



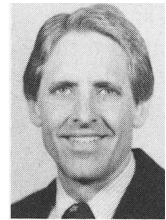
## AUTHORS — OCTOBER 1987

### FISSION REACTORS

#### AN APPROACH FOR INTEGRATING PLANT OPERATIONS AND MAINTENANCE INFORMATION WITH SYSTEM RELIABILITY ANALYSIS

**Edmund T. Rumble** (top) (PhD, University of California, Los Angeles, 1974) is a corporate vice president at Science Applications International Corporation. He has worked on risk assessment and reliability studies of nuclear and fossil power plants, as well as software programs to support these activities. **Boyer B. Chu** (PhD, mechanical engineering, University of Wisconsin, Madison) has worked for Westinghouse Research and Development (R&D) Center and United Gulf Nuclear Fuel Corporation. Since 1974, he has been a project manager in the safety technology department of the Nuclear Power Division, Electric Power Research Institute. He is responsible for developing and managing many probabilistic risk assessment and system reliability methodology R&D activities.

*Edmund T. Rumble  
Boyer B. Chu*



#### THE MULTISPECTRUM HIGH CONVERTOR WATER REACTOR

**Yigal Ronen** (top) (BS, mechanical engineering, and MS, nuclear engineering, Technion-Israel Institute of Technology, 1967; PhD, nuclear engineering, Cornell University, 1970) is professor of nuclear engineering at Ben-Gurion University (BGU). His research interests include advanced concepts of nuclear reactors and problems in uncertainty analysis. **Melvin J. Leibson** (MS, chemical engineering, Syracuse University, 1956) is a research associate at BGU. Since 1983 he has worked on many aspects of tight-lattice advanced pressurized water reactor designs. Prior to his affiliation with BGU, he worked at Alco Products, Inc. on small military reactor power plants, and for over 20 years at the Knolls Atomic Power Laboratory in the field of shielding design and radiation protection.

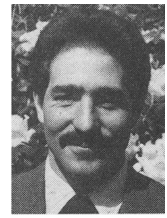
*Yigal Ronen  
Melvin J. Leibson*



## A RESONANT CAVITY LEVEL MEASUREMENT TECHNIQUE FOR USE WITH GAS ENHANCEMENT MODULES IN LIQUID-METAL REACTORS

**Douglas R. Smith** (top) (MS, nuclear engineering, University of Washington, 1986; BS, mechanical engineering, University of Washington, 1985) is an engineer for the Boeing Company. He has worked in reactor operation and as a radar technician for the U.S. Navy. **Robert W. Albrecht** (PhD, nuclear engineering, University of Michigan, 1961) is a professor of nuclear and electrical engineering at the University of Washington. He is involved in reactor dynamics and reactor noise in the nuclear engineering field and signal processing in electrical engineering.

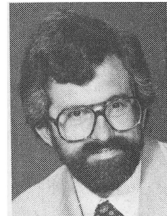
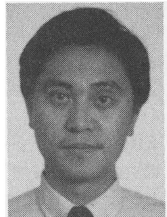
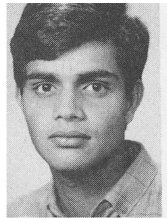
*Douglas R. Smith  
Robert W. Albrecht*



## PRELIMINARY ANALYSIS OF A SMALL, INHERENTLY SAFE BOILING WATER REACTOR

**Sreenivas Jayanti** (top right) [B. Tech., mechanical engineering, Institute of Technology, Banaras Hindu University, Varanasi, India, 1984; MS, nuclear engineering, The Ohio State University (OSU), 1986] is currently studying for a Diplôme d'Etudes Approfondies at the Institut National Polytechnique de Grenoble, France. His primary areas of interest are convective heat transfer, thermal hydraulics, and two-phase flows. **Richard N. Christensen** (top left) (BS, physics, Brigham Young University, 1968; MS, mechanical engineering, and PhD, nuclear engineering, Stanford University) is currently an associate professor in the nuclear engineering program at OSU. His current research areas include enhanced heat transfer, two-phase flow and heat transfer, condensation in the presence of a noncondensable, heat transfer in nuclear waste repositories, and inherently safe reactors. **Nancy Yost** (no photo available) (BS, mechanical engineering, OSU; MS, nuclear engineering, OSU, 1986) is currently at OSU. Her research interests are heat transfer and waste disposal. **Chris Wang** (center right) is currently a PhD student at OSU. His primary areas of interest are radiation dosimetry and radiation detection and measurement. **David van Deusen** (bottom left) (BS, mechanical engineering, OSU; MS, nuclear engineering, OSU, 1985) is currently working at American Electric Power, Columbus, Ohio. His research interests include condensation in the presence of noncondensables and inherently safe reactors. **Don W. Miller** (bottom right) (BS, physics, Miami University, 1964; PhD, nuclear engineering, OSU, 1971) is currently a professor and chairman of the nuclear engineering program at OSU. His primary areas of interest are nuclear instrumentation, measurement, control, and application of artificial intelligence in nuclear engineering.

