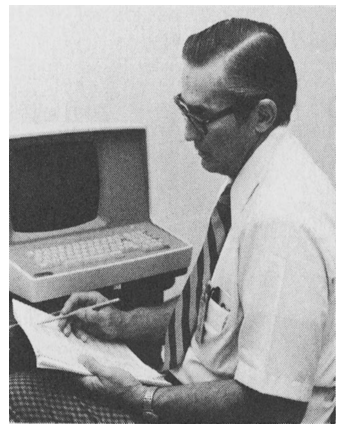
nuclear technology®

AUTHORS — FEBRUARY 1975

MATERIALS DOSIMETRY

PREFACE: DATA DEVELOPMENT AND TESTING FOR FAST REACTOR DOSIMETRY

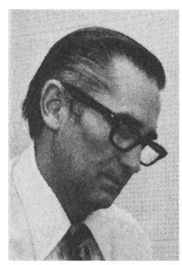
W.N. McElroy

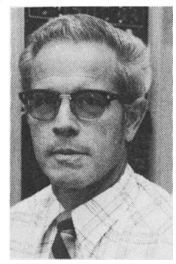


W. N. McElroy (PhD, Illinois Institute of Technology, 1965) has been engaged in neutron dosimetry and irradiation effects studies for reactor fuels and materials development programs for the past 10 years. He is presently a fellow scientist in the Irradiation Analysis Section of Westinghouse Hanford Company and has technical responsibility for the operation of the USAEC's Fast-Reactor Materials Dosimetry Center at the Hanford Engineering Development Laboratory.

FUELS AND MATERIALS FAST-REACTOR DOSIMETRY DATA DEVELOPMENT AND TESTING

W. N. McElroy
L. S. Kellogg





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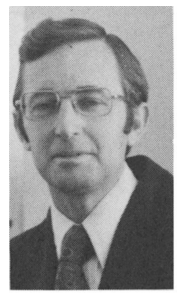
PREPARATION AND CHARACTERIZATION OF NEUTRON DOSIMETER MATERIALS

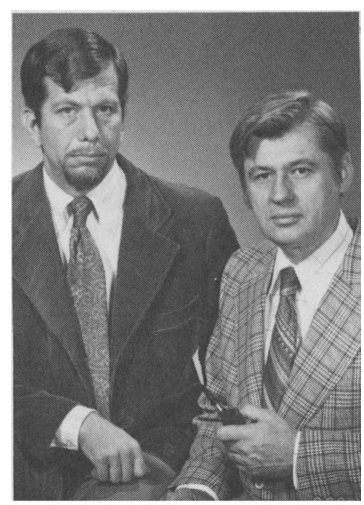
H. L. Adair
E. H. Kobisk

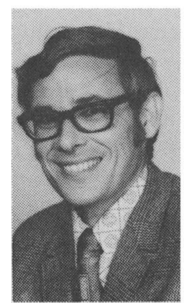


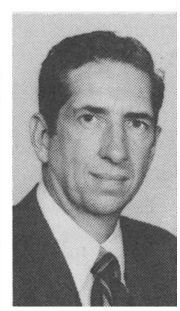
H. L. Adair (left) (BS, physics, Oglethorpe University, 1960; MS, physics, University of Tennessee, 1968) has been a member of the Isotopes Division of Oak Ridge National Laboratory since 1960. His interests have been in the separation of stable isotopes and in the preparation and definition of both stable and radioactive target materials used for nuclear research. E. H. Kobisk (MS, physical chemistry, Illinois Institute of Technology, 1952; MS, industrial management, University of Tennessee, 1962) is department head of the Isotope Research Materials Laboratory, Isotopes Division, Oak Ridge National Laboratory. He has been associated with Union Carbide at Oak Ridge since 1951 and has had a wide range of experience in gaseous diffusion technology, preparation of research materials (stable and radioactive), high temperature chemistry, technical personnel evaluation and recruitment, and direct management.

