RSIC Newsletter

RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION FOR THE U.S. DEPARTMENT OF ENERGY

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No. 162 *June 1978*

I hear and I forget, I see and I remember, I do and I understand. . . . Chinese Proverb

SENSITIVITY-UNCERTAINTY SEMINAR-WORKSHOP PLANS PROGRESS

A block of rooms has been set aside for attendees of the RSIC seminar-workshop on the "Theory and Application of Sensitivity and Uncertainty Analysis," to be held at the Royal Scotsman Inn in Oak Ridge, Tennessee, August 22–24, 1978. Please contact the motel directly for reservations. (Royal Scotsman Inn, 420 S. Illinois, Oak Ridge, TN 37830, Phone 615-483-4371.)

Those who plan to attend should send an application form to us (see back of April or May RSIC Newsletter). We urge you to respond by July 1, 1978, so we can make final arrangements for the seminar and workshop.

The workshop will demonstrate the ORNL FORSS system. Although not limited to one-dimensional application, the workshop problems will be confined to analyses with the FORSS version of ANISN, a multigroup one-dimensional discrete ordinates technique. It will be assumed that multigroup cross sections are available in ISOTXS, ANISN, or AMPX master format. Modules of the FORSS system which will be featured are: JULIET—source and sensitivity coefficient generation, FANISN—the one-dimension discrete ordinates transport calculation, SENPRO Service Module—sensitivity profile manipulation routine, SENTINEL—analysis of the effect of proposed cross-section changes, CAVALIER—uncertainty analysis, UNCOVERS—uncertainty analysis and adjustment, and NUTCRCKR—solution of inverse problem.

The following is a tentative program for the seminar.

SESSION I: Sensitivity and Uncertainty Analysis for Fast and Thermal Reactors
Tuesday, August 22, 1978—8:15 a.m.

The Use of Cross-Section Sensitivities in the Analysis of Fast Reactor Integral Parameters, P. Collins and M. Lineberry (Argonne National Laboratory, Idaho).

Advances in Fast Reactor Sensitivity and Uncertainty Analysis, J. H. Marable and C. R. Weisbin (Oak Ridge National Laboratory).

Testing of ENDF/B Cross-Section Data in the Californium-252 Neutron Benchmark Field: Status and Accuracy, Wolf Mannhart (Physikalish-Tech, Braunschweig, Germany).

Controlled Cross-Section Adjustment by Integral Data, U. Salmi, J. J. Wagschal, A. Yaari, and Y. Yeivin (Hebrew University, Israel).

Sensitivity Analysis Applied to the Calculation of Detector Response Kernels, W. H. Scott, Jr. (Science Applications, Inc.), P. J. McDaniel, J. R. Renken, and S. A. Wright (Sandia Laboratories).

Sensitivity of Water Reactor Fuel Cycle Parameters and Costs to Nuclear Data, M. Becker, D. R. Harris, B. Quan and J. M. Ryskamp (Rensselaer Polytechnic Institute).

Uncertainty Analysis for Resonance Parameters of the Fissile Isotopes in the Thermal Region, Jack K. Thompson (Battelle-Northwest Laboratory).

Fission Product Decay Power and Uncertainties After Realistic Reactor Operator Histories, T. J. Trapp (Oregon State University).

IF YOU CHANGE YOUR ADDRESS, please notify us (including Building and Room No. where needed). *Third Class Mail* is returned to us at our expense if the addressee has moved. If your mail is returned, your name will be deleted from our distributions until we hear from you.

SESSION II: Sensitivity and Uncertainty Analysis for Dosimetry and Fusion Reactor Applications
Tuesday—1:45 p.m.

Use of HEDL Codes in the Sensitivity and Uncertainty Analysis of the Pressure Vessel Embrittlement Damage Function Problem, G. L. Guthrie, F. Schmittroth, R. L. Simons, E. P. Lippincott, and C. Oster (Westinghouse Hanford).

Varied Applications of a New Maximum-Likelihood Code with Complete Covariance Capability, Frank Schmittroth (Westinghouse Hanford).

Sensitivity and Uncertainty Analysis Applied to NBS-ISNF, B. Broadhead and J. H. Marable (Oak Ridge National Laboratory).

Sensitivity Analysis Applied to an Integral Test of Niobium Cross Sections, Dan Ingersoll (Oak Ridge National Laboratory).