*Sreenivas Jayanti  
Richard N. Christensen  
Nancy Yost  
Chris Wang  
David van Deusen  
Don W. Miller*

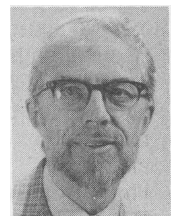


## NUCLEAR SAFETY

## DISTRIBUTIONS FOR BINOMIAL FAILURE RATE PARAMETERS

**Corwin L. Atwood** (PhD, mathematics, Cornell University, 1968) is employed by EG&G Idaho, Inc. as a statistician at the Idaho National Engineering Laboratory. His interests include common cause failures, uncertainty analyses of computer codes, data analysis, and statistical computing. From 1967 to 1977, he taught statistics at several universities.

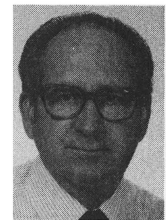
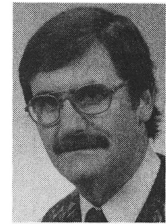
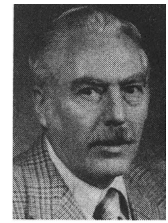
*Corwin L. Atwood*



## CRITICAL EXPERIMENTS USING HIGH-ENRICHED URANYL NITRATE WITH CADMIUM ABSORBER

**Raymond C. Lloyd** (top right) (MS, physics, South Dakota State University, 1951) is a staff scientist at the Pacific Northwest Laboratory (PNL). He has 35 years' experience in critical experiment work and nuclear criticality safety at Hanford and is the author or co-author of numerous publications in these areas of research. He is currently performing criticality studies on plutonium and Pu + U mixtures at the Critical Mass Laboratory of PNL to provide data for nuclear safety guidance in handling these materials. **E. Duane Clayton** (top left) (PhD, physics, University of Oregon, 1952) is a senior staff scientist at PNL. He has 36 years' experience in the nuclear field at Hanford, which includes experimental reactor physics, critical experiment work, criticality research and analysis, and nuclear criticality safety. He placed the Critical Mass Laboratory of PNL in operation in 1961 and was manager of this facility until 1984. He now serves as technical coordinator for criticality research programs at PNL. **Robert E. Wilson** (center right) (PhD, nuclear engineering, University of Washington, Seattle, 1974) joined the Idaho Chemical Processing Plant (ICPP) as manager of criticality safety in 1975. His interests include critical mass physics, benchmark critical experiments, and safety analysis. He previously worked for Westinghouse-Hanford in fast reactor safety analysis. **Robert C. McBroom** (bottom left) (PhD, nuclear physics, University of Florida, 1976) is an engineer with Westinghouse Idaho Nuclear Company at the ICPP. He is responsible for criticality safety analysis of process systems and implementation of analysis methods. He joined the staff of the ICPP in 1981, moving from GA Technologies, Inc., where he held a similar position in the high-temperature gas-cooled reactor fuel manufacturing plant. **Robert R. Jones** (bottom right) (graduate, Ricks College, 1947) has worked for 32 years at the Idaho National Engineering Laboratory, the past 12 years as a nuclear criticality safety engineer.

*Raymond C. Lloyd  
E. Duane Clayton  
Robert E. Wilson  
Robert C. McBroom  
Robert R. Jones*

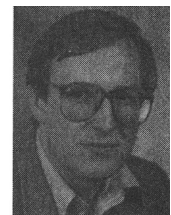


## RADIOACTIVE WASTE MANAGEMENT

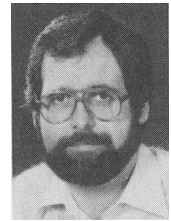
### SAFETY ANALYSES AND DERIVATION OF SITE-SPECIFIC REQUIREMENTS ON RADIOACTIVE WASTE FOR THE PLANNED GERMAN REPOSITORY "KONRAD"

