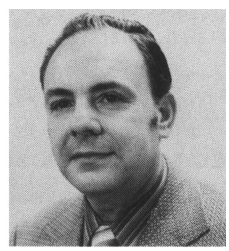
nuclear technology

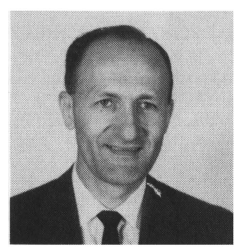
AUTHORS — MARCH 1974

REACTORS

DEFINITIONS OF BREEDING RATIO AND DOUBLING TIME

H. L. Wyckoff
Paul Greebler

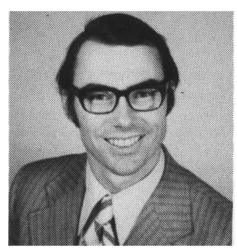


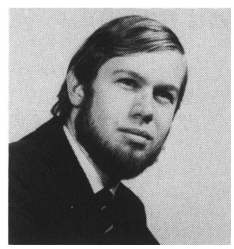


Harvey Wyckoff (top) (BS, electrical engineering, University of Wisconsin, 1948) is assistant to the general manager of the Project Management Corporation where he is on assignment from the Commonwealth Edison Company. His early nuclear experience included an assignment in the Nuclear Power Group, the Utility Organization that participated with Commonwealth Edison in Dresden I; since then, he has been assigned to various phases of Edison's Dresden I activities. For the past seven years, he has been involved in a variety of design activities related to the development of the fast breeder reactor. Paul Greebler (PhD, physics, Rutgers University, 1954) is manager of nuclear engineering in General Electric Company's Breeder Reactor Department. He has 25 years of experience in heat transfer and reactor physics design and computational methods development, including water, gas-cooled, and liquid-metal reactors. He has been responsible for reactor physics and shielding design activities in support of LMFBR design and development.

PRACTICAL XENON SPATIAL CONTROL

Douglas C. Bauer
Claude G. Poncelet





Douglas C. Bauer (top) (PhD, Carnegie-Mellon University, 1972) is the deputy assistant director of the Office of Energy Conservation at the U.S. Department of the Interior. He is responsible for initiating and managing a large, interagency federal research and development program in energy conservation. He previously was the White House Fellow assigned to the Secretary of the Department of Transportation. Claude G. Poncelet (PhD, North Carolina State, 1965) is the head of the Division of Nuclear Science and Engineering at Carnegie-Mellon University and was Dr. Bauer's PhD thesis advisor for the work reported in this paper. He has published extensively in the fields of nuclear kinetics, transport theory, and education.

REACTOR SITING

CIVIL DEFENSE IMPLICATIONS OF AN LMFBR IN A THERMONUCLEAR TARGET AREA

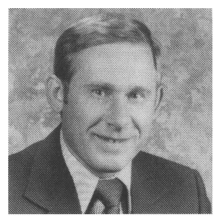
C. V. Chester
R. O. Chester

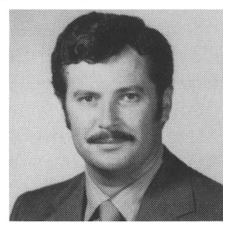
C. V. Chester (left) (PhD, chemical engineering, University of Tennessee) is chief of the Civil Defense Research Section, Health Physics Division, Oak Ridge National Laboratory. His current area of interest is the strategic aspects of civil defense. R. O. Chester (PhD, physics, University of Tennessee) is a development engineer with the Health Physics Division, Oak Ridge National Laboratory. She is presently most interested in emergency measures for protecting population from accidental radioactivity release from power reactors.