MEASUREMENT OF ABSOLUTE FISSION RATES

J. A. Grundl
D. M. Gilliam
N. D. Dudey
R. J. Popek



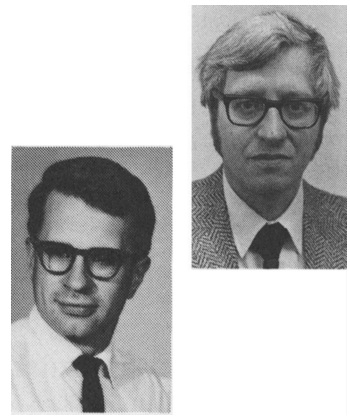




James Grundl (top right) (PhD, University of New Mexico) and David Gilliam (top left) (PhD, University of Michigan) are members of the Nuclear Sciences Division at the National Bureau of Standards and are engaged in the development of reference neutron fields and the standardization of integral reaction rate measurements for nuclear technology. Norman D. Dudey (bottom left) (PhD, nuclear chemistry, Clark University) is currently manager of the Analytical Chemistry Laboratory at Argonne National Laboratory (ANL). Prior to this assignment, he was group leader of the Dosimetry and Burnup Group at ANL. He has been active for the past seven years in neutron dosimetry and fuel burnup methodology with particular interests in the areas of Ge(Li) gamma spectrometry and measurements of cross sections and fission yields required for fast reactor dosimetry and burnup determinations. Ray J. Popek (bottom right) (BS, chemistry, University of Illinois) has been active for 17 years in radiochemistry research in the Chemical Engineering Division at ANL. His recent interests have been in the areas of applying solid-state track recorder techniques to fission rate measurements within fast reactor environments and measurements of fission yields related to burnup and fast neutron dosimetry applications.

EVALUATED DECAY SCHEME DATA

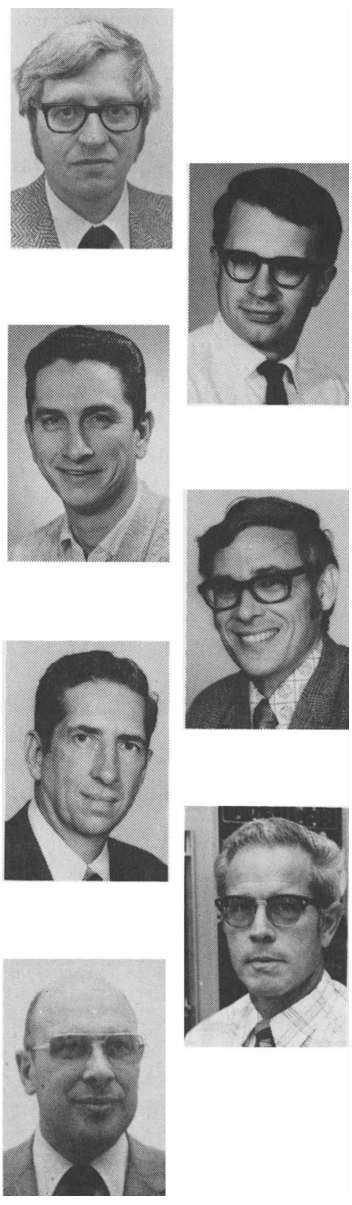
R. G. Helmer
R. C. Greenwood



Richard G. Helmer (left) (PhD, physics, University of Michigan, 1961) has been employed at the National Reactor Testing Station (NRTS) (now designated Idaho National Engineering Laboratory) with Aerojet Nuclear Company (and its predecessors Idaho Nuclear Corporation and Phillips Petroleum Company) since 1961. At the NRTS, he has been involved in nuclear structure studies and applied problems using gamma-ray and electron spectroscopy. Reginald C. Greenwood (PhD, University of Western Ontario, 1960) is currently employed at the NRTS with Aerojet Nuclear Company. His research activity has centered on the areas of neutron capture gamma-ray spectroscopy and nuclear decay studies. Coincident with this work he has also been engaged in an effort to develop more precise gamma-ray energy standards for use in Ge(Li) detector spectroscopy.

NONFISSION REACTION RATE MEASUREMENTS

R. C. Greenwood
R. G. Helmer
J W Rogers
N. D. Dudey
R. J. Popek
L. S. Kellogg
W. H. Zimmer



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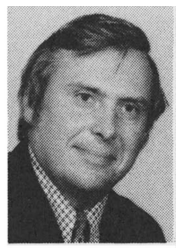
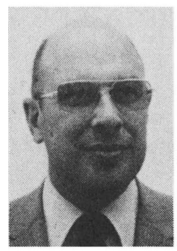
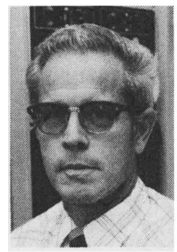
of Technology, 1951) is staff chemist for Atlantic Richfield Hanford Company, Research and Development Section. He has been engaged in various phases of energy analysis and design for the past 20 years. Current interest is design of energy-analyzing systems in support of all phases of waste management, environmental surveillance, and process control.

