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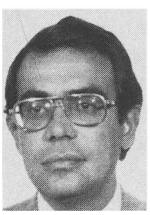
AUTHORS — MAY 1985

GAS CORE REACTOR RESEARCH PROGRAM AT THE UNIVERSITY OF FLORIDA

GAS CORE REACTOR NEUTRONICS — THEORETICAL MODELING AND EXPERIMENTAL VERIFICATION

Edward T. Dugan
Nils J. Diaz
Edward E. Carroll, Jr.
H. M. Forehand



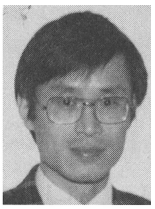
Edward T. Dugan (top) (BS, mechanical engineering, University of Notre Dame, 1968; MS, 1972, and PhD, 1976, nuclear engineering, University of Florida) is an associate professor of nuclear engineering sciences at the University of Florida. His primary technical interests include reactor physics, heat and mass transfer in nuclear systems, and systems operations, dynamics, and control for nuclear power plants. **Nils J. Diaz** (center) (PhD, nuclear engineering sciences, University of Florida, 1969) is currently associate dean for research and professor of mechanical engineering at California State University, Long Beach (CSULB). He recently moved to CSULB from the University of Florida, where he was a professor of nuclear engineering sciences and director of the nuclear facilities. He has been engaged in the development of gaseous core reactors since 1973 and was the director of the Multi-Disciplinary Advanced Reactor Research Group at the University of Florida, which conducted joint projects with Los Alamos and Oak Ridge National Laboratories. **Edward E. Carroll, Jr.** (bottom) (AB, physics, Harvard University, 1950; MS, 1952, and PhD, 1959, nuclear physics, University of Pennsylvania) is a professor of nuclear engineering sciences at the University of Florida. He was formerly a scientist in experimental reactor physics at the Westinghouse Bettis Atomic Power Laboratory. His current research interests include reactor noise measurement and analysis and gamma-ray imaging with diffracting crystals. A photograph and biography were not available for **H. M. Forehand**.

A STUDY OF CORROSION-RESISTANT MATERIALS FOR PULSED GASEOUS CORE NUCLEAR SYSTEMS

E. Dow Whitney
Dae Joon Kim
Dennis S. Tucker

E. Dow Whitney (right) (BA, chemistry, University of Buffalo, 1950; PhD, physical chemistry, New York University, 1954) is a professor in and head of the Ceramics Division, Department of Materials Science and Engineering, and an affiliate professor, Department of Nuclear Engineering Sciences, University of

Florida. He has worked on inorganic fluorine chemistry, particularly the synthesis of solid fluorine-containing polyhalogen oxidizers for high-energy propellant systems. His current interests are mainly nuclear materials and the thermodynamics/kinetics of high-pressure, high-temperature phase transformations in solids. **Dae-Joon Kim** (top) (BS, 1975, and MS, 1979, ceramic engineering, Yonsei University, Seoul, Korea; MS, materials engineering, University of Florida, 1983) is now a student in the doctorate program for materials and metallurgical engineering at the University of Michigan. Currently, he is working on the phase transformations and sintering behavior of the co-precipitated ZrO_2-Y_2O_3-Ta_2O_5 system. **Dennis S. Tucker** (bottom) (BA, mathematics, University of LaVerne, 1977; MS, ceramic engineering, Georgia Institute of Technology, 1978; PhD, materials science and engineering, University of Florida, 1983) is currently a staff member at Los Alamos National Laboratory and is studying the effects of neutron irradiation on ceramic and polymer materials for fusion reactor applications.



THERMOPHYSICAL PROPERTIES OF UF_6-He MIXTURES RELEVANT TO CIRCULATING GAS CORE REACTOR SYSTEMS

Calvin C. Oliver
Edward T. Dugan

Calvin C. Oliver (top) (PhD, mechanical engineering, Purdue University, 1963) joined the University of Florida in 1967 where his teaching and research interests are heat transfer, fluid mechanics, and acoustics. He is currently investigating problems of liquid transfer between vessels under microgravity conditions. If the project involving gas mixtures is extended, the effort will be experimental. **Edward T. Dugan** (BS, mechanical engineering, University of Notre Dame, 1968; MS, 1972, and PhD, 1976, nuclear engineering, University of Florida) is an associate professor of nuclear engineering sciences at the University of Florida. His primary technical interests include reactor physics, heat and mass transfer in nuclear systems, and systems operations, dynamics, and control for nuclear power plants.

