



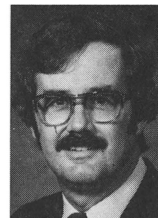
AUTHORS — JANUARY 1982

FISSION REACTORS

JOINING TECHNIQUES FOR CORE FLOW TEST LOOP FUEL ROD SIMULATORS

*A. J. Moorhead
R. W. McCulloch*

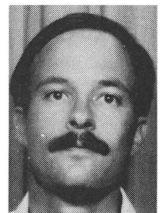
Arthur J. Moorhead (top) (BS, metallurgical engineering, University of Tennessee, 1962) is a research staff member in the Welding and Brazing Group, Metals and Ceramics Division, Oak Ridge National Laboratory (ORNL). He has published articles on laser welding, brazing, refractory metal, ferritic steel, and stainless steel joining. Recently, he was codeveloper of a thermal-shock-resistant ceramic-to-metal seal for instrumentation used to monitor fluid flow parameters in high temperature out-of-reactor safety experiments. **R. W. McCulloch** (BS, electrical engineering, University of Kansas, 1970; MS, metallurgy and materials science, Lehigh University, 1974) is a staff development engineer at ORNL. He has been responsible for development of high flux/high temperature fuel rod simulators at ORNL since 1975. Current interests include high reliability, small diameter sheathed thermocouple and refractory alloy fuel rod simulator development.



INSTRUMENT FAULT DETECTION IN A PRESSURIZED WATER REACTOR PRESSURIZER

*R. N. Clark
B. Campbell*

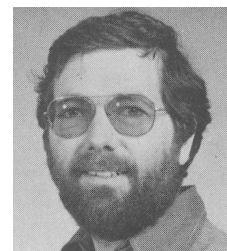
Robert N. Clark (top) (BS, 1950, and MS, 1951, electrical engineering, University of Michigan; PhD, Stanford University, 1969) has been on the faculty of the Electrical Engineering Department at the University of Washington since 1957. Currently he is interested in the theory of failure detection in automatic control systems and the application of such schemes to nuclear plants and aerospace systems. **Bruce Campbell** (BS, engineering, U.S. Military Academy, 1972; MS, nuclear engineering, University of Washington, 1980) is a nuclear safety analysis engineer for Brown & Root, Inc., currently assigned to the South Texas Nuclear Project.



MEASUREMENTS AND CALCULATIONS OF THE FUEL TEMPERATURE COEFFICIENT OF REACTIVITY FOR THE HINKLEY POINT 'B' ADVANCED GAS-COOLED REACTOR

Andrew Richard Raymond Telford

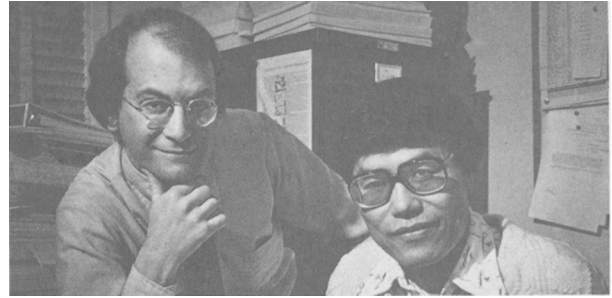
A. R. R. Telford (BSc, physics; PhD, x-ray astronomy, University of Bristol, England) joined the Research Division of the Central Electricity Generating Board in 1973. Since that time he has been working mainly on the transient behavior of advanced gas-cooled reactors (AGRs), with a particular interest in reactivity temperature feedback effects. He is presently studying post-trip heat removal in AGRs.



ANALYZING THE ROD DROP ACCIDENT IN A BOILING WATER REACTOR

Hsiang-Shou (Sam) Cheng (right) [PhD, nuclear engineering, Massachusetts Institute of Technology (MIT), 1968] is a member of the Simulator Improvement Group at Brookhaven National Laboratory (BNL). **David J. Diamond** (PhD, nuclear engineering, MIT, 1968) is group leader for the Core and Systems Code Development Group at BNL. Their interests are in the development of physics and engineering computer models and in their application to light water reactor safety and core performance problems. This includes both static and transient analysis of the entire steam supply system and the interpretation of reactor instrumentation.