HIGH FLUX LEVEL REACTION RATE MEASUREMENTS

W. H. Zimmer
R. R. Heinrich
L. S. Kellogg
W. Y. Matsumoto



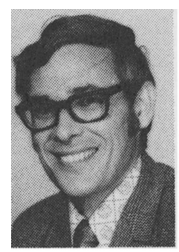


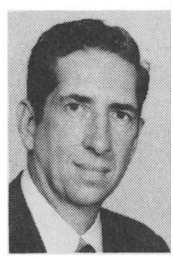


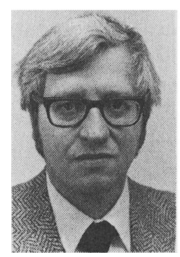
W. H. Zimmer (top left) (BS, chemistry, Illinois Institute of Technology, 1951) is staff chemist for Atlantic Richfield Hanford Company, Research and Development Section. He has been engaged in various phases of energy analysis and design for the past 20 years. Current interest is design of energy analyzing systems in support of all phases of waste management, environmental surveillance, and process control. Robert R. Heinrich (top right) (MS, nuclear chemistry, University of Chicago, 1961) is staff member of the Chemical Engineering Division of Argonne National Laboratory. Current technical interests include fast neutron dosimetry, fission yields, and neutron activation. L. S. Kellogg (bottom left) (BS, Oregon State University, 1956) has been engaged in radiochemical analysis for 14 years and neutron dosimetry for the past 5 years. He is presently a senior scientist in radiochemistry at Westinghouse Hanford Company. W. Y. Matsumoto (bottom right) (BA, chemistry and mathematics. Eastern Washington State College, 1950) has been engaged in analytical and radiochemistry at Hanford for General Electric, Battelle-Northwest, and Westinghouse Hanford Company since 1951. He is currently an advisory scientist in chemistry and analysis at Westinghouse Hanford Company.

FISSION-PRODUCT-RATE MEASUREMENTS AND YIELDS

N. D. Dudey
R. J. Popek
R. C. Greenwood
R. G. Helmer
J W Rogers
L. S. Kellogg
W. H. Zimmer







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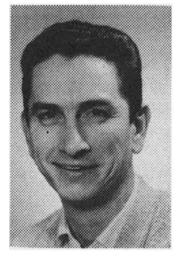
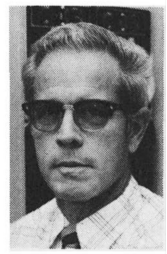
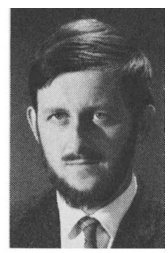


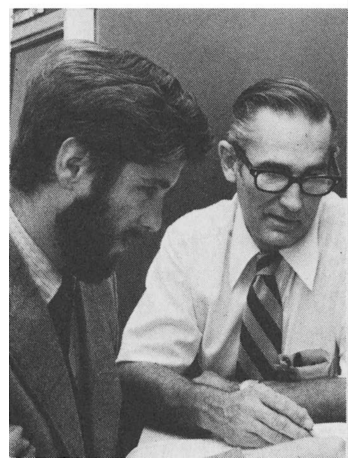


HELIUM PRODUCTION CROSS SECTION OF BORON FOR FAST-REACTOR NEUTRON SPECTRA

Harry Farrar, IV
W. N. McElroy
E. P. Lippincott

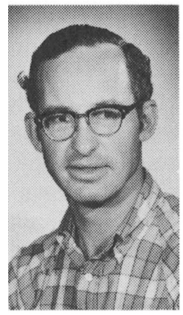
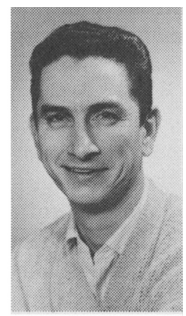
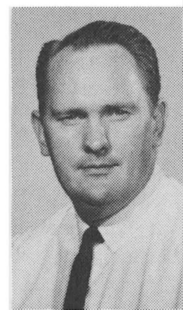


