



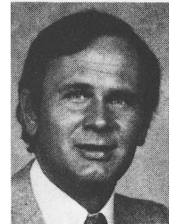
AUTHORS — NOVEMBER 1980

REACTORS

RECYCLING OF ACTINIDES IN LIGHT WATER REACTORS

Sunanta Patrashakorn (top) (BS, physics, 1971, and MS, nuclear technology, 1974, Chulalongkorn University, Bangkok, Thailand; MS, nuclear engineering, University of Arizona, 1979) has been a nuclear physicist in the Physics Division of The Office of Atomic Energy for Peace, Bangkok, Thailand, since 1971 (on leave). She was awarded an International Atomic Energy Agency fellowship August 1977–July 1980. At present, she is a graduate student in the Department of Nuclear Engineering of The University of Arizona. **Reiner Papp** (MS, nuclear engineering, Vienna Technical University, 1967; PhD, nuclear engineering, Atomic Institute of Austrian Universities, 1971) spent 2½ years on sabbatical leave as visiting professor in the Department of Nuclear Engineering of The University of Arizona and is presently doing research in comparative environmental impact analysis of coal and nuclear energy at the Institute of Applied Systems Analysis of the Karlsruhe Nuclear Research Center in the Federal Republic of Germany.

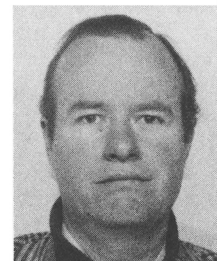
*Sunanta Patrashakorn
Reiner Papp*



AN APPRAISAL OF SUBCOOLED BOILING AND SLIP RATIO FROM MEASUREMENTS MADE IN THE LINGEN BOILING WATER REACTOR

Graeme Nash (BA, natural sciences and theoretical physics, University of Cambridge, 1966) joined the United Kingdom Atomic Energy Authority in 1969 as a theoretical physicist at the Atomic Energy Establishment, Winfrith, Dorset. He worked from 1969 to 1979 on the development of theoretical methods of light water reactor fuel management and core physics simulation. Since 1979, he has worked in North Sea oil reservoir engineering and computer simulator development.

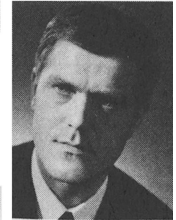
G. Nash



UNSTEADY DISPERSED FLOW HEAT TRANSFER UNDER LOSS-OF-COOLANT ACCIDENT RELATED CONDITIONS

A. Ghazanfari (top) (PhD, mechanical engineering, Universities of Aachen and Bochum) has performed research in the area of two-phase flow heat transfer and thermohydraulics. Since joining the Nuklear-Ingenieur-Service Consulting Engineers in 1979, he has been involved in the international two-dimensional/three-dimensional project management at Gesellschaft für Reaktorsicherheit (GRS). **E. F. Hicken** (center) (PhD, extraordinary professor, engineering, Universities of Braunschweig and Bochum) is now a division manager at GRS. His work has been in the areas of heat transfer and fluid dynamics of single and two-phase flow, emergency core cooling system and containment problems, and research and development programs. **A. Ziegler** (bottom) (PhD, physics, University of Bonn) is a professor of nuclear engineering at the University of Bochum and a member of the German Reactor Safety Commission as an expert in reactor dynamics, thermodynamics, and design. His work has been in the areas of heavy water, light water, and fast breeder reactors.

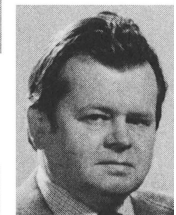
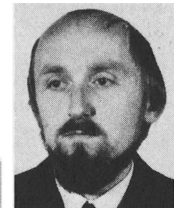
*A. Ghazanfari
E. F. Hicken
A. Ziegler*



