



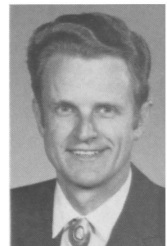
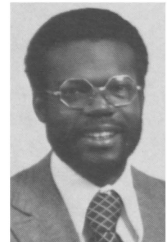
AUTHORS — AUGUST 1977

REACTORS

NUCLEAR DESIGN SENSITIVITY ANALYSIS FOR A FUSION REACTOR

Earl L. Simmons (top) (BS, mechanical engineering, 1974, and MS, nuclear engineering, 1976, Howard University) is a consultant with Los Alamos Scientific Laboratory (LASL). He is presently at Massachusetts Institute of Technology involved with theoretical research in nuclear engineering. Donald J. Dudziak (center) (BS, marine engineering, 1974; MS, physics, 1957; PhD, mathematics, 1963) is section leader at LASL for Fusion Nucleonics and alternate group leader for Transport and Reactor Theory. His interests are in fusion reactor blanket and shield nucleonic methods development, as well as design. He also leads shield design efforts for two 14-MeV neutron source facilities and a space electric power reactor. Previously, he has worked in pressurized water reactor shielding, stochastic kinetics, cross-section data systems, and irradiation facility neutron spectrum analysis. Siegfried A. W. Gerstl (bottom) (BS, 1962, MS, 1965, physics, University of Stuttgart, Germany; PhD, physics, University of Karlsruhe, Germany) is a staff member in the Theoretical Division at LASL. His most recent research involves the application of perturbation methods to cross-section and design sensitivity analyses, and he is the originator of the SENSIT code. His current interests are in the development of improved neutron transport methods for shielding applications in fusion reactors.

*E. L. Simmons
Donald J. Dudziak
S. A. W. Gerstl*



APPLICATION OF THE BAYES EQUATION TO PREDICTING REACTOR SYSTEM RELIABILITY

Ralph R. Fullwood (top) (PhD, nuclear engineering, Rensselaer Polytechnic Institute, 1965) is manager for safeguards and reliability at Science Applications, Inc. (SAI). He was an early participant in the *Reactor Safety Study* and has participated in light water reactor (LWR) and liquid-metal fast breeder reactor (LMFBR) fuel cycle and SNM safeguards studies. Prior to joining SAI in 1972, he was a staff scientist at the Los Alamos Scientific Laboratory. Robert C. Erdmann (bottom) (PhD, California Institute of Technology, 1965) is vice-president and manager of the Physics and Safety Division of SAI. He was a participant in the *Reactor Safety Study* and had led and participated in risk analyses in all aspects of nuclear energy as well as commercial product safety. Prior to joining SAI in 1973, he was a professor at the University of

*R. R. Fullwood
R. C. Erdmann
E. T. Rumble
G. S. Lellouche*



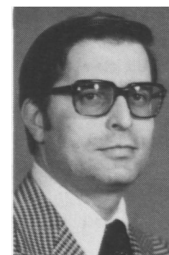
California at Los Angeles (UCLA). Edmund T. Rumble (top) (PhD, nuclear engineering, UCLA, 1974) is manager of fuel and material at SAI. He has conducted studies in risk, core, and fuel behavior in LWRs and LMFBRs. Prior to joining SAI in 1974, he was at Karlsruhe, FRG. Gerald S. Lellouche (bottom) (PhD, nuclear engineering, North Carolina State College, 1960) is program manager for statistical and environmental analysis for the Electric Power Research Institute (EPRI). He is a co-author of a text in reactor dynamics and has conducted research in dynamics, fluid and thermal hydraulics, and LWR probabilistic safety. Prior to joining EPRI in 1974, he was principal investigator for reactor physics safety analysis for Brookhaven National Laboratory.



MANAGEMENT ANALYSIS OF NUCLEAR ALLOCATION FOR THE GENERATION OF ELECTRICITY

Petros T. Antonopoulos (top) (ScD, nuclear engineering, Massachusetts Institute of Technology, 1972) is a nuclear engineer with the Research and Development Group of Yankee Atomic Electric Company. His background is in NSSS core design, safety analysis, and economics. His current interests are utility systems optimization and loss-of-coolant accident development. Joe C. Turnage (PhD, nuclear engineering, Massachusetts Institute of Technology, 1972) is manager of the Technical Resources Department at Yankee Atomic Electric Company. His current research interests include energy policy analysis and the management of programs in thermal hydraulic accident analysis, fuel behavior modeling, data base management software development, and computational system design and support.

