

RSIC Newsletter



RADIATION SHIELDING INFORMATION CENTER

OAK RIDGE NATIONAL LABORATORY

OPERATED BY UNION CARBIDE CORPORATION • FOR THE U.S. ENERGY RESEARCH
AND DEVELOPMENT ADMINISTRATION

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OAK RIDGE, TENNESSEE 37830

No. 131

October 1975

I start where the last man left off.

...Thomas Edison

FIFTH INTERNATIONAL CONFERENCE ON REACTOR SHIELDING TO BE HELD IN 1977

Plans are being formed to hold the Fifth International Conference on Reactor Shielding in the Oak Ridge-Knoxville, Tennessee area April 18-22, 1977. The conference, to be sponsored by the Oak Ridge National Laboratory and the Energy Research and Development Administration (ERDA), is being scheduled approximately 5 years after the Fourth Conference held in Paris, France (1972). Co-sponsors will include the American Nuclear Society (ANS), Oak Ridge Associated Universities (ORAU), and others. Cooperation of the International Atomic Energy Agency (IAEA) and the OECD Nuclear Energy Agency (NEA) is expected. D. K. Trubey of RSIC is general chairman and S. A. W. Gerstl, Los Alamos Scientific Laboratory, is chairman of the Technical Program Committee. Further information will be published as it becomes available.

REMINDER

Reserve your copy of Volume IV, ORNL-RSIC-13 now. Volume IV contains the abstracts of code packages CCC-169 through CCC-263. You may reserve your copy to be mailed as it comes off the press by writing RSIC, ORNL, P.O. Box X, Oak Ridge, Tennessee 37830.

REPORT OF ORNL SHIELDING ANALYSIS OF FFTF NOW AVAILABLE

Research staff members of the Neutron Physics Division, Oak Ridge National Laboratory (ORNL) were engaged, in cooperation with Westinghouse Electric Corporation Advanced Reactors Division (WARD), in shielding analysis of the Fast Flux Test Facility (FFTF) from 1969 to 1975. The program, directed by C. E. Clifford and with analytical work directed by F. R. Mynatt, is described in considerable technical detail in a report by Lorraine S. Abbott and F. R. Mynatt. It is titled *Review of ORNL Radiation Shielding Analyses of the Fast Flux Test Facility Reactor*, ORNL-5027 (July 1975), and is available from the ERDA Technical Information Center, P. O. Box 62, Oak Ridge, TN 37830 for \$10.60, printed copy, or \$2.25, microfiche. A companion report describing the final FFTF shielding design has been issued by WARD as WARD-2171-54, *FFTF Shielding Design & Analysis—Summary Report* (June 1975), J. L. Rathbun, editor. The project manager at WARD was P. F. Fox.

The ORNL report reviews the design support analyses performed to predict the neutron and secondary-gamma-ray fluxes and dose rates and the sodium-activation gamma-ray dose rates that can be expected at various locations in the Fast Flux Test Facility (FFTF). The calculations were concentrated in areas of particular concern to the facility designers. The regions studied were: the stainless steel shield below the reactor core; the steel and sodium region above the core; the clearance gaps around massive plugs that rotate within the thermal shield and pressure vessel head above the sodium pool; the region between the side of the core and the pressure vessel wall, including a stored-fuel region; a large nitrogen-filled cavity surrounding the reactor pressure and guard vessels, in which a concrete shield was introduced; the vessel support system; the branch-arm pipe and center-island shielding in the head compartment; and the regions outside the reactor vessel through which the sodium coolant ducts lead to the primary heat exchangers.

SPECIAL ISSUE OF NUCLEAR ENGINEERING AND DESIGN ON RADIATION DAMAGE IN GRAPHITE AND STEEL

The August 1975 issue of *Nuclear Engineering and Design* (Vol. 33, No. 1) is a special report on the IAEA specialist's meetings on radiation damage units in graphite and ferritic and austenitic steel. In addition

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to the technical articles, there are recommendations on radiation damage in graphite, radiation damage units in ferritic pressure vessel steels, and displacement calculations for reactor/accelerator studies in austenitic steel.

PERSONAL ITEMS

The following changes of address have been noted: **Stephen A. Dupree** from Science Applications, Inc. to Theoretical Division, Sandia Laboratories, Albuquerque, New Mexico; and **Zolin G. Burson** from EG&G, Las Vegas, Nevada to Division of Operational Safety, Energy Research and Development Administration, Washington, D.C.

