



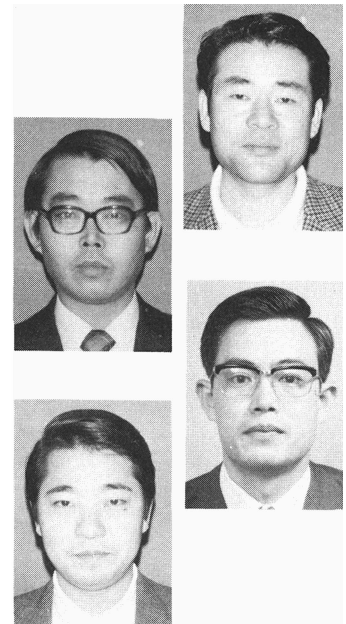
## AUTHORS – NOVEMBER 1979

### REACTORS

#### A NEW EXPRESSION OF FEW-GROUP NUCLEAR CONSTANTS FOR ANALYZING LIGHT WATER REACTOR CORES

**Yoshitaka Naito** (top right) (BS, physics, University of Kyoto, 1962) is a senior engineer at the Japan Atomic Energy Research Institute and has worked on the development of the core analysis system for light water reactors (LWRs). His current interest is in burnup calculation. **Masahiro Mimura** (top left) (MS, mechanical engineering, Tokyo Institute of Technology, 1970) is a senior research engineer at Central Research Institute of Electric Power Industry and has worked on the development of the core management system for LWRs. His current interest is in burnup calculation. **Masao Toba** (bottom right) (MS, electrical engineering, Tokyo Institute of Technology, 1965) is a chief engineer at Nuclear Fuel Industries, Ltd. His current interest is in the field of safety analyses of pressurized water reactors. **Ryoich Onuki** (bottom left) (BS, nuclear engineering, Tokai University, 1969) is a lead engineer at Japan Atomic Power Company and has worked on the development of the core design system for LWRs. He is currently engaged in the core management of the Tokai-II nuclear power station.

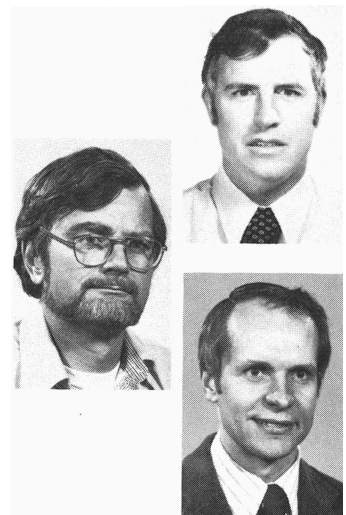
*Y. Naito  
M. Mimura  
M. Toba  
R. Onuki*



#### CORRELATION OF THE CESIUM-134/CESIUM-137 RATIO TO FAST REACTOR BURNUP

**John R. Phillips** (top) (PhD, chemistry, University of New Mexico, 1973) is a member of the International Safeguards Group at Los Alamos Scientific Laboratory (LASL), working on the research and development of nondestructive techniques for the characterization of irradiated materials. **Barry K. Barnes** (center) (PhD, physics, Rice University, 1965) has worked in research and the teaching of nuclear physics and nuclear engineering at the U.S. Army Nuclear Defense Laboratory, the University of Lowell, and LASL. He is currently involved in liquid-metal fast breeder reactor fuel pin development as the section leader of the gamma-ray scanning section of the Materials Science Division at LASL. **Thomas R. Bement** (bottom) (PhD, statistics, Kansas State University, 1972) is employed in the Statistics Group at LASL and has been actively involved in the analysis of nondestructive measurements for the past three years.

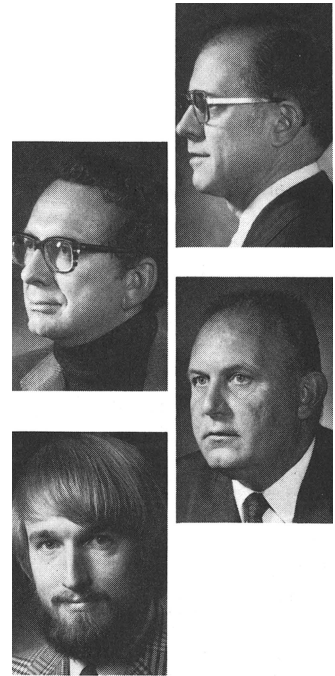
*John R. Phillips  
Barry K. Barnes  
Thomas R. Bement*



