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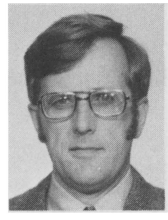
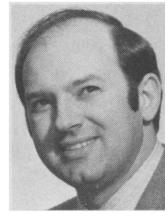
AUTHORS — MAY 1984

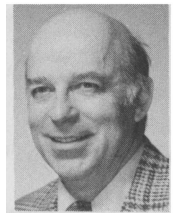
CRITICAL REVIEW

PERFORMANCE OF METALLIC FUELS AND BLANKETS IN LIQUID-METAL FAST BREEDER REACTORS

Leon C. Walters
B. R. Seidel
J. Howard Kittel





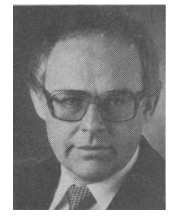


Leon C. Walters (top) (BS, 1961; MS, 1963; and PhD, 1966, metallurgical engineering, Purdue University) has been an associate director for fuels and materials of Argonne National Laboratory's (ANL's) Experimental Breeder Reactor-II (EBR-II) Division in Idaho from 1978 to the present, where his responsibilities include the maufacture and performance of fuels and materials in EBR-II. After joining ANL in 1970 as a staff member, he was responsible for the design, implementation, and analysis of data for the in-reactor creep experiments on stainless steel cladding. From 1973 to 1979 he served as section manager, where his responsibilities included assuring the safe and reliable performance of the in-core and ex-core components of EBR-II. **B. R. Seidel** (center) (BS, metallurgy, Montana College of Mineral Science and Technology, 1967; MS, materials science, Northwestern University, 1969; MRE, religious education, North American Baptist Seminary; PhD, materials science, Northwestern University, 1975) has been responsible for the qualification and performance characterization of fuel, control, and blanket materials and related internal reactor components of the EBR-II fast breeder reactor for more than nine years with the EBR-II project at ANL. Currently, in addition to assessing fuels and materials performance, he manages the technical activities that focus on the improvement of performance, reliability, and lifetime of all reactor components. **J. Howard Kittel** (bottom) (BS, metallurgical engineering, Washington State University, 1943) was first employed at the U.S. National Aeronautics and Space Administration's Lewis Research Center where he was associated with the R&D of high-temperature materials for aircraft propulsion. In 1951, he joined ANL where he led a group for investigating irradiation effects in materials for nuclear reactors. The results of these studies led to the design of the Mark-II fuel element for EBR-II. His present position is manager of ANL's Office of Waste Management programs.

NUCLEAR FUELS

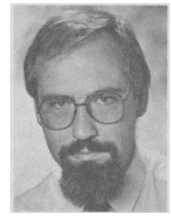
RISK-ORIENTED ANALYSIS OF THE GERMAN PROTOTYPE FAST BREEDER REACTOR SNR-300: OFF-SITE ACCIDENT CONSEQUENCE MODEL AND RESULTS OF THE STUDY

Anton Bayer
Joachim Ehrhardt



Anton Bayer (right) (Dipl.-Phys., 1966; Dr.-Ing., 1971; and Dr.-Ing. habil., 1978, University of Karlsruhe) worked in the field of reactor physics until 1971 and then on the radiological impact of nuclear facilities and on risk analysis. He is a scientist at the

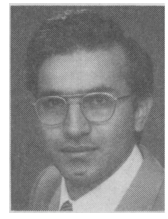
Kernforschungszentrum Karlsruhe (KfK) and a professor at the University of Karlsruhe. **Joachim Ehrhardt** (right) (Dipl.-Phys., 1970, and Dr.-Ing., 1975, University of Karlsruhe) worked in the field of reactor noise analysis until 1978 and then on off-site consequence models and computer codes of risk studies. He is a scientist at KfK.