NUCLEAR SAFETY

TRANSFER OF MOLECULAR FISSION PRODUCTS BETWEEN A GAS AND A SURFACE, WITH APPLICATION TO IODINE RETENTION IN A GRANULAR BED

Hans S. Häggblom

Hans S. Häggblom (Licentiate of Technology, electronics, Royal Technological Institute, Stockholm, 1958; Dr. Technology, reactor physics, Chalmers University of Technology, Gothenburg, Sweden, 1969) is a research engineer at Studsvik Energiteknik AB, Nyköping, Sweden. He is involved in the development of computational methods in the area of fission products and aerosol transport connected to severe reactor core accidents. He has worked earlier with development of computational methods for nuclear waste deposition and in the field of reactor physics.

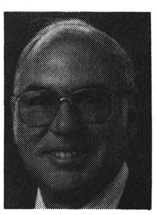
DECONTAMINATION OF CARBONATE CONTAINING PROCESS STREAMS IN NUCLEAR FUEL REPROCESSING BY ION EXCHANGE CHROMATOGRAPHY

Werner Faubel
Sameh A. Ali

Werner Faubel (top) (Dipl.-Chem., 1976, and Dr. rer. nat., fission yields and isomer ratios, 1980, University of Mainz; postdoctoral studies, pion-induced fission, Los Alamos National Laboratory, 1981) has been employed at the Institute of Radiochemistry of the Nuclear Research Center Karlsruhe (KfK) since 1981 where he has worked in the area of developing a waste treatment method of separation of fission products and actinides from waste solutions via ion exchange. **Sameh A. Ali** (Dipl.-Chem., 1964, and Dr. rer. nat., 1967, separation and purification of transplutonium elements, University of Karlsruhe) is head of the nuclear technology group at the Institute of Radiochemistry, KfK. He is in charge of processing highly irradiated transuranium target, waste treatment, and development of separation processes of fission products for medical use.

THE BEHAVIOR OF BREACHED BOILING WATER REACTOR FUEL RODS ON LONG-TERM EXPOSURE TO AIR AND ARGON AT 598 K

R. Kohli
D. Stahl
V. Pasupathi
A. B. Johnson, Jr.
E. R. Gilbert

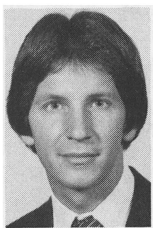


R. Kohli (top right) (PhD, School of Mines, Leoben, Austria, 1980) is currently responsible for postirradiation examination (PIE) at the Battelle Columbus Laboratories' (BCL) Hot Cell Facility. His research interests include spent fuel storage, fuel/cladding interactions, chemical thermodynamics, and high-temperature materials chemistry. **D. Stahl** (top left) (PhD, materials science, New York University, 1972), presently a program manager at BCL, was also employed at United Nuclear Corp. and Argonne National Laboratory. He has been involved with the irradiation behavior of nuclear fuels and materials for research reactors, light water power reactors, and breeder reactors under normal and off-normal conditions. His current interest is in the behavior of spent fuel and high-level waste glass under storage and repository conditions. **V. Pasupathi** (center right) (MS, materials science, University of Florida, 1967) is the manager of the hot cell facilities at BCL. His research interests are in the areas of PIE of reactor core components and evaluation of in-reactor performance. **A. B. Johnson, Jr.** (bottom left) (PhD, fuel technology, University of Utah, 1958), currently staff scientist at Battelle's Pacific Northwest Laboratory (BPNL) in Richland, was previously employed with the U.S. Air Force and General Electric Company, where he studied the corrosion of aluminum and zirconium alloys under simulated nuclear reactor conditions. He has also studied the effects of nuclear radiation on aqueous corrosion and investigated in-reactor failure mechanisms, stress corrosion, and decontamination of reactor coolant system materials. He is currently interested in spent fuel storage technology, including investigations of light water reactor (LWR) fuel integrity in wet and dry storage. **E. R. Gilbert** (bottom right) (PhD, engineering sciences, Washington State

University, 1970) currently manages projects to develop design bases for interim and monitored retrievable dry storage of spent LWR fuel at BPNL. He has been involved in research in radiation effects on fissile and nonfissile materials, alloy development for breeder and fusion reactors, and applied physical and mechanical properties of materials.

