



## AUTHORS — NOVEMBER 1978

### REACTORS

#### USE OF ZERO POWER PLUTONIUM REACTOR MEASUREMENTS AS A SUPPORT OF CRITICALITY PREDICTION FOR THE SNR-300

**Servais Pilate** (top right) (Civil Eng., Faculté Polytechnique, Mons, Belgium, 1962) joined Belgonucleaire in 1963, and was active in the German-Belgian-Dutch SNR-300 Project from its beginnings in 1967. He was attached for three years to the SNEAK team at Karlsruhe, and is now in charge of fast reactor physics for his company in Brussels. **Roger de Wouters** (top left) (Civil Eng., University of Brussels, Belgium, 1965) joined Belgonucleaire in 1967, where he worked in thermal reactor physics design before being involved in core design studies on the prototype SNR-300 and the SNR-2 large breeder. **Udo K. Wehmann** (center right) (Dipl. Phys., Dr. rer. nat., Universities of Göttingen and Bonn) has been involved since 1967 in the German Fast Breeder Program. Nuclear core design of KNK II, SNR 300, and SNR 2, evaluation of critical experiments, and general core optimization studies are his main areas of interest. **Fritz Helm** (bottom left) (Dipl. Phys., Erlangen, 1955; PhD, physical chemistry, Würzburg, 1959) was a physicist at Argonne National Laboratory from 1960 to 1967, and has been at the Karlsruhe Research Centre since 1967. His main field of work is the physics of fast reactors, and his present responsibility is the planning and coordination of research on the SNEAK fast critical facility. **Werner Scholtyssek** (bottom right) (Dipl. Phys., Würzburg, 1969) has worked at the Karlsruhe Research Centre since 1969. He was attached to the U.K. Atomic Energy Establishment at Winfrith in 1976 and 1977. His main field of work is experimental and analytical reactor physics, especially in the dosimetry field.

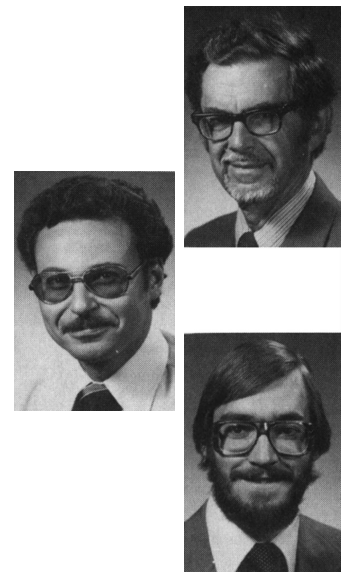
*S. Pilate  
R. de Wouters  
U. Wehmann  
F. Helm  
W. Scholtyssek*



#### TRITIUM PATHWAYS AND HANDLING PROBLEMS IN A LASER FUSION REACTOR

**Edwin M. Larsen** (top) (PhD, chemistry, Ohio State University, 1942) is a professor of chemistry at the University of Wisconsin (UW) at Madison. He joined the UW faculty in 1942, spent the period from 1943 to 1946 working on polonium at the Manhattan Project facility operated by Monsanto (Dayton), and returned to Madison in 1946. His research interests are in zirconium chemistry and inorganic lithium chemistry. **S. I. Abdel-Khalik** (center) (PhD, mechanical engineering, University of Wisconsin, 1973) is an assistant professor of nuclear engineering at UW at Madison. He joined the UW faculty in 1976 after two years of postdoctoral work in chemical engineering and one year with the nuclear industry. His work centers around laser fusion technology and fission reactor safety. **Mark S. Ortman** (bottom) (BS, chemistry and mathematics, Friends University, 1975) is a graduate student in chemistry at UW at Madison and has a research assistantship in the Nuclear Engineering Department. His research work involves the thermodynamic properties of lithium oxide.

*Edwin M. Larsen  
S. I. Abdel-Khalik  
Mark S. Ortman*



## IMPROVED LOAD FOLLOW STRATEGY FOR RETURN-TO-POWER CAPABILITY

**C. E. Meyer** (top right) (MS, nuclear engineering, University of Wisconsin, 1972) is a senior engineer with Westinghouse Nuclear Fuel Division. Since 1976, he has been associated with the Model 414 [3800-MW(thermal)] plant design in the areas of core control and plant availability. **C. L. Bennett** (top left) (BS, physics, Washington State University, 1962) is a senior engineer with Westinghouse Nuclear Fuel Division, responsible for the nuclear design of the Westinghouse Model 414 core. His current efforts are in core power distribution control and core protection system design. **D. J. Hill** (bottom right) (MS, engineering science, Purdue University, 1963) is a nuclear design group manager with the Westinghouse Nuclear Fuel Division, associated with the Model 414 plant design. His current interest is in alternate fuel cycles. **K. J. Dzikowski** (bottom left) (MS, nuclear engineering, Carnegie-Mellon University, 1973) is a fuel technology engineer for the Westinghouse Water Reactor Division Marketing. He has been associated with development programs to improve core control techniques and load follow flexibility.