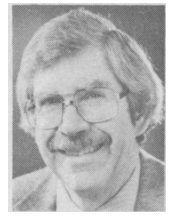


AN INVESTIGATION OF BWR/4 PARALLEL CHANNEL EFFECTS DURING A HYPOTHETICAL LOSS-OF-COOLANT ACCIDENT FOR BOTH INTACT AND BROKEN JET PUMPS

Mohammad R. Fakory
R. T. Lahey, Jr.

Mohammad R. Fakory (top) [MS, mechanical engineering, 1977, and Nuclear Engineer, nuclear engineering, 1977, Massachusetts Institute of Technology; PhD, nuclear engineering, Rensselaer Polytechnic Institute (RPI), 1983] was faculty instructor at RPI from 1981 to 1982. He has been engaged in development of thermal-hydraulic models and computerized data acquisition systems for analysis and measurement of single-phase and two-phase flow dynamics in fast breeder and light water nuclear reactors. He is currently a staff scientist in the engineering department at Simulation Associates, Inc. His current interests are in the areas of simulation of power plants and development of parallel computer systems for design of advanced engineering simulators. **R. T. Lahey, Jr.** (BSc, marine engineering, U.S. Merchant Marine Academy; MSc, nuclear engineering, RPI; ME, engineering mechanics, Columbia University; PhD, mechanical engineering, Stanford University, 1970) has more than 20 years of experience in the field of nuclear engineering, including industrial experience at KAPL and General Electric's Nuclear Engineering Division. He is currently chairman of the Department of Nuclear Engineering at RPI. His main interests are concerned with the application of two-phase flow and boiling heat transfer phenomena to nuclear reactor thermal hydraulics and safety technology.

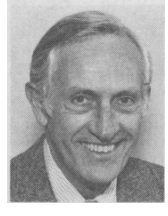


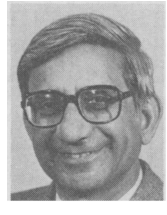


VAPOR TRANSPORT OF FISSION PRODUCTS IN POSTULATED SEVERE LIGHT WATER REACTOR ACCIDENTS

Daniel Cubicciotti
Bal Raj Sehgal

Daniel Cubicciotti (top) (PhD, chemistry, University of California, 1946) is a scientific specialist in the Materials and Corrosion Program of the Nuclear Power Division of the Electric Power Research Institute (EPRI). He has engaged in research on chemical aspects of materials behavior at high temperature since Manhattan Project days. Currently he is involved in research on the vapor transport of fission products in nuclear accidents and on effects of coolant water chemistry on boiling water reactor pipe stress corrosion cracking. **Bal Raj Sehgal** (PhD, University of California, Berkeley, 1961) is a senior scientific advisor in the Nuclear Power Division at EPRI. Before joining EPRI in 1974, he worked at Brookhaven and Argonne National Laboratories on problems in reactor physics, light water reactor analysis, fast reactor engineering, and safety. He served as visiting professor at Purdue University (1973-1974), Massachusetts Institute of Technology (1980-1981), and University of California, Berkeley (1982-1983). At EPRI he has managed programs in advanced reactors, code development and validation and is currently directing and performing research in the degraded core and source term areas.

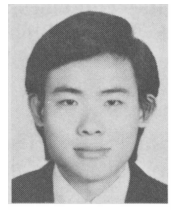


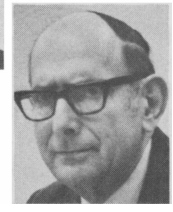


FUEL CYCLES

OPTIMIZATION AND ANALYSIS OF LOW-LEAKAGE CORE MANAGEMENT FOR PRESSURIZED WATER REACTORS

Yi-Chiang Chang
Alexander Sesonske



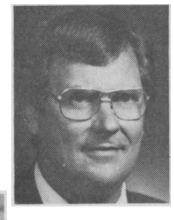


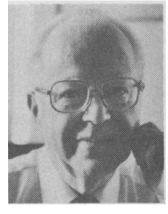
Yi-Chiang Chang (top) (BS, 1975, and MS, 1977, nuclear engineering, Tsing-Hua University, Taiwan; PhD, nuclear engineering, Purdue University, 1983) is employed by the Public Service Commission of Indiana. His current interests include nuclear fuel management and nuclear economics. **Alexander Sesonske** (PhD, University of Delaware, 1950) is professor of nuclear engineering at Purdue University. In addition to nuclear fuel management, his interests include nuclear reactor engineering, reactor safety, and thermal hydraulics.