Jan Rataj of the Shielding Group at the Nuclear Research Center at Rez, Prague, Czechoslovakia has been awarded an International Atomic Energy Agency fellowship for directed studies in theory and practical application of particle transport methods in the Federal Republic of Germany at the Institut für Kernenergetik der Universität Stuttgart. He will begin his new duties in January, 1976.

During the months of October and November **Dr. Anthony Foderaro** of Penn State University will be assisting the Federal Electricity Commission in Mexico City in the development of a calculational system for the shielding of BWR power stations. His Mexico address is: c/o Dr. Hector De la Fuente, Comisión Federal de Electricidad, Rodano 14, 10-0 Piso Anexa, Mexico 5, D.F.

UPCOMING CONFERENCES

International Symposia—Brussels, Belgium (April 22-24, 1976) and Paris, France (April 26-28, 1976) on Californium-252 Utilization:

The French Atomic Energy Commission and the Laboratory of Radiobiology at the University of Brussels are jointly holding the first International Symposium on Californium-252 Utilization in Western Europe. This symposium will have been preceded by six californium-252 utilization meetings and three topical meetings of the American Nuclear Society, all of which were held in the United States, and by the International Atomic Energy Agency Seminar on the uses of californium-252 in teaching and research which was held 14-18 April 1975 in Karlsruhe, Federal Republic of Germany. The main objective of the symposium is to promote research and development work on the californium-252 uses in medicine, education, science and technology and to provide a broad exchange of information on presently available data and techniques. The symposium is jointly sponsored by the American Nuclear Society, the European Nuclear Society, and the Belgian and the French Sections of the American Nuclear Society.

The symposium will be divided into two separate meetings contrasting both in scope and location. The Brussels Symposium will be primarily devoted to medical physics, radiobiology and medical applications of californium-252 and will be held April 22-24, 1976 at one of the outstanding hotels in midtown Brussels. The Paris Symposium will be primarily devoted to source technology, scientific and industrial applications of californium-252 and will be held April 26-28, 1976 at the Centre d'Etudes Nucléaires, Saclay 91190. Each local symposium will have five sessions including an introductory lecture and free papers on selected topics, followed by a panel discussion. The Brussels Symposium will deal with the following topics: biological effectiveness of californium-252; dosimetry; dose rate effect; research in progress; and application to radiotherapy. The Paris Symposium will deal with the following topics: production of ^{252}Cf , source technology and safety; californium-252 properties and application to science and education; application to nuclear industry; application to mineral industry; and miscellaneous applications, neutron gauging, activation analysis, neutron radiography, and other application developments.

French and English will be the official languages of the Symposium. Simultaneous translation in these two languages will be provided during the Paris Symposium.

Authors are invited to submit a 250-word abstract of their intended contribution to the chairman of the International Scientific Advisory Committee, for the particular symposium in which they wish to participate. DEADLINE: October 20, 1975. Authors will be informed of the acceptance of their contribution by January 1, 1976.

Inquiries may be addressed to: Centre D'Etudes Nucléaires Group Radiometallurgie (A l'attention de Mr. Hayet), BP No. 6, 92260 Fontenay-aux-Roses, France, or to Université Libre de Bruxelles Service de Radiobiologie (A l'attention de Mr. Le. Professeur Mewissen), 109, boulevard de Waterloo, 1000 Bruxelles, Belgique.

International Conference on "Surface Effects in Controlled Fusion Devices," sponsored jointly by Sandia Laboratories and Energy Research and Development Administration (ERDA), February 16-20, 1976, Sir Francis Drake Hotel, San Francisco, California:

An increased understanding of the complex interactions between surfaces and the plasma radiation environment is essential to the use of controlled fusion as a large scale energy source. The importance of these interactions and the resultant effects on structural integrity and plasma contamination were discussed at a conference held at Argonne National Laboratory, January, 1974 (Proceedings published in *The Journal of Nuclear Materials* 53, 1974).