**MOLTEN-SALT REACTORS FOR EFFICIENT NUCLEAR FUEL UTILIZATION WITHOUT PLUTONIUM SEPARATION**

**J. R. Engel** (top right) (BS, chemical engineering, University of Toledo, 1953; OSORT, 1954) is a member of the Engineering Technology Division at Oak Ridge National Laboratory (ORNL). He has been involved in the development and evaluation of fluid-fuel reactors for a number of years. **W. A. Rhoades** (top left) (BS, engineering physics, University of Illinois, 1956; MS, engineering, University of California, Los Angeles, 1966) has been at ORNL since 1971 and is currently in the Engineering Physics Division. His major activities are in improved methods for neutron/photon transport calculations. **W. R. Grimes** (bottom right) (AB, Wabash College, 1940; MS, Purdue University, 1942) was associated for nearly 25 years with behavior of molten salts as nuclear reactor fluids. He is presently a staff member of the Chemical Technology Division of ORNL, where his primary interest is in basic research in support of the U.S. Department of Energy Fossil Fuels Program. **J. F. Dearing** (bottom left) (BS, astrophysics, University of Wisconsin, 1970; MS, nuclear engineering, University of Wisconsin, 1976) is in the Engineering Technology Division at ORNL. His primary interest is computational simulation of reactor core thermal-hydraulics under normal and off-normal conditions.

*J. R. Engel  
W. A. Rhoades  
W. R. Grimes  
J. F. Dearing*



**A SIMPLIFIED INTERASSEMBLY HEAT TRANSFER MODEL FOR THE ANALYSIS OF LIQUID-METAL FAST BREEDER REACTOR CORE RESTRAINT SYSTEMS**

**Jim P. Wei** (PhD, mechanical engineering, University of Maryland, 1972) worked on liquid-metal fast breeder reactor thermal-hydraulics and safety at the General Electric Company Advanced Reactor Systems Department. His current interests are in fluid flow and heat transfer associated with fast breeder reactor performance and safety.

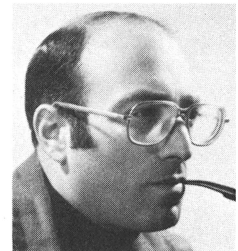
*Jim P. Wei*



**A METHOD FOR REFUELING LIGHT WATER REACTORS WITH NATURAL URANIUM**

**Yigal Ronen** (BSc, mechanical engineering, Technion, Israel, 1965; MSc, nuclear engineering, Technion, Israel, 1967; PhD, nuclear engineering, Cornell University, 1970) is the head of the Nuclear Engineering Department at Ben-Gurion University of the Negev, Beer-Sheva, Israel. His main interests lie in reactor theory and transport theory.

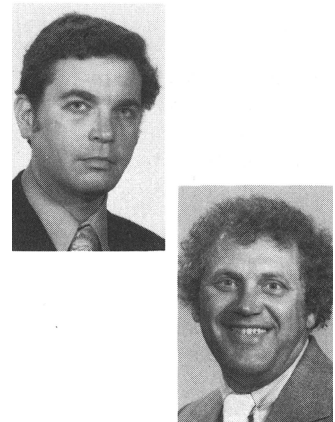
*Yigal Ronen*



**POWER SUPPLY REQUIREMENTS FOR A TOKAMAK FUSION REACTOR**

**Jeffrey N. Brooks** (top) (PhD, electrical engineering, New York University, 1972) is a staff member in the Fusion Power Program at Argonne National Laboratory (ANL). He has been involved in various aspects of fusion plasma engineering and tokamak reactor design studies. He is also the principal investigator on a project to define the power supply requirements for fusion reactors. **Robert L. Kustom** (PhD, electrical engineering, University of Wisconsin) is presently deputy director of the Accelerator Research Facilities Division at ANL. His principal activities include the duties of manager of accelerator systems for the Intense Pulsed Neutron Source Program, and principal investigator on the Pulsed Coil/Energy Storage and Transfer Program.