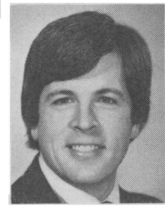
CHEMICAL PROCESSING

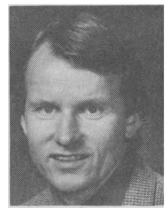
RECOVERY OF NOBLE METALS FROM FISSION PRODUCTS

George A. Jensen
A. M. Platt
George B. Mellinger
William J. Bjorklund







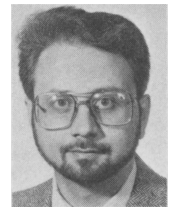


George A. Jensen (top right) (BS, chemical engineering, 1958; MS, chemical engineering, 1965; and PhD, engineering science, 1973, Washington State University) has been with Battelle-Pacific Northwest Laboratories (BPNL) since 1973. Prior to that time, he was an assistant professor of chemical engineering at Washington State University. His current interests include the production and utilization of byproducts from nuclear processing. He is currently involved in work to extract noble metals from nuclear wastes, testing and evaluating tritium lights for military and civilian runway lighting and marking, disinfestation of crops using radiation produced from decay of ^{137}Cs, and related efforts. **A. M. Platt** (top left) (BS, chemical engineering, Carnegie Mellon University; MS, chemical engineering, Texas A&M University) is employed at BPNL. He has been active nationally and internationally in nuclear fuel and nuclear waste management for the past 30 years. He received the 1982 ANS Special Award for Outstanding Personal Contributions to the treatment and isolation of nuclear waste. **George B. Mellinger** (bottom right) (BS, 1972, and MS, 1979, ceramic engineering, University of Washington) is currently a senior research engineer at BPNL. Interests include glass composition development, nuclear waste form performance requirements, and product quality verification in waste glass production. **William J. Bjorklund** (bottom left) (BS, chemical engineering, University of Washington, 1969) is a project manager at BPNL with 14 years of experience in the nuclear field, including 10 in waste management. He is currently project manager of the Radioactive Liquid Fed Ceramic Melter Pilot Plant being installed at the U.S. Department of Energy facilities in Richland, Washington.

RADIOACTIVE WASTE MANAGEMENT

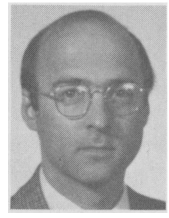
APPLICATION OF DYNAMIC SIMULATION TO RADWASTE EVAPORATOR SYSTEMS

Habib Amin
K. C. Chiu
David W. James



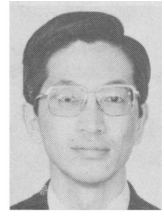
Habib Amin (right) (BS, chemical engineering, Oregon State University, 1972; MS, 1974, and PhD, 1978, chemical engineering, University of California, Berkeley) is a senior engineer previously with research and engineering and currently in the

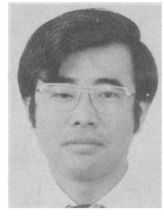
System and Process Engineering Group of the nuclear engineering department of Bechtel Power Corporation (BPC), San Francisco. His current areas of interest are system evaluations and process engineering with emphasis on nuclear power plants and waste management. **K. C. Chiu** (top) (BS, chemical engineering, Rangoon Institute of Technology, 1963; MS, chemical engineering, University of Florida, 1968; PhD, chemical engineering, Louisiana State University, 1971) is an engineering specialist with Bechtel Petroleum, Inc. His current areas of interest are mathematical modeling of radioactive waste processing, melter, and off-gas systems and dynamic simulation of normal, off-normal, and postulated failure conditions during which certain stringent criteria should be met. **David W. James** (bottom) (BChE, chemical engineering, University of Minnesota, 1968; MSNE, nuclear engineering, Purdue University, 1970) is supervisor of the System and Process Engineering Group in the nuclear engineering department of BPC. His interests and activities focus on the integration of advanced system concepts in the design of nuclear plant process systems.

