

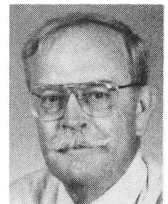
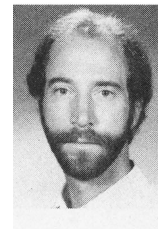
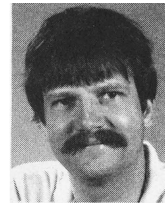
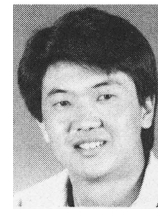
## AUTHORS — DECEMBER 1987

### FISSION REACTORS

#### A REMOTE MAINTENANCE ROBOT SYSTEM FOR A PULSED NUCLEAR REACTOR

**William M. Davidson** (top right) (BS, electrical engineering, Missouri Institute of Technology, 1979) has worked at Sandia National Laboratories (SNL) since 1979. His interests are in real-time computer control and computation and real-time operating systems. **Alan K. Morimoto** (top left) (MS, mechanical engineering, University of New Mexico, 1984) is currently working at SNL as a mechanical design engineer in robotics. His interests are in design and implementation of miniature and large assembly mechanical components for robot systems. **Mary M. Moya** (center right) (MS, electrical engineering, Stanford University, 1980) is a member of the technical staff at SNL and a PhD candidate in the Department of Electrical Engineering at the University of New Mexico. Her research interests include sensor development, signal processing, and intelligent control for robotic systems. **J. Lee Schoeneman** (center left) (MS, electrical engineering, University of New Mexico, 1981) joined SNL in 1976. Since then he has worked in the areas of nuclear safeguards, solar energy control technology, and robotics. His main interests and current activities lie in the areas of digital circuit design and microprocessor software/hardware interfacing. **Siegfried Thunborg** (bottom right) (MSME, University of New Mexico, 1962) is a member of the technical staff at SNL with 35 years experience in mechanical design and project management. His current technical interest is in robotic handling of hazardous materials. **Gregory P. Starr** (bottom left) (PhD, in mechanical engineering, Stanford University, 1978) has been on the faculty of the University of New Mexico since 1978, where he is currently an associate professor of mechanical engineering. His research interests include sensor-based control of robots, control of dexterous hands, and digital control.

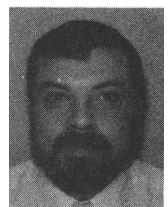
*William M. Davidson  
Alan K. Morimoto  
Mary M. Moya  
J. Lee Schoeneman  
Siegfried Thunborg  
Gregory P. Starr*



#### A DIGITAL COMPUTER MODEL FOR PREDICTING REACTOR COOLANT PUMP BEHAVIOR

**Samir M. Sami** (right) (BScA, MScA, and PhD, University of Montréal, Canada, 1981) has worked in the area of two-phase flow at various industries and institutions since graduation. He has specialized in the transient analysis of thermohydraulics and particularly thermohydraulic code developments for Canada deuterium uranium reactors. He is currently a professor of mechanical engineering at the University of Sherbrooke, Canada, and

*Samir M. Sami  
C. Tran*



is involved in various projects with Atomic Energy of Canada Ltd., Westinghouse Canada Ltd., Rolls-Royce Canada, Canairtech Inc., and ASEA Ltd. **C. Tran** (photo not available) (BSc, Ecole Polytechnique, 1985) is a graduate student at the University of Sherbrooke, Department of Mechanical Engineering.

#### **PROMPT-NEUTRON DECAY CONSTANT ESTIMATION AT FULL-POWER OPERATION**

**Mo-chen Hsu** (BS, nuclear engineering, National Tsing-Hua University, Taiwan, 1972; MS, 1976, and PhD, 1979, mechanical engineering, University of Wisconsin-Madison) worked on reactor core modeling and developed coarse-mesh neutronics computer codes for accuracy improvement against fine-mesh codes and plant-measured data via parameters optimization techniques. He has worked on hardware design, software programming, and system integration of microprocessor-based instruments. He is currently working in the instruments and controls engineering group of Northeast Utilities. His interests include the time series modeling technique and multivariate analysis to investigate reactor noise for malfunction detection, stability evaluation, and system characterization.

*Mo-chen Hsu*



#### **A REAL-TIME EXPERT SYSTEM FOR NUCLEAR POWER PLANT FAILURE DIAGNOSIS AND OPERATIONAL GUIDE**

Photographs and biographies for **Norio Naito**, **Akira Sakuma**, **Kei Shigeno**, and **Nobuyuki Mori** were not available at publication time.

*Norio Naito  
Akira Sakuma  
Kei Shigeno  
Nobuyuki Mori*

#### **POOL DYNAMICS OF NATURAL-CONVECTION-COOLED RESEARCH REACTORS**

A photograph and a biography for **Jae-Joo Ha** were not available at publication time. **Tunc Aldemir** (right) (BS, mathematical physics, Istanbul University, Turkey, 1971; MS, 1975, and PhD, 1978, nuclear engineering, University of Illinois) is an assistant professor of nuclear and mechanical engineering at Ohio State University. He has 8 years of experience with the low enriched uranium conversion/upgrade of research reactors. His current research interests are numerical methods, probabilistic analysis of dynamic systems, optimal maintenance scheduling, and in-core fuel management.