The Application of Uncertainty Analysis in Conceptual Fusion Reactor Design, C. W. Maynard (University of Wisconsin).

Sensitivity and Uncertainty Analysis for Secondary Energy Distributions, S. A. W. Gerstl (Los Alamos Scientific Laboratory).

Discussion Session: Discussion of Sessions I and II: Limitations and Future Directions
Tuesday—5:00 p.m.

Reception and Banquet: *Tuesday—7:00 p.m.*

SESSION III: Advances and Future Extensions for Sensitivity and Uncertainty Analysis
Wednesday, August 23, 1978—8:30 a.m.

High Order Effects in Sensitivity Theory, Ehud Greenspan (Nuclear Research Center, Negev).

Sensitivity Theory for Safety Analysis, E. M. Oblow (Oak Ridge National Laboratory).

First and Higher Order Perturbation Techniques and Their Application in System Analysis and Data Adjustments, Augusto Gandini (CNEN-CSN-Casaccia, Rome, Italy).

Sensitivity Theory for Depletion Analysis, M. L. Williams, J. H. Marable, and E. M. Oblow (Oak Ridge National Laboratory).

Expectations for ENDF/B-V Uncertainty Files: Coverage, Strengths, and Limitations, F. G. Perey and R. W. Peelle (Oak Ridge National Laboratory).

SESSION IV: Concluding Panel
Wednesday—11:15 a.m.

Workshop on FORSS: Begins Wednesday at 2:00 p.m. and continues on *Thursday, August 24, 1978.*

RSIC USERS' FEEDBACK-IN-DEPTH

In the April issue we printed a letter from Péter Vértes, of the Hungarian Academy of Science Central Research for Physics, suggesting our solicitation of feedback on distributed computer codes. He proposed a list of questions to be asked. We feel that perhaps intentional systematic seeking of feedback on user experience may be worth the considerable effort required. Perhaps a test could be made on a few selected codes.

We have received a favorable response from Gary W. Phillips, Radiation Detection Group, Radiation Technology Division, Naval Research Laboratory, as follows:

> I have just finished reading the letter from Péter Vértes and would like to second the suggestion wholeheartedly.
>
> Recently I distributed a similar survey (although less detailed) to everyone who has contacted me concerning PSR-101/HYPERMET, and I am getting a good response. In order to encourage a prompt reply, I would suggest that the form be kept to one page in length and require only checks or one or two word responses, except for a space for comments. A further inducement might be the promise of sending out a summary of responses to all who return the questionnaire.
>
> *Gary W. Phillips*

Please give us your thoughts on this matter.

GERMAN STANDARDS TRANSLATED

Three standards, published by the Nuclear Engineering Standards Committee of the German Institute for Standardization, have been translated into English. They were received by an RSIC staff member who serves as chairman of the American Nuclear Society (ANS) Subcommittee on Radiation Protection and Shielding Standards, ANS-6. The standards were translated by an ORNL consultant and edited in consultation with Professor H. Schultz, Technical University of Hannover, who is chairman of the German shielding standards work. The translations have been issued as follows:

- Classification of Concretes for Neutron Shielding in Respect to Atomic Composition: DIN 25 413, ORNL-tr-4460
- Design of Gas-Filled Double-Bend Ducts in Concrete Shields Against Gamma Radiation: Definitions and Conditions. DIN 25 427, Part 1, ORNL-tr-4461
- Design of Gas-Filled Double-Bend Ducts in Concrete Shields Against Gamma Radiation: Proportionment of the Duct and the Embedded Iron Layers for Point Souce Radiation and Collimated Radiation: DIN 25 427, Part 2, ORNL-tr-4462

These standards may be obtained by contacting Margaret R. Tevis, Technical Information Center, U.S. Department of Energy, P. O. Box 62, Oak Ridge, TN 37830.

FEEDBACK ON USE OF AIREM

We have received a report from R. A. Crandall, Radiological Assessment, Northeast Utilities Service Company, Hartford, Connecticut, that results of CCC-242/AIREM compare very favorably with measured doses. A pressurized ionization chamber was installed at the site boundary of Millstone Nuclear Plant nearest the stack (780 meters). Data analysis indicates agreement of AIREM dose results to within 30% of measured values. A copy of Mr. Crandall's letter is available upon request. The AIREM code package,

which calculates doses to the general population from atmospheric emissions of radionuclides, was developed by the U.S. Environmental Protection Agency, Office of Radiation Programs.