MATERIALS

TWO FUSION REACTOR BLANKETS WITH VANADIUM AS STRUCTURAL MATERIAL

James E. Struve
Nick Tsoulfanidis

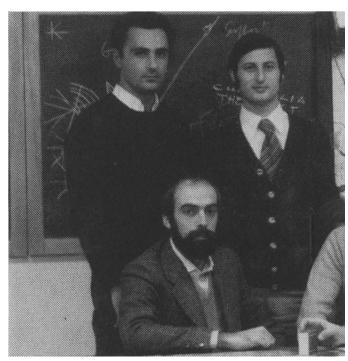


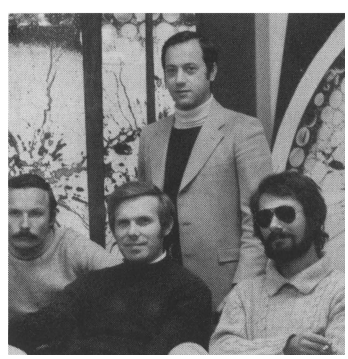


James E. Struve (top) (MS, nuclear engineering, University of Missouri-Rolla, 1973) is a member of the U.S. Army Nuclear Agency. His current interests involve studies of weapons effectiveness. Nick Tsoulfanidis (BS, physics, University of Athens, Greece, 1960; MS, nuclear engineering, University of Illinois, 1965; PhD, nuclear engineering, University of Illinois, 1968) is associate professor of nuclear engineering at the University of Missouri-Rolla. In addition to his teaching duties, he conducts research in the area of radiation transport by using the Monte Carlo method.

IN-PILE THERMAL CONDUCTIVITY OF FUEL OXIDE: UO_2 PELLETS AND VIPAC UO_2-PuO_2 PELLETS AND SOL-GEL

A. Calza-Bini
G. Cosoli
G. Filacchioni
M. Lanchi
A. Nobili
U. Rocca
P. L. Rotoloni

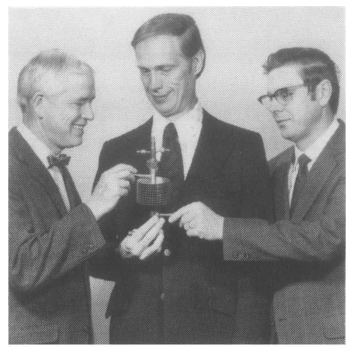




The authors, A. Nobili (top left), A. Calza-Bini (top seated), M. Lanchi (top right), G. Cosoli (bottom left), P. L. Rotoloni (bottom center), U. V. Rocca (standing, bottom), and G. Filacchioni (bottom right), form the Irradiation Group of "Laboratorio Tecnologie Ceramiche," and have conducted since 1965 a research program to increase understanding of fuel pin behavior, particularly thermal and mechanical. Since 1967, an experimental program has been carried out using a hydraulic rabbit, several highly instrumented rigs in MTR and small assemblies in BWR and LMFBR, and parallel work on modeling of pins in-pile thermal and mechanical behavior has been carried out.