Harry Farrar, IV (top) (PhD, nuclear physics, McMaster University, Canada) is the project development engineer in charge of the Applied Nuclear Research Programs at the Atomics International Division of Rockwell International Corporation. He has developed a high-sensitivity mass spectrometer system for measuring parts-per-trillion concentrations of helium leading to the development of stable product helium-generation fluence monitors for determining fast-reactor neutron fluence. W. N. McElroy (bottom right) (PhD, Illinois Institute of Technology, 1965) has been engaged in neutron dosimetry and irradiation effects studies for reactor fuels and materials development programs for the past 10 years. He is presently a fellow scientist in the Irradiation Analysis Section of Westinghouse Hanford Company and has technical responsibility for the operation of the USAEC's Fast Reactor Materials Dosimetry Center at the Hanford Engineering Development Laboratory. E. P. Lippincott (bottom left) (PhD, nuclear physics, Massachusetts Institute of Technology, 1966) has worked on reactor physics and neutron dosimetry for the past 8 years. He is currently a senior scientist in the Irradiation Analysis Section of Westinghouse Hanford Company.



CFRMF NEUTRON FIELD FLUX SPECTRAL CHARACTERIZATION

J W Rogers
D. A. Millsap
Y. D. Harker

J W Rogers (top) (BS, physics, Georgetown College) has been actively involved with the CFRMF (including design, startup, operation, and testing) from its conception until the present. He has conducted experimental measurements and analyses of neutron spectra, flux, and reaction rates. D. A. Millsap (center) (BS, physics, Washington State University) has worked on the development of methods of nondestructive sample analysis using reactivity measurements, design calculations for the CFRMF, detailed calculations of the central spectrum of the CFRMF, and reaction-rate calculations. Y. D. Harker (bottom) (PhD, physics, Colorado State University, 1969) has worked with slow- and fast-neutron integral cross-section measurements. His current interests are integral cross-section measurements on fission-product and transuranic nuclides and neutron spectrometry using multiple foil dosimetry.

THE SECONDARY INTERMEDIATE-ENERGY STANDARD NEUTRON FIELD AT THE MOL-ΣΣ FACILITY

A. Fabry
G. De Leeuw
S. De Leeuw



A. Fabry (top), G. De Leeuw (center), and S. De Leeuw (bottom) are members of the Reactor Study Department of the Centre d'Etude de l'Energie Nucleaire-Studie Centrum voor Kernenergie (CEN/SCK), Mol, Belgium. The three authors are currently working in the fields of reactor physics and neutron dosimetry within the frame of the tripartite German-Dutch-Belgian Fast Breeder Program. They are cooperating with the U.S. Atomic Energy Commission Interlaboratory LMFBR Reaction Rate Program. A. Fabry (MS, University of Liege) is a permanent member of the EURATOM Working Group on Reactor Dosimetry and has been attached for two years to the Neutron Standards Program at the National Bureau of Standards. G. De Leeuw (PhD, University of Brussels) and S. De Leeuw (MS, electronic engineering, University of Ghent) were attached for seven years to the Fast Reactor Physics Program in Saclay and in Cadarache.

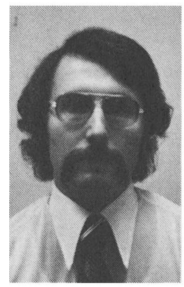
ENDF/B FILE FOR DOSIMETRY APPLICATIONS

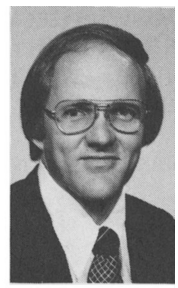
B. A. Magurno
O. Ozer

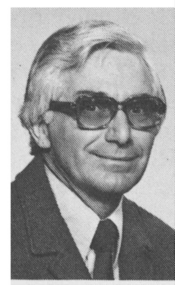
B. A. Magurno is with the National Neutron Cross Section Center, Brookhaven National Laboratory, Upton, Long Island, New York. O. Ozer is with the Electric Power Research Institute, Palo Alto, California. (More detailed biographical data and photos not available.)