The above meeting will provide a forum for interdisciplinary discussions between plasma physicists, surface scientists, and fusion reactor technologists. A series of invited talks will review recent progress in each of these fields. Experimental and theoretical contributed papers must contain new results directly related to controlled fusion technology in areas which include: particle and neutron sputtering; surface erosion; radiation-induced desorption; radiation-related surface chemistry; plasma impurity effects; plasma-surface interactions; surface analysis; and simulation methods. English will be the official language of the conference. Preliminary titles of

contributed papers should be submitted to: Dr. Walter Bauer, Program Committee, Sandia Laboratories, Livermore, CA 94550. The titles must be received by October 10, 1975. Selection of papers by the Program Committee will be based solely on a 300-500 word summary, which must be received by December 5, 1975. Additional information on form and content will be sent in the near future. A collection of the summaries will be distributed at the conference. Conference proceedings will be published in *The Journal of Nuclear Materials*. Instructions for the preparation of manuscripts will be sent to the authors of accepted papers. Camera-ready copies of accepted papers should be received by Dr. M. S. Kaminsky, co-editor, Argonne National Laboratory, Argonne, Illinois 60439, by February 2, 1976.

Members of the International Conference Committee are: C. R. Finfgeld, USA (co-chairman); B. C. Gregory, Canada; V. M. Gusev, USSR; M. S. Kaminsky, USA (co-chairman); G. M. McCracken, UK; M. Prevot, France; H. Vernickel, West Germany; and R. Watanabe, Japan.

The Fifth International CODATA Conference will be held in Boulder, Colorado, on June 27-July 1, 1976. The scope of the Conference will include all the disciplines represented in CODATA, i.e., the physical sciences, geosciences, astronomy, and the life sciences. Emphasis will be placed on problems and opportunities which are common to these various disciplines.

The subjects expected to be highlighted at the Conference include data needs in energy, environmental, and other major programs, methodology of data evaluation in various fields; statistical techniques; and computer applications to the storage, retrieval and dissemination of data.

Users of data, as well as those involved in data compilation and evaluation, are invited to submit papers on subjects within the scope of the Conference. The title, together with a brief description of the contents, should be submitted as soon as possible, but not later than November 1, 1975, to the Chairman of the Program Committee, David R. Lide, Jr., National Bureau of Standards, Washington, D.C. 20234.

For further details on the Conference, please write to: CODATA Secretariat, 51 Boulevard Montmorency, 75016 Paris, France, or Numerical Data Advisory Board National Research Council, 2101 Constitution Avenue, Washington, D.C. 20418.

CHANGES IN THE DATA COLLECTION

The following changes were made during September.

DLC-7/HPICE

A minor revision was made to the DLC-7/HPICE Atomic Form Factors, Incoherent Scattering Functions, and Photon Interaction Cross Section library which was announced in the July 1975 RSIC Newsletter. This revision, designated as DLC-7F, was the result of a recalculation of the coherent and incoherent scattering cross sections using the 1973 Fundamental Constants (E. R. Cohen and B. N. Taylor, *J. Phys. Chem. Ref. Data* 2, 663, 1973) rather than the 1964 constants used for DLC-7E. A comparison showed that the resulting cross sections differed by less than 0.1% so that there is essentially no practical difference between DLC-7E and DLC-7F. The revision was made in order to be consistent with the document describing the work. Ref.: J. H. Hubbell (NBS), Wm. J. Veigele and E. A. Briggs (Kaman Sciences), and R. T. Brown and D. T. Cromer (LASL), "Atomic Form Factors, Incoherent Scattering Functions, and Photon Scattering Cross Sections," *J. Phys. Chem. Ref. Data* (NBS, D. R. Lide, Ed.) (In press).

DLC-37/EPR

The DLC-37/EPR coupled 121-group cross section library has been updated with the addition of cross section data for K and Na and also kerma factors for gamma rays generated by PSR-51/SMUG and, where possible, neutron kerma factors from DLC-29/MACKLIB. Requests should be accompanied by one (to be written blocked) or three (unblocked) magnetic tapes.

CHANGES IN THE CODE COLLECTION

The following changes were made in the month of September.

CCC-137/RIBD II

A complete replacement of this radioisotope buildup and decay code and data library package was contributed by the developers at Hanford Engineering Development Laboratory, Westinghouse Hanford Company. The code developer cites the following advantages of RIBD II over the earlier RIBD: a) improved numerics for burst-type exposures, b) extended library allowing greater choice of fuel types and fissioning energies, c) library based on ENDF/B-IV, d) library updating and listing features, and e) NAMELIST input form and improved output format. References: BNWL-962, DUN-4136, HEDL-TME

75-26. FORTRAN IV. Versions are available for the CDC 6600 computer, CCC-137A, and the IBM 360, CCC-137B.

