



AUTHORS — JUNE 1988

FISSION REACTORS

DIAGNOSTIC TECHNIQUES OF A SMALL-BREAK LOSS-OF-COOLANT ACCIDENT AT A PRESSURIZED WATER REACTOR PLANT

Akio Gofuku (top right) [BS, 1981, and MS, 1983, electrical engineering, Kyoto University (KU), Japan] is an instructor at the Institute of Atomic Energy, KU. He is concerned with diagnostic studies of pressurized water reactor plants. His current interests are computer applications to nuclear power plant operations and numerical calculation techniques of liquid-vapor two-phase flow.

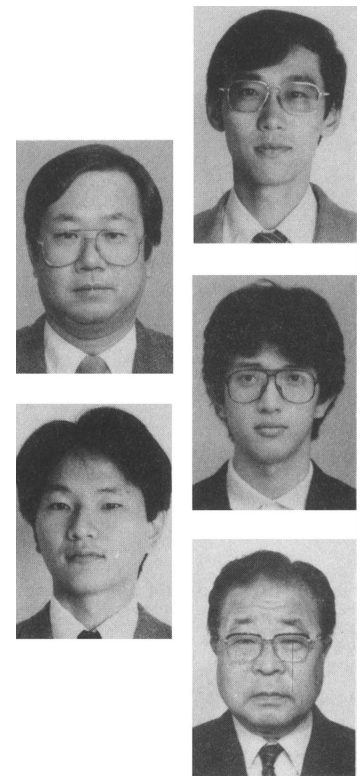
Hidekazu Yoshikawa (top left) (PhD, electrical engineering, KU, Japan, 1970) is an associate professor at the Institute of Atomic Energy. He has worked at Power Reactors and Nuclear Fuel Development Corporation where he dealt with fast breeder reactor safety analyses. His current interests and activities are human factors research in man/machine interface.

Shunsuke Hayashi (center right) (BS, 1984, and MS, 1986, electrical engineering, KU, Japan) is an engineer at the Yokogawa Electric Company, Ltd. He is currently researching a distribution control system.

Kenji Shimizu (bottom left) (BS, electrical engineering, KU, Japan, 1987) is a graduate student of electrical engineering at KU. He is currently studying and evaluating an accident tracking simulation code.

Jiro Wakabayashi (bottom right) (BS, 1951, and D. Eng., 1959, electrical engineering, KU) is a professor at the Institute of Atomic Energy. His current research interests are the dynamics, control, and instrumentation of nuclear power plants. He is also interested in operational reliability and safety.

*Akio Gofuku
Hidekazu Yoshikawa
Shunsuke Hayashi
Kenji Shimizu
Jiro Wakabayashi*



AN EFFICIENT COMPUTATIONAL TECHNIQUE FOR LIGHT WATER REACTOR CORE DYNAMICS

Chun-Der Wu (top) (BS, nuclear engineering, National Tsing-Hua University of Taiwan, 1978; PhD, nuclear engineering, University of Cincinnati, 1986) is a senior nuclear engineer at Fauske and Associates, Inc. His interests and current activities are in the areas of core design and safety analysis.

Joel Weisman (PhD, University of Pittsburgh) is professor of nuclear engineering and director of the Laboratory of Basic and Applied Nuclear Research at the University of Cincinnati. Prior to coming to Cincinnati in 1968, he spent 18 years in industry.

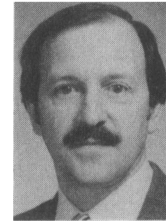
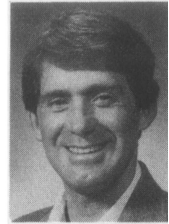
*Chun-Der Wu
Joel Weisman*



REACTION KINETICS OF IODINE AND CESIUM IN STEAM/HYDROGEN MIXTURES

August W. Cronenberg (top) (PhD, engineering science, Northwestern University, 1971) is presently an independent consultant working on various aspects of reactor safety and fuel behavior. He worked at Argonne National Laboratory from 1971 to 1974, was professor of chemical and nuclear engineering at the University of New Mexico from 1974 to 1977, and was a senior scientist at EG&G Idaho, Inc. from 1977 to 1979. His main interests are in the areas of thermal and material science, and reactor safety. **Daniel J. Osetek** (MS, nuclear engineering, University of New Mexico, 1978) is manager of the Severe Accident and Source Term Research Unit at the Idaho National Engineering Laboratory. He has contributed to the planning and conduct of in-pile fuel behavior tests at the Power Burst Facility and the Loss-of-Fluid Test Facility. He is presently responsible for the analysis and reporting of results from these two test programs.

