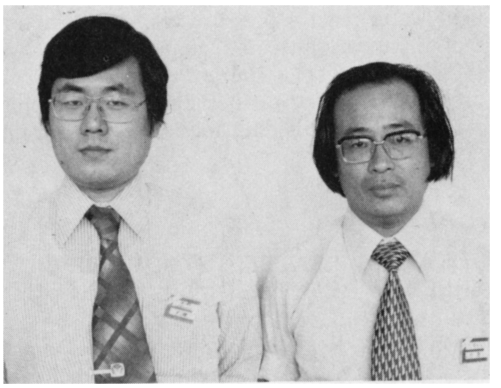
nuclear technology®

AUTHORS — MID-APRIL 1980

REACTORS

BOILING WATER REACTOR CONTROL ROD PROGRAMMING USING HEURISTIC AND MATHEMATICAL METHODS

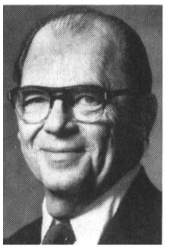
Tamotsu Hayase
Hiroshi Motoda

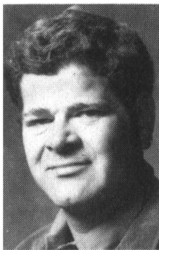


Tamotsu Hayase (left) (MSc, nuclear engineering, Tokyo Institute of Technology, 1975) is a member of the Core Management Section of the Energy Research Laboratory (ERL), Hitachi, Ltd., Japan. His current interests include computer-aided design and evaluation systems for nuclear technology, and core management of nuclear reactors. **Hiroshi Motoda** (PhD, nuclear engineering, Tokyo University, 1972) is a member of the Core Management Section of the ERL. His current interests include improved core design and management, core dynamic stability, and power maneuvering optimization of boiling water reactors.

A RADIONUCLIDE TRAP FOR LIQUID-METAL-COOLED REACTORS

J. C. McGuire
W. F. Brehm

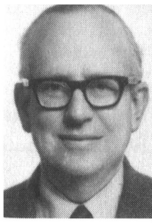




Joseph C. McGuire (top) (AB, chemistry, Franklin College, 1943; MS, chemistry, University of New Mexico, 1963) is a principal engineer in radioactivity control at Westinghouse Hanford Company. He is currently active in sodium and lithium technology and in the control of tritium permeation through reactor materials. He has engaged in nuclear research since 1944. **William F. Brehm** (BS, metallurgy, Massachusetts Institute of Technology, 1962; MS, materials science, Cornell University, 1964; PhD, materials science, Cornell University, 1967) has 15 years of experience in liquid-metal technology, with special interest in radioactive material corrosion and mass transport processes. He is currently manager of the Radioactivity Control Technology Section at Westinghouse Hanford Company.

REACTION RATE CALCULATIONS IN URANIUM AND THORIUM BLANKETS SURROUNDING A CENTRAL DEUTERIUM-TRITIUM NEUTRON SOURCE

A. D. Krumbein
M. Lemanska
M. Segev
J. J. Wagschal
A. Yaari





A. D. Krumbein (top right) (PhD, physics, New York University, 1951) is a senior scientist at the Soreq Nuclear Research Center in Israel working in both the Department of Theoretical Physics and Applied Mathematics and the Plasma Physics Department. His current research interests include fusion-fission reactor calculations and laser plasma interactions. **M. Lemanska** (top left) (PhD, reactor physics, Israel Institute of Technology, 1967) is a scientist at the Soreq Nuclear Research Center in Israel in the Department of Theoretical Physics and Applied Mathematics. Her current interests are diffusion and transport theories. **M. Segev** (center right) (DSc, reactor engineering, Israel Institute of Technology, 1968) is an associate professor of nuclear engineering in the Department of Nuclear Engineering of the Ben-Gurion University of the Negev, Beer Sheva, Israel. His current research interests include conceptual reactor design problems and cross-section evaluations for reactor-oriented studies. **J. J. Wagschal** (bottom left) (PhD, physics, The Hebrew University of Jerusalem, 1965) is a research staff member in the Engineering Physics Division of the Oak Ridge National Laboratory while on leave from the Racah Institute of Physics at The Hebrew University of Jerusalem, Israel, where he is an associate professor of physics. His current research interests include neutron and neutrino transport, light water reactor pressure vessel damage dosimetry, and cross-section uncertainty and adjustment. **A. Yaari** (bottom right) (MSc, physics, The Hebrew University of Jerusalem, 1970) is presently working on her PhD at The Hebrew University. She is interested in shielding and in fast reactor physics.