FCODE-BETA/SS: A FUEL PERFORMANCE CODE FOR STAINLESS STEEL CLAD PRESSURIZED WATER REACTOR FUEL

Richard W. Smith
Gary S. Was

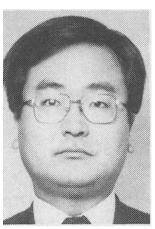


Richard W. Smith (top) [BS, nuclear engineering, The University of Michigan (UM), 1981] is a doctoral candidate in the Department of Nuclear Engineering at UM. His research interests, in addition to fuel performance modeling, include the mechanisms of irradiation creep and hydrogen embrittlement in metals and alloys. **Gary S. Was** (ScD, nuclear materials engineering, Massachusetts Institute of Technology, 1980) is an assistant professor in the Department of Nuclear Engineering at UM. His current interests include radiation effects on surface and bulk properties of alloys.

HEAT TRANSFER AND FLUID FLOW

SUBCHANNEL ANALYSIS PROGRAM FOR BOILING WATER REACTOR FUEL BUNDLES BASED ON FIVE CONSERVATION EQUATIONS OF TWO-PHASE FLOW

Yasunori Bessho
Sadao Uchikawa

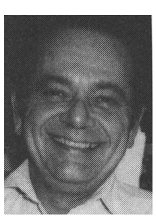


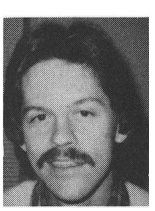
Yasunori Bessho (top) (MS, nuclear engineering, Kyoto University, Japan, 1975) has worked in the area of boiling water reactor (BWR) core management and nuclear thermal-hydraulic stability for nine years at Energy Research Laboratory (ERL), Hitachi, Ltd. His current technical interests include BWR thermal hydraulics. **Sadao Uchikawa** (PhD, nuclear engineering, University of Tokyo, Japan, 1982) is a member of the Nuclear Reactor System Design Section of ERL. His current technical interests include BWR core design and numerical simulation of nuclear and thermal-hydraulic phenomena.

ANALYSES

MULTIREGION CONCENTRATION DIFFUSION COEFFICIENT DETERMINATION USING DAVIDON'S VARIABLE METRIC METHOD

Clarence E. Lee
Joe W. Durkee





Clarence E Lee (top) (BS, physics, Universilty of California, Berkeley, 1953; MA, physics, Cornell, 1962; PhD, physics, University of Colorado, 1973) worked at the Los Alamos National Laboratory (LANL) from 1953 to 1978, when he joined Texas A&M University as a professor of nuclear science. His research interests include numerical and analytical transport and diffusion methods for neutrons, charged particles, fission product, and thermal gas-cooled reactor analysis. **Joe W. Durkee**

(BS, 1979; MEng, 1981; and PhD, 1983, nuclear engineering, Texas A&M University) recently joined the LANL space reactor group. His research interests include numerical and analytical methods, thermal hydraulics, and reactor design.

THE INTERNATIONAL DEMO-RAMP-II PROJECT AT STUDSVIK

H. Mogard
H. Knaab
U. Bergenlid
G. Lysell

H. Mogard (top right) (MSc, metallurgy, Royal Institute of Technology, Stockholm, 1949) is manager of international fuel projects at Studsvik Energiteknik AB. His special interest is the pellet/clad interaction performance of fuel rods. **H. Knaab** (top left) (Diplom-Ingenieur, mechanical engineering, Technische Hochschule Aachen, Germany, 1957) is manager of the main department for light water reactor fuel performance evaluation and fuel service, Kraftwerk Union AG, Erlangen. His work is primarily in the irradiation testing of fuel and core materials in test facilities of research reactors and power reactors as well as in the development and application of postirradiation examination techniques in spent fuel pools. One of his current technical interests is the behavior of fuel rods under steady-state and transient operating conditions at high burnup. **U. Bergenlid** (bottom right) (MSc, engineering physics, Royal Institute of Technology, Stockholm, 1953) is responsible for nondestructive examinations at the R2 reactor. **G. Lysell** (bottom left) (MSc, engineering physics, Chalmers University of Technology, Gothenburg, 1970) is working at the hot cell laboratory of Studsvik Energiteknik AB.