*Hsiang-Shou Cheng
David J. Diamond*

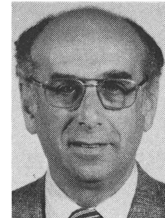


FUEL CYCLES

THE ROLE OF PLUTONIUM-238 IN NUCLEAR FUEL CYCLES

John V. Massey (top) (PhD, nuclear engineering, Georgia Institute of Technology, 1980) is an engineer with the Research and Engineering Division, Process Technology Development Department of Bechtel Group Inc. in San Francisco, California. His present activities include planning and analysis of the liquid-metal fast breeder reactor and other advanced fuel cycle systems and design, analysis, and evaluation of advanced fuel reprocessing and isotope separation technologies. **Alfred Schneider** (PhD, chemical engineering, Polytechnic Institute of New York, 1958) has been a professor of nuclear engineering at the Georgia Institute of Technology since 1975. He previously was director of nuclear technology for Allied Chemical and Allied-General Nuclear Services. His research interests include the nuclear fuel cycle, chemical aspects of nuclear power reactors, and energy conversion.

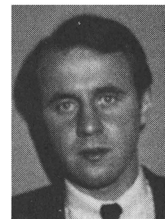
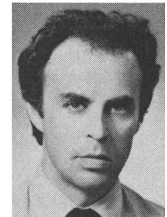
*J. V. Massey
A. Schneider*



OPTIMIZATION OF FUEL CYCLE STRATEGIES WITH CONSTRAINTS ON URANIUM AVAILABILITY

Pekka Silvennoinen (top) (MS, engineering physics, Helsinki University of Technology, 1968; PhD, nuclear science and engineering, Virginia Polytechnic Institute and State University, 1971) is the head of the Nuclear Engineering Laboratory at the Technical Research Centre of Finland. His research interests include fuel management and energy economics. **Juhani Vira** (center) (MS, mathematics, 1975, and Lic. Tech., applied mathematics, 1981, Helsinki University of Technology) is a research scientist at the Nuclear Engineering Laboratory of the Technical Research Centre of Finland. His current interests are in mathematical modeling of the nuclear fuel cycle decisions. **Roger Westerberg** (bottom) (MS, nuclear engineering, Helsinki University of Technology, 1979) has been a research scientist at the Nuclear Engineering Laboratory of the Technical Research Centre of Finland, mainly involved in nuclear fuel cycle analysis. Currently he is with the International Atomic Energy Agency, Vienna.

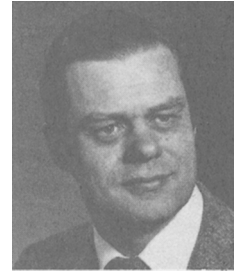
*P. Silvennoinen
J. Vira
R. Westerberg*



IRRADIATION PERFORMANCE OF COATED FUEL PARTICLES WITH FISSION PRODUCT RETAINING KERNEL ADDITIVES

R. Förthmann

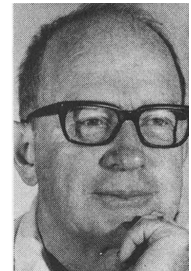
Rüdiger Förthmann (Dr., inorganic chemistry, Technical University Clausthal, Federal Republic of Germany, 1965) is group leader in the Chemistry Division of the Institute of Reactor Materials at Kernforschungsanlage Jülich. His research interests are the evaluation of irradiation tests with coated particles, and, particularly, the transport behavior of solid fission products in fuel kernels and coating materials.



MIGRATION OF BRINE INCLUSIONS IN SALT

Thomas H. Pigford

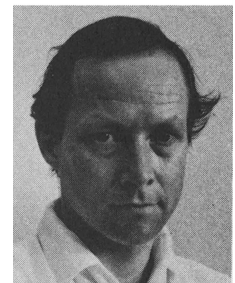
Thomas H. Pigford (ScD, chemical engineering, Massachusetts Institute of Technology, 1952) is professor of nuclear engineering at the University of California, Berkeley. His research interests include nuclear fuel cycle analysis, fuel management in reactors, nuclear chemical engineering, migration of radionuclides in geologic media, nuclear safety, and environmental effluents. He became interested in the migration of brine inclusions while serving on the Panel on the Waste Isolation Pilot Plant, National Research Council, National Academies of Science and Engineering.



