



AUTHORS — NOVEMBER 1975

REACTORS

A METHOD FOR OPTIMUM DETERMINATION OF ADJUSTABLE PARAMETERS IN THE BOILING WATER REACTOR CORE SIMULATOR USING OPERATING DATA ON FLUX DISTRIBUTION

*Takashi Kiguchi
Toshio Kawai*

Takashi Kiguchi (top) (MSc, nuclear engineering, Tokyo University, 1969) is a researcher for the Atomic Energy Research Laboratory, Hitachi, Ltd. He has been engaged in developing a boiling water reactor (BWR) core management system. His current interests include the flux synthesis method for fast breeder reactor calculation. Toshio Kawai (BSc, physics, Tokyo University, 1955) is a chief researcher for the Atomic Energy Research Laboratory, Hitachi, Ltd. He has been engaged in in-core fuel management optimization of the BWR. His current interests include in-core detector noise interpretation and two-phase hydraulic stability of the BWR.



SUBCOMPARTMENT ANALYSIS OF HIGH-ENERGY PIPE RUPTURES

*C. William Savery
Y. S. Huang
George M. Kowal*

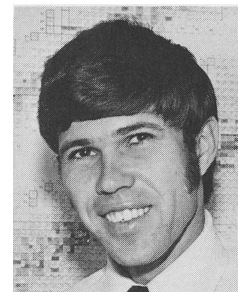
C. William Savery (top) (PhD, University of Wisconsin, 1969) worked at General Atomic from 1960 to 1966. Now an associate professor of mechanical engineering at Drexel University, he is engaged in teaching, nuclear reactor safety research, and consulting. Y. S. Huang (center) (PhD, Case Institute of Technology, 1971) is in the Nuclear and Safety Analysis Department at Gilbert Associates, Inc., where he is presently involved in the analysis of various hydrodynamic and thermal phenomena of nuclear power plant designs. George M. Kowal (bottom) (PE, MS, The Pennsylvania State University, 1964) is manager of the Nuclear and Safety Analysis Department at Gilbert Associates, Inc. The work he supervises includes nuclear safety, radiation protection, and other general analyses.



COMPUTER SIMULATION OF PULSED-NEUTRON EXPERIMENTS PERFORMED ON THE FORT ST. VRAIN HIGH-TEMPERATURE GAS-COOLED REACTOR

Wayne Pfeiffer

Wayne Pfeiffer (PhD, engineering science, California Institute of Technology, 1969) is manager of the Fuel Methods Department at General Atomic. His interests include methods development for reactor physics, engineering, and economics problems.



ANALYSIS AND RESULTS OF PULSED-NEUTRON EXPERIMENTS PERFORMED ON THE FORT ST. VRAIN HIGH-TEMPERATURE GAS-COOLED REACTOR

*W. Pfeiffer
J. R. Brown
A. C. Marshall*

Wayne Pfeiffer (center) (PhD, engineering science, California Institute of Technology, 1969) is manager of the Fuel Methods Department at General Atomic. His interests include methods development for reactor physics, engineering, and economics problems. James R. Brown (right) (PhD, physics, California Institute of Technology, 1951) is a senior staff reactor physicist at General Atomic. He is responsible for the startup physics testing of the Fort St. Vrain HTGR. He was previously responsible for several critical experiments, for neutron research experiments using pulsed-neutron techniques, and for startup physics testing of the Peach Bottom HTGR. Albert C. Marshall (left) (MS, nuclear engineering, The Pennsylvania State University, 1967) is cognizant engineer for the Fort St. Vrain Core Physics Section at General Atomic. His main interests are core physics design and analysis.

