



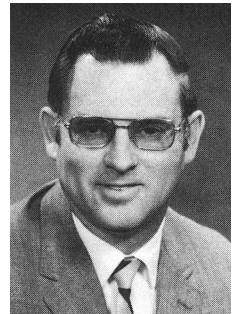
AUTHORS – JANUARY 1976

FUELS FOR PULSED REACTORS

PREFACE: FUELS FOR PULSED REACTORS

James A. Horak (PhD, materials science and metallurgy, Northwestern University, 1966) is associated with the Radiation Effects Group, Metals and Ceramics Division, Oak Ridge National Laboratory. His current interests are determination of the effects of the controlled thermonuclear reactor (CTR) environment (radiation, temperature, stress, and chemical) on the mechanical and physical properties of materials that have potential utilization in CTRs.

James A. Horak



POWER BURST FACILITY FUEL STUDIES

J. T. Cole (right) (BS, mechanical engineering, University of New Mexico, 1964) is currently technical assistant to the assistant general manager, Programs, of Aerojet Nuclear Company. Previously he directed all activities relating to fuel design, development (in-pile and out-of-pile testing), and fabrication for the Power Burst Facility. His engineering experience includes heat transfer analysis, with a broad background in environmental test engineering. R. E. Wood (left) (PhD, nuclear physics, University of Utah, 1955) is deputy assistant manager for Reactor Operations and Programs with dual capacity as director, Reactor Support Division, for the Idaho Operations Office of the U.S. Energy Research and Development Administration (ERDA). He has worked in many areas of reactor design, test operations, and data reduction and analysis. He spent 1 year at Brookhaven National Laboratory, 13 years with General Electric Company, and the past 7 years with the U.S. Atomic Energy Commission (now ERDA).

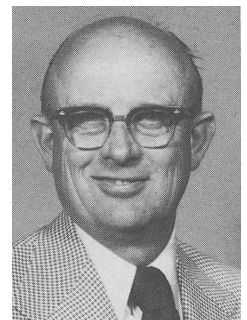
*J. T. Cole
R. E. Wood*



(U,Zr)C-GRAPHITE FUEL FOR TREAT CONVERTER STUDIES

Keith V. Davidson (MS, metallurgical engineering, Colorado School of Mines, 1950) is currently responsible for uranium fuel element extrusion development for various reactor programs at Los Alamos Scientific Laboratory. He has been involved in the development and fabrication of high-temperature structural materials and uranium fuels for the past 18 years.

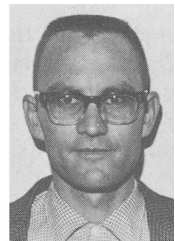
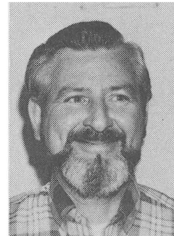
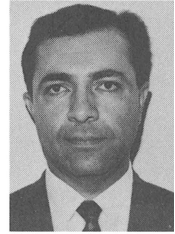
Keith V. Davidson



FUEL ELEMENTS FOR PULSED TRIGA® RESEARCH REACTORS

Massoud Simnad (top) (PhD, Cambridge University, 1945) has been involved in research and development work on nuclear reactor materials and fuels since he joined Gulf General Atomic in 1956. From 1959 to 1969 he was an assistant chairman of the Metallurgy Department. From 1962 to 1963 he was a visiting professor at the Massachusetts Institute of Technology in the Department of Nuclear Engineering and Metallurgy. Fabian C. Foushee (center) (AB, San Diego State University, 1951; Diploma, Oak Ridge School of Reactor Technology, 1955) joined General Atomic Company in 1960 and was assigned to the Engineering Division of the TRIGA Reactor Project, where he has performed nuclear, heat transfer, shielding, safety, and performance analysis on advanced TRIGA reactors. Gordon B. West (bottom) joined the Theoretical Physics Group of the TRIGA Reactor Project in 1957. He participated in the nuclear design and dynamic testing of the first TRIGA reactor. Since then, he has specialized in kinetic analysis and has been involved with the development of computational techniques to determine the prompt negative temperature coefficient of pulsing TRIGA research reactors. He has contributed substantially to the design of low excess reactivity power reactors utilizing U-ZrH fuel and was responsible for the nuclear design of the TRIGA-ACPR, the long-life TRIGA-FLIP fuel for higher power research reactors, and the 14-MW TRIGA Research/Materials and Testing Reactor.

