



AUTHORS — APRIL 1983

FISSION REACTORS

THE EFFECT OF COOLANT ORIFICING ON THE CORE PERFORMANCE OF A HETEROGENEOUS LIQUID-METAL FAST BREEDER REACTOR

*Mamoru Konomura
Yoshiaki Oka
Shigehiro An*

Mamoru Konomura (top) (MS, nuclear engineering, University of Tokyo, 1980) is enrolled in the doctor of engineering course at the University of Tokyo. His interest is in the core design of fast breeder reactors (FBRs). **Yoshiaki Oka** (center) (Dr. Eng., University of Tokyo, 1974) is an associate professor at the Nuclear Engineering Research Laboratory of the University of Tokyo (UTNL). His current research interests include core design of medical-purpose reactors and radiation shielding. **Shigehiro An** (bottom) (Dr. Eng., University of Tokyo, 1963) is a professor at UTNL. His research interests include core design of FBRs and medical purpose reactors.



NUCLEAR SAFETY

AN EMERGENCY MEASUREMENT SYSTEM FOR THE RAPID ASSESSMENT OF ENVIRONMENTAL EXPOSURE

*Karl Heinemann
Ralf Hille
Kurt Jürgen Vogt*

Karl Heinemann (top) (Dr., nuclear physics, Philipps-University Marburg, 1970) is involved in release control and environmental monitoring at the Department of Safety and Radiation Protection at Kernforschungsanlage Jülich (KFA). His current technical interests include measurement of the different chemical forms of iodine and diffusion experiments. **Ralf Hille** (center) (Dr., physics and mathematics, University of Hamburg, 1974) is manager of the Department of Safety and Radiation Protection at KFA. His responsibility comprises the emergency response organization for nuclear facilities. He is engaged in the development of administrative and technical procedures for disaster control. **Kurt Jürgen Vogt** (bottom) (Dr. Ing., nuclear engineering, TH Aachen, 1970) was responsible for environmental protection in the Department of Safety and Radiation Protection at KFA. He died on June 15, 1982.



SIMPLE REACTOR MODEL SIMULATION OF A LOFT ATWS EVENT

J. Louis Tylee

J. Louis Tylee (BS, 1972, and MS, 1974, mechanical engineering, University of California, Davis; PhD, electrical engineering, University of Idaho, 1982) is supervisor of the Advanced Control and Estimation Section at EG&G Idaho, Inc. For the



past four years, he has been investigating applications of optimal estimation and control theory to nuclear power plant systems. Prior to joining EG&G, he was an engineer with General Electric Company. His current research interests include developing low-order, accurate process models (especially using bond graph techniques), failure detection methods, practical uses of state estimation, and microcomputer applications.

EVALUATION OF VOLATILE AND GASEOUS FISSION PRODUCT BEHAVIOR IN WATER REACTOR FUEL UNDER NORMAL AND SEVERE CORE ACCIDENT CONDITIONS

Jeffrey Rest

Jeffrey Rest (BS, physics, University of Illinois, 1966; MS, physics, University of Illinois, Champaign-Urbana, 1968; PhD, theoretical physics, University of Wisconsin, 1972) is group leader of the Analytical Modeling Group in the Materials Science and Technology Division at Argonne National Laboratory. His technical interests currently are in nuclear fuel rod performance modeling, the behavior of volatile and gaseous fission products in nuclear fuel during normal and accident conditions, and lifetime evaluation of fusion reactor materials.



FUEL CYCLES

A MODIFIED BORRESEN COARSE-MESH COMPUTATION FOR A THREE-DIMENSIONAL PRESSURIZED WATER REACTOR BENCHMARK PROBLEM

*Chang Hyo Kim
Samuel H. Levine*

Chang Hyo Kim (top) (ScD, nuclear engineering, Massachusetts Institute of Technology, 1972) is on the nuclear engineering faculty of the College of Engineering, Seoul National University. For the last several years he has been engaged in reactor physics analysis as well as computer code development for the in-core fuel management of the pressurized water reactor and Canada deuterium uranium pressurized heavy water reactor. **Samuel H. Levine** (PhD, nuclear physics, University of Pittsburgh, 1954) is professor of nuclear engineering and director of the Breazeale Nuclear Reactor at The Pennsylvania State University. His technical interests currently are in fuel management, neutron spectrum measurements, research with radiation sources, and TRIGA reactors.



