



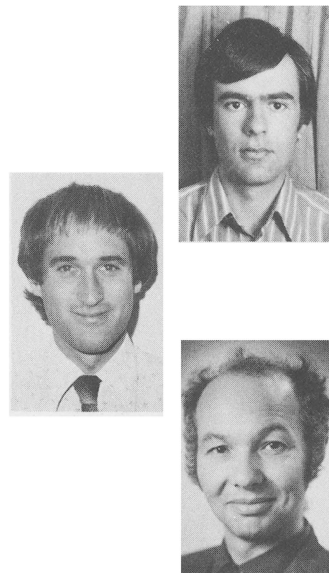
## AUTHORS — MARCH 1980

### REACTORS

#### AN INVESTIGATION OF PARTICULATE CORROSION PRODUCT TRANSIENTS IN THE PRIMARY COOLANT OF THE WINFRITH STEAM GENERATING HEAVY WATER REACTOR

*F. A. Means*  
*R. S. Rodliffe*  
*K. Harding*

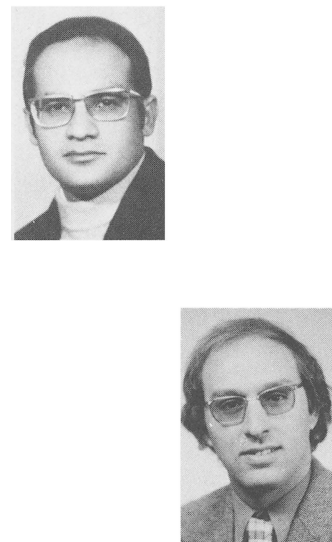
**F. A. Means** (top) (BA, physics, University of Oxford, 1974) was a research officer in the Circuit Studies and Applied Chemistry Section of the Applied Physics Division at the Berkeley Nuclear Laboratories (BNL) of the British Central Electricity Generating Board from 1974 until 1978. During this time, he investigated all aspects of particulate corrosion product behavior in water reactor coolant circuits. **R. S. Rodliffe** (center) (BA, physics, University of Oxford, 1966) is a group leader in the Circuit Studies and Applied Chemistry Section at BNL. Since 1966, he has worked on various aspects of radioactivity behavior in both gas-cooled and water-cooled reactor systems. **K. Harding** (bottom) (C. Chem., MRIC, Barnsley College of Technology, England, 1955) is the section leader responsible for chemical plant development at the U.K. Atomic Energy Establishment, Winfrith, and is currently concerned with nuclear waste treatment.



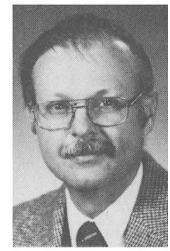
#### TRITIUM AND FISSILE FUEL EXCHANGE BETWEEN HYBRIDS, FISSION POWER REACTORS, AND TRITIUM PRODUCTION REACTORS

*M. Z. Youssef*  
*R. W. Conn*  
*W. F. Vogelsang*

**Mahmoud Z. Youssef** (top) [MS, nuclear engineering, University of Wisconsin (UW), 1977] is on leave from the Atomic Energy Authority, AR, of Egypt and is working toward his PhD degree in nuclear engineering from UW-Madison. Currently, he holds a research assistantship with the Fusion Research Program at UW. He graduated from the University of Alexandria, AR, of Egypt, and spent one year at the Casaccia Nuclear Study Center in Italy. His research interests are in the area of fusion-fission hybrid systems technology, nuclear data processing, sensitivity analysis, perturbation theory, and neutronics methods for fusion and fission reactors. **Robert W. Conn** (bottom) (PhD, California Institute of Technology, 1968) spent one year at the Joint Euratom Nuclear Research Center at Ispra, Italy, and a year at the Brookhaven National Laboratory before joining UW in 1970. He has been a professor of nuclear engineering since 1975. His primary research interests include fusion reactor



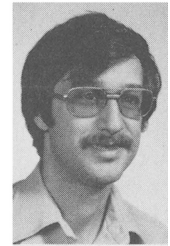
physics and technology, neutronics methods for fusion and fission reactors, and molecular collision theory. Since 1974, he has been director of the UW Fusion Engineering Program. **William F. Vogelsang** (right) (PhD, physics, University of Pittsburgh, 1956) is a professor of nuclear engineering at UW. His interests have included critical assemblies, neutron diffraction, and nondestructive fuel assay. His research interests are in the radioactivity and safety problems of fusion reactors, the design, and the neutronics analysis of fusion and fission systems.