ROTATING PLUG SIZE STUDY FOR LIQUID-METAL FAST BREEDER REACTORS

L. J. Nemeth

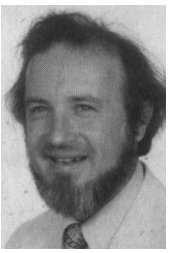
Lawrence J. Nemeth (BS, aeronautical engineering, Aeronautical University, 1949) works for the General Electric Company Advanced Reactor Systems Department. He is currently assigned as a senior engineer responsible for the design studies of the in-vessel fuel handling equipment and the reactor closure assembly for the large commercial breeder reactor facility.

EXPERIMENTAL VALUE OF PERCENT VARIATION IN ROOT-MEAN-SQUARE EX-CORE DETECTOR SIGNAL TO THE CORE BARREL AMPLITUDE SCALE FACTOR

J. P. Thompson
G. R. McCoy
B. T. Lubin


James P. Thompson (top) (BS, electrical engineering, University of Connecticut, 1969) is supervisor of the Measurements and Analysis Group in the Engineering Development and Services Department at Combustion Engineering. He has extensive experience in the recording, reduction, and analysis of random data. **Glen R. McCoy** (bottom) (MS, nuclear engineering, Pennsylvania State University, 1970) is the assistant project manager for Combustion Engineering's nuclear steam supply system being supplied for the Tennessee Valley Authority's Yellow Creek Nuclear Plant. Formally, his technical interests include the application of neutron noise techniques in the measurement of various physical reactor parameters, including core barrel

motion. **Barry T. Lubin** (right) (PhD, University of Connecticut, 1971) is supervisor of the Normal Operating Conditions Analysis Group in the Reactor Design Department at Combustion Engineering. His responsibilities include dynamic analysis of reactor internals subjected to flow-induced loading and monitoring of reactor internals under conditions of normal operation.

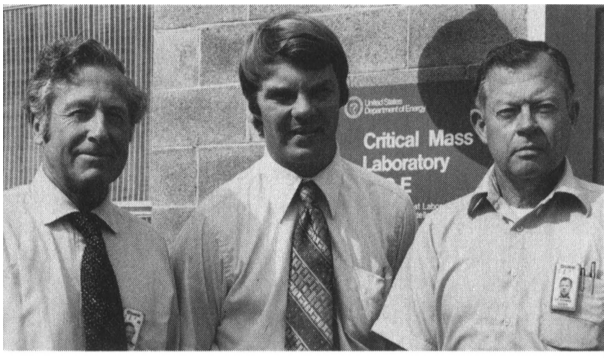


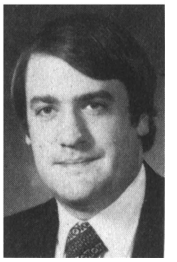
FUELS

CRITICAL EXPERIMENTS WITH SOLID NEUTRON ABSORBERS AND WATER-MODERATED FAST TEST REACTOR FUEL PINS

B. M. Durst
S. R. Bierman
E. D. Clayton
J. F. Mincey

B. M. Durst (top photo, center) (BS, physics, University of Washington, 1971; MS, nuclear engineering, Louisiana State University, 1974) is a research scientist at Battelle-Pacific Northwest Laboratories (PNL), where he has been actively involved in the generation of basic experimental and computational criticality data. **S. R. Bierman** (top photo, right) (BS, chemical engineering, Texas Technological University, 1956; MS, nuclear engineering, University of Washington, 1963) has been involved both in the chemical processing industry and in criticality research and analysis. He is currently a staff scientist at the Critical Mass Laboratory at PNL, where he has been active in both the generation of basic experimental criticality data and the utilization of these data in performing criticality analyses of production plant systems. He is currently vice chairman of the Nuclear Criticality Safety Division of the American Nuclear Society (ANS). **E. Duane Clayton** (top photo, left) (PhD, physics, University of Oregon, 1952) is currently associate manager of criticality analysis at PNL, and is a research associate professor in the University of Washington's Department of Nuclear Engineering. He is a pioneer in criticality studies with plutonium and, since its inception in 1961, has been director of the Plutonium Critical Mass Laboratory of PNL. He is currently chairman of Work Groups 12 and 15 within Subcommittee ANS-8 (Fissionable Materials Outside Reactors) of the ANS Standards Committees. His current technical interests include most aspects of criticality measurements and studies. **J. F. Mincey** (bottom) (BS, nuclear engineering, North Carolina State University, 1976) was employed after graduation by the Oak Ridge National Laboratory (ORNL) High Temperature Gas-Cooled Reactor Program, where he performed postirradiation neutronic analyses of fuel qualification experiments. He now serves under ORNL's Consolidated Fuel Recycle Program as nuclear engineering task leader and is doing graduate work at the University of Tennessee.