*Petros T. Antonopoulos
Joe C. Turnage*



NEUTRONICS STUDIES OF THE GAS-CARRIED LITHIUM OXIDE COOLING-BREEDING FUSION REACTOR BLANKET AND SHIELD

E. T. Cheng (right) (PhD, nuclear engineering, University of Wisconsin, 1976) and Tak Yun Sung (left) (PhD, nuclear engineering, University of Wisconsin, 1976) are research associates in the Nuclear Engineering Department of the University of Wisconsin at Madison. Cheng completed his PhD thesis in the area of controlled thermonuclear reactor nucleonic analysis and variational methods for nuclear reactor studies. Sung has been engaged in the radioactivity related problems of potential fusion reactors. His current interest is related to the safety and environmental problems associated with fusion radioactivity. D. K. Sze (center) (PhD, chemical engineering, Massachusetts Institute of Technology, 1971) is an associate scientist of nuclear engineering at the University of Wisconsin. He joined the staff of the University of Wisconsin in 1971, and is responsible for the thermal-hydraulic designs in the fusion design team. His primary interests are in heat transfer, mass transfer, flow mechanics, and thermodynamics. His current research activities include fusion reactor technology, lithium-stainless-steel corrosion studies, and solid-gas two-phase flows.

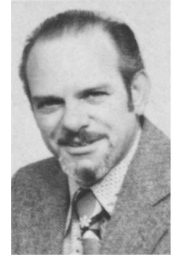
*E. T. Cheng
T. Y. Sung
D. K. Sze*



ELIMINATION OF FLOW-RATE FLUCTUATIONS IN THE CORE OF THE FRJ-2 RESEARCH REACTOR AND ITS USEFULNESS FOR REACTOR OPERATION

*Johannes Wolters
Manfred Nickel*

Johannes Wolters (top) (Diplom-engineer, mechanical engineering, Technische Hochschule, Aachen, 1963) was project manager for the power increase of the FRJ-2 research reactor of the Kernforschungsanlage (KFA) Jülich. He was responsible for most of the thermodynamic and safety analyses in conjunction with the project and for the necessary startup thermodynamic testing. He is now a division leader in the Institut für Nukleare Sicherheitsforschung (ISF) of KFA and is mainly engaged in the safety analysis of the high-temperature gas-cooled reactor. Manfred Nickel (technician of mechanical engineering) was cognizant engineer for remote handling modifications of FRJ-2 and for emergency cooling experiments. He is now a scientific assistant in the ISF. His main interests are remote handling equipment and failure modes analysis.



UNCERTAINTIES IN CALCULATED HEATING AND RADIATION DAMAGE IN THE TOROIDAL FIELD COIL OF A TOKAMAK EXPERIMENTAL POWER REACTOR DUE TO NEUTRON CROSS-SECTION ERRORS

*R. G. Alsmiller, Jr.
J. Barish
C. R. Weisbin*

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. J. Barish (center) (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. C. R. Weisbin (bottom) (Eng. ScD, nuclear engineering, Columbia University, 1969) is a program manager for Sensitivity Analysis and Cross Section Processing in the Nuclear Engineering Analysis Section of the Neutron Physics Division of ORNL. For the past few years, his principal interest has been in the development of the FORSS data sensitivity analysis code system for performance parameter uncertainty estimation.

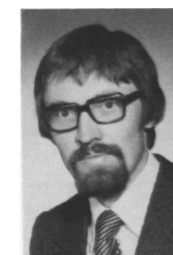


REACTOR SITING

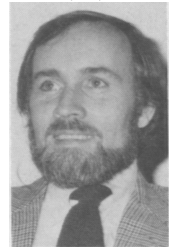
THE COST EFFECTIVENESS OF REMOTE NUCLEAR REACTOR SITING

*Friedrich Niehaus
Harry J. Otway*

Friedrich Niehaus (right) (Doctorate, reactor technology, Technische Hochschule, Aachen, FRG) is employed by the International Atomic Energy Agency (IAEA) as a member of the Joint IAEA/IIASA (International Institute for Applied Systems Analysis) Research Project on risk assessment. He has participated in studies on the environmental impacts



of energy production and is presently working on the use of decision methodologies for integrating information on technical estimates of risk with measures of social value. Harry J. Otway (PhD, University of California at Los Angeles) is a leader on the project at IAEA. He has published extensively on various aspects of risk assessment. His current research interest is in the informational basis of attitude formation.



FUEL CYCLES

CORE-STATE MODELS FOR FUEL MANAGEMENT OF EQUILIBRIUM AND TRANSITION CYCLES IN PRESSURIZED WATER REACTORS

*José M. Aragonés
José M. Martínez-Val
María R. Corella*

José M. Aragonés (left) (MS, engineering, Politechnic University of Madrid, 1969) has worked in the Reactor Theory and Methods Development Group at the Junta de Energía Nuclear (JEN), Madrid, Spain since 1970. He is interested in the areas of fuel management and reactor physics. José M. Martínez-Val (right) (MS, engineering, Politechnic University of Madrid, 1973) has been a member of the Group since 1973. María R. Corella (center) (MS, economics, University of Madrid, 1962) was formerly a member of the Planning and Economics Studies Section at JEN. She became a member of the Group in 1973.