**NEUTRON MODERATION IN INERTIAL CONFINEMENT FUSION PELLETS AND EFFECTS ON DAMAGE AND RADIOACTIVE INVENTORY**

**F. Beranek** (top) [BS, 1973, MS, 1974; and PhD, 1978, nuclear engineering, University of Wisconsin (UW)] is employed by E. I. du Pont de Nemours and Company at the Savannah River Laboratory in the Nuclear Physics Division. His current research involves development and implementation of the Water Reactor Analysis Package system for loss-of-coolant accident analysis. **Robert W. Conn** (PhD, California Institute of Technology, 1968) spent one year at the Joint Euratom Nuclear Research Center at Ispra, Italy, and a year at the Brookhaven National Laboratory before joining UW in 1970. He has been a professor of nuclear engineering since 1975. His primary research interests include fusion reactor physics and technology, neutronics methods for fusion and fission reactors, and molecular collision theory. Since 1974, he has been director of the UW Fusion Engineering Program.

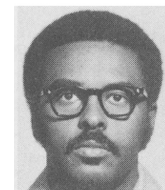
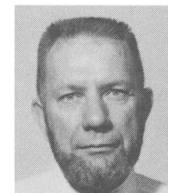
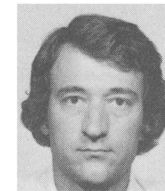
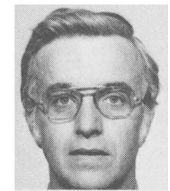
*F. Beranek  
R. W. Conn*



**SHIELDING CALCULATIONS FOR THE TOKAMAK FUSION TEST REACTOR NEUTRAL BEAM INJECTORS**

**R. T. Santoro** (top right) (MS, physics, University of Tennessee, 1967) is a member of the Engineering Physics Division at Oak Ridge National Laboratory (ORNL). His current interests are in neutron transport and neutron interactions with matter related to fusion reactor design. He is currently involved in the neutronic investigations of reactor blanket and shield design, neutral beam injectors, radiation streaming from penetrations, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields. **R. A. Lillie** (top left) (PhD, University of Tennessee, 1975) is a research staff member in the Engineering Physics Division at ORNL. His work has been in the areas of fission reactor core physics and shielding analysis. His current interests focus on the application of radiation transport methods to fusion reactor neutronics problems. **R. G. Alsmiller, Jr.** (bottom right) (PhD, University of Kansas, 1957) is leader of the Applied Physics and Fusion-Reactor Analysis Group of the Engineering Physics Division at ORNL. For several years, he has directed the theoretical research in this division in the areas of high energy nuclear reactions, high energy nuclear transport, and fusion reactor neutronics. **J. M. Barnes** (bottom left) (BS, mathematics, University of Arkansas, 1965) is a member of the Computer Sciences Division at ORNL. He is involved in the neutronic analysis of fusion reactor blankets and shields, neutral beam injectors, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields.

*R. T. Santoro  
R. A. Lillie  
R. G. Alsmiller, Jr.  
J. M. Barnes*

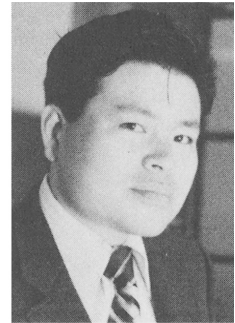


**OPTIMUM FUEL LOADING AND OPERATION PLANNING FOR LIGHT WATER REACTOR POWER STATIONS. PART II: BOILING WATER REACTOR CASE STUDY**

*Tsutomu Hoshino*

**OPTIMUM FUEL LOADING AND OPERATION PLANNING FOR LIGHT WATER REACTOR POWER STATIONS. PART III: INCREMENTAL COST STUDY**

**Tsutomu Hoshino** (Dr. Eng., electrical engineering, Kyoto University, 1967) is an associate professor at the Institute of Atomic Energy at Kyoto University. Since 1960, he has been engaged in research on nuclear reactor dynamics, control, optimization, and related computer applications. His current interests are in the areas of simulation of nuclear power systems including fusion facilities, and the development of special-purpose parallel computer systems for simulations.