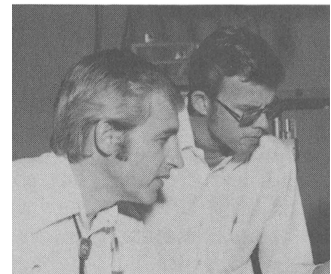
*Massoud T. Simnad
Fabian C. Foushee
Gordon B. West*



MATERIAL PROPERTY DETERMINATION FOR FAST PULSED REACTOR FUELS BY RAPID FISSION HEATING

J. A. Reuscher (left) (PhD, Texas A&M University, 1965) is supervisor of the Reactor Source Applications Division at Sandia Laboratories. He has worked mainly on the dynamic thermomechanical and pulse behavior of fast pulsed reactors. His current interests include methods for improving the performance of TRIGA reactors. T. R. Schmidt (right) (PhD, University of Arizona, 1969) is a staff member in the Reactor Studies Division at Sandia Laboratories. He has worked on the design of and application for fast pulse reactors, performing simulation experiments and material property determination experiments. His current interests include in-pile fast reactor safety experiments.

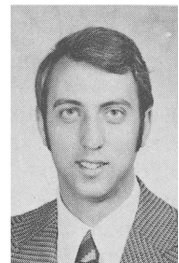
*J. A. Reuscher
T. R. Schmidt*



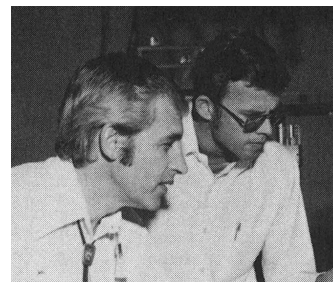
A MEASUREMENT OF TEMPERATURE-DEPENDENT INTERNAL FRICTION FOR URANIUM, U-0.78 wt% Ti, U-6 wt% Mo, AND U-10 wt% Mo

E. T. Laats (MS, Idaho State University, 1974) is a staff member at Aerojet Nuclear Company in the Systems Safety Research Division. He is interested in material properties and reactor performance. His current work area is fuel behavior code development and verification.

*E. T. Laats
T. R. Schmidt
J. A. Reuscher*



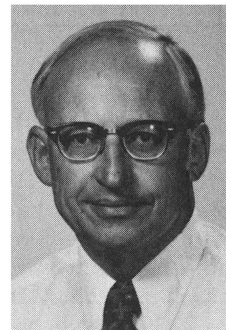
T. R. Schmidt (right) (PhD, University of Arizona, 1969) is a staff member in the Reactor Studies Division at Sandia Laboratories. He has worked on the design of and application for fast pulse reactors, performing simulation experiments and material property determination experiments. His current interests include in-pile fast reactor safety experiments. J. A. Reuscher (left) (PhD, Texas A&M University, 1965) is supervisor of the Reactor Source Applications Division at Sandia Laboratories. He has worked mainly on the dynamic thermomechanical and pulse behavior of fast pulsed reactors. His current interests include methods for improving the performance of TRIGA reactors.



