



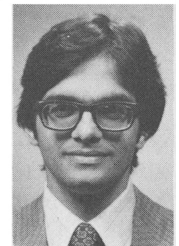
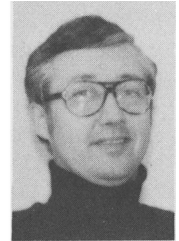
AUTHORS — NOVEMBER 1977

CRITICAL REVIEW

IDENTIFICATION OF NUCLEAR SYSTEMS

T. W. Kerlin (top) (PhD, nuclear engineering, The University of Tennessee, 1966) is a professor in the Nuclear Engineering Department at The University of Tennessee and is director of the Power Plant Dynamics, Control and Testing Division of The University of Tennessee Engineering Experiment Station. He is interested in power plant dynamic modeling and testing. Gilles Zwingelstein (center) (Doctorat d'Etat, automatic control, Bordeaux University, 1977) is working at Centre d'Etudes Nucleaires de Saclay, where he manages a group involved in system analysis and signal processing. His interests include dynamic analysis, surveillance, diagnosis, and control of pressurized water reactors and fast breeder reactors. Belle R. Upadhyaya (bottom) (BE, mechanical engineering, Mysore University, India, 1965; MAsC, mechanical engineering, University of Toronto, 1968; PhD, systems engineering, University of California at San Diego, 1975) has, since 1975, been with the Department of Nuclear Engineering of The University of Tennessee at Knoxville, where he is presently a research associate. His current work includes research and development in data processing applied to nuclear power reactors, empirical model development, parameter estimation and control, and estimation of sensor characteristics by time series methods.

T. W. Kerlin
G. C. Zwingelstein
B. R. Upadhyaya

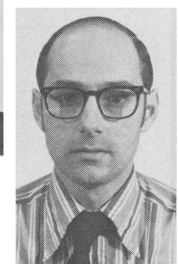


RADIATION ENVIRONMENTS IN NUCLEAR REACTOR POWER PLANTS

RADIATION QUALIFICATION OF NUCLEAR REACTOR COMPONENTS

James A. Naber (top) (PhD, Purdue University, 1965) is manager of the Physics Division and vice-president of IRT Corporation in San Diego. He has specialized in the study of electrical and optical properties of solid-state materials in radiation environments. He is currently chairman of the Institute of Electrical and Electronic Engineers Committee formulating standards for qualification of reactor components. Norman A. Lurie (PhD, University of Michigan, 1969) is manager of the Nuclear and Applied Science Department at IRT. His current interests are in nuclear measurements, dosimetry, and radiation transport.

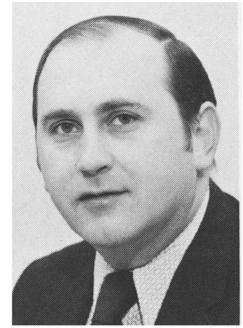
J. A. Naber
N. A. Lurie



NORMAL OPERATING RADIATION LEVELS IN PRESSURIZED WATER REACTOR PLANTS

James Sejvar (BS, engineering physics, South Dakota State University, 1965) is a senior engineer working at Westinghouse Electric Corporation in the areas of radiation analysis and shielding. His experience includes the determination of fission and corrosion product source terms, dose analyses, and plant radiation monitoring in pressurized water reactors. He is currently involved with the Westinghouse Program on Maintaining Occupational Radiation Exposure As Low As Is Reasonably Achievable.