CHEMICAL PROCESSING

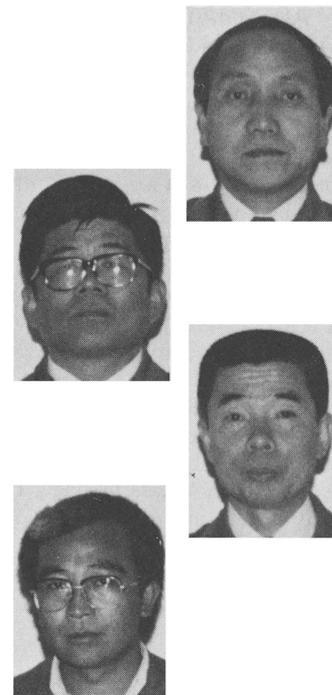
DEVELOPMENT OF A PROCESS FOR THE CO-CONVERSION OF Pu-U NITRATE MIXED SOLUTIONS TO MIXED-OXIDE POWDER USING A MICROWAVE HEATING METHOD

*Masumichi Koizumi
Katsuyuki Ohtsuka
Hiroto Isagawa
Hideo Akiyama
Akio Todokoro*

Masumichi Koizumi (right) (Dr. Ph., physical science, Hokkaido University, 1955) is a deputy director of the Tokai Works of the Power Reactor and Nuclear Fuel Development



Corporation (PNC). Since 1956 he has been engaged in the field of plutonium fuel cycle development, especially plutonium fuel fabrication techniques. **Katsuyuki Ohtsuka** (top right) (B. Eng., mining engineering, Hokkaido University, 1957) is a general manager of the Waste Management Section at the Oarai Engineering Center of PNC. He has been engaged in the design and administration work of Tokai Reprocessing Plant since 1966. His current technical interests are in the areas of microwave utilization for nuclear fuel cycle development. **Hiroto Isagawa** (top left) (Dr. Eng., applied chemistry, University of Tokyo, 1970) is a senior staff member of the Plutonium Fuel Division of PNC. In the period between 1977 and 1981, he worked on the research and development of a co-conversion technique for the plutonium nitrate solution. **Hideo Akiyama** (bottom right) (B. Eng., mechanical engineering, Keio University, 1960) is a general manager of the Plutonium Conversion Technology Development Section of PNC. He has been engaged in the research and development of plutonium conversion techniques since 1976. His current interests are with the plutonium balance in the nuclear fuel cycle. **Akio Todokoro** (bottom left) (M. Eng., applied chemistry, Gunma University, 1971) is an engineering manager at the Plutonium Conversion Technology Development Section of PNC. He has been engaged in the research and development of co-conversion techniques of plutonium nitrate solutions since 1977.