*Jae-Joo Ha  
Tunc Aldemir*



### **NUCLEAR SAFETY**

#### **SITE SELECTION OF A DUAL PURPOSE NUCLEAR POWER PLANT IN SAUDI ARABIA**

**Fahmy M. Hussein** (right) [BS, nuclear engineering, 1970, and BS, nuclear physics, 1972, Alexandria University, Egypt; MS, atomic physics, 1974, and PhD, mechanical engineering, 1978, University of Western Ontario, (UWO), Canada] worked as a demonstrator at UWO for 1 year. He worked as a reactor safety engineer and a reactor design and commissioning engineer at Atomic Energy of Canada Ltd. from 1979 to 1984. Since 1984,

*Fahmy M. Hussein  
Mohamed A. Obeid  
Khalid S. El-Malahy*



he has been on the staff of the College of Engineering, King Saud University, Saudi Arabia. His interests include nuclear engineering and heat and mass transfer, especially reactor safety, siting, and desalination. **Mohamed A. Obeid** (top) (BS, electrical engineering, University of Alexandria, Egypt, 1959; MS, 1965, and PhD, 1967, nuclear engineering, University of Virginia, Charlottesville) worked as a senior engineer for the Babcock & Wilcox Company. Since 1968 he has been on the staff of the College of Engineering, King Saud University, Saudi Arabia. He was the head of the Department of Electrical Engineering from 1979 to 1983, and he presently holds the position of professor. His broad interests lie in electrical power and nuclear engineering areas, including reactor dynamics, safety, research and development, and energy planning. **Khalid S. El-Malahy** (bottom) (BS, mechanical engineering, King Saud University, Saudi Arabia, 1982) worked as a researcher from 1982 to 1985 at the Saudi National Center for Science and Technology, Riyadh, Saudi Arabia. He is currently employed by the Saline Water Conversion Corporation, Riyadh, as project engineer.

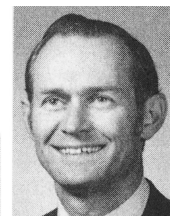
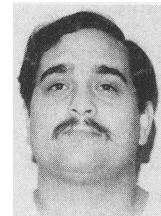


## NUCLEAR FUELS

### CALCULATIONAL ASSESSMENT OF THE MEASURABILITY OF KEY RADIONUCLIDES FOR SEVERELY FAILED NUCLEAR POWER PLANT FUEL

*Stephen E. Binney  
Richard D. Harris*

**Stephen E. Binney** (top) (PhD, nuclear engineering, University of California, Berkeley) has been on the nuclear engineering faculty at Oregon State University since 1973. His broad interests lie in the areas of application of nuclear instrumentation and nuclear techniques to a variety of scientific and engineering problems. **Richard D. Harris** (MS, nuclear engineering, Oregon State University, 1983) is employed as an engineer at the Bettis Atomic Power Laboratory. His interests include radiation detection and measurement techniques.

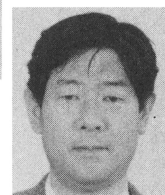


## RADIOACTIVE WASTE MANAGEMENT

### MELTING OF URANIUM-CONTAMINATED METAL CYLINDERS BY ELECTROSLAG REFINING

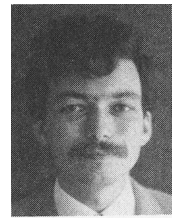
*Tatsuhiko Uda  
Yoshihiro Ozawa  
Hajime Iba*

**Tatsuhiko Uda** (top) (BS, pharmacology, 1970, and MS, agricultural technology, 1972, Kyoto University, Japan) works at Energy Research Laboratory (ERL), Hitachi, Ltd., on uranium handling and measurement studies. His current interests include measurement instruments and systems in nuclear fuel reprocessing plants. **Yoshihiro Ozawa** (center) (MS, 1970, and PhD, 1981, nuclear engineering, Tokyo University, Japan) is a senior researcher at ERL. His current interests are in radioactive waste management, especially radioactive iodine removal with absorbents. **Hajime Iba** (bottom) (BS, 1964, and MS, 1966, applied chemistry, Tohoku University, Japan) is a senior researcher at ERL. He is involved in research on uranium handling and enrichment technology.