NEW ANS STANDARDS PUBLICATIONS

Guidelines on the Nuclear Analysis and Design of Concrete Radiation Shielding for Nuclear Power Plants, prepared by ANS-6.4 working group under the leadership of B. A. (Barney) Engholm of General Atomic, San Diego, has become available. It is intended to be a "guide to good practice," with a choice of analytical methods or, in some cases, recommendations for the shielding engineer in preparing conceptual designs or final construction drawings. Chapter contents include terms and definitions, characterization of concrete, calculation methods, concrete shielding data, and applications. Available from the American Nuclear Society (ANS), 555 N. Kensington Ave., LaGrange Park, Ill. 60625, for $38.00 per copy.

The working group, now under the leadership of Gene Normand, Sargent and Lundy (Chicago), is undertaking the development of a standard on compensatory shielding materials (materials useful for filling gaps and other streaming paths in bulk shields).

Standards Committee Report of Activities for 1977, published by the ANS, covers the year's efforts by the five American National Standards Committees (N Committees) for which ANS holds the secretariat and the nearly 200 projects of the ANS Standards Committee, involving the efforts of over 1,000 individuals. During the year nine projects were approved as American National Standards. Scopes and membership of the ANS working groups and subcommittees are listed, as are reports by Subcommittee chairmen and by ANS representatives to N Committees outside the ANS secretariat. Available from ANS for $7.50 per copy.

PHOTON SHIELDING MANUAL SECOND EDITION AVAILABLE

The second edition of *The Photon Sielding Manual*, by A. (Tony) Foderaro of Pennsylvania State University, includes two additional tables of data, some changes in explanatory material and equations associated with the data, and corrections of several typographical errors. The first edition was printed five times.

The manual was specifically designed to facilitate gamma-ray shielding calculations using a pocket calculator. Available from The Penn State Bookstore, McAllister Building, The Pennsylvania State University, University Park, PA 16802, for $5.40 plus postage.

PERSONAL ITEMS

D. W. (Doug) Muir has taken a 2-year leave of absence from Los Alamos Scientific Laboratory to join the Nuclear Data Section of the International Atomic Energy Agency in Vienna. He expects to return to Los Alamos in June 1980.

John T. Ward, Jr., has moved from the University of Virginia to work in the Shielding Group at CEA/CEN Saclay, France. His new address is: CEN.CEA Saclay, SERMA/LEP, B. P. No. 2, 91190 Gif-Sur-Yvette, France.

CHANGES IN THE COMPUTER CODE COLLECTION

The following change was made in the computer code collection during the month.

CCC-276A/DOT 3.5

The IBM 360 version (A) of this two-dimensional discrete ordinates radiation transport code package has been updated to include DUCT. DUCT uses the results of a DOT calculation for the idealized shield and calculates the perturbation to scalar fluxes caused by the presence of ducts filled with coolant. Both DOT 3.5 and DUCT were contributed by ORNL.

CHANGES IN THE DATA COLLECTION

The following change was made during May.

DLC-53/VITAMIN-4C

A new package of 171-neutron-group cross sections and Bondarenko factors in CCCC interface format has been added to the collection. Designated VITAMIN-4C ("4C" is short for CCCC), the package contains neutron cross sections essentially equivalent to DLC-41B/VITAMIN-C. The data in CCCC format were removed from the original version of DLC-41 and placed in DLC-53. Thus, DLC-41B has only data in AMPX format while DLC-53 contains only data in CCCC format. Both are the result of a Department of Energy Divisions of Magnetic Fusion Energy and Reactor Research and Technology collaboration to produce cross-section libraries for fusion and LMFBR neutronics. Sample problems are designed to be executed using computer codes found in PSR-117/MARS (see April 1978 newsletter). Transmittal requires 5 blocked magnetic tapes for the data library and sample input/output and one tape for PSR-117/MARS. Reference: ORNL-RSIC-37. IBM 360/91.

VISITORS TO RSIC

The following persons came for an orientation visit and/or to use RSIC facilities during the month of May:

Dennis M. Burgett, Data General Corporation, Charlotte, North Carolina; Jack L. Isbell, Data General Corporation, Knoxville, Tenn.; Clarence E. Lee, Texas A & M University, College Station; Stephen A. Nass and Walter Zobel, Tennessee Valley Authority, Knoxville; Jacob Neufeld, ORNL Consultant; Charles A. Presto, Data General Corporation, Atlanta, Georgia; Jorma Routti, Helsinki University of Technology, Finland; and Ivan and Merri M. H. Wood, Georgia Tech, Atlanta.