**PLUTONIUM FUEL CYCLES IN THE SPECTRAL SHIFT CONTROLLED REACTOR**

*F. M. Sider  
R. A. Matzie*

**F. M. Sider** (top) (BS, engineering science, 1972, BS, mathematics, 1972, MA, mathematics, 1974, and MS, nuclear engineering, 1975, The Pennsylvania State University) is employed in the Advanced Design Projects Group of Combustion Engineering, Inc. Her interests include the nuclear fuel cycle and advanced converter reactors. **R. A. Matzie** (BS, physics, U.S. Naval Academy, 1965; MS, 1971, and PhD, 1976, nuclear engineering, Stanford University) is a supervisor of advanced design and physics at Combustion Engineering, Inc. His current technical interests include the thorium fuel cycle, alternate reactor concepts, and plutonium recycle.

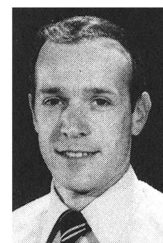


**CONFINEMENT OF RUTHENIUM OXIDES VOLATILIZED DURING NUCLEAR FUELS REPROCESSING**

*Edward T. Maas, Jr.  
John M. Longo*

**Edward T. Maas, Jr.** (top) (BS, chemistry, Northern Illinois University, 1967; PhD, inorganic chemistry, Iowa State University, 1972) was a post-doctoral research associate with IBM Corporation from 1972 to 1974. Since 1974, he has been with Exxon Research and Engineering Company in their Corporate Research Laboratories. His general field of interest throughout his career has been the chemistry of metals, especially the transition metals. His recent interests include the chemistry of uranium and other metallic elements in the nuclear fuel cycle.

**John M. Longo** (BA, chemistry, 1961, PhD, solid state chemistry, 1964, University of Connecticut) completed a year of post-doctoral study in 1965 at the University of Stockholm on the crystal chemistry of transition metal oxides. The next five years were spent at the Massachusetts Institute of Technology Lincoln Laboratory, where he was involved in the preparation and characterization of solid state materials. Special emphasis was placed on the synthesis of new compounds at high pressure. Since 1971, he has been at the Corporate Research Laboratories of Exxon, where he has responsibility for the Solid State Chemistry Group. His current research interests are concerned with the preparation of high surface area mixed metal oxides for use as catalysts.

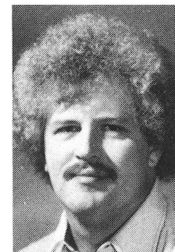
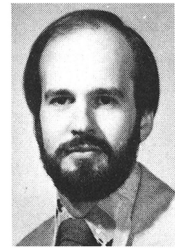


## FUELS

### UNCERTAINTY ANALYSIS AND THERMAL STORED ENERGY CALCULATIONS IN NUCLEAR FUEL RODS

**Mitchel E. Cunningham** (top) (MS, nuclear engineering, Oregon State University, 1977) is a development engineer with the Nuclear Fuels Section of Battelle-Pacific Northwest Laboratories (PNL). For the past two years, he has been involved with the analysis of in-reactor fuel rod data. **Courtney R. Hann** (center) (BS, metallurgical engineering, South Dakota School of Mines and Technology) has 14 years of experience in nuclear fuel technology. During the conduct of work reported in this paper, he was manager of the Nuclear Fuels Section at PNL. His current assignment at Battelle is that of associate manager of the Materials Department. **Anthony R. Olsen** (bottom) (PhD, Oregon State University, 1972) is a senior statistician in the Statistics and Material Safeguards Section at PNL. His interests are data analysis of applied problems and statistical computing.

*Mitchel E. Cunningham  
Courtney R. Hann  
Anthony R. Olsen*



## RADIOACTIVE WASTE

### ADSORPTION OF IODINE SPECIES WITH ION EXCHANGE RESINS IN AQUEOUS SOLUTIONS

**Chien-chang Lin** (top) (BS, chemical engineering, Tunghai University, 1959; PhD, chemistry, University of New Mexico, 1968) did his post-doctoral research at Washington University in St. Louis (September 1967 to February 1971) with A. C. Wahl in radiochemical studies of nuclear fission. He joined the General Electric Company (GE) in 1971 at the Vallecitos Nuclear Center. He was primarily responsible for the investigation of iodine chemistry and radiochemical measurements in the boiling water reactor (BWR) systems. He is currently a principal engineer, and his interests include reactor coolant chemistry, iodine chemistry, radiochemical measurement techniques, radioactivity source terms, and activated corrosion product transport modeling in the BWR primary system. **Judy J. Younger** (BS, chemistry, San Jose State University, 1972; MS, chemistry, San Jose State University, 1976) is currently working for Quadrex Corporation and is a member of the Chemical and Process Group. She previously worked (1974 to 1977) for GE in the Nuclear Energy Division, where she was involved in water chemistry specification and performed water chemistry related studies for the BWR.