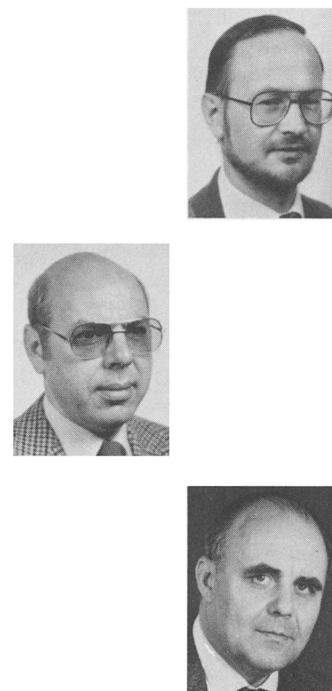


NUCLEAR FUELS

MASS SPECTROMETRIC STUDY OF THE POTENTIAL OF Al_2O_3/SiO_2 ADDITIVES FOR THE RETENTION OF CESIUM IN COATED PARTICLES

*K. Hilpert
R. Odoj
H. W. Nürnberg*

K. Hilpert (top) [diploma, physics, University of Mainz, 1969; PhD, physical chemistry, University of Bonn, Federal Republic of Germany (FRG), 1973] is group leader of the Institute of Applied Physical Chemistry at the Nuclear Research Center Jülich, and he gives lectures as privatdozent at the Technical University of Darmstadt. His research interests lie in the field of fission product transport in high-temperature gas-cooled reactors, metal halide discharge lamps, and fundamental aspects of high-temperature chemistry. **R. Odoj** (center) (diploma, chemistry, 1973; PhD, physical chemistry, 1978, University of Bonn, FRG) is group leader of the Institute of Chemical Technology at the Nuclear Research Center Jülich. His research interests are the process chemistry of the nuclear fuel cycle and particularly the volatilization of the fission products and their compounds during solidification as well as their influence on the physical and chemical stability of the products for final disposal. **H. W. Nürnberg** (bottom) has been director of the Institute of Applied Physical Chemistry at the Nuclear Research Center Jülich since 1975 and professor of physical chemistry at the University of Bonn. His institute is engaged in the physico-chemical aspects of the high-temperature gas-cooled reactor, new procedures for electrochemical large-scale hydrogen production, and the environmental chemistry of toxic heavy metals and organic pollutants.



AN AUTOMATED PROCEDURE FOR SELECTING BOILING WATER REACTOR REFUELING POLICIES FOLLOWING OPERATIONAL PROBLEMS OR CHANGES

S. H. Yeh (top) (BS, nuclear engineering, National Tsing-Hua University, 1971; PhD, nuclear engineering, University of Cincinnati, 1980) is now employed at the Quadrex Corporation, Campbell, California. He is currently working on various nuclear engineering computational problems. **Alice Y. Ying** (center) (BS, nuclear engineering, National Tsing-Hua University, 1977; MS, nuclear engineering, University of Cincinnati, 1982) is currently a graduate student at the University of Cincinnati. She is now completing her PhD dissertation. **J. Weisman** (bottom) (PhD, University of Pittsburgh) is a professor of nuclear engineering and director of the Nuclear Engineering Program at the University of Cincinnati. Prior to joining the university in 1968, Weisman spent 18 years in industry, where his last position was manager of thermal and hydraulic analysis for the Westinghouse Electric Corporation Pressurized Water Reactor Division.

*S. H. Yeh
Alice Y. Ying
J. Weisman*



DECONTAMINATION OF RADIOACTIVE METAL SURFACES BY PLASMA ARC GOUGING

Osamu Kuriyama (top) (BS, applied chemistry, 1973; MS, applied chemistry, 1975, Tohoku University) is a research scientist at the Energy Research Laboratory (ERL) of Hitachi Ltd. specializing in surface chemistry. His current interests include the radioactive waste management and chemistry of nuclear waste. **Takao Koyama** (center) (BS, aeronautics, Tokyo University, 1964) is a senior research scientist at ERL specializing in hydraulics. His current interests include radioactive waste management and uranium enrichment. **Makoto Kikuchi** (bottom) (BS, chemistry, Tohoku University, 1968; PhD, chemistry, University of New York at Buffalo, 1973) is senior researcher and section manager of ERL. His work has been in radioactive waste management and reactor water chemistry.

*Osamu Kuriyama
Takao Koyama
Makoto Kikuchi*



MATERIALS

EFFECT OF HELIUM PRESSURE ON THE RESPONSE OF UNIRRADIATED UO₂ SUBJECTED TO THERMAL TRANSIENTS

G. R. Fenske (top) (PhD, nuclear engineering, University of Illinois-Urbana, 1980) has been involved in fast reactor safety research in the Materials Science and Technology Division of Argonne National Laboratory (ANL) since 1979. **R. B. Poeppel** (bottom) (PhD, materials science, Cornell University, 1969) is group leader of the Ceramics Group in the Materials Science and Technology Division of ANL. His areas of expertise include fission-gas-induced swelling and gas release in nuclear fuels; fuel element modeling; ceramic fabrication;