MAY 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.

THIS LITERATURE IS ON ORDER. IT IS NOT IN OUR SYSTEM. PLEASE ORDER FROM NTIS OR OTHER AVAILABLE SOURCE AS INDICATED.

REACTOR AND WEAPONS RADIATION SHIELDING LITERATURE

AAEC/E-432
Monte Carlo Calculations of Time-Dependent Neptunium-237 and Uranium-235 Fission Rates in a Pulsed Thorium Assembly.
McGregor, B.J.
November 1977
Australian Atomic Energy Commission, Research Establishment, Lucas Heights

AERE-R-8654
Activation Detectors for Neutron Flux and Spectrum Determination.
Boot, S.J.
March 1977
H.M.S.O. price Pound1.50; NTIS (U.S. Sales Only)

ANL/NDM-35
Evaluated Nuclear Data File of Th-232.
Meadows, J.; Poenitz, W.; Smith, A.; Smith, D.; Whalen, J.; Howerton, R.
February 1978
NTIS

ANL/NDM-38
The Alpha and Spontaneous Fission Half-Lives of ^{242}Pu.
Meadows, J.W.
December 1977
NTIS

ANL/NDM-41
Energy-Averaged Neutron Cross Sections of Fast-Reactor Structural Materials.
Smith, A.; McKnight, R.; Smith, D.
February 1978
NTIS

ANL-Trans-1086; FEI-659 (In Russian)
Results of Calculating the Physical Characteristics of a Standard Fast Reactor with the OSKAR-75 System of Constants.
Bobkov, Yu.G.; Usachev, P.N.
No Date
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BNL-NCS-23556; CONF-771109-89
Reference Nuclear Data for Space Technology.
Burrows, T.W.; Holden, N.E.; Pearlstein, S.
1977
Dep., NTIS

BNWL-1939-8
Pacific Northwest Laboratory Report on Fusion Energy Research, April 1977 - June 1977.
July 1977
NTIS

CONF-770323-3
Tasks and Problems Concerning Nuclear Technology Transfer.
Frewer, H.
1977
Dep., NTIS

CONF-770901
Proceedings of a Workshop on the Evaluation of Models Used for the Environmental Assessment of Radionuclide Releases.
Hoffman, F.O. (Ch.)
April 1978
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CONF-771036-5
Foil Activation Dosimetry at Energies Below 1 MeV.
Stallmann, F.W.; Kam, F.B.K.
1977
Dep., NTIS

CONF-771036-6
Dosimetry Needs for the Magnetic Fusion Materials Program.
Heinrich, R.R.; Greenwood, L.R.; Odette, G.R.; Farrar, H.,IV; Dierckx, R.; Gold, R.
October 1977
Dep., NTIS

CONF-771109-60
Sputtering Calculations with the Discrete Ordinated Method.
Hoffman, T.J.; Dodds, H.L., Jr.; Robinson, M.T.; Holmes, D.K.
November 29, 1977
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CONF-771109-79
Two-Dimensional Neutronics Analysis of the Tokamak Fusion Test Reactor.
Santoro, R.T.; Barnes, J.M.; Lillie, R.A.; Alsmiller, R.G.,Jr.
1977
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CONF-771109-81
Nuclear Design Calculations for the TFTR Neutral Beam Injectors.
Santoro, R.T.; Alsmiller, R.G.,Jr.; Barnes, J.M.
1977
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CONF-771109-88
Computer Program SCAP-BR for Gamma-Ray Streaming Through Multi-Legged Ducts.
Byoun, T.Y.; Babel, P.J.; Dajani, A.T.
December 1977
Dep., NTIS

COO-2490-7
Study of Structure of Light Nuclei with Neutrons.
Lane, R.O.
September 1, 1976 - August 31, 1977
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ECN-12
Intercomparison of Recent Evaluations for the Capture Cross Sections of Some Fission-Product Nuclides.
Gruppelaar, H.; Janssen, A.J.; Dekker, J.W.M.
November 1976
Stichting Energieonderzoek Centrum Nederland, Petten