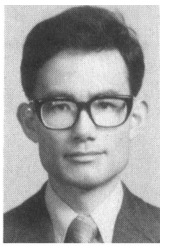


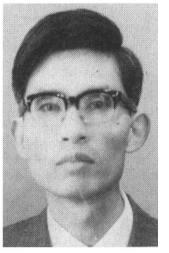


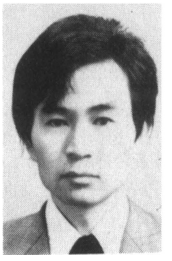
RADIATION

REMODELING AND DOSIMETRY ON THE NEUTRON IRRADIATION FACILITY OF THE MUSASHI INSTITUTE OF TECHNOLOGY REACTOR FOR BORON NEUTRON CAPTURE THERAPY

Otohiko Aizawa
Keiji Kanda
Tetsuya Nozaki
Tetsuo Matsumoto





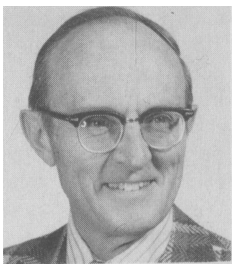


Otohiko Aizawa (top right) (PhD, nuclear engineering, Tokyo Institute of Technology, 1963) is an associate professor at Atomic Energy Research Laboratory of the Musashi Institute of Technology. His technical interests are in neutron cross-section and neutron spectra measurements and in computer data analysis related to reactor physics. **Keiji Kanda** (top left) (PhD, nuclear engineering, Tokyo Institute of Technology, 1961) is an associate professor at the Research Reactor Institute of Kyoto University and deputy director of the Critical Facility Division. He is currently interested in reactor physics of the thorium fuel cycle, high flux reactor design, reducing enrichment of research reactors, and radiation biology. **Tetsuya Nozaki** (bottom right) is an associate professor at Atomic Energy Research Laboratory of the Musashi Institute of Technology and section manager of reactor operation. His technical interests are in radiation dosimetry and health physics. **Tetsuo Matsumoto** (bottom left) (BS, electrical engineering, Musashi Institute of Technology, 1973) is a research associate at Atomic Energy Research Laboratory of the Musashi Institute of Technology. His interests are in dose measurements and in computer data management related to reactor physics.

ANALYSIS

SUBCRITICAL LIMITS FOR SPECIAL FISSILE ACTINIDES

H. K. Clark

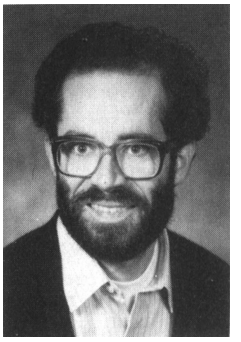


Hugh K. Clark (AB, chemistry, Oberlin College, 1939; PhD, physical chemistry, Cornell University, 1943) is a research associate in the Nuclear Physics Division of the Savannah River Laboratory. His interests lie in developing calculational methods for criticality safety evaluation. He continues to be active in the work of the American Nuclear Society Standards Subcommittee 8 to develop nuclear criticality safety standards.

RADIOISOTOPES

EFFECTS OF INDOOR RESIDENCE ON RADIATION DOSES FROM ROUTINE RELEASES OF RADIONUCLIDES TO THE ATMOSPHERE

D. C. Kocher



D. C. Kocher (PhD, experimental nuclear physics, University of Wisconsin, 1970) is a research staff member in the Technology Assessments Section of the Health and Safety Research Division at Oak Ridge National Laboratory. His current research activities are concerned with the development and implementation of methodologies for the assessment of radiological impacts on the general population from releases of radioactivity to the environment.