



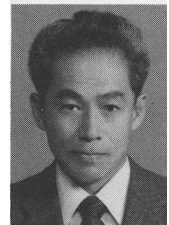
AUTHORS — APRIL 1986

FISSION REACTORS

A LOGICAL SELECTION OF MEASURES FOR QUALITY ASSURANCE ON THE INTEGRITY OF LIQUID-METAL FAST BREEDER REACTOR PRIMARY BOUNDARIES

Sadao Hattori

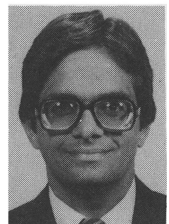
Sadao Hattori (MS, nuclear engineering, Tokyo Institute of Technology, Japan, 1959; graduate, Reactor Hazard Evaluation Course, Oak Ridge National Laboratory, 1960) has had experience in design, safety, and licensing of light water reactors for Chubu Electric Power Company; design, licensing, and construction of the Fugen nuclear power plant for the Power Reactor and Nuclear Fuel Development Corporation, and has worked with regulatory and industrial committees on the safety design and evaluation criteria of nuclear power plants since 1961. He is currently directing the liquid-metal fast breeder reactor research project at the Central Research Institute of Electric Power Industry of Japan.



STOCHASTIC ESTIMATION APPROACH FOR THE EVALUATION OF THERMAL-HYDRAULIC PARAMETERS IN PRESSURIZED WATER REACTORS

*Der-Jhy Shieh
Belle R. Upadhyaya*

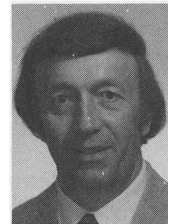
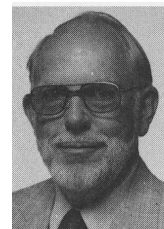
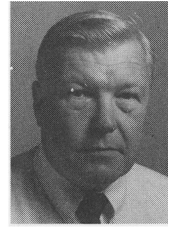
Der-Jhy Shieh (top) (PhD, nuclear engineering, University of Tennessee, 1985) is currently an associate scientist at the Institute of Nuclear Energy Research, Taiwan. His areas of interest are nuclear reactor noise analysis, surveillance and diagnostics, and digital control. **Belle R. Upadhyaya** (PhD, systems engineering, University of California, San Diego, 1975) has been with the Department of Nuclear Engineering, the University of Tennessee, Knoxville, since 1975, where he is presently an associate professor. His current work includes research and development in data processing and systems analysis applied to nuclear power reactors, and sensor fault monitoring. He is a consultant to the Oak Ridge National Laboratory.



RADIOLOGICAL SAFETY ANALYSIS OF THE HOT FUEL EXAMINATION FACILITY/SOUTH

J. C. Courtney (top) (BS, civil engineering, 1960; MS, nuclear engineering, 1962; and PhD, nuclear engineering, 1965, Catholic University of America) is professor of nuclear engineering at Louisiana State University (LSU). He has been a visiting scientist at the Hot Fuel Examination Facility (HFEF) located at Argonne National Laboratory (ANL) every summer since 1975. Prior to joining LSU in 1971, he was with the Aerojet General Corporation working on definition of the radiation environment and shielding design for the nuclear rocket (NERVA) program. His current interests are in the area of radiation shielding, safety analysis, and applied health physics. **K. R. Ferguson** (center) (AB, Albion College, 1944; MS, nuclear physics, University of Illinois, 1948) joined the Remote Control Engineering Division of ANL in 1948, and was associate director of the division from 1960 to 1966. In 1966 he transferred to Argonne/West to work on advanced hot-cell concepts, and from 1967 to 1969 was assistant project manager for design of the HFEF/North project. His work since then has included HFEF safety analysis, criticality safety, and design studies related to the Integral Fast Reactor proposal. He is currently self-employed, with interest in all aspects of the design and operation of nonreactor nuclear facilities. **J. P. Bacca** (bottom) (BS, metallurgical engineering, Colorado School of Mines, 1953; MS, metallurgical engineering, University of Idaho, 1963) is manager of the HFEF complex at ANL. His principal responsibilities emphasize the postirradiation handling and examination of fuels and other materials important to fast reactor safety programs. Previously, his work involved metallurgical research on plutonium metals and alloys at Dow Chemical Company and development of nuclear fuels for the Naval Reactors Program at Westinghouse Electric Corporation.