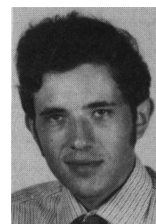
*C. E. Meyer  
C. L. Bennett  
D. J. Hill  
K. J. Dzikowski*



## A GENERALIZED TREATMENT OF HETEROGENEITY EFFECTS FOR THE SHIELDING FACTOR METHOD

**E. Kujawski** (top) (BS, physics, Polytechnic Institute of Brooklyn, 1965; MS, physics, Polytechnic Institute of Brooklyn, 1966; PhD, physics, Massachusetts Institute of Technology, 1969) is a senior engineer in the General Electric (GE) Fast Breeder Reactor Department. He joined GE in 1975 after several years of teaching and research in nuclear theory. His current interests include data evaluation, methods development, and the analysis of critical experiments. He is presently chairman of the Large Core Code Evaluation Working Group and a participant in the Cross Section Evaluation Working Group. **R. Protsik** (BS, engineering physics, University of Toledo, 1960; MS, computer science, Stanford University, 1967; Engineer, nuclear engineering, Stanford University, 1972; PE, California, 1977) is a senior engineer in the GE Fast Breeder Reactor Department. For the past ten years, he has worked primarily in the area of methods development in reactor analysis.

*E. Kujawski  
R. Protsik*

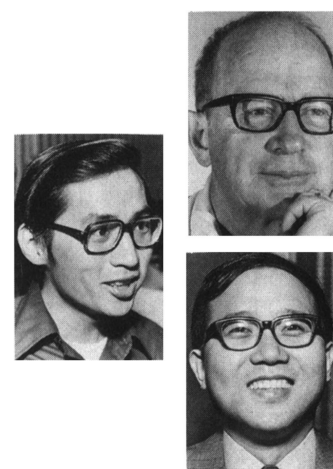


## FUEL CYCLES

### DENATURED FUEL CYCLES FOR INTERNATIONAL SAFEGUARDS

**Thomas H. Pigford** (top) (ScD, chemical engineering, Massachusetts Institute of Technology, 1952) is professor and chairman of the Department of Nuclear Engineering at the University of California, Berkeley. He has worked in the fields of nuclear chemical engineering, nuclear reactor design, nuclear fuel cycle analysis, nuclear safety analysis, and radioactive waste management. **Che-Sui Yang** (center) (MS, nuclear engineering, University of California, Berkeley, 1974) is a graduate student in nuclear engineering at Berkeley, where he has specialized in the analysis of thorium fuel cycles. He is a part-time employee at the Electric Power Research Institute. **Mitsuru Maeda** (bottom) (MS, nuclear engineering, Tokyo University, 1966) is a member of the research staff in chemical and nuclear engineering at the University of California.

*T. H. Pigford  
C. S. Yang  
M. Maeda*

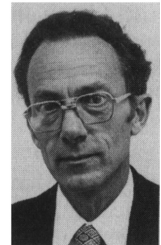
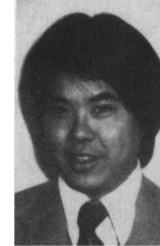


## FUELS

### ACTINIDE REDISTRIBUTION IN THE OUTER REGIONS OF MIXED-OXIDE FUEL

**Leo A. Lawrence** (top) (MS, physics, University of Denver, 1967) and **Dale F. Washburn** (bottom) (PhD, metallurgy, University of California at Los Angeles, 1962) are members of the Fuels and Controls Department at the Hanford Engineering Development Laboratory (HEDL), operated by Westinghouse Hanford Company for the U.S. Department of Energy. Lawrence, a senior scientist in the Performance Analysis Section, has been involved since 1968 with the in-reactor performance of mixed-oxide fuels. His current interests center in the area of chemical behavior. Washburn, manager of the Terminal Mechanisms Section, has been at HEDL since 1974. Prior to that, he was at the Knolls Atomic Power Laboratory. His current interests lie in the area of mixed-oxide fuel pin breach mechanism and post-breach behavior. **David C. Hata** (center) (BS, metallurgical engineering, University of Washington, 1975), associated with HEDL from 1975 to 1977, is currently pursuing advanced studies at the University of Washington.

*L. A. Lawrence  
D. C. Hata  
D. F. Washburn*



## SHIELDING

### RADIATION SHIELDING OF MAJOR PENETRATIONS IN TOKAMAK REACTORS

**Jungchung Jung** (top) (PhD, nuclear engineering, Kyoto University, Japan, 1973) is in the Applied Physics Division at Argonne National Laboratory (ANL) with the Fusion Reactor Neutronics Group. He has conducted research on various problems of transport theory. His current interests are method developments and analysis for nuclear design of fusion reactor blankets and shields. **Mohamed A. Abdou** (PhD, nuclear engineering, University of Wisconsin, 1973) was, until April 1978, with the Applied Physics Division at ANL, where he was manager of fusion reactor systems studies. He is presently an associate professor of nuclear engineering at the Georgia Institute of Technology. His current interests are focused on the technology problems in fusion energy systems, particularly nuclear analysis, blanket engineering, economics, and fusion reactor design and modeling.