ECN-33
Tables of RCN-2 Fission-Product Cross Sections. Evaluation, Volume 2 (13 Nuclides).
Gruppelaar, H.
December 1977
Netherlands Energy Research Foundation (ECN),

3 Westerduinweg, Petten (NH), The Netherlands

ECN-35
Adjusted Neutron Spectra of STEK Cores for Reactivity Calculations.
Dekker, J.W.M.; Dragt, J.B.; Janssen, A.J.; Heijboer, R.J.; Klippel, H.Th.
February 1978
Netherlands Energy Research Foundation (ECN), 3 Westerduinweg, Petten (NH), The Netherlands

EURFNR-1465
Importance and Status of (n, alpha)-Cross Sections for a Reliable Prediction of Radiation Damage in Stainless Steel.
Goel, B.
June 1977
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GA-A-14632; CONF-771029-53
Neutron Wall Loading Characteristics of a Doublet Reactor.
Woods, T.J.
September 1977
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HEDL-SA-1238; CONF-771036-7
Overview of Gamma-Ray Energy Deposition and Spectra in Fast Reactor Environments.
Gold, R.
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INIS-mf-3749, pp.3-5
Energy Deposition Distribution Measured in the Shielded Area of a 15 MeV Neutron Generator.
Hogeweg, B.; Broerse, J.J.
1976
INIS
Published in Summary Form Only

INIS-mf-3749, pp.6-8
Neutron Energy Spectra for Collimated d-D and d-T Neutron Beams as Employed for ENDIP.
Hogeweg, B.; Broerse, J.J.; Chemtob, M.; Nguyen, V.D.
1977
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INIS-mf-3769, pp.26-27
Use of Ge(Li) Spectrometer for Energy and Output Determination of Various Uncalibrated Sources and X-Ray Beams.
Khadake, R.G.; Vishwakarma, R.R.; Gangadharan, P.
1976
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INIS-mf-3769, pp.38-39
Tissue Dose Distribution for Air Scattered Gamma Photons.
Sarkar, P.K.; Kirthi, K.N.
1976
INIS
Published in Summary Form Only

INIS-mf-3769, pp.39-40
Suggested Revisions of Neutrons MPFDs.
Nagarajan, P.S.
1976
INIS
Published in Summary Form Only

INIS-mf-3769, pp.40-41
Contribution of Ground-Scattered Neutrons in the Calibration of a Rem Counter.
Rao, U.S.; Misra, S.C.; Gupta, U.C.
1976
INIS
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JAERI-M-6996
Neutron Nuclear Data of ^{235}U, ^{238}U, ^{239}Pu, ^{240}Pu and ^{241}Pu Adopted in JENDL-1. Preliminary Results.
Kikuchi, Y.; Nakagawa, T.; Matsunobu, H.; Kanda, Y.; Kawai, M.
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Test of Calculational Methods for the Neutron Physics of Lithium-Blanket Models for a Fusion Reactor.
Herzing, R.
December 1976
Dep., NTIS (U.S. Sales Only)

KFK-2377 (In German); Thesis (In German)
Improved Treatment of Anisotropic Elastic Neutron Scattering with Consistent Transport Approximations of Energy-Dependent Order.
Wiese, H.W.
November 1976
Inst. fuer Neutronenphysik und Reaktortechnik, Karlsruhe Univ. (Germany, F.R.)

LA-6792-MS
Neutron Monitoring and Neutron Measurements; Experimental Possibilities at the INS Source.
Dierckx, R.
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Nuclear Data Development and Shield Design for Neutrons Below 60 MeV.
Wilson, W.B.
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LA-7183-MS
Riggatron Nucleonics: One-Dimensional Analysis.
Wienke, B.R.; Dudziak, D.J.; Bosler, G.E.
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LA-UR-77-1033
Neutron Dosimetry at the Intense Neutron Source (INS).
Dierckx, R.
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NRPB/RandD-1, pp.142-143
Unfolding Pulse Height Spectra from a Liquid Scintillator Neutron Spectrometer.
Jones, D.G.
March 1977
National Radiological Protection Board, Harwell (UK), H.M.S.O., price Pound1.75

ORAU/IEA(O)-77-32
The Nuclear Debate: Norwegian Perspective.
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Oak Ridge Associated Universities, Inc., Institute of Energy Analysis