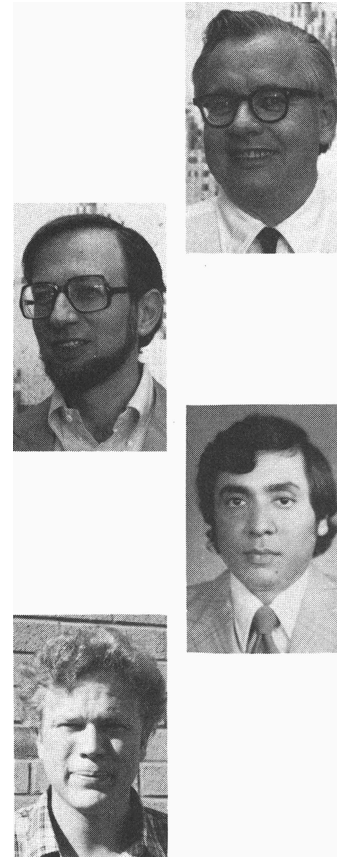
*Jeffrey N. Brooks  
Robert L. Kustom*



### SENSITIVITY OF NUCLEAR FUEL CYCLE COST TO UNCERTAINTIES IN NUCLEAR DATA

**Donald R. Harris** (top right) [BS, physics, MS, mathematics, 1949, Carnegie Mellon University; MA, physics, Princeton University, 1953; PhD, nuclear engineering, Rensselaer Polytechnic Institute (RPI), 1976] is an associate professor of nuclear engineering at RPI. His interests include reactor core analysis, transport methods, nuclear data, shielding, and criticality safety. He was formerly at Bettis Atomic Power Laboratory, where he was a fellow scientist, and at Los Alamos Scientific Laboratory, where he was leader of the Nuclear Data Group from 1971 to 1975. **Martin Becker** (top left) (BEngSci, New York University, 1960; SM, 1962, PhD, 1964, Massachusetts Institute of Technology) is professor of nuclear engineering and director of the Center for Technology Assessment at RPI. His current research activities include nodal analysis, fuel cycles, fast reactor theory, thermal-hydraulic stability, and evaluation of energy alternatives. He is a Fellow of the American Nuclear Society and a senior member of the Institute for Electrical and Electronics Engineers. He serves as a consultant to a number of organizations. **Ansar Parvez** (bottom right) (BS, physics/mathematics, Punjab University, 1967; MS, physics, Punjab University, 1969; MS, nuclear technology, Islamabad University, 1971; PhD, nuclear engineering, RPI) is presently with the Centre for Nuclear Studies at the Pakistan Institute of Nuclear Science and Technology. **John M. Ryskamp** (bottom left) (BS, 1976, ME, 1976, PhD, 1979, nuclear engineering, RPI) worked on sensitivity analysis, neutron thermalization, and fuel depletion as a graduate student. He is currently working in the Reactor Physics Division of EG&G at the Idaho National Engineering Laboratory.

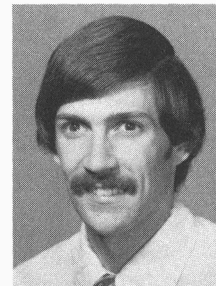
*D. R. Harris  
M. Becker  
A. Parvez  
J. M. Ryskamp*



### AN AUTOMATED GRAVIMETRIC TITRATOR FOR THE DETERMINATION OF URANIUM IN SAFEGUARDS MATERIALS

**Bruce W. Moran** (BS, chemistry, Allegheny College, 1974; MA, education, 1975), a chemist at the New Brunswick Laboratory at Argonne, Illinois, is involved in the precise and accurate analysis of uranium-bearing materials, in the automatization of uranium analytical procedures, and in the development and evaluation of new uranium analytical procedures.

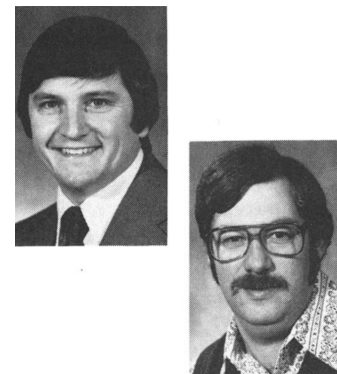
*Bruce W. Moran*



### COMPARISON OF ANION EXCHANGE RESINS FOR RECOVERING PLUTONIUM FROM NITRIC ACID WASTE

**J. D. Navratil** (top) (PhD, chemistry, University of Colorado, 1975) is presently a staff member at the International Atomic Energy Agency, Vienna, in the Research and Laboratories Division, on leave from Rockwell International. His work has been in actinide chemistry and separations, analytical chemistry, chemical thermodynamics, and americium and plutonium processing. **L. L. Martella** (BA, education, University of Northern Colorado, 1970) has worked at Rockwell International Rocky Flats Division since 1971 in chemical research and development. His work has been in actinide separations, recovery, and purification as well as processing.