THE CENTRAL NEUTRON SPECTRUM OF THE FAST CRITICAL ASSEMBLY BIG-TEN

E. J. Dowdy
E. J. Lozito
E. A. Plassmann



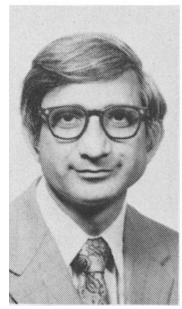




E. J. Dowdy (top) (PhD, nuclear engineering, Texas A&M University) was on the faculties of the University of Missouri, Columbia (1965-1967), and Texas A&M University (1967-1973) prior to joining the Los Alamos Scientific Laboratory (LASL) where he has been engaged in low-energy nuclear-physics research in support of the classified nuclear safeguards program. E. J. Lozito (center) (M. Eng., nuclear engineering, Texas A&M University) has worked in the critical experiments group at LASL, and is now in the Nuclear Division of the American Electric Power Service Corporation. E. A. Plassmann (bottom) (PhD, experimental physics, Indiana University) has been a staff member of the critical experiments group of LASL since 1955, participating in the nuclear rocket research and weapons programs.

ANALYSIS OF DOSIMETRY MEASUREMENTS IN EBR-II

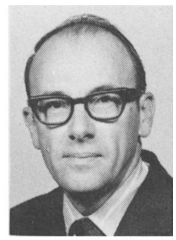
B. R. Sehgal
R. H. Rempert

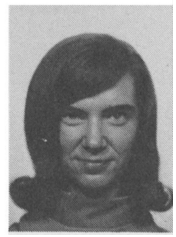


Bal Raj Sehgal (left) (PhD, University of California, Berkeley, 1961) has been involved with physics analysis of the EBR-II since joining Argonne National Laboratory in 1968. Previously, he worked at Brookhaven National Laboratory on analysis of thermal reactor lattices. Roger H. Rempert is a staff member with the EBR-II Project at Argonne National Laboratory. He is primarily concerned with computer applications of reactor analysis and is currently engaged in core loading analysis.

ANALYSIS OF BURNUPS IN EBR-II DRIVER-FUEL ELEMENTS

David Meneghetti
Earl R. Ebersole
Phyllis Walker

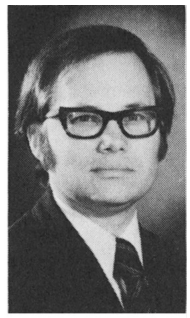


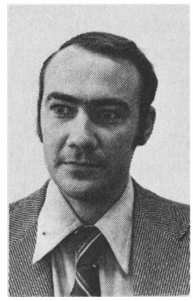


David Meneghetti (top) (PhD, physics, Illinois Institute of Technology, 1954) is a senior physicist at Argonne National Laboratory (ANL) and currently is manager of the physics analysis section of the EBR-II Project. Earl R. Ebersole (center) (BS, chemistry, University of Wisconsin, 1943) as manager of the ANL-West Analytical Laboratory is responsible for all analytical chemistry at the EBR-II site. Phyllis Walker (bottom) (MS, mathematics, University of Kansas, 1965) is a computer scientist at ANL. She is currently with the Energy and Environmental Systems Division working on methods development and data base design for various environmental problems. Formerly, she developed burnup analysis models for LMFBRs in the EBR-II Division.

MEASUREMENT OF FISSION PRODUCT YIELDS AND THE ENERGY INTEGRAL FISSION CROSS SECTION OF THORIUM-232 IN A CALIFORNIUM-252 FISSION-NEUTRON SPECTRUM

James R. Deen
E. Linn Draper, Jr.





James R. Deen (top) (PhD, The University of Texas at Austin, 1973) is currently a senior engineer in the Nuclear Energy Division of the General Electric Company. For the past two years he has been performing lattice and whole-core model evaluations based on comparisons with hot and cold critical reactor data and in-core power distribution measurements. He is currently involved in advanced BWR design optimization and critical experiment analysis. E. Linn Draper, Jr. (PhD, nuclear engineering, Cornell University) is the director of the Nuclear Reactor Laboratory and associate professor of mechanical engineering at the University of Texas at Austin. His research activities include fission physics, fusion reactor calculations, and the economics of power systems.