CCC-185/INREM-EXREM III

This Beta, Positron, Electron, and Gamma Radiation Environmental Dose Code package has been extended by additional sample problem output from INREM applications, a contribution of the Environmental Sciences and Neutron Physics Divisions of the Oak Ridge National Laboratory. Reference: ORNL-5003. FORTRAN IV; IBM 360.

CCC-261/MORSE-L

The ORNL Monte Carlo Radiation Transport Code System (CCC-203) was modified at the Lawrence Livermore Laboratory (LLL) to solve neutron, gamma-ray, and coupled neutron-gamma-ray penetration problems only using the CDC 6600/7600 and CHAT (internal LLL compiler language similar to FORTRAN IV). The CHAT version was contributed to RSIC (CCC-261A) by LLL. A version converted to run on standard FORTRAN IV compilers (CCC-261B) was contributed by EG&G, Goleta, California. EG&G has also contributed a LLLTRAN-to-FORTRAN Converter which is operable on the CDC for RSIC's use. References: UCID-16680, UCID-16682, and UCID-16683.

CCC-264/DLS

The two-dimensional shielding code using a combination of diffusion theory and line-of-sight method was contributed by INTERATOM of Germany through the OECD Nuclear Energy Agency Computer Programme Library, Ispra, Varese, Italy. Reference: ORNL-tr-4007 (INTERATOM Nr 479). FORTRAN IV; CDC 6600.

CCC-265/CASIM

Monte Carlo simulation of transport of hadron cascades in bulk matter (accelerator shielding code) was contributed by the Radiation Physics Group, Fermi National Accelerator Laboratory, Batavia, Illinois. FORTRAN IV; IBM 360. Reference: FN-272.

CCC-266/ONETRAN

One-dimensional multigroup discrete ordinates finite element transport code was contributed by Los Alamos Scientific Laboratory, New Mexico. FORTRAN IV; CDC 7600. An IBM version is in process. Reference: LA-5990-MS.

CCC-268/ALBEMO

Albedo-Monte Carlo radiation transport code (void volumes with reflecting walls) was contributed by INTERATOM of Germany through the OECD Nuclear Energy Agency Computer Programme Library, Ispra, Varese, Italy. FORTRAN IV; CDC 6600. References: ORNL-tr-4008 (ITB 75.10), INTERATOM Nrs. D-A 395 and 33,798.2.

PSR-94/GELI2-SPAN2

Calculation of nuclide abundances from multichannel gamma-ray spectra codes were contributed by Savannah River Laboratory, Aiken, South Carolina. Reference: DP-1275. FORTRAN IV; IBM 360.

VISITORS TO RSIC

Visitors to RSIC during the month of September were: Adeeb S. Makarious, Atomic Energy Establishment, Cairo, Egypt, and University of Tennessee, Knoxville; Arnie Warshawsky and Forest O. Thompson, U.S. Army Nuclear Agency, Ft. Bliss, Texas; John Christenson, University of Cincinnati, Cincinnati, Ohio; Francois Kertesz, Société Internationale de Technologie, Paris, France; Danner Wolfgang, Max-Planck Institut für Plasmaphysik, Garching, Germany; Denis Breton, CEA/CEN, Plasma Physics Division, Fontenay-aux-Roses, France; Wesley L. Holley, Stephen A. Dupree, and George E.

