402—P1, pp.238—255
Conceptual Design of a Fusion—Fission Hybrid Reactor
Based on a Mirror Fusion Reactor with a Subcritical
Gas—Cooled Fission Blanket.
Wolkenhauer, W.C.; Leonard, B.R.,Jr.; Sutey, A.M.;
Moir, R.W.
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Neutronic and Photonic Analyses of Fusion Reactor
Blankets Containing Natural Uranium.
Parish, T.A.; Draper, E.L.,Jr.
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CONF—740402—P1, pp.271—280
Calculations of a Fast Fission Blanket for DT Fusion
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   Study of the Development of Neutron and Plasma Radiation
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   Persiani, P.J.
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CONF—740402—P1, pp.313—323
   An Intense Neutron Source Facility Using A Supersonic
Jet Target.
   Cline, M.C.; Emigh, C.R.
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   Neutron Spectral Measurements in the Spallation Neutron
Sources: Characterization of the BLIP Neutron Facility.
   Dudey, N.D.; Heinrich, R.R.; Fluss, M.J.
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CONF—740402—P1, pp.333—338
   Neutrons from a High Energy Proton Beam Stop.
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   The Induced Activity and Decay Power of the Structure
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    Tritium Containment and Recovery in Fusion Reactor
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    Heat Flux Limitations on First—Wall Shields for Early
Fusion Machines.
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    On the Thermal State of the Fusion Blanket.
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    Nuclear Design of the Magnet Shield for Fusion Reactors.
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  Neutronics and Photonics Study of Fusion Reactor
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  Tritium Breeding Potential of the Princeton Reference
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  Use of Tantalum and Liquid Lead in a Fusion Reactor
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  Integral Neutronics Experiments on a Lithium Metal
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     Nuclear Blanket and Shielding Problems in Demonstration
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     Compilation of Threshold Reaction Neutron Cross Sections
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     February,1974
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     Solution of the Coupled Integral and Differential Form
 of the Transport Equation Using a Legendre Polynomials
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 Geometry.
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     Parametric Representation of the Shielding Factor Curves.
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 Establishment 21020 Ispra (Va), Italy

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   June,1973
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Radioactive Chains with Two Unstable States.
   Wenzelburger, H.
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IAEA Intercomparison, Vinca, Yugoslavia, May 1973.
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    Carter, L.L.; Cashwell, E.D.; Everett, C.J.;
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