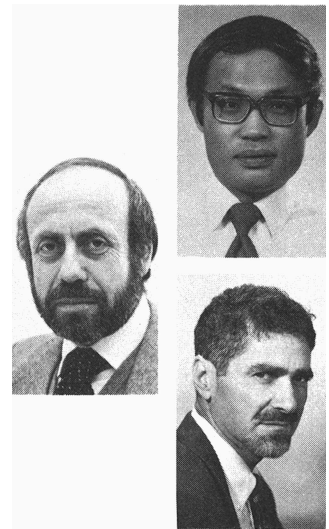
*J. D. Navratil  
L. L. Martella*



**THE EFFECT OF SOLID FISSION PRODUCTS AND DISLOCATIONS ON OXIDE FUEL ELEMENT BEHAVIOR IN FAST OVERPOWER TRANSIENTS**

*Shan Heng Chien  
A. R. Wazzan  
D. Okrent*

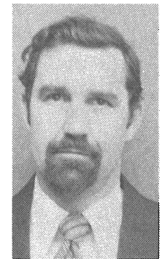
**Shan Heng Chien** (top) [BS, National Tsing Hua University; MS, nuclear engineering, University of California, Los Angeles (UCLA), 1977] is a PhD candidate in the Nuclear Engineering Department at UCLA. His current research interests include grain boundary bubble effects during a reactor transient. **A. R. Wazzan** (center) (PhD, engineering science, University of California, Berkeley, 1963) is a professor in the Department of Chemical, Nuclear and Thermal Engineering at UCLA. His current fields of interest include fuel element modeling and laminar boundary layers. **D. Okrent** (bottom) (PhD, physics, Harvard University, 1951) is a professor in the Department of Chemical, Nuclear and Thermal Engineering at UCLA. His current fields of interest include nuclear fuel element behavior, reactor safety, and risk-benefit.



**RADIATION-INDUCED OUTGASSING FROM TYPE 304 STAINLESS STEEL**

*T. P. Toepker  
J. N. Anno*

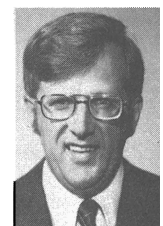
**T. P. Toepker** (top) (BS, physics, 1961, MEd, 1964, MS, physics, 1968, Xavier University; PhD, nuclear engineering, University of Cincinnati, 1978) is chairman of the Physics Department at Xavier University. He has taught nuclear physics and has directed the undergraduate nuclear laboratory at Xavier for nine years. In addition to his interests in nuclear physics, he has interests in holographic techniques for stress analysis. **J. N. Anno** (BS, 1955, MS, 1961, PhD, 1965, physics, The Ohio State University) is a professor of nuclear engineering and director of the Laboratory of Basic and Applied Nuclear Research at the University of Cincinnati. He was employed by Battelle Memorial Institute from 1953 to 1970, where he spent a large portion of his time in nuclear-oriented research, including six years as operating supervisor of the Battelle Research Reactor. Since 1970, he has been engaged in teaching and research at the University of Cincinnati, with special interests in fission and fusion reactors.



**OBSERVATIONS OF DILATION AND BOWING IN EXPERIMENTAL BREEDER REACTOR II DUCTS AND CLADDING**

*L. C. Walters  
C. M. Walter*

**Leon C. Walters** (right) (BS, 1961, MS, 1963, and PhD, 1966, metallurgical engineering, Purdue University) was named associate director of the Fuels and Materials Department of the Argonne National Laboratory (ANL) Experimental Breeder Reactor II (EBR-II) Project in Idaho in May 1978. His responsibilities include the manufacture and performance of the fuels and materials in the EBR-II and nondestructive testing programs on ex-core components. In addition, he is manager of



ANL's interdivisional National Cladding/Duct Materials Development Program. **C. M. "Mon" Walter** (BS, metallurgical engineering, University of Washington, 1960; MS, 1966, PhD, 1968, materials science, Northwestern University) was a staff member of ANL's Materials Science Division from 1960 to 1968, when he joined the EBR-II Project in Illinois and later moved to its Idaho location. His special interests included the properties and in-reactor performance of fast reactor fuels and cladding materials and diffusion in materials. He was associate director of the Project's Fuels and Materials Department at the time of his death in April 1978.