Kaye, Sandia Laboratories, Albuquerque, New Mexico; Richard Lee Emch, Jr., U.S. Nuclear Regulatory Commission, Washington, D.C.; Cheri L. Erickson, Jet Propulsion Laboratory, Pasadena, California; William C. Hopkins and Fred Nolte, Bechtel Power Corporation, Gaithersburg, Maryland; Thomas R. Jaworowski and Gil McCoy, Bechtel Corporation, San Francisco, California; Ti-Ke Shen, Bechtel Power Corporation, Norwalk, California; Roger C. Kennedy, Boeing Company, Seattle, Washington; Peter Lu, United Engineers & Constructors, Philadelphia, Pennsylvania; Michael Belford and G. Sen, Southern Services, Inc., Birmingham, Alabama; Bobby D. Belt, Southern Services, Inc., Atlanta, Georgia; Carl F. Johnson, Black & Veatch Consulting Engineers, Kansas City, Missouri; Sam Kang, Westinghouse Electric, Pittsburgh, Pennsylvania; Steven J. Nathan, NUS Corporation, Rockville, Maryland; Larry C. O'Malley, Exxon Nuclear, Bellevue, Washington; J. V. Pace, III, Union Carbide Corporation, Oak Ridge, Tennessee; Margaret Simmons, Los Alamos Scientific Laboratory, Los Alamos, New Mexico; Peter G. Studer, U.S. Air Force, Wright-Patterson AFB, Ohio; Shiao-Der Su, General Atomic Company, San Diego, California; D. O. Tomlin, Westinghouse Advanced Reactors Division, Madison, Pennsylvania; W. A. Wiffkopf, Babcock and Wilcox Company, Lynchburg, Virginia; Ronald Swanson, Radiation Research Associates, Ft. Worth, Texas; William F. Smith, Duke Power Company, Charlotte, North Carolina; Allen Miller, Richard Lindgren, and Gary H. Herling, Naval Research Laboratory, Washington, D.C.; Bernard Fried and T. Y. Byoun, Burns & Roe, Paramus, New Jersey; Theodore F. Bohn, Aerojet Nuclear Company, Idaho Falls, Idaho; Y. T. Song, Naval Surface Weapons Center, Whiteoak, Silver Spring, Maryland; and Albert A. Rainis, Vulnerability Laboratory, Aberdeen Proving Grounds, Maryland.

SEPTEMBER 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.

Special bibliographies and selected computer-printed abstracts of the literature in the RSIC system are available upon request. The Selective Dissemination of Information (SDI) Service is available by submitting a list of subject categories defining the recipient's interests.

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-350

New Approach to the Estimation of
Radiopharmaceutical Radiation Dose Distributions.
Hetherington, E.L.R.; Wood, N.R.
March 1975
Dep., NTIS (U.S. Sales Only) \$4.00

AE-503

Systematic Study of Neutron Inelastic Scattering
Energy Range 2.0 to 4.5 MeV.
Almen-Ramstroem, E.
April 1975
NTIS

ANL-75-2; NEA-CRP-L-118

Proceedings of the NEACRP Meeting of a
Monte Carlo Study Group - July 1-3, 1974 -
Argonne, Illinois, U.S.A.
Hytry, C. (Comp.)
1975
Argonne National Laboratory, 9700 South Cass
Avenue, Argonne, Illinois 60439

ANL-75-30, pp.73-74

A Simple Approach to Calculating Gamma Ray
Skyshine for Reduced Shielding Applications.
Borak, T.B.
1974
NTIS

ANL/CTR/TM-45

CTR Quarterly Progress Report - April-June, 1975.

Argonne National Laboratory

August 8, 1975

Argonne National Laboratory, Argonne, Illinois 60439

ANL/NDM-13

Response of Several Threshold Reactions in Reference Fission Neutron Fields.

Smith, D.L.; Meadows, J.W.

June 1975

Dep., NTIS \$5.25

BNWL-SA-5404

New Directions in Health Physics.

Vaughan, B.E.

April 1975

NTIS

BNWL-tr-135

Simulation of the Evolution of Defects in a Lattice by Monte Carlo Method.

Lanor, J.M.

1974

NTIS

CEA-R-4666 (In French)

Evaluation of the Equivalent Dose Rates Due to Neutrons Emitted by Plutonium Oxide Sources: Graphs.

Gouguet, J.

June 1975

Dep., NTIS (U.S. Sales Only) \$5.75

CONF-750443-3

Dose-Response Curves and Their Modification by Specific Mechanisms.

Yuhas, J.M.

1975

Dep., NTIS \$4.25

CONF-750545-1

Heterogeneity Effects in Neutron Transport Computations.

Gelbard, E.M.

1975

Dep., NTIS

COO-2231-24

Neutron Spectra at 0 Degrees from 71-MeV Deuteron Bombardment of a Thick Carbon Target.

Madey, R.; Waterman, F.M.; Baldwin, A.; Wall, N.S.