THE INFLUENCE OF SPECIATION ON THE GEOSPHERIC MIGRATION OF RADIONUCLIDES

J. Hadermann

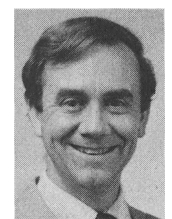
Jörg Hadermann (Diploma, physics, 1964, and PhD, theoretical nuclear physics, 1968, University of Basle, Switzerland) is currently with the Swiss Federal Institute for Reactor Research at Würenlingen, Switzerland. He has been involved in low and intermediate energy nuclear physics for 14 years. Since 1978 he has been working on problems centering on radionuclide transport from waste repositories. Here, his interest lies primarily in safety assessment.



FUEL CYCLE COST CONSIDERATIONS OF INCREASED DISCHARGE BURNUPS

*Lawrence R. Scherpereel
Fred J. Frank*

Lawrence R. Scherpereel (right) (BS, 1967, and MS, 1969, mechanical engineering—nuclear option, University of Notre Dame) is currently manager of fuel and field services evaluations, Westinghouse Nuclear Commercial Operations Division. His responsibilities include management of nuclear fuel fabrication application engineering activities, including the direction



of methods and analyses relating to nuclear fuel cycle economic and technical evaluations. **Fred J. Frank** (BS, mechanical engineering, Ohio State University, 1957; graduate studies, nuclear engineering, University of Cincinnati, 1958 to 1961) is currently a fellow engineer of fuel and field services evaluations, Westinghouse Nuclear Commercial Operations Division. His responsibilities include nuclear fuel cycle technical evaluations including the establishment of and improvements in nuclear fuel cycle economic methodology.

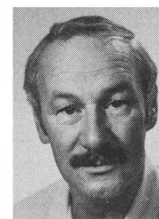
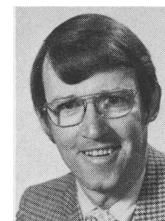


MATERIALS

IN-REACTOR MEASUREMENT OF CLADDING STRAIN: FUEL DENSITY AND RELOCATION EFFECTS

Paul J. Fehrenbach (top) (PhD, mechanical engineering—materials science, University of Waterloo, 1972) is a research engineer in the Fuel Materials Branch at the Chalk River Nuclear Laboratories (CRNL) of Atomic Energy of Canada Ltd. His current interests include the design and analysis of instrumented ceramic fuel irradiations and application of the results to fuel performance models. **Paul A. Morel** (center) is a research technician in the Fuel Materials Branch at CRNL. His current research activities include fabrication and operation of instrumented fuel assemblies for determination of the irradiation behavior of ceramic fuels. **R. Donald Sage** (bottom) is also a research technician in the Fuels and Materials Branch at CRNL. His current research interests include computer program development for the retrieval and analysis of irradiation data from instrumented ceramic fuel assemblies.

*P. J. Fehrenbach
P. A. Morel
R. D. Sage*



THE EFFECT OF RESIDUAL DECONTAMINATION REAGENT ON STRESS CORROSION CRACKING OF AUSTENITIC MATERIALS UNDER HIGH TEMPERATURE WATER

Masami Yajima (top) (BS, 1960, and PhD, 1970, metallurgical engineering, Tokyo Institute of Technology) is presently manager of applied metallurgy and chemistry, Nuclear Energy Group, Toshiba Corporation. He joined Toshiba in 1977 and worked as a senior research engineer responsible for the research work on boiling water reactor (BWR) plant material technology until 1980. Prior to that, he worked at Hitachi, which he joined in 1960, at its Central Research Laboratory, where he worked in the fields of mechanical metallurgy and high pressure metallurgy. **Naoaki Takashima** (bottom) (BS, mechanical engineering, Waseda University, 1964) is manager of operating plant engineering, Nuclear Energy Group, Toshiba Corporation. Since he joined Toshiba in 1964, he has worked as a system design engineer in the fields of off-gas systems and radioactive disposal systems of BWR plants. He is also responsible for the research and development program on reactor system decontamination

*Masami Yajima
Naoaki Takashima
Sadaaki Sasaki
Satsuharu Takimoto*



technology in Toshiba. **Sadaaki Sasaki** (top) (BS, electro-chemistry, 1968, and MS, nuclear engineering, 1970, Tokyo Institute Technology) is currently involved with the transportation of spent fuels and fuel reprocessing in the Nuclear Fuels Department of Tokyo Electric Power Company Inc. He carried out research and development work on BWR water chemistry and reactor system decontamination at the Nuclear Power Research and Development Institute of Tokyo Electric Power Company Inc. **Satsuharu Takimoto** (bottom) (BS, chemical engineering, Ibaragi University, 1962) is presently a section manager responsible for radiation control and water chemistry at Fukushima-daini Nuclear Power Station of Tokyo Electric Power Company Inc. He was formerly a member of the task group on reactor system decontamination technology development at Tokyo Electric Power Company Inc.