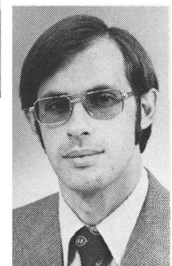
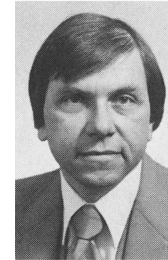
J. Sejvar



CALCULATION OF ACCIDENT DOSES TO EQUIPMENT INSIDE CONTAINMENT OF POWER REACTORS

Michael J. Kolar (top) (PhD, nuclear engineering, Case Western Reserve University, 1968) is principal nuclear engineer and manager of the Applied Engineering Analyses Section at Gilbert/Commonwealth's Jackson, Michigan office. His current interests include reactor safety, dynamic analysis of piping systems, and computer graphics, Nolan C. Olson (BS, engineering, Idaho State University, 1972) is a senior research engineer with Allied Chemical Corporation, Idaho Chemical Programs. His interests include radiological dose assessment and shielding. He is currently involved in the assessment of the suitability of materials and components for use in a waste calcining operation.

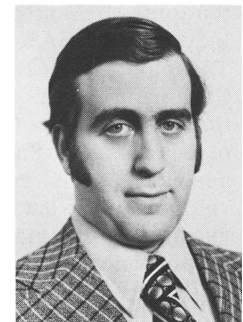
*Michael J. Kolar
Nolan C. Olson*



CONSIDERATION OF THE EFFECT OF IODINE PLATEOUT ON CONTAINMENT POST-LOSS-OF-COOLANT ACCIDENT DOSES

Eugene Normand (BS, chemical engineering, Polytechnic Institute of Brooklyn, 1964; MS, nuclear engineering, University of Washington, 1966; PhD, nuclear engineering, University of Washington, 1969) is the group leader of the Project Shielding Group in the Nuclear Safeguards and Licensing Division of Sargent & Lundy Engineers. His current interest is in radiation protection aspects of the design of nuclear power plants, in particular those related to shielding, "skyshine" dose rates, and radiation environments for equipment.

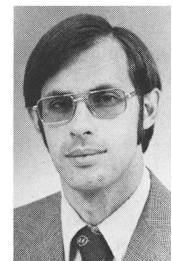
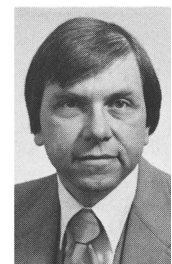
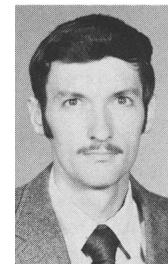
Eugene Normand



POST-LOSS-OF-COOLANT ACCIDENT DOSES TO PRESSURIZED WATER REACTOR EQUIPMENT

Michael J. Kolar (top) (PhD, nuclear engineering, Case Western Reserve University, 1968) is principal nuclear engineer and manager of the Applied Engineering Analyses Section at Gilbert/Commonwealth's Jackson, Michigan office. His current interests include reactor safety, dynamic analysis of piping systems, and computer graphics. John R. McCarty (center) (MS, nuclear engineering, University of Oklahoma, 1970) is a nuclear engineer with Gilbert/Commonwealth. He performs thermal-hydraulic and accident analyses for the design and licensing of nuclear power plants. Nolan C. Olson (bottom) (BS, engineering, Idaho State University, 1972) is a senior research engineer with Allied Chemical Corporation, Idaho Chemical Programs. His interests include radiological dose assessment and shielding. He is currently involved in the assessment of the suitability of materials and components for use in a waste calcining operation.

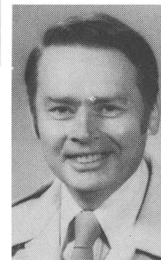
*Michael J. Kolar
John R. McCarty
Nolan C. Olson*