DENITRATION OF AQUEOUS WASTE SOLUTIONS FROM THE NUCLEAR FUEL REPROCESSING

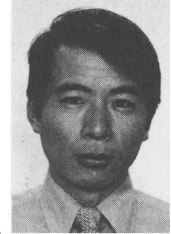
M. Kelm (top right) (chemistry, Technische Universität Berlin, 1971; Dr. Ing., radiation chemistry, Hahn Meitner Institute, Berlin, 1974) is group leader in the field of medium level radioactive waste treatment at Kernforschungszentrum Karlsruhe. His special interests are denitration and cementation of radwaste. **B. Oser** (top left) (Ing. Grad., chemical engineering, Fachhochschule Mannheim, 1972) worked on applied radiation chemistry at Imhausen Chemical Laboratory in 1973, and is currently specializing in the denitration of radwaste at Kernforschungszentrum Karlsruhe. **S. Drobnik** (bottom right) (Ing. Grad., chemical technology, Technical University Belgrad, Yugoslavia, 1954) worked for three years in the nuclear research center "B. KIDRIC" in Belgrad, and since 1964 has been at Kernforschungszentrum Karlsruhe working on radwaste treatment. He is currently specializing in the treatment and solidification of spent solvent and the denitration of aqueous solutions from the reprocessing of nuclear fuel. **W. D. Deckwer** (bottom left) (chemistry, 1969, and Dr. rer. nat., technical chemistry, 1973, Technische Universität Berlin) has taught technical chemistry and reaction engineering at the Technische Universität Hannover since 1976. His main research interests are applied reaction kinetics and multiphase reactors.

*M. Kelm
B. Oser
S. Drobnik
W. D. Deckwer*



IN-PILE DIAMETER MEASUREMENT OF LIGHT WATER REACTOR TEST FUEL RODS FOR ASSESSMENT OF PELLET-CLADDING MECHANICAL INTERACTION

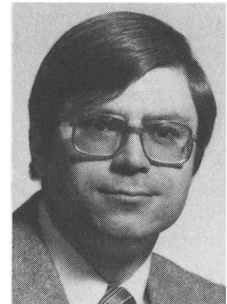
*Masaaki Uchida
Michio Ichikawa*



Masaaki Uchida (top) (BS, nuclear technology, University of Tokyo, 1966) was attached to the Organization for Economic Cooperation and Development Halden Reactor Project in Norway from 1976 through 1978 to participate in light water reactor (LWR) fuel irradiation experiments including the one covered by the present paper. His current interest is the modeling of LWR fuel rod deformation under accident conditions. **Michio Ichikawa** (BS, metallurgy, University of Tokyo, 1958; Dr., nuclear technology, University of Tokyo, 1971) has been engaged in the study of LWR fuel behavior under irradiation. His current interest is LWR fuel behavior modeling both under normal and off-normal operating conditions.

BEHAVIOR OF DEFECTIVE PRESSURIZED WATER REACTOR FUEL RODS DURING POWER RAMP AND POWER-COOLING-MISMATCH CONDITIONS

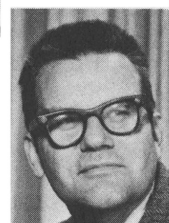
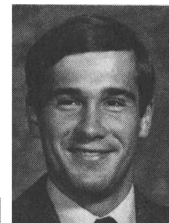
Douglas W. Croucher



Douglas W. Croucher (BS, engineering physics, University of California, Berkeley, 1969; MS, 1971, and PhD, 1975, nuclear engineering, University of New Mexico) is a supervisor in the Thermal Fuels Behavior Program at EG&G Idaho, Inc. His research interests include transient fuel rod behavior, fission product release and transport, and reactor safety. At present, he is engaged in the development of new test programs for the Power Burst Facility and the Engineering Test Reactor at the Idaho National Engineering Laboratory.

A COMPARISON OF MODELS FOR ELECTRIC GENERATION PLANNING

*Jose L. Del Valle
Mujid S. Kazimi
Fred C. Schweppe*

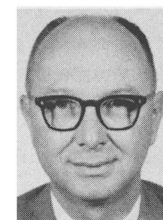
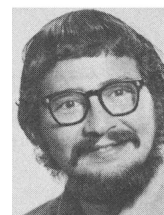
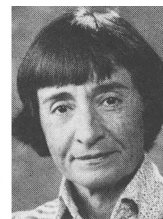


Jose L. Del Valle (top) [Ing. Minas, Polytechnical University of Madrid, 1976; MS, nuclear engineering, Massachusetts Institute of Technology (MIT), 1978; MBA, Harvard Business School, 1980] is currently interested in the economics and financing of the electric utility industry. **Mujid S. Kazimi** (center) (BS, University of Alexandria, Egypt, 1969; MS, 1971, and PhD, 1973, nuclear engineering, MIT) is associate professor of nuclear engineering at MIT. His research interests include engineering and safety analysis of nuclear systems. **Fred C. Schweppe** (bottom) (BS, 1955, and MS, 1956, electrical engineering, University of Arizona; PhD, electrical engineering, University of Wisconsin, 1958) was with the Lincoln Laboratory of MIT, Lexington from 1958 until 1966. He is presently professor of electrical engineering at the Electric Power Systems Engineering Laboratory of MIT, Cambridge. His general research interests are in the areas of control operations and planning for interconnected bulk-power systems; economic, environmental, and reliability (security) trade-offs; and demand modeling.