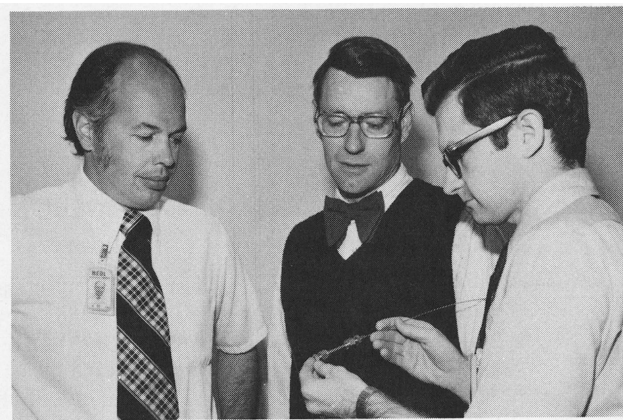


FUELS

MECHANICAL PROPERTIES OF UNIRRADIATED FAST REACTOR CLADDING DURING SIMULATED OVERPOWER TRANSIENTS

*C. W. Hunter
R. L. Fish
J. J. Holmes*

Clifford Hunter (center) (PhD, Lehigh University, 1968), senior scientist in the Mechanical Properties Section of Westinghouse Hanford Company, is responsible for the mechanical properties testing of fast reactor fuel pin cladding, with particular emphasis on properties for reactor transient analysis. Robert Fish (right) (MS, Oregon State University, 1969) is advanced engineer in the Mechanical Section of Westinghouse Hanford Company and is responsible for evaluating the effects of neutron irradiation on the tensile and transient mechanical properties of core structural materials. James Holmes (left) (MS, University of Washington, 1964) is manager of mechanical metallurgy at Westinghouse Hanford Company, and directs the experimental programs to determine the effects of fast reactor core environment on the mechanical properties of duct and cladding materials.



EFFECTS OF FISSILE ATOM SEGREGATION IN LIGHT WATER REACTOR PLUTONIUM RECYCLE FUELS

*R. O. Meyer
C. R. Hann
D. D. Lanning*

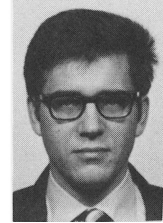
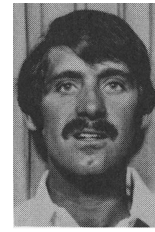
R. O. Meyer (left) (PhD, physics, University of North Carolina) is a reactor engineer for the U.S. Nuclear Regulatory Commission and is responsible for evaluating fuel performance of reactors involved in licensing actions. His previous laboratory experience includes measurement and analysis of plutonium segregation in liquid-metal fast breeder reactor fuels. C. R. Hann (center) (metallurgical engineering, South Dakota School of Mines and Technology) is a technical program leader at Battelle-Northwest for several research and development programs related to the safety and performance of light-water reactor nuclear fuel components. D. D. Lanning (right) (BA, physics, University of Oregon, 1967) has been involved with various aspects of reactor fuel design and development at Battelle-Northwest since 1967. Currently his interests include analysis of data on thermal properties and performance of fuel rods.



AN ASSESSMENT OF THE COOLANT VOIDING DYNAMICS FOLLOWING THE FAILURE OF PREIRRADIATED LMFBR FUEL PINS

*August W. Cronenberg
Michael A. Grolmes*

August W. Cronenberg (top) (PhD, nuclear engineering, Northwestern University, 1971) spent a year in the VISTA migrant worker program before returning to Argonne National Laboratory (ANL), where he worked on fluid dynamics and fuel-coolant-interaction problems in the Division of Reactor Analysis and Safety. In 1974 he joined the Chemical and Nuclear Engineering Department at the University of New Mexico. Michael A. Grolmes (PhD, mechanical engineering, Notre Dame University, 1968) has worked at ANL since 1968, specializing in areas of two-phase flow, heat transfer, and reactor safety. He is currently manager of the heat transfer and fluid dynamics program in ANL's Division of Reactor Analysis and Safety.