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Sensitivity and Uncertainty Analysis for Functionals of Time-Dependent Nuclide Density Field.
Williams, M.L.; Weisbin, C.R.
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Fission-Product Energy Release for Times Following Thermal-Neutron Fission of ^{239}Pu Between 2 and 14000 Seconds.
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SUPERDAN: Computer Programs for Calculating the Dancoff Factor of Spheres, Cylinders, and Slabs.
Knight, J.R.
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An Evaluation of the Distribution of Absorbed Dose in Child Phantoms Exposed to Diagnostic Medical X-Rays.
Chen, W.; Poston, J.W.; Warner, G.G.
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The Na(n,x gamma) Reaction Cross Section for Incident Neutron Energies Between 0.2 and 20.0 MeV.
Larson, D.C.; Morgan, G.L.
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Evaluation of ^{232}Th(n,n'), (n,2n), and (n,3n) Cross Sections.
Fu, C.Y.
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Analytical Calculations of Neutron Slowing Down the Transport and Transport in the Constant-Cross-Section Problem.
Cacuci, D.G.
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Evaluation of Neutron Cross Sections for ^{19}F in the Energy Range from 100 keV to 20 MeV.
Sugi, T.
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The Ionizing Radiation in Dwellings Related to the Building Materials.
Swedjemark, G.A.
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UCID-17397
Fusion-Fission Hybrid Reactors: A Capsule Introduction.
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Systematics of Neutron-Induced Fission Cross Sections over the the Energy Range 0.1 Through 15 MeV, and at 0.0253 eV.
Behrens, J.W.
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Dosimetry Measurements External to a 10 Kiloliter Liquid-Air Vessel Containing a D-T Neutron Source.
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Gamma-Ray Dosimetry Errors with TLDs.
Grahan, C.L.; Homann, S.G.
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Radiation Protection Around a Controlled Fusion Research Facility: The Tokamak of Fontenay-aux-Roses, TFR.
CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Dept. de Physique du Plasma et de la Fusion Controlee
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A Systematic Approach to the Radiation Damage Problem in Fission and Fusion Reactor Structural Alloys.
Bullough, R.; Eyre, B.L.; Kulcinski, G.L.
September 1976
Nuclear Engineering Department, University of Wisconsin, Madison, Wisconsin

WAPD-TM-1365
Spatial Distribution Measurements of Fission Neutrons in Water as an Oxygen Data Test (AWBA Development Program).
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Solution of the Point Kinetics Equations by the Matrix Exponential Method.
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Razani, A.; Nagel, M.; Rouse, C.A.; Perkins, R.G.; Cerbone, R.J.
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Iron-Water Combination for Shielding of 14 MeV Neutrons.
Shani, G.
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The Solution of the Time-Independent Multi-Group Neutron Transport Equation Using Spherical Harmonics.
Fletcher, J.K.
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Measurements of Neutron Total Cross Section Minima in Natural Iron and Silicon.
Kobayashi, K.; Fujita, Y.; Ogawa, Y.
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Low Energy Photon Attenuation Coefficients. (Letter to the Editor)
Shahnawaz; Visweswara Rao, V.
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Calculation of the Efficient Solid Angle of an Extended Radiation Source.
Khleskov, V.I.
July-August 1975

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An Installation for the Absolute Measurements of Photon Radiation Absorbed Dose in Graphite.
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Coupled Electron Photon Collisional Transport in Externally Applied Electromagnetic Fields.
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Mayer, R.M.; Morris, E.T.
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Measurements of Resonance Neutron Self Shielding Factors for Gold and Silver Using Slowing-Down Time Spectrometer.
Fujino, M.; Takahashim, F.; Yamamoto, H.
October 1976

J. Nucl. Sci. Technol., 13(12), 715-721
Properties of Transport Solution for Neutron Density in Slab Geometry in Piecewise Polynomial Approximation.
Pitkaeranta, J.
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J. Phys. D, 10(8), 1109-1115
Space- and Angle-Dependent Steady-State Thermal Neutron Spectra in Finite Water Assemblies.
Garg, S.; Ahmed, F.; Kothari, L.S.
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Moment-Generated Radiative-Transfer Functions for Relativistic Maxwellian Electrons.
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Neutron Energy Spectra and Dose-Distribution Spectra of Cyclotron-Produced Neutron Beams.
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Proton-Beryllium Neutron Production at 25 - 55 MeV.
Johnsen, S.W.
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Tuli, J.K.
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