FABRICATION OF URANIUM-MOLYBDENUM ALLOY FUELS FOR PULSED REACTORS

James M. Taub

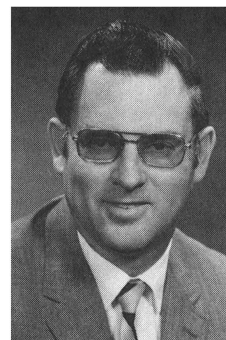
James M. Taub (MS, metallurgical engineering, Case Institute of Technology, 1944) has been associated with the development and fabrication of nuclear and special materials since 1944 at the Los Alamos Scientific Laboratory. He is an ASM Fellow and received the U.S. Atomic Energy Commission Lawrence Award in 1963 for his pioneering work on the metallurgy and fabrication of uranium and its alloys. He was deeply involved in the development of high-temperature fuel elements for the Rover nuclear rocket engine. His current interests lie in the development of materials for nuclear and other energy programs.



SUMMARY OF UNPUBLISHED PRESENTATIONS FOR FUELS FOR PULSED REACTORS

James A. Horak

James A. Horak (PhD, materials science and metallurgy, Northwestern University, 1966) is associated with the Radiation Effects Group, Metals and Ceramics Division, Oak Ridge National Laboratory. His current interests are determination of the effects of the controlled thermonuclear reactor (CTR) environment (radiation, temperature, stress, and chemical) on the mechanical and physical properties of materials that have potential utilization in CTRs.

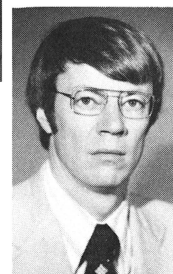
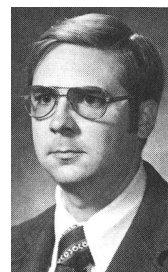


REACTORS

CLINCH RIVER BREEDER REACTOR BREEDING CHARACTERISTICS

*G. C. Tillett, Jr.
A. R. Buhl*

George C. Tillett, Jr. (top) (MS, nuclear engineering, University of Oklahoma, 1972) is a reactor engineer with the Division of Reactor Research and Development of the U.S. Energy Research and Development Administration (ERDA). His interests include reactor physics and reactor instrumentation. Anthony R. Buhl (PhD, engineering science, University of Tennessee, 1967) joined the U.S. Atomic Energy Commission in Jan. 1973 and is currently acting as assistant project director for the Clinch River Breeder Reactor at ERDA. He was formerly with Oak Ridge National Laboratory, where he was involved in the development of a subcriticality monitoring system for liquid-metal fast breeder reactors and in computational methods development for fast-reactor kinetics and design applications.



FUSION-FISSION HYBRID CONCEPTS FOR LASER-INDUCED FUSION

James Maniscalco

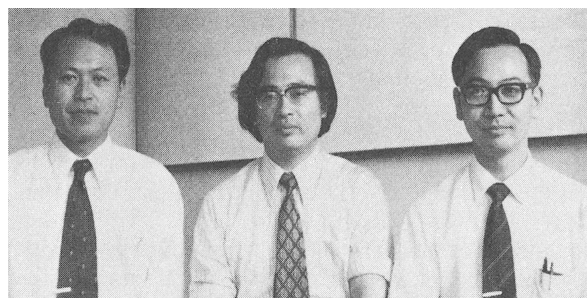
James A. Maniscalco (PhD, nuclear engineering, Purdue University, 1973) is a lieutenant in the U.S. Navy, currently assigned as a military research associate at Lawrence Livermore Laboratory, where he is working in the System Studies Group for Laser Fusion. His present interests lie with the technological problems of power and fissile fuel production with laser fusion, particularly blanket neutronics and radiation shield design.



