

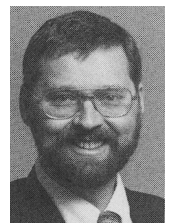
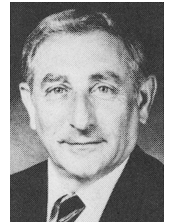
AUTHORS — NOVEMBER 1989

NSF WORKSHOP ON THE RESEARCH NEEDS OF THE NEXT GENERATION NUCLEAR POWER TECHNOLOGY

EXECUTIVE SUMMARY: RESEARCH IN NUCLEAR POWER— WORKSHOP ON THE NEEDS OF THE NEXT GENERATION OF NUCLEAR POWER TECHNOLOGY

A. David Rossin (top) [BS, engineering physics, Cornell University, 1954; MS, engineering, Massachusetts Institute of Technology (MIT), 1955; MBA, Northwestern University, 1963; PhD, metallurgy, Case Western Reserve University, 1966] is president of Rossin and Associates, consultants to management. He served as assistant secretary for nuclear energy, U.S. Department of Energy, from 1986 to 1987 and was director of the Nuclear Safety Analysis Center at the Electric Power Research Institute from 1981 to 1986. He has also been director of research for Commonwealth Edison Company and has performed and managed research on safety and materials at Argonne National Laboratory. He served as visiting lecturer at the University of California–Berkeley and as visiting scientist at MIT. **KunMo Chung** (center) (PhD, physics, Michigan State University, 1963) holds an endowed chair professorship and is director of the Institute of Energy Studies at Ajou University in Suwon, Korea. He is also president of the Korea Science and Engineering Foundation, the Korean Atomic Energy Commissioner, and the Korea Governor of the International Atomic Energy Agency. His professional interests include nuclear power plant engineering and plasma physics. **K. L. Peddicord** (bottom) (BS, mechanical engineering, University of Notre Dame, 1965; MS, 1967, and PhD, 1972, nuclear engineering, University of Illinois) is professor of nuclear engineering at Texas A&M University and assistant director for research of the Texas Engineering Experiment Station. From 1972 to 1975, he worked as a research nuclear engineer at the Eidgenössisches Institut für Reaktorforschung in Würenlingen, Switzerland. From 1975 to 1982, he served as an assistant professor and an associate professor of nuclear engineering at Oregon State University. He has also been a visiting scientist at the Euratom Joint Research Center in Ispra, Italy.

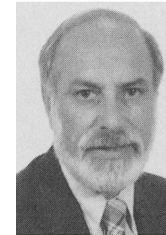
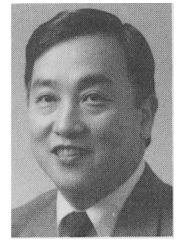
*A. David Rossin
KunMo Chung
K. L. Peddicord*



NUCLEAR POWER TECHNOLOGY: A MANDATE FOR CHANGE

KunMo Chung (top) (PhD, physics, Michigan State University, 1963) holds an endowed chair professorship and is director of the Institute of Energy Studies at Ajou University in Suwon, Korea. He is also president of the Korea Science and Engineering Foundation, the Korean Atomic Energy Commissioner, and the Korea Governor of the International Atomic Energy Agency. His professional interests include nuclear power plant engineering and plasma physics. **George A. Hazelrigg** (PhD, aerospace engineering, Princeton University, 1969) is a deputy division director of the Electrical and Communications Systems Division of the National Science Foundation (NSF). He has been a proponent of new technologies and has worked on nuclear and other advanced space propulsion and power systems. At NSF, he has directed research programs on the development of microelectromechanical systems.

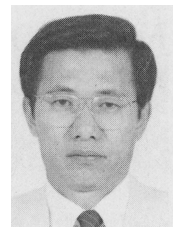
*KunMo Chung
George A. Hazelrigg*



THE INTEGRAL FAST REACTOR

Yoon I. Chang (PhD, nuclear science, The University of Michigan, 1971) is general manager of the Integral Fast Reactor (IFR) Program at Argonne National Laboratory. He has been responsible for the overall technical direction of the IFR technology development effort, which encompasses metallic fuel performance, pyroprocessing, safety, core design, and fuel cycle demonstration. His interests include neutronics analysis, reactor core design, fuel cycle analysis, advanced concept development, and related research and development activities.

Yoon I. Chang



MODULARIZED HIGH-TEMPERATURE GAS-COOLED REACTOR SYSTEMS

David D. Lanning [PhD, nuclear engineering, Massachusetts Institute of Technology (MIT), 1963] is professor of nuclear engineering at MIT. He has been a consultant to a number of firms active in the electric utility and nuclear industries. His professional interests include nuclear engineering education and the design, safety, control, and operation of nuclear reactor systems. During the 1970s, he was codirector of the MIT Research Reactor (MITR), with the responsibility for the design and installation of the MITR-II. He has also been a principal investigator of MIT's program on nuclear power plant innovation in the area of modular high-temperature gas-cooled reactors, and he is also the group coordinator for the advanced instrumentation and control program in the MIT nuclear engineering department.

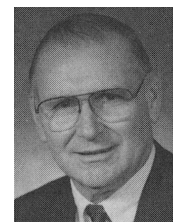
David D. Lanning



OPPORTUNITIES FOR AUTOMATION AND CONTROL OF THE NEXT GENERATION OF NUCLEAR POWER PLANTS

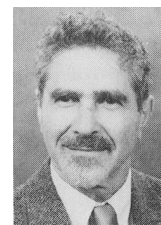
Robert E. Uhrig (BS, mechanical engineering, University of Illinois, 1948; MS, 1950, and PhD, 1954, theoretical and applied mechanics, Iowa State University) holds a joint appointment as distinguished professor of engineering at the University of Tennessee and as distinguished scientist at Oak Ridge National Laboratory. He is a former vice president of Florida Power and Light Company.