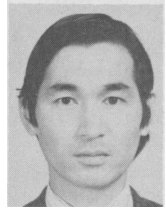


USING TITANIUM OXIDE FOR COBALT REMOVAL FROM HIGH-TEMPERATURE WATER

Fumio Kawamura
Kiyomi Funabashi
Makoto Kikuchi
Katsumi Ohsumi





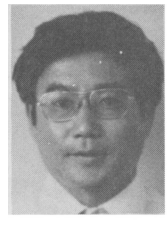


Fumio Kawamura (top right) (BS, chemical engineering, Gunma University, 1970; MS, 1972, and Dr. Eng., 1976, Tohoku University) has been a research scientist at Energy Research Laboratory (ERL), Hitachi Ltd., since 1976. He has specialized in transport phenomena and is currently working in the field of radioactive waste management and reactor water chemistry. **Kiyomi Funabashi** (top left) (Hitachi Technical College, 1974) has been a research scientist at ERL since 1971. He has specialized in adsorption chemistry and developed various adsorbents, including iodine adsorbent, which is currently used in boiling water reactor plants. **Makoto Kikuchi** (bottom right) (BS, chemistry, Tohoku University, 1968; PhD, chemistry, University of New York at Buffalo, 1973) is a senior engineer at Hitachi Works, Hitachi Ltd., and responsible for R&D of radioactive waste systems. **Katsumi Ohsumi** (bottom left) (BS, nuclear engineering, Ohsaka University, 1970) has been an engineer at Hitachi Works, Hitachi Ltd., since 1970. His work has been in the chemical and radiological engineering of reactor water chemistry.

CRITICALITY SAFETY

A MULTIPLE REGRESSION EQUATION FOR CALCULATED k_{eff} BIAS ERRORS BY CRITICALITY CODE SYSTEM

Yasushi Nomura
Takanori Shimooke



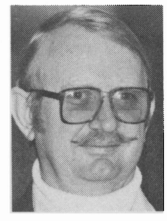
Yasushi Nomura (top) (BS, nuclear engineering, Tokyo University, 1967) is a senior engineer of JINS (Institute of Nuclear Safety Japan). His current interests are criticality code verification with experimental data and its application to audit calculations. **Takanori Shimooke** (BS, 1957, and MS, 1959, physics; Dr. Eng., nuclear engineering, Kyoto University, 1975) is a deputy director of JINS. His main activities are related to preparing and improving the safety analysis codes to be used for audit calculations on nuclear power plants as well as fuel cycle plants submitted for licenses, and also making the audit calculations

on behalf of the government. He had been engaged in reactor safety research at Japan Atomic Energy Research Institute until he moved to JINS in 1980.

ANALYSES

TECHNIQUE FOR PRODUCING A CONTINUOUS INTERFERENCE-FREE STREAM OF ARGON-41 IN AIR

Tung-Tse Tseng
William A. Jester



Tung-Tse Tseng (top) [BS, nuclear engineering, National Tsing-Hua University, Taiwan, Republic of China, 1978; MS, nuclear engineering, The Pennsylvania State University (PSU), 1982] is currently a PhD candidate at PSU. His research interests include nuclear instrumentation, environmental monitoring, and measurement technology. **William A. Jester** (PhD, chemical engineering, PSU, 1965) is an associate professor of nuclear engineering. His research and teaching interests cover a wide range of applications involving the use of ionizing radiation and radioactive materials. He has also done extensive work in the development and testing of radiation monitoring systems.