*G. R. Fenske
R. B. Poeppel
J. E. Emerson
P. M. Chapello
S. G. Das
R. H. Sevy*



high-temperature corrosion, mechanical, and transport properties of ceramics; and application of coatings for corrosion resistance. **J. E. Emerson** (top) (associate, mechanical engineering technology, Wentworth Institute, 1961) has been involved in reactor safety research at ANL since 1961. He is presently associated with the Materials Science and Technology Division at ANL. **P. M. Chapello** (bottom) (undergraduate studies, Lewis University, 1973) was involved in material science research at ANL from 1974 to 1982. He is presently employed by Barber-Coleman in the Environmental Controls Division. **S. G. Das** (photograph not available) (PhD, theoretical physics, University of Chicago, 1973) is currently involved in solid state and materials science research at ANL as a consultant with Corporate Computer Services of Warrenville, Illinois. **R. H. Sevy** (photograph not available) (MS, physics, University of Pittsburgh, 1954) has worked in the area of fast reactor safety for several years and is a staff physicist in the Reactor Analysis and Safety Division of ANL.



TEMPERATURE-DEPENDENT MICROHARDNESS OF A533-B REACTOR PRESSURE VESSEL STEELS

*Bryce L. Shriver
Thomas G. Hook*

Bryce L. Shriver (photograph not available) (PhD, metallurgical engineering, University of Missouri-Rolla, 1973) is a visiting assistant professor of nuclear engineering and materials science at the University of Virginia and serves as the supervisor of nuclear training at the North Anna Power Station. His research interests include irradiation effects in structural materials. **Thomas G. Hook** (photograph not available) (MS, nuclear engineering, University of Virginia, 1981) is serving as a nuclear engineer for EDS Nuclear, Inc., San Francisco, California.

NUCLEAR SAFETY

INVESTIGATIONS ON THE IMPROVEMENT OF THE IODINE FILTRATION CONCEPT OF PRESSURIZED WATER REACTORS

*H. Deuber
J. G. Wilhelm*

H. Deuber (top) (PhD, physical chemistry, University of Bonn, 1972) is working at the Karlsruhe Nuclear Research Center (KfK), Federal Republic of Germany, since 1973. His work includes research on the removal of airborne radioiodine by iodine filters and the environmental impact of airborne radioiodine released by nuclear facilities. **J. G. Wilhelm** (MS, chemistry, University of Mainz, 1962) has worked at KfK since 1962. From 1963 until 1966 he spent two and one-half years as a guest scientist at Oak Ridge National Laboratory. His primary research interest is in the field of nuclear filter technology. Since 1974 he has been the managing director of the Laboratory for Aerosolphysics and Filter Technology at KfK.



A LIQUID-METAL FAST BREEDER REACTOR FUELING CONCEPT FOR THORIUM UTILIZATION AND IMPROVED INHERENT SAFETY

Yuji Ishiguro

Yuji Ishiguro (BS, physics, Tokyo University of Education, 1962; PhD, nuclear engineering, North Carolina State University, 1973) taught reactor analysis and neutron transport theory at IPEN, São Paulo, Brazil, from 1973 to 1979. He is currently leader of a group that is designing a thorium-cycle breeder reactor that is of particular interest to Brazil.



METHOD FOR THE SEALING AND DECONTAMINATION OF RADIOACTIVE AND RADIOACTIVELY CONTAMINATED COMPONENTS AND MATERIALS

*Daniel Neupert
Peter Demtröder*

Daniel Neupert (top) (Dr. Rer. Nat., chemistry, University of Saarbrücken, 1978) is a scientist with NUKEM GmbH, Hanau, Federal Republic of Germany. His particular interests are methods and processes to minimize waste and improve personnel safety in nuclear technology. **Peter Demtröder** (chemical engineering, Fachhochschule of Krefeld, 1977) is an engineer in the Decommissioning Department of Transnuklear GmbH, Hanau, Federal Republic of Germany. He is mainly concerned with the volume reduction and transport of radioactive solid waste.