Robert E. Uhrig



A LOOK AT SAFETY GOALS AND SAFETY DESIGN TRENDS FOR ADVANCED LIGHT WATER POWER REACTORS

David Okrent



David Okrent (PhD, physics, Harvard University, 1951) worked at Argonne National Laboratory for 20 years before becoming a faculty member of the School of Engineering and Applied Science at University of California-Los Angeles in 1971. His research interests include fast reactor physics, safety and technology, light water reactor safety, nuclear fuel element modeling, probabilistic risk analysis, societal risks, disturbance analysis, and expert systems.

MATERIALS RESEARCH NEEDS FOR NEAR-TERM NUCLEAR REACTORS

John R. Weeks



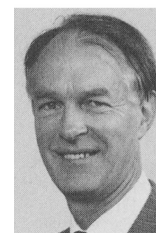
John R. Weeks (PhD, metallurgy, University of Utah, 1953) is a senior reactor consultant in the Reactor Analysis Division at Brookhaven National Laboratory. His fields of expertise include materials for nuclear reactors, corrosion, stress corrosion cracking of materials in light water reactors and liquid-metal fast breeder reactors, and behavior of nuclear waste package materials.

FISSION REACTORS

THE EUROPEAN BREEDER PROGRAM

G. Cicognani (top) (Dr., industrial chemistry, Bologna University, Italy, 1958) has been an assistant professor and, from 1968 to 1984, teaching professor with the faculty of engineering mainly in the field of the nuclear fuel cycle. Among his published works, the treatise on the fuel cycle of nuclear plants is to be regarded as particularly important. Since 1961, he has worked at the European Nuclear Energy Agency (ENEA) in several special managerial assignments and since 1980 he has been director of ENEA's fast reactor department, responsible for research, development, and industrial promotion of fast neutron reactors. **A. M. Broomfield** (center) joined the United Kingdom Atomic Energy Authority (UKAEA) in 1956 and has been involved in work on fast reactors since 1962. He was engaged in fast reactor physics studies to 1974 at Winfrith, including a 2-year period, 1965-1967, on assignment to Argonne National Laboratory. In 1974 he moved to Dounreay to join the team operating the prototype fast reactor (PFR), becoming head of operations in 1975, head of the PFR Division in 1977, and assistant director (PFR) in 1981. In 1985 he moved to Risley to become deputy fast reactor program director for the UKAEA and director in 1987. A photograph and a biography for **R. Lallement** were not available at publication time. **W. Marth** (bottom) (PhD, physics, Technical University of Munich, Federal Republic of Germany) is director of the fast breeder project at Kernforschungszentrum Karlsruhe GmbH and was chairman of the steering committee for European research and development breeder cooperation in 1987-1988.

*G. Cicognani
A. M. Broomfield
R. Lallement
W. Marth*



FAST BREEDER REACTORS FOR ENERGY SECURITY

William M. Jacobi

William M. Jacobi (PhD, chemical engineering, Syracuse University) is a vice president at Westinghouse Electric Corporation, responsible for the government operations business unit. He was previously the president of Westinghouse Hanford Company, responsible for managing the Hanford advanced energy research and defense production site.

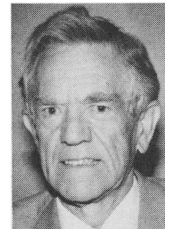
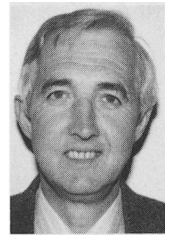


FUEL CYCLES

A VERSATILE FACILITY AT WINDSCALE, UNITED KINGDOM, FOR THE FABRICATION OF EXPERIMENTAL MIXED URANIUM-PLUTONIUM-OXIDE NUCLEAR FUEL

*Hugh M. MacLeod
George R. Chilton
J. Alan Dodd*

Hugh M. MacLeod (top) (PhD, chemical engineering, University of Bradford, United Kingdom, 1974) has 29 years of experience in fast breeder reactor fuel cycle operations. He is manager of new facilities, responsible for the design and installation of new plant and facilities for the Fuel Manufacturing Technology Centre at the Windscale Laboratory of the United Kingdom Atomic Energy Authority (UKAEA). His principal interest is in powder technology. **George R. Chilton** (center) (BSc Hons, ceramics, University of Leeds, United Kingdom, 1966) is operations manager for the Fuel Manufacturing Technology Centre at Windscale Laboratory with 23 years of experience in plutonium fuel manufacture. He has been responsible for the manufacture of experimental fuel and fuel pins for the prototype fast reactor (PFR) since 1980 and, prior to that, for development and basic studies on oxide fuels. **J. Alan Dodd** (bottom) (BEng, mechanical engineering, University of Liverpool, United Kingdom, 1950) has recently retired from Risley Technical Services of the UKAEA. In addition to supervising the mechanical design of fuel manufacturing plants, his responsibilities included PFR fuel design and fusion reactor blanket design studies.



ECONOMICS

A NEW MIXED FOSSIL/NUCLEAR ENERGY SYSTEM FOR THE PRODUCTION OF ELECTRICITY WITH ZERO EMISSION OF CARBON DIOXIDE

W. Seifritz

A photograph and a biography for **W. Seifritz** were not available at publication time.