## MODELING INTERACTION OF DEEP GROUNDWATERS WITH BENTONITE AND RADIONUCLIDE SPECIATION

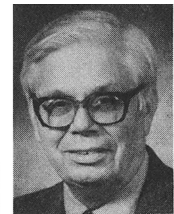
*Hans Wanner*



**Hans Wanner** (PhD, inorganic and physical chemistry, Federal Institute of Technology, Zurich, Switzerland, 1984) has worked on the thermodynamic investigation of the formation and hydrolysis of metal ion complexes in an aqueous solution. In 1984, he joined the Swiss Federal Institute for Reactor Research in Würenlingen, Switzerland, where he became involved in the problems of radioactive waste disposal. His area of work there was the mathematical modeling of chemical processes for the safety assessment of nuclear waste repositories. Since 1986, he has been with the Organization for Economic Cooperation and Development Nuclear Energy Agency (NEA), Paris, France, where he is coordinating an international review of chemical thermodynamic data known as the NEA thermochemical data base project.

## EMPIRICAL CORRELATIONS FROM WASTE GROUT FORMULATION DATA

*Othar K. Tallent  
Earl W. McDaniel  
Karen E. Dodson  
Terry T. Godsey*



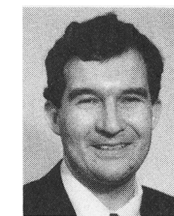
**Othar K. Tallent** (top right) (BS, chemistry, University of Tennessee, 1968) is a principal investigator in the Grout Technology Development Program at Oak Ridge National Laboratory (ORNL). His principal areas of work have been in radiochemical process development and waste immobilization technology. **Earl W. McDaniel** (top left) (undergraduate studies, chemical engineering, North Carolina State University, 1955 to 1958; BS, chemistry and mathematics, Catawba College, 1959; graduate studies, chemistry and mathematics, University of Tennessee, 1962 to 1964), an employee of ORNL since 1959, is presently manager of the Grout Technology Development Program in the Chemical Technology Division. His principal areas of expertise are process development and immobilization of radioactive waste in cement-based matrices. **Karen E. Dodson** (bottom right) (senior chemical engineering student, University of Tennessee) is a science technologist in the Grout Technology Development Program at ORNL. She has 11 years of experience in process development and waste immobilization technology. **Terry T. Godsey** (bottom left) (AS, chemical engineering technology, State Technical Institute, 1982) has been a laboratory technician for 4 years in the Chemical Technology Division at ORNL. His principal area of interest is in waste research and development.



## MATHEMATICAL MODELING OF THE CHEMICAL DECONTAMINATION OF BOILING WATER REACTOR COMPONENTS

*Alexander P. Murray*

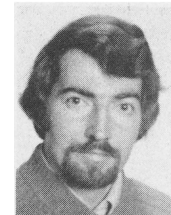
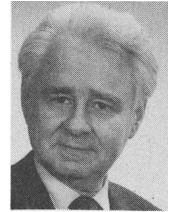
**Alexander P. Murray** (BS, 1978, and MS, 1985, chemical engineering, Carnegie-Mellon University) has worked on chemical and electrolytic decontamination developmental projects since 1978. He has also been involved with chemistry and engineering analyses related to the nuclear and energy industries, encompassing laboratory and pilot-scale experimentation and demonstration. His current activities include decontamination, corrosion, volume reduction, and radwaste processing, particularly as they apply to entire reactor system decontamination.



**A STUDY OF FLOW THROUGH A FRACTURE NETWORK DESCRIBED BY STATISTICALLY DISTRIBUTED PROPERTIES***Carol Braester  
Roger Thunvik*

**Carol Braester** (top) (PhD, technical sciences, Technion-Israel Institute of Technology, Israel, 1971) is a professor of numerical methods for the solution of flow problems, with application to groundwater hydrology and petroleum engineering. From 1976 to 1978, he was a visiting professor of reservoir engineering at the Norwegian Institute of Technology, and from 1983 to 1984, he was a visiting professor in the Royal Institute of Technology, Stockholm. His fields of interest include simulation of flow and heat processes related to radioactive waste repositories.

**Roger Thunvik** (PhD, Royal Institute of Technology, Sweden) is a research fellow at the Swedish Natural Science Research Council and is working as a researcher at the Royal Institute of Technology. His interests include flow through fractured rocks and numerical modeling.

**A DESIGN OF THE LIQUID-METAL REACTOR HAVING AN ALMOST CONSTANT REACTIVITY***Hyong Chol Kim  
Ming-Yuan Hsiao  
Samuel H. Levine*

**Hyong Chol Kim** (top) [BS, Seoul National University, Korea; MS, Pennsylvania State University (PSU)] is a PhD candidate at PSU. His current interests are in fast reactor physics, fuel management, and optimal control techniques.

**Ming-Yuan Hsiao** (center) (BS, nuclear engineering, National Tsing-Hua University, Taiwan, 1976; MS, nuclear engineering, 1980; PhD, nuclear engineering, University of Illinois, 1983) is an assistant professor of nuclear engineering at PSU. His research interests include fuel management, fission and fusion reactor design, neutron transport, and plasma transport.

**Samuel H. Levine** (bottom) (PhD, nuclear physics, University of Pittsburgh, 1954) is a professor of nuclear engineering at PSU. His current technical interests are in fuel management, neutron radiography, optimization techniques, beta dosimetry, reactor design, fast reactor physics, research reactor experiments, and neutron spectrum measurements and calculations.