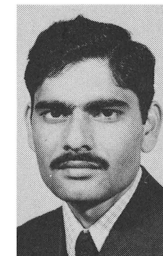


MATERIALS

PLUTONIUM TRIFLUORIDE AS A FUEL FOR MOLTEN SALT REACTORS—SOLUBILITY STUDIES

D. D. Sood (top left) (BSc, chemistry, Punjab, 1958) is currently responsible for the nonaqueous chemistry group in the Radiochemistry Division of the Bhabha Atomic Research Centre (BARC). He had one year of training in nuclear metallurgy at the Royal School of Mines, London, and participated in the molten salt breeder reactor development program at Oak Ridge National Laboratory for two years. P. N. Iyer (top right) (PhD, chemistry, Sheffield, 1965) is currently working on the fuel development and analysis of fuel materials. His previous experience includes high-temperature and x-ray studies on mixed oxides (with particular reference to protactinium) and molten salt chemistry. R. Prasad (second from top left) (MSc, chemistry, Allahabad, 1966) is currently working on thermodynamics of alloys and chlorination volatility studies. His previous interests include development of nonaqueous methods for fuel reprocessing and molten salt chemistry. V. N. Vaidya (second from top right) (MSc, chemistry, Kanpur, 1968) is currently working on the development of sol-gel process for fuel materials. He was an active member of the molten salt chemistry group at BARC. K. N. Roy (second from bottom left) (PhD, chemistry, Bombay, 1967) is currently working on actinide halides. His previous interests include chemical kinetics and molten salt chemistry. V. Venugopal (second from bottom right) (MSc, chemistry, Madras, 1970) is currently engaged in thermodynamic studies on actinides. He was an active member of the molten salt chemistry group at BARC. Z. Singh (bottom left) (BSc, chemistry, Meerut, 1969) is currently working on actinide halides. He was an active member of the molten salt chemistry group at BARC. M. V. Ramaniah (bottom right) (PhD, nuclear chemistry, Washington University, 1956) is head of the Radiochemistry Division at BARC. He is currently working on fission chemistry and chemistry of plutonium and other actinides.

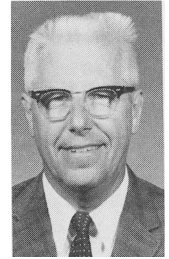
*D. D. Sood
P. N. Iyer
R. Prasad
V. N. Vaidya
K. N. Roy
V. Venugopal
Z. Singh
M. V. Ramaniah*



FAST- AND THERMAL-NEUTRON IRRADIATION AND ANNEALING OF Cu, Ni, Fe, Ti, AND Pd

James A. Horak (top) (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 CTR environment (radiation, temperature, stress, and chemical) on the mechanical and physical properties of materials that have potential utilization in CTRs. Thomas Hugh Blewitt (BS, Case Institute of Technology, 1950; BS, New York University, 1944; DS, physics, Carnegie Institute of Technology, 1950) has been a professor of materials engineering at the University of Illinois at Chicago Circle since 1965.

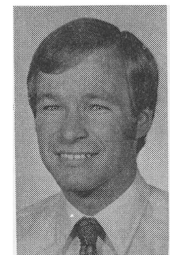
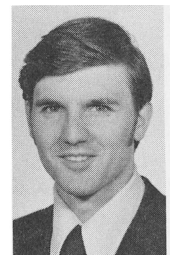
*J. A. Horak
T. H. Blewitt*



ANALYTICAL DETERMINATION OF NITRIDE NITROGEN IN LITHIUM COOLANTS

Richard J. Schlager (top) (BS, chemistry, Colorado School of Mines, 1974) is a graduate research assistant in the Department of Metallurgical Engineering, Colorado School of Mines. He is performing research in the field of liquid metal corrosion. David L. Olson (center) (PhD, materials science, Cornell University, 1970) is an associate professor of metallurgical engineering at the Colorado School of Mines. He is concerned with research in the areas of corrosion, reactive metals, and joining. Walter L. Bradley (bottom) (PhD, materials science, University of Texas, 1969) is an associate professor of metallurgical engineering at the Colorado School of Mines. He is involved with research in the areas of mechanical behavior of materials and phase transformations.