CHEMICAL PROCESSING

RADIOLYTIC INSTABILITY OF FERROUS SULFAMATE IN NUCLEAR PROCESS SOLUTIONS

Ned E. Bibler

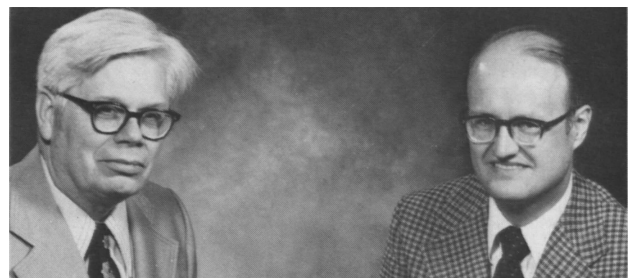
Ned E. Bibler (PhD, radiation chemistry, Ohio State University, 1965) is presently a staff chemist in the Separations Chemistry Division at the Savannah River Laboratory. His interests are in the chemical effects of radiation associated with nuclear fuel reprocessing, with separating and purifying intensity radioactive sources such as ^{244}Cm and ^{238}Pu , and with storing radioactive wastes. He has performed basic radiolysis studies with ^{60}Co gamma rays, ^{244}Cm alpha particles, and ^{252}Cf fission fragments.



EFFECTS OF METAL ION IMPURITIES ON PuO_2 DISSOLUTION IN NITRIC-HYDROFLUORIC ACID SOLUTION

*O. K. Tallent
J. C. Mailen*

O. K. Tallent (left) (BS, chemistry, University of Tennessee, 1968) is a task leader in the Chemical Technology Division of Oak Ridge National Laboratory (ORNL). He has been engaged in various reactor fuel preparation and reprocessing studies including UO_2 - PuO_2 sol-gel preparation, actinide oxide separations from molten salts, and a variety of plutonium aqueous system studies. His current interests include problems common to both liquid-metal fast breeder reactor (LMFBR) and light water reactor (LWR) fuel reprocessing plants. James C. Mailen (PhD, chemical



engineering, University of Florida, 1964) is a group leader in the Chemical Technology Division at ORNL. He has been engaged in various reactor fuel reprocessing areas including fluoride volatility methods, molten salt breeder reactor studies, and aqueous processing of LMFBR and LWR fuels. His current interests include problems common both to LMFBR and LWR fuel reprocessing plants.

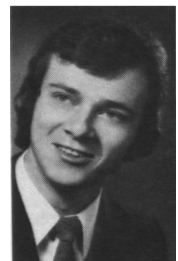
SOLVENT PERFORMANCE IN THTR NUCLEAR FUEL REPROCESSING. PART I: CALCULATION OF DOSES RECEIVED BY TBP-n-PARAFFIN EXTRACTANT IN REPROCESSING THTR FUELS APPLYING A THOREX FLOWSHEET

*B.-G. Brodda
D. Heinen*



SOLVENT PERFORMANCE IN THTR NUCLEAR FUEL REPROCESSING. PART II: ON THE FORMATION OF DIBUTYL PHOSPHORIC ACID BY RADIOLYTIC AND HYDROLYTIC DEGRADATION OF THE TBP-n-PARAFFIN EXTRACTANT

Bert-G. Brodda (top) (Dr.-Ing., chemistry, Technical University of Berlin, 1968) is group leader of the Hot Analytical Chemistry Section at the Institute for Chemical Technology, Nuclear Research Center, Jülich, FRG. He is responsible for the chemical analytical services of the JUPITER thorium high-temperature reactor reprocessing facility. Dieter Heinen (Ing. grad, Fachhochschule Aachen, 1975) works on reactor environmental surveillance and activation analysis at the Materials Testing Authority in Dortmund, FRG.



FUELS

FUEL FAILURES IN THE DODEWAARD BOILING WATER REACTOR

*D. Cordall
R. M. Cornell
K. W. Jones
J. S. Waddington*

D. Cordall (top left) (BSc, physics, University of Manchester, U.K., 1957), R. M. Cornell (top right) (BSc, physical metallurgy, University of Birmingham, U.K., 1961), and K. W. Jones (bottom left) (BEng, metallurgy, University of Liverpool, U.K., 1957) are research officers in the Fuel Examination Section at the Berkeley Nuclear Laboratories of the Central Electricity Generating Board. J. S. Waddington (bottom right) (PhD, metallurgy, University of Liverpool, U.K., 1964) is a senior section leader in the Fuel and Core Division at Berkeley Nuclear Laboratories. All are currently involved in examination and performance assessment of fuel from the United Kingdom domestic program.



RADIOACTIVE WASTE

LA VITRIFICATION EN FRANCE DES SOLUTIONS DE PRODUITS DE FISSION

Roger Bonniaud

Roger A. Bonniaud (MS, Institut National de Chimie Industrielle de Rouen, 1952) is the head of the Section of Solidification of Fission Product of the French Commissariat à l'Énergie Atomique, and is working at the Marcoule Nuclear Center. His field is related to the techniques of management of radioactive wastes and the examination of the generated materials.