CALIBRATION STABILITY OF OXYGEN METERS FOR LMFBR SODIUM SYSTEMS

J. M. McKee
D. R. Vissers
P. A. Nelson
B. R. Grundy
E. Berkey
G. R. Taylor

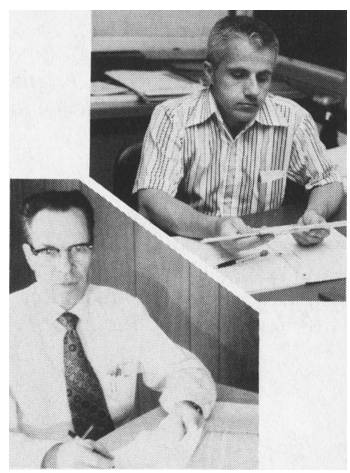


J. M. McKee (top left) (MS, metallurgy, New York University) has worked at Argonne National Laboratory (ANL) for six years, primarily on on-line monitoring of impurities in sodium. He is presently developing leak detectors for sodium-heated steam generators. D. R. Vissers (top right) (PhD, chemistry, The University of Wisconsin) has been a member of the Chemical Engineering Division of ANL for the past nine years. His past work has been in the areas of inorganic ion exchange, water desalination, nuclear fuel reprocessing, bioengineering, and sodium technology. He is currently working on high-energy electrical cells for automotive applications and off-peak energy storage. Paul A. Nelson (top center) (PhD, Northwestern University, 1958) is currently head of the Energy Conversion Section of the Chemical Engineering Division of ANL. Prior to that assignment, he was head of the Sodium Technology Section. Since 1958, he has worked in the fields of pyrochemical processing for purifying plutonium and uranium, preparation of ceramic fuels, and sodium technology, including the study of electrolytic oxygen meters and other impurity-measuring instruments for sodium. B. R. Grundy (seated, bottom) (BSc, chemistry, Liverpool University, England, 1956) first worked in sodium technology for the U.K. Atomic Energy Authority. He is now a senior scientist at Westinghouse Advanced Reactors Division (WARD) with current interests in several aspects of sodium technology, including on-line meters. G. R. Taylor (bottom right) (BS, chemical engineering, 1944; DSc, physical chemistry, Carnegie Institute of Technology, 1951) is manager of Chemical Technology WARD, with responsibility for development of the chemical technology required for the Liquid Metal Fast Breeder Reactor (LMFBR). He has 19 years of management experience in Pressurized Water Reactor and LMFBR development work. E. Berkey (bottom left) (BS, chemical engineering, Stanford University, 1962; PhD, nuclear science, Cornell University, 1967) is manager of Liquid Metal Technology and Chemistry, Westinghouse Research and Development Center, where he was active in the original development of the liquid sodium oxygen meter. He now has responsibility for diverse programs concerned with liquid metals.

INSTRUMENTS

THE UTILIZATION OF ON-LINE MONITORS AT EBR-II FOR SODIUM PURITY

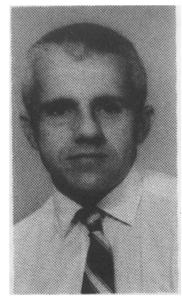
John T. Holmes
Grant O. Haroldsen



John T. Holmes (top) (MS, University of California, Berkeley, 1960) has been a chemical engineer at Argonne National Laboratory for the last 14 years. His work at Argonne has been in the areas of nuclear fuel reprocessing and synthesis, and sodium technology. He is currently the project manager for the installation of a water-to-sodium leak detection system to the EBR-II steam generating plant. Grant O. Haroldsen (MS, chemical engineering, University of Utah) is a registered professional engineer in California and Idaho. Much of his career has been devoted to reactor coolant purity and stability for water-cooled, organic-cooled, and sodium-cooled reactors. He is presently employed with Allied Chemical Corporation at the National Reactor Test Station in Idaho.

A HYDROGEN-ACTIVITY METER FOR LIQUID SODIUM AND ITS APPLICATION TO HYDROGEN SOLUBILITY MEASUREMENTS

D. R. Vissers
J. T. Holmes
L. G. Bartholme
P. A. Nelson



D. R. Vissers (top left) (PhD, chemistry, The University of Wisconsin) has been a member of the Chemical Engineering Division of ANL for the last nine years. His past work has been in the areas of inorganic ion exchange, water desalination, nuclear fuel reprocessing, bioengineering, and sodium technology. He is currently working on high-energy electrical cells for automotive applications and off-peak energy storage. J. T. Holmes (top right) (MS, University of California, Berkeley, 1960) has been a chemical engineer for the last 14 years with the Argonne National Laboratory. His work at Argonne has been in the areas of nuclear fuel reprocessing and synthesis, and sodium technology. He is currently the project manager for the installation of a water-to-sodium leak detection system to the EBR-II steam generating plant. L. G. Bartholme (center) is a member of the technical staff of the Chemical Engineering Division. He has worked in the fields of high-vacuum technology and sodium loop operation; he is currently working on the development of high-energy electrical cells for off-peak energy storage and automotive applications. P. A. Nelson (bottom) (PhD, Northwestern University, 1958) is presently head of the Energy Conversion Section of the Chemical Engineering Division; previously, he was head of the Sodium Technology Section. He has worked in the fields of pyrochemical processing for purifying plutonium and uranium, preparation of ceramic fuels, and sodium technology including the study of electrolytic oxygen meters and other impurity-measuring instruments for sodium.