1974

Dep., NTIS

COO-2231-27

Neutron Spectra at 0 Degrees from 83.7-MeV Deuteron Bombardment of a Thick Beryllium Target.

Madey, R.; Waterman, F.M.; Baldwin, A.; Wall, N.S.

1975

Dep., NTIS

COO-2459-1

Report of the APS Summer Study on Physics Problems Relating to Energy Technologies: Radiation Effects on Materials.

Vook, F.L.; Birnbaum, H.K.; Blewitt, T.H.

June 1974

Dep., NTIS \$9.25

COO-2479-2; CONF-750607-3

Measurement of Neutron Total Cross Sections of Sodium Near Minima.

Brown, P.H.; Quan, B.L.; Weiss, J.J.; Block, R.C.

June 8, 1975

Dep., NTIS \$4.00

DP-MS-74-61; CONF-750303-7

Consistent Set of Transplutonium Multigroup Cross Sections.

Benjamin, R.W.; Vanderveide, V.D.; Gorrell, T.C.; McCrosson, F.J.

1975

Dep., NTIS \$4.00

EPA-670/4-75-006

Activities and Needs Related to Radioactivity Standards for Environmental Measurements.

Eldridge, J.E.; Kahn, B. (Eds.)

June 1975

National Environmental Research Center, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio 45268

ERDA-50

Proceedings of the Symposium on Tritium Technology Related to Fusion Reactor Systems - October 1 and 2, 1974.

Smith, W.H.; Wilkes, W.R.; Wittenberg, L.J.

June 1975

NTIS \$7.60

- ERDA-TR58
The Experimental Thermonuclear Device
"Tokamak-20".
Kurchatov, I.V.; Yefremov, D.V.
1975
NTIS \$7.60
- FTD-HT-23-1507-74; AD-783978
Measurement of the Differential Neutron Dose
Albedo for Iron, Soil, and Water.
Kukhtevich, V.I.; Trykov, L.A.; Goryachev, I.V.
1967
NTIS \$3.00
- HEDL-SA-774
ENDF/B Dosimetry Cross Section File
Benchmark Neutron Flux-Spectral Uncertainties.
McElroy, W.N.
February 1975
NTIS
- HEDL-SA-775; CONF-750303-67
Helium Production in Reactor Materials.
Lippincott, E.P.; McElroy, W.N.; Farrar, H., IV
February 1975
Dep., NTIS \$4.00
- HEDL-TME-75-56
Controlled Thermonuclear Research - Quarterly
Report - January, February and March, 1975.
Doran, D.G.; Yoshikawa, H.H. (Comp.)
May 1975
NTIS \$5.45
- ICRP-2
Report of Committee II on Permissible Dose for
Internal Radiation.
ICRP
1959
Pergamon Press, Inc.
- IEA-354
Evaluation of Fast Reactor Blankets.
Oosterkamp, W.J.
September 1974
NTIS
- INDC(CCP)-52/LN
Nuclear Constants - Issue No.12 (Part II) -
Results Obtained in Studies on Photoneutron
Reactions Near the Threshold.
Abramov, A.I.
June 1975
IAEA Nuclear Data Section, Karnthner Ring 11,
A-1010 Vienna
- IS-T-672
Gamma-Ray Decay Schemes for Kr-91 and
Rb-91.
Glascock, M.D.
May 1975
Dep., NTIS
- KFK-2046
Neutron Capture in the keV Energy Range in
Structural Materials for Fast Reactors (Proceedings
of a NEACRP/NEANDC Specialist Meeting, Held
in May 1973 at the Kernforschungszentrum
Karlsruhe).
Schatz, B.; Kusters, H. (Eds.)
May 1975
Gesellschaft für Kernforschung mbH., Karlsruhe
- LA-5803
Gaussian Elimination for Dense Systems on Star
and a New Parallel Algorithm for Diagonally
Dominant Tridiagonal Systems.
Jordan, T.L.
June 1975
NTIS \$4.00
- LA-5952
A Method of Characteristics for the Transport
Equation Solution.
Carlson, B.G.
July 1975
NTIS \$4.00
- LA-5990-MS
ONETRAN: A Discrete Ordinates Finite Element
Code for the Solution of the One-Dimensional
Multigroup Transport Equation.
Hill, T.R.
June 1975
NTIS
- LA-6032-MS
LTPF: A Linear Theta-Pinch Neutron Source.
Ellis, W.R.
July 1975
NTIS \$4.00
- NIRS-R-2, pp.73-77 (In Japanese)
Profile of the Collimator Used for D-T Neutron
Therapy.
Maruyama, T.
November 1973
National Inst. of Radiological Sciences, Chiba
(Japan)

NIRS-R-2, pp.97-99 (In Japanese)

The Attenuation of Fast Neutrons in Several Materials.