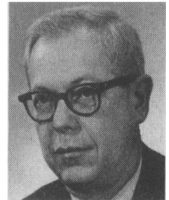
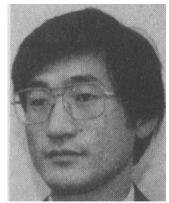
*August W. Cronenberg
Daniel J. Osetek*



A CONSISTENT AND COST-EFFECTIVE QUANTIFICATION OF CONTAINMENT PERFORMANCE CRITERIA

Chang K. Park (top) [PhD, nuclear engineering, University of Michigan (UM), 1986] joined Brookhaven National Laboratory (BNL) in 1984. He has been involved in various projects on nuclear reactor safety and probabilistic risk assessment, source term uncertainty analysis, risk allocation, information theory, and system reliability. He is currently involved in the Zion Risk Rebaselining Study. **Robert A. Bari** (center) (PhD, physics, Brandeis University, 1969) is associate chairman of the Department of Nuclear Energy at BNL. His current interests are nuclear reactor safety and waste management. **William Kerr** (bottom) (PhD, electrical engineering, UM, 1954) is a professor of nuclear engineering at UM.

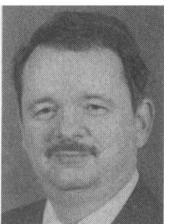
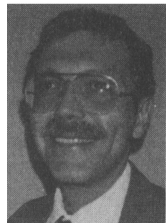
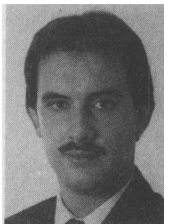
*Chang K. Park
Robert A. Bari
William Kerr*



DETERMINATION OF THE END STATE OF THE THREE MILE ISLAND UNIT 2 ACCIDENT USING NEUTRON TRANSPORT ANALYSIS

Bernard R. Bandini (top) [MS, The Pennsylvania State University (PSU), 1988] is a graduate assistant in nuclear engineering at PSU. At the time of this research, he was being supported by the Nuclear Science and Engineering and Health Physics Fellowship administered by Oak Ridge Associated Universities for the U.S. Department of Energy. His interests lie in the area of fission reactor shielding and core analysis. **Anthony J. Baratta** (center) (PhD, physics, Brown University, 1979) is an associate professor of nuclear engineering at PSU. His research interests include light water reactor transient analysis and neutron transport. **Victor R. Fricke** (bottom) (BA, physics, Northeastern University, 1967; MS, nuclear engineering, Purdue University, 1969) is the reactor analysis supervisor in the data management and analysis department of the Three Mile Island Unit 2 (TMI-2) Recovery Program. He joined the Burns and Roe Company in 1972, and participated in the design of several nuclear power plants. He was part of the original team of experts who came to TMI-2 a few days after the accident, and has subsequently been

*Bernard R. Bandini
Anthony J. Baratta
Victor R. Fricke*



involved in the TMI-2 Recovery Program as a technical planning specialist. He is responsible for analysis and interpretation of all data relating to the conditions of the reactor as a result of the accident.

FUEL CYCLES

CONSTRUCTION OF LINEAR EMPIRICAL CORE MODELS FOR PRESSURIZED WATER REACTOR IN-CORE FUEL MANAGEMENT

Kenneth C. Okafor (top) (BS, physics, Alabama A&M University, 1978; MS, nuclear engineering, Georgia Institute of Technology, 1979) is a doctoral student in nuclear engineering at The Ohio State University. His interests are in-core fuel management and numerical methods. **Tunc Aldemir** (BS, mathematical physics, Istanbul University, Turkey, 1971; MS and PhD, nuclear engineering, University of Illinois, 1978) is an assistant professor of nuclear and mechanical engineering at The Ohio State University. His current research interests are numerical methods, probabilistic analysis of dynamic systems, optimal maintenance scheduling, and in-core fuel management.

*Kenneth C. Okafor
Tunc Aldemir*

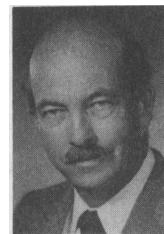


CHEMICAL PROCESSING

A COMPARISON OF PROCESSES FOR THE CONVERSION OF URANYL NITRATE INTO CERAMIC-GRADE UO_2

Paul A. Haas (PhD, chemical engineering, University of Tennessee) is a senior engineer with the Chemical Technology Division, Oak Ridge National Laboratory. His work has involved nuclear fuel reprocessing and recycle, isotope separation, waste treatments, and transuranium processes. He holds ten U.S. patents concerning nuclear fuel conversion processes.