A METHOD FOR GENERATING A CONTROL ROD PROGRAM FOR BOILING WATER REACTORS

*Toshio Kawai
Hiroshi Motoda
Takashi Kiguchi
Michihiro Ozawa*

Toshio Kawai (top left) (BSc, physics, Tokyo University, 1955) is a chief researcher at Atomic Energy Research Laboratory (AERL), Hitachi, Ltd. He has been engaged in in-core fuel management optimization of the boiling water reactor (BWR). His current interests include in-core detector noise interpretation and two-phase hydraulic stability of the BWR. Hiroshi Motoda (top center) (PhD, nuclear engineering, Tokyo University, 1972) is a researcher in the Systems Analysis Section of AERL, Hitachi, Ltd. He has been engaged in in-core fuel management optimization of the BWR. His current research interests include the reactor core management information system. Takashi Kiguchi (top right) (MS, nuclear engineering, Tokyo University, 1969) is also a researcher in the Systems Analysis Section of AERL, Hitachi, Ltd. He has been engaged in developing the BWR core management program system and the flux synthesis for fast breeder reactor burnup calculation. His current interests include the computer network for reactor management. Michihiro Ozawa (bottom) (BS, physics, Tokyo Institute of Technology, 1971) is an engineer at Hitachi Works of Hitachi Ltd. and has worked on nuclear core engineering. His duties now include planning control rod programming of the BWR.

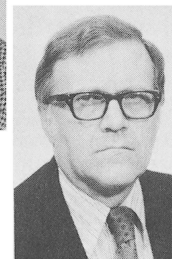


REACTOR SITING

HYDRODYNAMIC CONTAINMENT FOR UNDERGROUND NUCLEAR POWER PLANTS

*J. M. Cardito
E. V. Somers
J. H. McWhirter*

Joseph M. Cardito (top) (PhD, nuclear engineering, The Pennsylvania State University, 1970) is senior research engineer at Westinghouse Research Laboratories. His principal activities are in engineering systems analysis of energy and power generation systems. Edward V. Somers (center) (PhD, mathematics, University of Pittsburgh, 1949) is a consulting engineer in energy systems at the Westinghouse Research Laboratories. His responsibility is in the energy conversion field, and he is active in fossil and nuclear power generation by both conventional and unconventional methods and in residential, commercial, and industrial energy utilization. James H. McWhirter (bottom) (MS, electrical engineering, Carnegie-Mellon University, 1948) is a fellow engineer at the Westinghouse Research Laboratories. His principal activities are in the numerical solution of electromagnetic field problems.

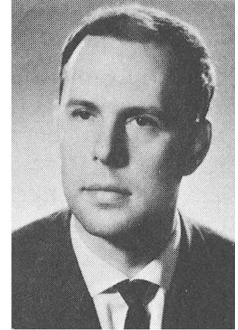


FUELS

FISSION GAS BEHAVIOR IN OXIDE FUEL ELEMENTS OF FAST BREEDER REACTORS

H. Zimmermann

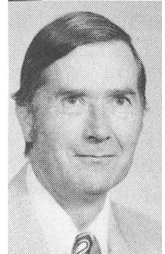
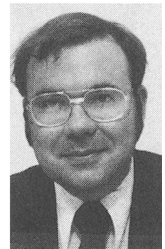
Heinz Zimmermann (Diplom-Ingenieur, Technical University of Magdeburg, 1959) has been involved in various aspects of the fuel cycle since 1964 at the Kernforschungszentrum Karlsruhe. For the past years his primary areas of activity have been fuel pin postirradiation examinations, fission gas behavior, and fuel swelling.



STATISTICAL AND METALLURGICAL ANALYSES OF EXPERIMENTAL MARK-IA DRIVER FUEL ELEMENT CLADDING FAILURES IN THE EXPERIMENTAL BREEDER REACTOR II

*N. J. Olson
C. M. Walter
W. N. Beck*

N. J. Olson (top) (PhD, metallurgy, Iowa State University, 1970), C. M. Walter (center) (PhD, materials science, Northwestern University, 1968), and W. N. Beck (bottom) (MS, physics, University of South Dakota, 1951) have been actively involved in the development of metallic fuels in the liquid-metal fast breeder reactor program, with special emphasis on maximizing the Experimental Breeder Reactor II driver fuel performance with high reliability. Current interests include fast reactor irradiation behavior of fuel and structural materials, and the application of statistics to reactor core qualification.