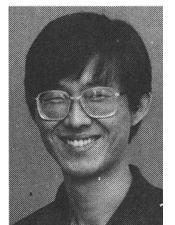
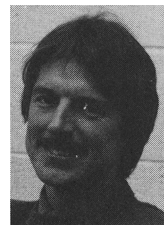
*J. C. Courtney
K. R. Ferguson
J. P. Bacca*



A REVERSE DEPLETION METHOD FOR PRESSURIZED WATER REACTOR CORE RELOAD DESIGN

Thomas J. Downar (top) (BS, U.S. Military Academy, 1974; MS, 1975, and PhD, 1984, Massachusetts Institute of Technology) joined the faculty of the School of Nuclear Engineering at Purdue University (PU) in 1984. He has worked as a consultant in reactor physics and nuclear fuel management for Yankee Atomic Electric Company, Westinghouse Electric Company, and Commonwealth Edison. His current research is in light water reactor reload optimization with special emphasis on approaches enhanced by utilizing the Cyber-205 supercomputer at PU. **Young Jin Kim** (BS, 1979, and MS, 1981, Seoul National University) is currently on leave from the Korea Advanced Energy Research Institute to complete his PhD work at PU.

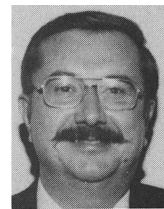
*Thomas J. Downar
Young Jin Kim*



PROSPECTS FOR THE RECOVERY OF URANIUM FROM SEAWATER

*Frederick R. Best
Michael J. Driscoll*

Frederick R. Best (top) [BS, mechanical engineering, Manhattan College, New York, 1968; MS, nuclear engineering, Massachusetts Institute of Technology (MIT), 1969; PhD, nuclear engineering, MIT, 1980) has been an assistant professor of nuclear engineering, Texas A&M University, from 1982 to the present, specializing in interphase transport phenomena experiments and modeling. Current projects include work on critical heat flux, strategic element recovery from seawater, heat pipes, and microgravity two-phase flow. **Michael J. Driscoll** (ScD, nuclear engineering, MIT, 1966) teaches and directs research on the nuclear fuel cycle and fuel management at MIT. His experience in the nuclear field began with the Naval Reactors Program in 1957.

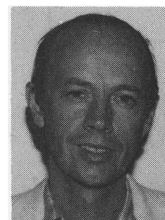
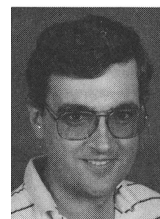


CHEMICAL PROCESSING

LOW-TEMPERATURE CONVERSION OF URANIUM OXIDES TO URANIUM HEXAFLUORIDE USING DIOXYGEN DIFLUORIDE

*Larned B. Asprey
Scott A. Kinkead
P. Gary Eller*

Larned B. Asprey (top) (BS, chemistry, Iowa State College, 1940; PhD, chemistry, University of California, Berkeley, 1949) is a staff scientist in the isotope and structural chemistry group at Los Alamos National Laboratory (LANL). He has specialized in the fields of actinide and fluorine chemistry throughout his career and is currently studying recovery of plutonium by non-aqueous treatment of radioactive wastes and nuclear fuels. **Scott A. Kinkead** (center) (BS, chemistry, U.S. Air Force Academy, 1974; PhD, chemistry, University of Idaho, 1984) is a staff scientist in the isotope and structural chemistry group at LANL. His current interests are in the field of superoxidizer chemistry and photo- and fluorine chemistry of the actinides. **P. Gary Eller** (bottom) (BS, chemistry, West Virginia University, 1967; PhD, chemistry, Ohio State University, 1971) is associate group leader in the isotope and structural chemistry group at LANL. His current interests include actinide volatilization using low-temperature molecular fluorinating agents and structural characterization of actinide speciation in nuclear waste forms.