Paul A. Haas



MATERIALS

INVESTIGATION OF SELF-WELDING RATE OF STRUCTURAL MATERIALS IN LIQUID SODIUM

Norikatsu Yokota (top) (MS, applied physics, Hokkaido University, Japan, 1974) is a researcher at Energy Research Laboratory (ERL), Hitachi, Ltd. He has worked on the experimental evaluation of fission product (cesium, iodine, 3H , etc.) behavior in sodium loops and on the improvement of reliability of sodium components for fast breeder reactors (FBRs). He is presently studying the deposition mechanism of corrosion products in the primary cooling system of FBRs. **Shigehiro Shimoyashiki** (mechanical engineering, Ibaraki Technical College, Japan, 1962) is

*Norikatsu Yokota
Shigehiro Shimoyashiki*

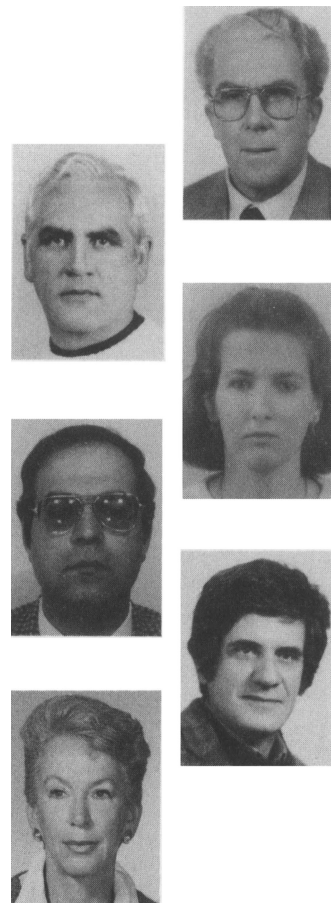


a senior researcher at ERL. He is responsible for the development of sodium components and the improvement of the reliability of structural materials for FBRs.

ADVANCES IN THE ELECTROLYSIS OF TRITIATED WATER

G. Pierini (top right) (graduate, chemistry, University of Florence, Italy, 1956) is currently employed at the Joint Research Centre (JRC) of the European Community in Ispra, Italy, and is working in the tritium and blanket technology processes. **B. Spelta** (top left) (Dipl., Technical Institute of Galileo Ferraris, Verona, Italy, 1951) is involved in research on the electrolysis and hydrogen isotope separation in the fusion program of the JRC. **S. Maffi** (center right) (graduate, chemistry, University of Milan, Italy, 1981) has worked at the Department of Industrial Chemistry of the Milan Polytechnic since 1981. Her main interests and activities are in the field of electrochemistry. Currently, she is working on the development of new separators to be employed in electrolytic cells. **G. Modica** (center left) (graduate, industrial chemistry, University of Catania, Italy, 1972; PhD, chemistry, University of Milan, Italy, 1974) has worked at the Department of Industrial Chemistry of Milan Polytechnic since 1974. He has worked at O. DeNora SpA, Milan, Italy, as a researcher for research and development (R&D) of new separators for brine electrolysis. Currently, he is working on R&D of new separators for water electrolysis. His interests and activities are in polymer science and in electrochemistry. **G. Perez** (bottom right) (chemistry, University of Rome, Italy, 1961) has been a staff member at the Nuclear Chemistry Institute of the National Research Council of Italy (CNR) since 1961. His research has involved the fields of radiation chemistry and chemical effects of tritium decay. Other activities have included environmental chemistry and radiogaschromatographic analysis. **E. Possagno** (bottom left) (Deg., chemistry, Rome University, Italy, 1957) has been a staff member at the Nuclear Chemistry Institute of the CNR since 1962. Her research interests include nuclear chemistry, radiation chemistry, and electronic energy transfers in the solid state.