*Chien-chang Lin  
J. J. Younger*



## MATERIALS

### THE OXIDATION KINETICS OF SOME ZIRCONIUM ALLOYS IN FLOWING CARBON DIOXIDE AT HIGH TEMPERATURES

**Rajiv Kohli** (MS, metallurgy, Indian Institute of Science, Bangalore, 1976) is a research fellow at the Institute of Metallurgy at the Österreichische Studiengesellschaft für Atomenergie in Vienna, Austria. His main interests are in oxidation of zirconium alloys and fuel-cladding interactions.

*Rajiv Kohli*



### MEASUREMENT OF THE GAMMA DOSE RATE DISTRIBUTION IN A SPENT FUEL ASSEMBLY WITH A THERMOLUMINESCENT DETECTOR

**Akio Ohno** (top) (electronics, Junior College of Ibaraki University) has been involved in critical experiments on light-water-moderated lattices with  $UO_2$  and  $PuO_2-UO_2$  fuel rods at the Tank-type Critical Assembly (TCA) of the Japan Atomic Energy Research Institute (JAERI) and in nondestructive measurements on spent fuel assemblies. His current interest is developmental studies of nondestructive techniques for fine measurements on inside information of spent fuel assemblies. **Shojiro Matsuura** (MS, nuclear engineering, Kyoto University, 1960) has conducted critical experiments at TCA for the development of techniques for nondestructive measurements. He is currently a staff engineer for the Planning Office of JAERI. His current interest is the strategic study of nuclear fuel cycle exploitation and planning on the required research, development, and demonstration.

*Akio Ohno  
Shojiro Matsuura*



### RADIOACTIVE WASTE

### BOUNDARY CONDITIONS FOR THE GEOSPHERIC TRANSPORT EQUATION

**Auguste Zurkinden** (Dr. technical sciences, ETH Zürich, Switzerland, 1976) is an engineer-physicist at the Section for the Protection of Health and Environment of the Swiss Nuclear Safety Division. He is mainly involved in dispersion and dose calculations as a consequence of accidental activity releases from nuclear power plants and also from underground radioactive waste repositories.

*Auguste Zurkinden*



### MATERIALS

### THE EFFECTS OF Fe-Ni-Co-V STRUCTURAL ALLOYS ON FUSION REACTOR NEUTRONIC PERFORMANCE

**J. M. Barnes** (top) (BS, mathematics, University of Arkansas, 1965) is a member of the Computer Sciences Division at Oak Ridge National Laboratory (ORNL). He is involved in the neutronic analysis of fusion reactor blankets and shields, neutral beam injectors, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields. **B. L. Bishop** (bottom) (BS, statistics, University of Tennessee, 1955) is a member of the Computer Sciences Division, assigned to the Engineering Physics Division at ORNL. A major part of her current effort is in calculations involved with radiation dosimetry. She is also assisting on the irradiation effects calculations in support of the ORNL magnetic fusion reactor programs.

*J. M. Barnes  
B. L. Bishop  
R. T. Santoro  
T. A. Gabriel*



**R. T. Santoro** (top) (MS, physics, University of Tennessee, 1967) is a member of the Engineering Physics Division at ORNL. His current interests are in neutron transport and neutron interactions with matter related to fusion reactor design. He is currently involved in the neutronic investigations of reactor blanket and shield design, neutral beam injectors, radiation streaming from penetrations, radiation effects in materials, and the analysis of integral experiments for fusion reactor shields. **T. A. Gabriel** (bottom) (PhD, physics, University of Tennessee, 1969) is a member of the Engineering Physics Division at ORNL. His interests are in neutron transport and neutron interactions with matter, related to electronuclear fuel production, nuclear instrument design, and fusion reactor engineering. A large part of his recent effort has been devoted to neutronic analysis of magnetically confined fusion reactors, in support of blanket design for a reactor conceptual design team, and to the ORNL Fusion Reactor Irradiation Effects Program.