NUCLEAR FUELS

A MODEL FOR THE RELEASE OF RADIOACTIVE KRYPTON, XENON, AND IODINE FROM DEFECTIVE UO₂ FUEL ELEMENTS

*Brent J. Lewis
Colin R. Phillips
M. J. F. Notley*

Brent J. Lewis (right) (BSc, physics, 1978; MEng, nuclear engineering, 1980; and PhD, nuclear engineering, 1984, University of Toronto) joined Atomic Energy of Canada Limited in 1980 to work on the fuel defect program at Chalk River Nuclear Laboratories (CRNL). Experimental results from this program led to the development of a fission product release model for his



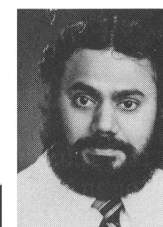
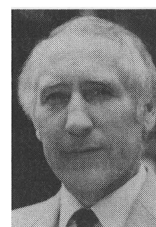
doctoral thesis. His current interests are in fuel performance modeling during both normal and high-temperature accident conditions. **Colin R. Phillips** (top) (BE and PhD, chemical and metallurgical engineering, University of Adelaide) is a professor in the Department of Chemical Engineering and Applied Chemistry, University of Toronto, where he has been since 1969. His work includes study of the role of fluid mechanics and reaction kinetics in various transport phenomena-based processes, especially with respect to heavy oil conversion and the properties and behavior of uranium/radium in ores and tailings and of radon decay products in the atmosphere. **M. J. F. Notley** (bottom) (metallurgical engineering, Cambridge University, England, 1954) worked on nuclear fuel performance and was head of the Fuel Engineering Branch at CRNL from 1979 to 1985.



SOL-GEL MICROSPHERE PELLETIZATION PROCESS FOR FABRICATION OF HIGH-DENSITY ThO_2 -2% UO_2 FUEL FOR ADVANCED PRESSURIZED HEAVY WATER REACTORS

Chaitanyamoy Ganguly (top right) (BE, 1968, and PhD, 1980, metallurgical engineering, University of Calcutta, India) is head of the Advanced Fuels Section, Radiometallurgy Division, Bhabha Atomic Research Centre, Bombay, now on Humboldt Fellowship at the Nuclear Research Center, Jülich (KFA). He has developed the mixed uranium plutonium carbide fuel for the fast breeder test reactor and is now working on thorium-based fuel for advanced pressurized heavy water reactors. **Hans Langen** (top left), a technician in mechanical engineering, was involved in setting up the sol-gel plant at the Institute for Chemical Technology (ICT), KFA. He is presently responsible for operation and maintenance of this plant. **Erich Zimmer** (bottom right) [Dr. rer. nat., chemistry, University of Mainz, Federal Republic of Germany (FRG), 1965] is a section head of ICT. He is involved in reprocessing and waste treatment and has developed sol-gel processes for high-temperature reactor fuel production. **Erich R. Merz** (bottom left) (Dr. rer. nat., nuclear chemistry, University of Mainz, FRG, 1957; professor, Nuclear Technology Rheinisch-Westfälische Technische Hochschule Aachen, 1970) has been director of the ICT of KFA since 1968. He is a member of the German Reactor Safety Commission. His work has been in the area of the end of the nuclear fuel cycle, including radioactive waste disposal.

*Chaitanyamoy Ganguly
Hans Langen
Erich Zimmer
Erich R. Merz*

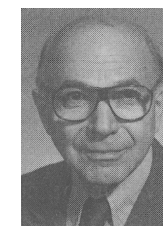


RADIOACTIVE WASTE MANAGEMENT

RESIDUAL DEPTH PROFILE IN THE EVALUATION OF GRANULAR ADSORBENTS

Victor R. Deitz (PhD, physical chemistry, The Johns Hopkins University, 1932) has been involved with adsorption and the commercial solid adsorbents, first at the National Bureau of Standards (1939 to 1963) and then at the Naval Research Laboratory (1963 to the present). His current specialty is with gas adsorbent charcoals for the removal of radioactive iodine and also for the retention of toxic gases.