HEAT TRANSFER AND FLUID FLOW

INFLUENCE OF PARTIAL BLOCKAGE OF A BWR BUNDLE ON HEAT TRANSFER, CLADDING TEMPERATURE, AND QUENCHING DURING BOTTOM FLOODING OR TOP SPRAYING UNDER SIMULATED LOCA CONDITIONS

*Bernhard Brand
Hans-Peter Gaul
Janardan Sarkar*

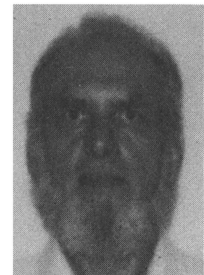
Bernhard Brand (top) [Dipl.-Ing., mechanical engineering, Technical University of Darmstadt, Federal Republic of Germany (FRG), 1971] has been involved in the nuclear safety programs of Allgemeine Elektrizitätsgesellschaft (AEG)/Kraftwerk Union (KWU) as research engineer since 1971 and is presently a senior supervisor with the PKL Project. **Hans-Peter Gaul** (center) (Graduate, Ing., physics, Higher Technical College, Lübeck, 1969) has been working with SIEMENS/KWU in the nuclear safety programs as a research engineer since 1969. His current interests are two-phase flow measurement techniques and planning and designing of thermal-hydraulic test facilities. **Janardan Sarkar** (bottom) (BSc, physics, University of Calcutta, India; Dipl.-Ing., chemical engineering, Technical University of Berlin, 1970), with SIEMENS/KWU since 1971, has been involved in nuclear safety programs dealing with data evaluation and analysis. His current interests include fluid dynamics and heat transfer.



DOWNFLOW POST-CRITICAL HEAT FLUX HEAT TRANSFER TO LOW PRESSURE WATER

*Paul Robershotte
Peter Griffith*

Paul Robershotte (photo not available) [BS, 1976, and MS, 1977, mechanical engineering, Massachusetts Institute of Technology (MIT)] has been with the U.S. Army Corps of Engineers since his graduation. **Peter Griffith** (BS, mechanical engineering, New York University, 1950; MS, mechanical engineering, University of Michigan, 1952; ScD, mechanical engineering, MIT, 1956) has worked in boiling, condensation, two-phase flow, and supercritical heat transfer. He has consulted in the nuclear and chemical industries, and has been on the faculty of MIT since 1956.



FAST-NEUTRON HODOSCOPE AT TREAT: METHODS FOR QUANTITATIVE DETERMINATION OF FUEL DISPERSAL

Alexander De Volpi (top right) [MS, nuclear engineering physics, 1958, and PhD, physics, 1967, Virginia Polytechnic Institute and State University (VPI)] is a physicist with a reactor research background. His development of the fast-neutron hodoscope began in 1963. He is author of a 1979 book on fission weapons proliferation and coauthor of a new book on proliferation of fusion weapons. De Volpi is manager of the In-Pile Diagnostics Section of the Reactor Analysis and Safety Division at Argonne National Laboratory (ANL), and the other coauthors of this paper are on the staff of that section. **Charles L. Fink** (top left) (BS, physics, 1966, and PhD, nuclear physics, 1971, University of Pittsburgh) is a physicist whose current work involves analysis of hodoscope data and development of improved fuel-motion detectors. **Gerald E. Marsh** (center right) (BS, 1962, and MS, 1965, physics, University of Chicago) is a nuclear engineer who specializes in analysis of neutron hodoscope data from Transient Reactor Test Facility experiments. **Edgar A. Rhodes** (bottom left) (MS, physics, VPI, 1965; PhD, physics, Florida State University, 1972) has research experience in solid-state and reactor physics. He joined the ANL staff in 1974 as a member of the hodoscope group. **George S. Stanford** (bottom right) (BSc, physics, Acadia University, 1949; MA, physics, Wesleyan University, 1951; PhD, nuclear physics, Yale University, 1956) has been with ANL since 1959. He currently analyzes and interprets hodoscope data.

A. De Volpi
C. L. Fink
G. E. Marsh
E. A. Rhodes
G. S. Stanford