**Heinz Peter Berg** (top) [PhD, theoretical physics, Technical University of Clausthal, Federal Republic of Germany (FRG), 1980] worked from 1980 to 1983 in the fields of atomic and reactor physics. He joined the Federal Institute of Physics and Technology (PTB), Braunschweig, in 1983. He is responsible for incident analyses in the operational phase and for criticality calculations of repositories for radioactive waste. **Dietrich Ehrlich** (center) (PhD, experimental physics, University of Göttingen, FRG, 1967) worked from 1967 to 1978 at Ludwig-Maximilian University, Munich, in the field of experimental low-energy nuclear physics. He joined PTB in 1978, where a new division for management of nuclear waste disposal had been founded. He was responsible for radiation protection and for radiological safety analysis of normal operation of disposal facilities. **Heinrich Illi** (bottom) (PhD, physical chemistry, Technical University of Braunschweig, FRG, 1972) worked in the fields of physical

*Heinz Peter Berg  
Dietrich Ehrlich  
Heinrich Illi  
Bruno R. Thomauske*



chemistry and chemical technology at several universities after completing his studies of geophysics. He joined PTB in 1978, where he is now responsible for safety analysis and research and development of repositories for radioactive waste. **Bruno R. Thomauske** (right) (PhD, experimental physics, Albert-Ludwig University, Freiburg/Brg., FRG, 1983) has worked at PTB since 1983 in the fields of safety analyses in the operational phase and radiation protection.

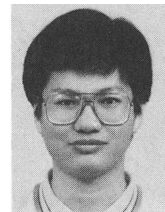


## HEAT TRANSFER AND FLUID FLOW

### NUMERICAL INVESTIGATION OF FLUID AND THERMAL MIXING DURING HIGH-PRESSURE INJECTION

**Tzing-Shenq Horng** (top) [BE, nuclear engineering, 1983, National Tsing Hua University (NTHU), Taiwan] is a PhD candidate in the Department of Nuclear Engineering, NTHU. His research interests include numerical simulation of turbulent flow, reactor thermal hydraulic analysis, and reactor safety. **Cheng-Chang Chieng** (PhD, Virginia Polytechnic Institute and State University, 1974) is a professor in the Department of Nuclear Engineering at NTHU. She is interested in applications of turbulence modeling in many areas, computational fluid dynamics, and reactor safety.

*Tzing-Shenq Horng  
Cheng-Chang Chieng*

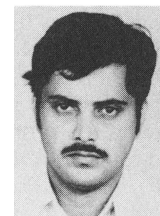


## CHEMICAL PROCESSING

### DISSOLUTION OF $\text{PuO}_2$ IN $\text{HNO}_3$ - $\text{HF}$ - $\text{N}_2\text{H}_4$ MEDIUM

**Mrs. Abdul Majeed Shakila** (top right) (MSc, chemistry, Bombay University, India, 1982) joined the Bhabha Atomic Research Centre (BARC), Bombay in 1981. She has been working in the radiochemistry program of the Indira Gandhi Centre for Atomic Research (IGC) since 1983. **Thandangorai Ganapathi Srinivasan** (top left) (BSc, chemistry, Madras University, India, 1972) joined BARC in 1973. He was a member of the Fuel Reprocessing Division at BARC until 1982 when he transferred to IGC. **Kanwal Nain Sabharwal** (bottom right) (MSc, chemistry, Delhi University, India, 1979) joined BARC in 1981. He has been with IGC since 1982. **Polur Rangarao Vasudeva Rao** (bottom left) (BSc, chemistry, Madras University, India, 1972; PhD, chemistry, Bombay University, India, 1979) joined BARC in 1972. He worked in the Radiochemistry Division at BARC until 1978 when he transferred to IGC. All the authors are presently engaged in studies on process chemistry problems relevant to fast reactor fuel reprocessing.

*Mrs. Abdul Majeed  
Shakila  
Thandangorai Gana-  
pathi Srinivasan  
Kanwal Nain  
Sabharwal  
Polur Rangarao  
Vasudeva Rao*



**MEASUREMENT OF VELOCITY PROFILE OF MERCURY  
FLOW BY ULTRASOUND DOPPLER SHIFT METHOD***Yasushi Takeda*

**Yasushi Takeda** (PhD, nuclear engineering, Tohoku University, Japan, 1980) formerly worked at Tohoku University. He transferred to the Swiss Institute for Nuclear Research in 1981 and joined the spallation neutron source project. There he has been in charge of research and development of the liquid-metal target. His current interests are heat transfer and fluid flow on the natural convection in an enclosure.