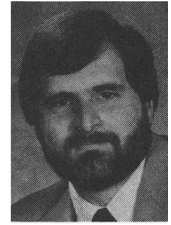
Victor R. Deitz



DEFORMATION AND FRACTURE CHARACTERISTICS FOR IRRADIATED INCONEL X-750

W. J. Mills (top) (BS, 1971; MS, 1973; and PhD, 1975, metallurgical engineering, Lehigh University) is a fellow engineer in the Materials Technology Section at Westinghouse Hanford Company where he characterizes the fracture mechanics behavior of nuclear reactor structural materials. His technical interests include the study of metallurgical variables and environment and neutron irradiation on the fatigue and fracture responses for ferritic steels, austenitic stainless steels, and nickel-base superalloys. **Bernard Mastel** (BS, analytical chemistry, Northern State College, Aberdeen, South Dakota, 1949) is a research scientist at the Westinghouse Hanford Company. He has studied microstructural changes in high-purity metals, reactor structural materials, and nuclear fuels after neutron irradiation with the transmission electron microscope. Similar techniques are currently being applied to the evaluation of repository systems for nuclear waste disposal.

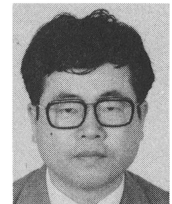
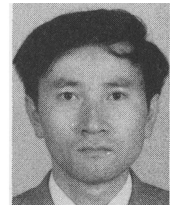
*W. J. Mills
Bernard Mastel*



DECONTAMINATION OF URANIUM-CONTAMINATED MILD STEEL BY MELT REFINING

Tatsuhiko Uda (top) (BS, pharmacological chemistry, 1970, and MS, agricultural technology, 1972, Kyoto University, Japan) is with the Energy Research Laboratory (ERL), Hitachi, Ltd., working on the study of nuclear fuel handling and radiation measurement, in particular radiation dosimetry for alpha contaminant. **Hajime Iba** (center) (MS, applied chemistry, Tohoku University, Japan, 1966) works at ERL on the study of nuclear fuel handling and fuel reprocessing technology. **Hiroyuki Tsuchiya** (bottom) (MS, nuclear engineering, Tokyo Institute of Technology, Japan, 1972) worked on the development of rad-waste treatment systems at ERL. He is currently in nuclear equipment design at Hitachi Works, Hitachi, Ltd.

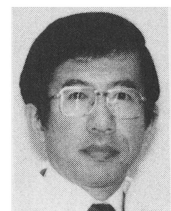
*Tatsuhiko Uda
Hajime Iba
Hiroyuki Tsuchiya*



ANALYSIS OF ENRICHMENT FACTOR OF URANIUM ENRICHMENT BY REDOX CHROMATOGRAPHY

Tetsuya Miyake (top) (BS, applied chemistry, Tokyo University, 1959; MS, chemical engineering, University of Minnesota, 1965) is director of the Uranium Enrichment Research Laboratory (UERL). Since 1959 he has worked at Asahi Chemical Industry Company, Ltd., in its Research and Development Division. His interest is mainly in applications development for ion-exchange resins and membranes. **Kunihiko Takeda** (bottom) (BS, physical chemistry, Tokyo University, 1966) is deputy director of

*Tetsuya Miyake
Kunihiko Takeda
Hatsuki Onitsuka
Toshinori Watanabe*



UERL. His interest includes basic phenomena of separation processes and preparation of organic and inorganic adsorbents. **Hatsuki Onitsuka** (right) (BS, 1970, and MS, 1972, analytical chemistry, Tokyo University) is a senior chemist in process development at UERL. His main interest is in separation technology and dispersion and mass transfer phenomena. **Toshinori Watanabe** (left) (BS, 1976, and MS, 1979, nuclear engineering, Nagoya University) is an engineer in process development at UERL. He is mainly interested in process control by computer and fluid dynamics.