MEASUREMENTS AND CALCULATIONS OF THE NEUTRON EMISSION SPECTRA FROM MATERIALS USED IN FUSION-FISSION REACTORS

Luisa F. Hansen (top right) (PhD, nuclear physics, University of California, Berkeley, 1959) is a senior physicist in the Experimental Physics Division at Lawrence Livermore National Laboratory (LLNL). She has been involved for many years in the measurements and calculations of neutron transport for materials of interest to fusion and weapon research (Livermore Pulsed Sphere Program). She has worked in the conceptual design of blankets for laser driven hybrid reactors in collaboration with Bechtel and Westinghouse. **Calvin Wong** (top left) (PhD, nuclear physics, California Institute of Technology, 1953) is a senior research physicist at LLNL. His research interests include investigations of (p,n) reactions and fusion reactor neutronics. **Ted Komoto** (center right) (BS, physics, Fresno State University, 1956) has worked with Monte Carlo codes at LLNL since 1973. **Bertram Pohl** (bottom left) (MS, physics, University of Michigan, 1962) has been active in neutron time-of-flight experiments and computer coding since 1964 at LLNL. **Robert J. Howerton** (bottom right) (MS, mathematics, Northwestern University, 1946) is assistant division leader of the Theoretical Physics Division of LLNL and group leader of the Physical Data Group. His responsibilities include overall supervision of nuclear data evaluation and development of Monte Carlo codes for the transport of neutrons, photons, and charged particles required for LLNL programs. His research interests are primarily concerned with development of methods for providing evaluated nuclear data.

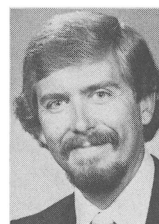
*L. F. Hansen
C. Wong
T. T. Komoto
B. A. Pohl
R. J. Howerton*



NONDESTRUCTIVE EXAMINATION OF A DEFECTIVE SILVER BRAZE USING RESONANCE-NEUTRON RADIOGRAPHY

J. W. Behrens (top) (BS, University of Illinois, 1970; MS, University of California, 1976) joined the Lawrence Livermore Laboratory (LLL) in 1970 and then the National Bureau of Standards (NBS) in 1978. At LLL he was responsible for an extensive experimental program to measure fast neutron-induced fission cross sections at the LLL 100-MeV electron Linac. His specialties include advanced neutron detector research and development and studies of fission systematics. For the past several years he has been developing high spatial resolution position-sensitive detectors for use in nondestructive analysis (NDA) and nondestructive evaluation (NDE) applications at the NBS electron Linac. **R. A. Schrack** (center) (BA, 1949, and MS, 1950, University of California, Los Angeles; PhD, University of Maryland, 1961) has been a physicist at the NBS for the past 30 years. He has carried out research in particle physics, mainly on the interactions of neutral mesons and neutrons using the accelerators and reactor at NBS. For the past several years much of his work has been related to NDA and NDE applications of neutron measurement techniques. **C. D. Bowman** (bottom) (BS, Virginia Polytechnic Institute, 1956;

*J. W. Behrens
R. A. Schrack
C. D. Bowman*



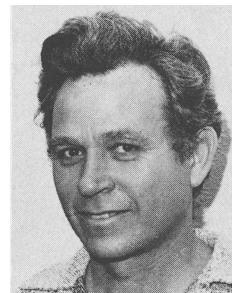
MA, 1958, and PhD, 1961, Duke University) joined LLL in 1961 and went to the NBS in 1972. At LLL he led the research program on the 100-MeV electron Linac and at NBS is now principal scientist in the Nuclear Radiation Division. He has worked primarily in the fields of neutron and photonuclear physics and applications of associated measurement methods.