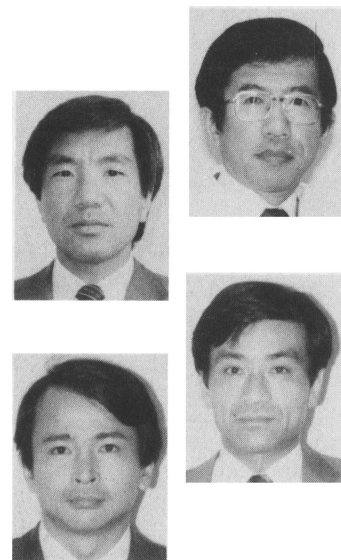
*G. Pierini
B. Spelta
S. Maffi
G. Modica
G. Perez
E. Possagno*



PROCESS ENERGY OF THE ADVANCED CHEMICAL URANIUM ENRICHMENT PROCESS

Kunihiko Takeda (top right) (BS, 1966, and PhD, 1986, physical chemistry, Tokyo University, Japan) is general manager of the Asahi Chemical Industry Company Uranium Enrichment Laboratory (UEL). His interests include basic phenomena of separation processes and preparation of organic and inorganic adsorbents. **Hatsuki Onitsuka** (top left) (BS, 1970, and MS, 1972, analytical chemistry, Tokyo University, Japan) is manager and chief chemist in process development at UEL. His main interest is in separation technology and dispersion and mass transfer phenomena. **Heiichiro Obanawa** (bottom right) (BS, 1972, and MS, 1974, physical chemistry, Tokyo University, Japan) is manager and chief chemist in basic research at UEL. His main interest is in applications development of ion exchange resins in various separation processes. **Shin Saito** (bottom left) (BS, 1978, and MS, 1980, chemical engineering, Tokyo Institute of Technology, Japan) is an assistant manager and engineer in process development at UEL. His current interests focus on analysis of separation behaviors in separation processes.

*Kunihiko Takeda
Hatsuki Onitsuka
Heiichiro Obanawa
Shin Saito*



DYNAMICS AND ENERGETICS OF A ^{251}Cf - ^{252}Cf POWER SYSTEM

Archie A. Harms (top) (PhD, nuclear engineering, University of Washington, 1969) is a professor of engineering physics at McMaster University, Canada. His research interests are in the areas of advanced nuclear energy systems, mathematical modeling, and neutron radiography. **Greg Cripps** (M.Eng., engineering physics, McMaster University, Canada, 1986) has worked on neutron transmutation doping and computer simulation of nonlinear systems. He is currently employed with Atlantis Flight Research in Canada.

*Archie A. Harms
Greg Cripps*

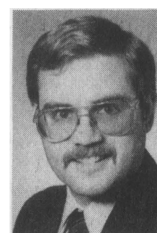


TECHNIQUES

APPLICATION OF NEUTRON RADIOGRAPHY FOR FLUID FLOW VISUALIZATION

John M. Cimbala (top right) [BS, aerospace engineering, The Pennsylvania State University (PSU), 1979; MS, 1980, and PhD, 1984, aeronautics, California Institute of Technology] is an assistant professor of mechanical engineering at PSU. His current interests are in the area of experimental fluid mechanics, and include flow visualization, turbulence, wind tunnel testing, neutron radiography, wake and jet flows, and the development of new experimental techniques for fluid mechanics research. **Daniel E. Hughes** (top left) (BS, 1975, and MS, 1986, nuclear engineering, PSU) is a research assistant at PSU's Breazeale Nuclear Reactor, where he has held a nonacademic faculty position since 1986. He was an electrical division officer in the U.S. Navy from 1970 to 1978, and from 1978 to 1984 he was a partner of Smith Hughes Associates, a residential construction, design, and land development company. **Samuel H. Levine** (bottom right) (PhD, nuclear physics, University of Pittsburgh, 1954) is professor of nuclear engineering at PSU. His current interests are in fuel management, neutron radiography, beta dosimetry, optimization techniques, reactor design, fast reactor physics, research reactor experiments, and power reactor operation. **Dhushy Sathianathan** (bottom left) (BS, mechanical engineering, Oklahoma State University, 1984; MS, mechanical engineering, PSU, 1986) is a second year doctoral student in the Department of Mechanical Engineering at PSU. His PhD research involves using neutron radiography as a fluid flow visualization tool.

*John M. Cimbala
Daniel E. Hughes
Samuel H. Levine
Dhushy Sathianathan*



HEAT TRANSFER AND FLUID FLOW

ASSESSMENT OF BOILING HEAT TRANSFER CORRELATIONS FOR ONCE-THROUGH STEAM GENERATORS

Yassin A. Hassan (BS, nuclear engineering, University of Alexandria, Egypt, 1968; MS, 1975, and PhD, 1979, nuclear engineering, University of Illinois; MS, mechanical engineering, University of Virginia) is on the faculty of the Department of Nuclear Engineering at Texas A&M University. He was previously with Babcock & Wilcox for 7 years. His interests include computational and experimental fluid flows, heat transfer, and analysis of conventional and space nuclear power systems.

Yassin A. Hassan