STABILITY OF LITHIUM NIOBATE ON IRRADIATION AT ELEVATED TEMPERATURE

William Primak (top left) (PhD, physical chemistry, Polytechnic Institute of Brooklyn, 1946) has since 1946 been at the Argonne National Laboratory (ANL), where he has been engaged in the investigation of radiation effects that may occur in reactor, accelerator, and other applications of nonmetallic materials. His technical interests have been in dimensional changes and optical and electrical properties. A. Peter Gavin (top right) (BS, chemical engineering, Northwestern Technological Institute, 1945) has been employed by ANL for the past 20 yr as an engineer, responsible for design, development, and operation of reactor components and systems. For the past 8 yr, he has been involved exclusively with research and development of acoustic monitoring systems for liquid-metal fast breeder reactors. T. T. Anderson (bottom left) (MS, mechanical engineering, Stanford University, 1958) is a mechanical engineer at ANL. He is working on transducer development for fast reactor safety experiments. His previous studies with the ANL Surveillance Program included development of acoustic waveguides, high-temperature, sodium-immersible microphones and accelerometers, and acoustic surveillance techniques and instrumentation. Emmet M. Monahan (bottom right) (BS, physics, Fairfield University, 1967; MA, physics, University of Texas at Austin, 1975) is a scientific assistant in the Solid State Science Division at ANL. His current interest is ion bombardment of insulators.

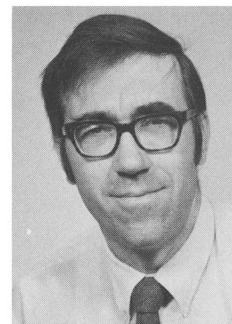
*William Primak
A. P. Gavin
T. T. Anderson
Emmet Monahan*



A POSSIBLE MECHANISM FOR CORROSION PRODUCT TRANSPORT AND RADIATION FIELD GROWTH IN A PRESSURIZED WATER REACTOR PRIMARY CIRCUIT

K. A. Burrill (B.Eng.Sc., University of Western Ontario, 1965; M.Eng., McMaster University, 1967; PhD, McMaster University, 1970, chemical engineering) is a member of the System Materials Branch at Chalk River Nuclear Laboratories, Atomic Energy of Canada Limited. His interest is in corrosion product transport in both water-cooled nuclear reactors and in heavy water production plants.

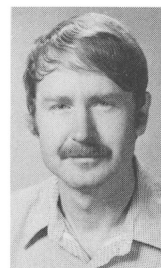
K. A. Burrill



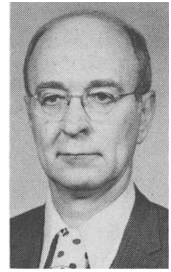
NUCLEAR REACTOR CONTROL SYSTEM DESIGN WITH SENSOR FAILURE

Laurence F. Miller (right) (BS, nuclear engineering, Kansas State University, 1964; MS, nuclear engineering, Kansas State University, 1966; PhD, nuclear engineering, Texas A&M University, 1976) is an assistant professor in the Department of Nuclear Engineering at The University of Tennessee. He is presently engaged in response time testing and analysis of resistance temperature detectors and has research interests in the design and analysis of

*L. F. Miller
R. G. Cochran
J. W. Howze*



reactor control systems. Robert G. Cochran (top) (PhD, The Pennsylvania State University) has been an associate professor at The Pennsylvania State University and is now a professor and head of the Department of Nuclear Engineering at Texas A&M University. He has professional interests in reactor engineering, fuel cycle analysis, power reactors and their environmental effects, and reactor operation and training. He is a registered professional engineer and a nuclear engineering consultant to industry and government. Jo W. Howze (bottom) (BA, 1965, BS, 1966, mechanical engineering; PhD, electrical engineering, Rice University, 1970) is currently an associate professor of electrical engineering at Texas A&M University. His specialty is theory and application of linear multivariable control systems. Other interests include digital signal processing, optimization theory, and aeroelasticity.