TECHNIQUES

THE USE OF THE REACTION $^{93}\text{Nb}(n,n')^{93m}\text{Nb}$ FOR FAST NEUTRON FLUX MEASUREMENT

Gad Shani

Gad Shani (BSc, electrical engineering, 1964, and MSc, nuclear science, 1966, Technion, Israel; PhD, nuclear engineering, Cornell University, 1970) is presently associate professor of nuclear engineering at Ben-Gurion University of the Negev, Israel. He is engaged in the neutronics and first-wall interaction in fusion reactors. His past activities have been in the fields of neutron physics, experimental reactor physics, application of nuclear radiation, and nuclear instrumentation.

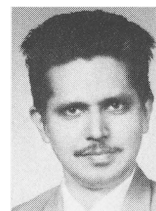


REACTORS

ANALYSIS OF THE BeO-REFLECTED URANIUM-233 NITRATE SOLUTION SUBCRITICAL MULTIPLICATION EXPERIMENTS CONDUCTED AT PURNIMA LABORATORIES

*P. K. Job
M. Srinivasan
V. R. Nargundkar*

Panakkal Kunjathu Job (top) [BSc, physics, Kerala University, 1970; graduate, Bhabha Atomic Research Centre (BARC) Training School, 1971] has been actively associated with the experimental criticality program on ^{239}Pu - and ^{233}U -fueled small fast and thermal systems at BARC, Trombay. Presently he is engaged in preparations for the startup of a BeO-reflected ^{233}U uranyl nitrate solution critical experiment. **Mahadeva Srinivasan** (center) (BSc, physics, University of Madras, 1955; graduate, BARC Training School, 1958; participant at the International Institute of Nuclear Science and Engineering, Argonne National Laboratory, 1961 and 1962; MSc, physics, University of Bombay, 1966) has been in charge of a critical experiments group at BARC since 1970. During 1968 and 1969 he was deputed to work at the Chalk River Nuclear Laboratories in Canada. His current interests include nuclear criticality physics, research reactor safety, noise analysis of nuclear systems, and experimental plasma pinch studies. **Vijay Nargundkar** (bottom) (MSc, physics, Karnataka University, 1956; PhD, pulsed neutron studies, University of Bombay, 1966) has been working at BARC since 1957. He has worked in the field of fission physics at Atomic Energy of Canada, Limited, Chalk River, Canada (1961 and 1962), pulsed fast reactors at the Joint Institute for Nuclear Research, Dubna, Soviet Union (1972), and fusion blanket neutronics at the Institute of Reactor Development, Jülich, Federal Republic of Germany (1977 and 1978). He has been the facility supervisor of the Purnima Critical Facility. His current interest is theoretical and experimental studies of fusion blanket neutronics.



METAL-MATRIX RADIOACTIVE WASTE FORMS PREPARED BY ELECTROCHEMICAL/GRAVITY CO-DEPOSITION

*N. H. Macmillan
R. Roy
P. T. B. Shaffer*

Norman H. Macmillan (top) (BA, MA, and PhD, metallurgy and materials science, Cambridge University; MA, applied physics, Harvard) spent five years with Martin-Marietta Laboratories and a year with the University of Aberdeen before assuming his present position at The Pennsylvania State University (Penn State). He also spent one summer as a visiting scientist with the Danish Atomic Energy Commission. His principal interests are the fundamental aspects of the mechanical behavior of solids. **Rustum Roy** (center) holds dual professorships in geochemistry and solid state at Penn State, where he is director of the Materials Research Laboratory and chairman of the Science, Technology, and Society Program. He is also a member of the National Academy of Engineering, a fellow of the American Ceramic Society, and a past president of the Materials Research Society. His research interests include materials synthesis and characterization, innovations in education, and the interrelation of science, technology, and society. **Peter T. B. Shaffer** (bottom) (BS, chemistry, Massachusetts Institute of Technology, 1951; PhD, inorganic chemistry, Penn State, 1956) after three years with E. I. Du Pont de Nemours and Company, Inc., in 1958, joined the Research and Development Division of The Carborundum Company. He currently provides technical support for the Nuclear Business Unit of the Electrominerals Division. Most of his more than 60 research publications have been concerned with the preparation and properties of SiC, B₄C, and other refractory carbides, borides, nitrides, and silicides.