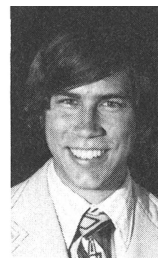


## ISOTOPES SEPARATION

### DYNAMICS AND CONTROL OF A PACKED DISTILLATION COLUMN FOR THE ISOTOPIC ENRICHMENT OF PLASMA EXHAUSTS FROM CONTROLLED THERMONUCLEAR REACTORS

**James F. Davis** (top right) (MS, chemical engineering, Northwestern University, 1978) is presently a PhD candidate at Northwestern University. His research involves both simulation and experimentation with schemes for energy efficiency enhancement in distillation. From 1974 to 1976, he was a research engineer with Amoco Chemicals, where he was involved with the production of terephthalic acid. **Richard S. H. Mah** (top left) (PhD, chemical engineering, Imperial College of Science & Technology, 1961) is a professor of chemical engineering, Northwestern University. He has published more than 30 papers and one monograph, and pioneered many of the developments in computer-aided process design, including automatic program generation, sparse computation, interactive synthesis, and SRV distillation. **William F. Stevens** (center right) (PhD, chemical engineering, University of Wisconsin, 1949) is the chairman of the Department of Chemical Engineering at Northwestern University, where he has taught for over 25 years. His primary research and teaching activities have been in the areas of process control, process optimization, and computer applications. In addition to his academic endeavors, he has served as a consultant and has spent several summers on full-time industrial assignments. **Balabhadra Misra** (bottom left) (PhD, chemical engineering, Columbia University, 1957) is an engineer at Argonne National Laboratory (ANL). He has in the past conducted calculational and experimental studies of heat transfer and fluid flow in conjunction with the space program, the liquid-metal fast breeder reactor program, and, more recently, the controlled nuclear fusion program. His current research activities involve the development of purification methods for liquid sodium based on the use of packed distillation columns. **Victor A. Maroni** (bottom right) (PhD, chemistry, Princeton University, 1967) is a chemist at ANL and is presently leader of the Fusion Reactor Research Group in the Chemical Engineering Division. His present activities include work on liquid lithium processing technology, hydrogen isotope permeation through metals, and tritium handling and containment technology for fusion reactors.

*James F. Davis  
Richard S. H. Mah  
William F. Stevens  
Balabhadra Misra  
Victor A. Maroni*



NUMERICAL SIMULATION OF THE BANE BERRY EVENT

**Robert W. Terhune** (top right) (MS, applied science, University of California, Davis, 1967) is currently a group leader in Applied Physics, Earth Sciences Division, Lawrence Livermore Laboratory (LLL). His areas of expertise are continuum mechanics, rock mechanics, and evaluating the response of geologic structures to explosions to assure containment of radioactive matter after underground nuclear detonations. His current interests are rock rubbleization and *in situ* mining operations. **H. David Glenn** (top left) (PhD, Washington State University, 1966) is a physicist at LLL. His recent research interests include high energy gas propagation, constitutive relations for geologic materials, and numerical simulation of explosive phenomenology. **Donald E. Burton** (center right) (PhD, Kansas State University, 1969) is currently group leader for code development at LLL in the Earth Sciences Division, where he has worked since 1973. His interests include shock physics, continuum mechanics, rock mechanics, numerical modeling, and computer science. He has done extensive numerical work on underground and impact cratering, containment of debris from underground nuclear testing, and explosive fracture enhancement for *in situ* coal gasification. **H. Lawrence McKague** (bottom left) (PhD, Pennsylvania State University, 1964) joined the LLL Nuclear Containment Program in 1972. Prior to that, he was assistant professor of geology at Rutgers University. His current interests are modeling the response of geologic media to nuclear explosions; the geologic, geochemical, and geophysical characterizations of nuclear test sites; and the mineralogy of zeolite minerals and geologic history of Yucca Flats. **John T. Rambo** (bottom right) (BA, economics, 1959; BS, physics, 1962, University of Portland) joined LLL in 1963, where he worked on shock wave measurements for nuclear explosives and on geophysics programs. More recently he has worked with one- and two-dimensional applied calculations of shock-induced phenomenology related to underground nuclear detonations. His attention is now focused on econometric calculations of the energy sector of the U.S. economy.

*R. W. Terhune  
H. D. Glenn  
D. E. Burton  
H. L. McKague  
J. T. Rambo*