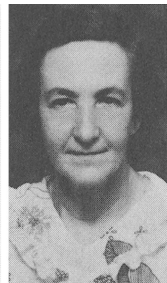


RADIOISOTOPES

COMPUTATIONAL EXPERIMENTS WITH A CALIFORNIUM-252 SOURCE FOR POSSIBLE USE IN NEUTRON RADIOGRAPHY

*D. Kedem
M. Lemanska*

Dan Kedem (left) (PhD, physics, Hebrew University, Jerusalem, 1971) is head of the NDT Department, Soreq Nuclear Research Center, Yavne, Israel. Miriam Lemanska received her PhD in reactor physics from the Israel Institute of Technology, Haifa, Israel, in 1967.

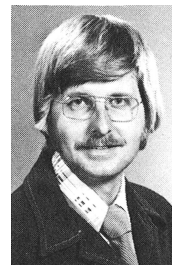


INSTRUMENTS

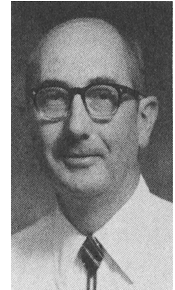
SOME STUDIES OF REFLECTOR CONSTRUCTION AND ELECTRONICS CONFIGURATIONS FOR OPTIMIZING PULSE-HEIGHT AND PULSE-SHAPE RESOLUTION IN ALPHA LIQUID-SCINTILLATION SPECTROMETRY

*John W. McKlveen
W. J. McDowell*

John W. McKlveen (BS, U.S. Naval Academy, 1965; ME(NE), 1971; PhD, nuclear engineering, University of Virginia, 1974) is a faculty member and Radiation Safety Officer and, in addition, is responsible for Radiation Research Laboratories at Arizona State University. His previous work included service in the Naval nuclear-powered submarine program and thesis research in the



area of liquid scintillation alpha-particle detection. His present research interests include liquid scintillation, environmental dosimetry, and fast-neutron activation analysis. W. J. McDowell (BS, chemistry, Tennessee Technological University, 1951; MS, inorganic chemistry, The University of Tennessee, 1954) did his graduate research in liquid ammonia chemistry. From 1951 to 1952 he was an analytical chemist at the U.S. Atomic Energy Commission's Oak Ridge Y-12 Plant. From 1954 to the present he has done research (both fundamental and process development) in separations chemistry at Oak Ridge National Laboratory, specializing in solvent extraction and ion exchange techniques.

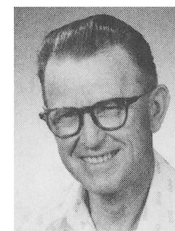
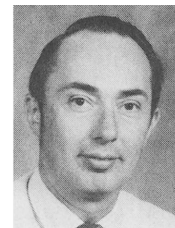


CHEMICAL PROCESSING

AN IN-LINE STATION FOR VOLUME CALIBRATION OF RASCHIG-RING-FILLED STORAGE TANKS FOR FISSILE SOLUTION

*Robert E. Rothe
Louis W. Doherty
A. L. Johnston*

Robert E. Rothe (top) (PhD, University of Wisconsin) joined the Nuclear Safety Group at Rockwell International's Rocky Flats (Colorado) Plant in 1964. He is a critical mass physicist and is also responsible for the enriched uranium solution used in experiments. Louis W. Doherty (center) (MS, University of Colorado) joined the same company in 1952 and has advanced to director of the Chemistry Standards and Calibration Laboratory. He is active on standards committees within the American National Standards Institute, the Institute of Nuclear Materials Management, and the American Society for Testing and Materials. A. L. Johnston (bottom) began his service at the Rocky Flats Plant in 1962, where he is presently a master technician in chemistry research and development.



TECHNIQUES

LABORATORY EXPERIMENTS TO CHECK COOLING TOWER COMPUTER MODELS

Heinrich Werle

Heinrich Werle (Dr. Ing., University of Karlsruhe, 1970) is a member of the Institute for Neutron Physics and Reactor Technology at the Nuclear Research Center Karlsruhe, Germany, where he is currently working on fast reactor safety.