*R. J. Schlager
D. L. Olson
W. L. Bradley*

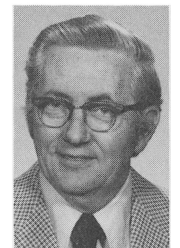


INSTRUMENTS

A GAMMA-RAY ABSORPTOMETER FOR NUCLEAR FUEL EVALUATION

James E. Ayer (top) (MS, chemical engineering, University of Maine, 1952) is a senior chemical engineer with the Division of Materials and Fuel Cycle Facility Licensing, U.S. Nuclear Regulatory Commission for the past 2½ years. He has worked as an environmental project manager involved with plutonium processing and fabrication plant reviews. Donald R. Schmitt, chief technician in the Plutonium Materials Fabrication Group of the Materials Science Division at Argonne National Laboratory, has supervised the technician force in the operation of a Plutonium Processing and Fabrication Facility in the development and manufacturing of plutonium-bearing fuel elements for nuclear reactor research for the past 15 years. Since 1951, he has been involved with the design, construction, and testing of the glove boxes and associated equipment for the facility and other projects.

*James E. Ayer
Donald R. Schmitt*



FAST-NEUTRON HODOSCOPE AT TREAT: DEVELOPMENT AND OPERATION

Alexander De Volpi (top left) (MS, nuclear engineering and physics, Virginia Polytechnic Institute, 1958; PhD, physics, Virginia Polytechnic Institute, 1967), hodoscope group leader, is a physicist with a reactor research background. He accepted a 2-year appointment at Argonne National Laboratory (ANL) in the Institute of Nuclear Science and Engineering, later transferring to Reactor and Applied Physics Research. His past research includes the neutron yield from ^{252}Cf . Ronald J. Pecina (top right) (BS, Illinois Institute of Technology, 1957) joined the ANL Electronics Division in 1958, and is presently the leader of the Digital Instruments and Systems Group. Robert T. Daly (center left) (MS, electrical engineering, University of Illinois, 1964) has been a member of the ANL Electronics Division for the past 11 years and is currently involved in development of multiwire proportioned counting systems and CAMAC data-acquisition systems. Dale J. Travis (center right) (De Vry Technical Institute, 1963) has been a member of the ANL Electronics Division for the past 11 years, specializing in digital electronics. Roy R. Stewart (bottom left) (MS, mechanical engineering, University of Illinois at Chicago) has worked in the Reactor Engineering and Reactor Analysis and Safety Divisions at ANL for the past 13 years as an assistant experimenter and fuel motion study analyst. Edgar A. Rhodes (bottom right) (MS, physics, Virginia Polytechnic Institute, 1965; PhD, physics, Florida State University, 1972) has research experience in solid-state and reactor physics. He joined the ANL staff in 1974 as member of the Hodoscope Group in the Reactor Analysis and Safety Division.

*A. De Volpi
R. J. Pecina
R. T. Daly
D. J. Travis
R. R. Stewart
E. A. Rhodes*



ANALYSIS

ANALYSIS OF GEOTHERMAL POWER PLANT WATER USING GAMMA RAYS FROM CAPTURE OF CALIFORNIUM-252 NEUTRONS

Dick Duffey (top) (BS, Purdue University; MS, University of Iowa; PhD, University of Maryland) is professor of nuclear engineering at the University of Maryland. Following work with the U.S. Atomic Energy Commission as a nuclear engineer in Washington, D.C. and Hanford, Washington, he started the nuclear engineering program at the University in 1954 and established the nuclear reactor project there in 1957, serving as nuclear reactor director through 1967. His technical interests are nuclear reactor design, construction, and operation, and neutron uses. John P. Balogna (center) (AB, analytical chemistry, radiochemistry, Holy Cross College, Colorado, 1941; University of Colorado, 1942-1943) is currently with the Los Alamos Scientific Laboratory. His technical interests include design of ultra-low-level gas-filled proportional counters and fission fragment energy measurements. Peter F. Wiggins (bottom) (B Mar E, State University of New York Maritime College; MME, New York University; PhD, University of Maryland)

*Dick Duffey
J. P. Balogna
Peter F. Wiggins*

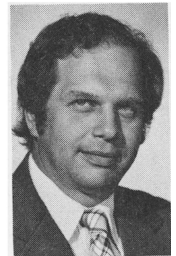


is chairman of the Naval Systems Engineering Department at the U.S. Naval Academy. He is a registered professional engineer in the State of Maryland and was a National Science Foundation Fellow. His current interests are reactor design and analysis, and engineering applications of neutron sources.