Nishimura, A.; Maruyama, T.; Kato, Y.

November 1973

National Inst. of Radiological Sciences, Chiba (Japan)

NRL-7886

Monte Carlo Calculations of Neutron and Photon Spectra for the INDI Project.

Herling, G.H.

June 10, 1975

Naval Research Laboratory, Washington, D.C. 20375

NRL Memo 3051

Report on NRL Measurements as a Participant in the INDI.

Attix, F.H.; Theus, R.B.; Gorbics, S.C.; Rogers, C.C.

May 1975

Naval Research Laboratory, Washington, D.C. 20375

ORNL-5027

Review of ORNL Radiation Shielding Analyses of the Fast Flux Test Facility Reactor.

Abbott, L.S.; Mynatt, F.R. (Eds.)

June 1975

ERDA, Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830 \$10.60

ORNL-TM-4283

ORNL TSF Pipe Chase Neutron Streaming Experiment - Phase Two.

McGregor, B.J.; Clifford, C.E.; Muckenthaler, F.J.; Mynatt, F.R.

August 1975

ERDA, Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830 \$5.45

ORNL-TM-4972; ENDF-219

The Nb(n,x gamma) Reaction Cross Section for Incident Neutron Energies Between 0.65 and 20.0 MeV.

Dickens, J.K.; Morgan, G.L.; Newman, E.

September 1975

NTIS \$5.45

ORNL-TM-5018

Measurement of Secondary Neutrons and Gamma Rays Produced by Neutron Bombardment of Water over the Incident Energy Range 1 to 20 MeV.

Morgan, G.L.

August 1975

NTIS

ORNL-TM-5024

Measurement of Secondary Neutrons and Gamma Rays Produced by Neutron Interactions in Silicon Dioxide over the Incident Energy Range 1 to 20 MeV.

Morgan, G.L.

September 1975

NTIS \$4.00

ORNL-TM-5033

Neutronics Calculations for the Tokamak Experimental Power Reactor Reference Design.

Santoro, R.T.

September 1975

NTIS \$4.00

ORO-4814-4

Recent Developments in Fast Neutron Personnel Dosimetry Using Track Etch Methods.

Sohrabi, M.; Morgan, K.Z.

1974

NTIS

STI/PUB-371; CONF-721127

Neutron Standard Reference Data. Panel Proceedings Series.

Proceedings of a Panel Held in Vienna, Austria, November 20-24, 1972.

IAEA

December 1974

IAEA \$20.00

STI/PUB-371, pp.37-40; CONF-721127, pp.37-40

International Intercomparison of Fast Neutron Flux Density Sponsored by Bureau International Des Poids et Mesures.

Axton, E.J.

December 1974

IAEA

STI/PUB-371, pp.75-83; CONF-721127, pp.75-83

Absolute Neutron Flux Determination in the Energy Region Between 0.4 MeV and 2 MeV.

Kaeppler, F.

December 1974

IAEA

STI/PUB-371, pp.85-88; CONF-721127, pp.85-88

Neutron Flux Measurements at the LLL Linac.

Czirr, J.B.; Sidhu, G.S.

December 1974

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- STI/PUB-371, pp.255-257; CONF-721127, pp.255-257
Neutron Flux Measurement in the keV Energy
Region: Suitability of Indium as an Activation
Standard for keV Neutrons.
Ryves, T.B.
December 1974
IAEA
- STI/PUB-371, pp.321-325 (In Russian); CONF-721127,
pp.321-325 (In Russian)
Use of Californium-252 as a Standard for Nu Bar
and Neutron Spectrum Measurements.
Kuz'minov, B.D.
December 1974
IAEA
- STI/PUB-371, pp.333-338; CONF-721127, pp.333-338
Standard Fission Neutron Spectra.
Ferguson, A.T.G.
December 1974
IAEA
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Shield Nuclear Design for the 5-kwe TE System.
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