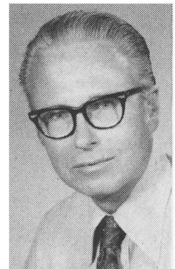
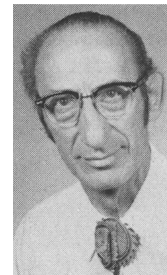


CHEMICAL PROCESSING

CONVERSION OF WASTE ZIRCALOY HULLS TO ZIRCONATE ION EXCHANGE MATERIALS FOR WASTE STABILIZATION

Herman S. Levine (top) (BS, chemistry, University of Pittsburgh, 1943; PhD, physical chemistry, University of Illinois, 1948) is a member of the Chemical Technology Division of Sandia Laboratories. He was involved in zirconium combustion and light water reactor safety studies. His current interest is radioactive waste management. E. J. Nowak (BS, chemical engineering, Northwestern University, 1958; PhD, chemical engineering, Princeton University, 1963) is currently a member of the technical staff in the Chemical Technology Division I at Sandia Laboratories. He is currently working on various aspects of nuclear waste management technology.

H. S. Levine
E. J. Nowak

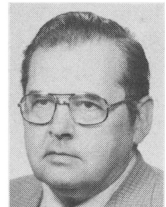


FUELS

THE PRODUCTION OF MOLTEN UO_2 POOLS BY INTERNAL HEATING: APPARATUS AND PRELIMINARY EXPERIMENTAL HEAT TRANSFER RESULTS

M. G. Chasanov (top) (PhD, physical chemistry, University of Delaware, 1952) is a staff member of the Argonne National Laboratory (ANL) and has worked in the nuclear field since 1952. W. H. Gunther (center) (BS, chemistry, De Paul University, 1952) is a scientific associate at ANL and has been in the nuclear energy field since 1956. L. Baker, Jr. (bottom) (BS, chemical engineering, Illinois Institute of Technology, 1949; PhD, chemistry, Illinois Institute of Technology, 1955) is manager of the Post-accident Heat Removal Section of the Reactor Analysis and Safety Division of ANL.

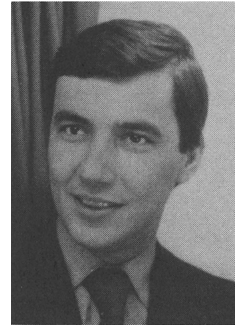
M. G. Chasanov
W. H. Gunther
L. Baker, Jr.



ON THE SIMULATION OF FAST BREEDER REACTOR PIN BEHAVIOR USING UO_2 PINS WITH DIRECT ELECTRICAL HEATING

A. Alexas

Alexander N. Alexas (Dipl. Phys., Universities of Heidelberg and Karlsruhe, 1971) has been working since 1969 at the Nuclear Research Centre at Karlsruhe, FRG, in the area of nuclear safety. His current interests are out-of-pile experiments on liquid-metal fast breeder reactor safety, with emphasis on UO_2 pin behavior and sodium fires. His previous work included the development of the experimental technique of the electrical pin burst facility.



MATERIALS

CALCULATION OF THE FRAGMENTATION OF UO_2 BY CAPACITOR DISCHARGE: NONEQUILIBRIUM MODEL

R. G. Alsmiller, Jr.

R. B. Perez

J. Barish

R. G. Alsmiller, Jr. (top) (PhD, physics, University of Kansas, 1957) is leader of the Applied Physics Calculations Group of the Neutron Physics Division at Oak Ridge National Laboratory (ORNL). For several years he has directed the theoretical research in this division in the areas of high-energy nucleon reactions and high-energy nucleon transport, with applications to the shielding of manned spacecraft and high-energy accelerators. R. B. Perez (center) (MS, chemistry, University of Valencia, Spain, 1952; MS, nuclear engineering, Massachusetts Institute of Technology, 1959; PhD, physics, University of Madrid, Spain, 1962) is a research staff member of the Neutron Physics Division at ORNL. He has worked in reactor physics and in neutron cross-section measurements and interpretation. J. Barish (bottom) (BS, mathematics and physical sciences, Memphis State University, 1962) is a research staff member of the Computer Sciences Division of Union Carbide Corporation Nuclear Division. Since 1963 he has worked with the Applied Physics Calculations Group of the Neutron Physics Division at ORNL. His major interest is in the development of numerical techniques to carry out high-energy nucleon transport calculations.