*Jungchung Jung  
Mohamed A. Abdou*

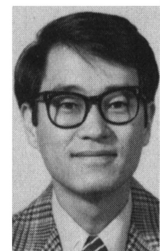
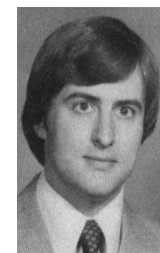


## INSTRUMENTS

### CALCULATION OF SPATIAL WEIGHTING FUNCTIONS FOR EX-CORE NEUTRON DETECTORS

**Mark W. Crump** (top) (MS, nuclear engineering, University of Michigan, 1975) is a doctoral candidate in nuclear engineering at The University of Michigan. His interests include reactor physics and nuclear plant simulation, including steam generator dynamic modeling. **John C. Lee** (PhD, nuclear engineering, University of California, Berkeley, 1969) is currently on the faculty of The University of Michigan, Ann Arbor. He was previously employed by Westinghouse Electric Corporation and General Electric Company, where he participated in the areas of reactor core physics and design analysis. His current interests include reactor physics, nuclear-thermal-hydraulic interface calculations, and power plant simulation and control.

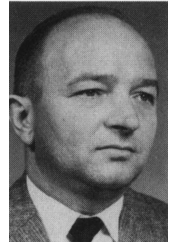
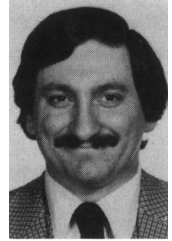
*Mark W. Crump  
John C. Lee*



## RELIABILITY, RELIABILITY WITH REPAIR, AND AVAILABILITY OF FOUR IDENTICAL ELEMENT MULTIPLEX SYSTEMS

**Richard D. Guild** (top) (BS, industrial engineering, Pennsylvania State University, 1949; MA, mathematics, Pennsylvania State University, 1958; PhD, industrial engineering and management sciences, Northwestern University, 1968) is currently associate professor of industrial engineering at The Pennsylvania State University. His principal areas of interest are statistical quality control and reliability engineering, and his background includes eight years industrial experience with GTE Sylvania. **Edmond G. Tourigny** (BS, nuclear engineering, Lowell Technological Institute, 1968; MEng, nuclear engineering, Pennsylvania State University, 1970; MEng, industrial and management systems engineering, Pennsylvania State University, 1976) is currently a program analyst with the Office of Nuclear Material Safety and Safeguards of the U.S. Nuclear Regulatory Commission. He has held industrial positions as a nuclear engineer with the Nuclear Materials and Equipment Corporation and as a marketing engineer with the Westinghouse Electric Corporation.

*Richard D. Guild  
Edmond G. Tourigny*



## DEVELOPMENT AND TESTING OF NEUTRON DOSIMETRY TECHNIQUES FOR ACCELERATOR-BASED IRRADIATION FACILITIES

**L. R. Greenwood** (top right) (PhD, physics, Rice University, 1970) has been a physicist in the Chemical Engineering Division at Argonne National Laboratory (ANL) since 1974. His work and current interests are concentrated on the development of neutron dosimetry and damage analysis for the magnetic fusion materials program and the development of advanced neutron detectors. **R. R. Heinrich** (top left) (MS, nuclear and inorganic chemistry, University of Chicago, 1961) is currently a group leader within the ANL Analytical Chemistry Laboratory. Prior to this assignment, he held the position of group leader of the Dosimetry and Damage Analysis Group in the Chemical Engineering Division of ANL. During his tenure at ANL, he has been active in the determination of nuclear parameters and neutron dosimetry. His current interests include fuel burnup methodology, Ge(Li) gamma spectrometry, and dosimetry. **R. J. Kennerley** (bottom right) (MS, nuclear engineering, Massachusetts Institute of Technology, 1973) worked on neutron damage analysis in materials at ANL from 1975 to 1976. He is currently employed at Central Engineering and Equipment Company, South Yarmouth, Massachusetts. **R. Medrzychowski** (bottom left) (BS, mechanical-nuclear engineering, Worcester Polytechnic Institute, 1976) was a participant in the 1976 Spring Undergraduate Research Program at ANL. He is currently employed at General Dynamics, Electric Boat Division, Groton, Connecticut, as a nuclear test supervisor.

*L. R. Greenwood  
R. R. Heinrich  
R. J. Kennerley  
R. Medrzychowski*