MEASUREMENT OF TRANSURANIC SOLID WASTES AT THE 10 nCi/g ACTIVITY LEVEL

C. John Umbarger (top) (PhD, physics, Florida State University) is a staff member at the Los Alamos Scientific Laboratory (LASL). The work presented here was completed while he was a member of the Nuclear Analysis Research Group. He is presently working in the Biophysics and Instrumentation Group at LASL. His current research interests include trace element analysis of environmental and biological materials as well as *in vivo* lung counting for plutonium workers. Leo R. Cowder is a senior technologist in the LASL Nuclear Analysis Research Group. His current responsibilities include design and implementation of nondestructive assay instrumentation for nuclear materials found in the nuclear fuel cycle.

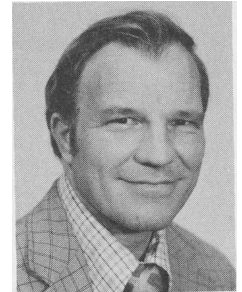
*C. J. Umbarger
L. R. Cowder*



THERMAL-NEUTRON FLUX DISTRIBUTION IN CUBICAL CAVITIES FROM AN ISOTOPIC NEUTRON SOURCE

John Bartko (PhD, nuclear physics, The Pennsylvania State University, 1966) is a Fellow Scientist at the Westinghouse Research Laboratories, Pittsburgh, Pennsylvania. He has conducted studies on the radiation effects in materials and semiconductor devices and projects involving beneficial uses of radiation. He is currently investigating a neutron activation technique for detecting explosives.

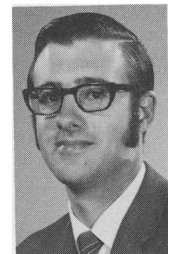
John Bartko



THE INFLUENCE OF NONSTATISTICAL VARIATIONS ON LOW-LEVEL MEASUREMENTS OF ¹³¹I IN MILK

John M. Matuszek (top) (BS, chemistry, Worcester Polytechnic Institute, 1957; PhD, nuclear chemistry, Clark University, 1962) is director of the Radiological Sciences Laboratory. Present research programs include the investigation of ¹²⁹I releases from nuclear fuel reprocessing plants, characterization of liquid and gaseous effluents from nuclear facilities, and the development of ultra-low-level radioanalytical methods. Carl J. Paperiello (BA, physics, LaSalle College, 1964; PhD, nuclear physics, University of Notre Dame, 1970), research scientist in charge of the Counting Group at the Radiological Sciences Laboratory, is responsible for the radioactivity measurements performed on all routine and research samples at the Laboratory. His research interests include the use of low-background internal gas-proportional counters for measurements of radiogases, analysis of ¹²⁹I, and the application of β - γ coincidence counting to ultra-low-level radiochemical measurements for ¹³⁵Xe and ¹³¹I.

*J. M. Matuszek
C. J. Paperiello*



A FAST-RESPONSE THERMOCOUPLE FOR TEMPERATURE FLUCTUATION MEASUREMENTS IN SODIUM COOLANTS

H. Bunschi
W. Seifritz

H. Bunschi (top) (Diploma, mechanical engineering, Swiss Federal Institute of Technology, Zürich, 1971) has investigated the behavior of temperature fluctuations in liquid sodium since 1971 at the Swiss Federal Institute for Reactor Research at Würenlingen. In 1975 he joined the Institute for Reactor Technology of the Swiss Federal Institute of Technology. W. Seifritz (PhD, nuclear engineering, Technical University, Karlsruhe, 1969; Habilitation, reactor technology, Technical University, Hannover, 1972) worked from 1964 to 1969 at the Kernforschungszentrum Karlsruhe. He has more than 10 years of experience in the experimental and theoretical aspects of reactor noise analysis.

