



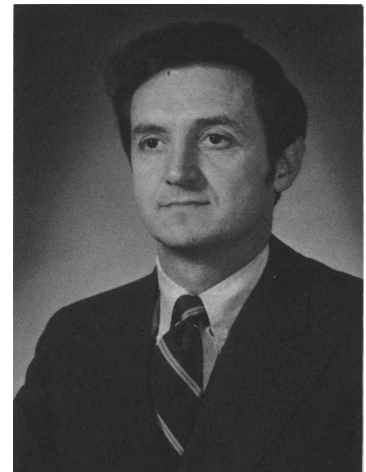
# AUTHORS — JUNE 1971

## REACTORS

### AN ANALYTICAL REACTOR EXCURSION MODEL WITH DELAYED NEUTRONS

*B. E. Leonard*

B. E. Leonard (PhD, North Carolina State University, 1966) has been involved with reactor and radiological physics research at the Armed Forces Radiobiology Research Institute since 1966. He is also an adjunct professor at the Catholic University of America, Washington, D.C.



### COMPARISON OF EXPERIMENTALLY MEASURED AND CALCULATED RADIATION ENVIRONMENT INTERNAL TO THE PAX R-1 REACTOR

*D. J. Hill  
W. D. Rankin*

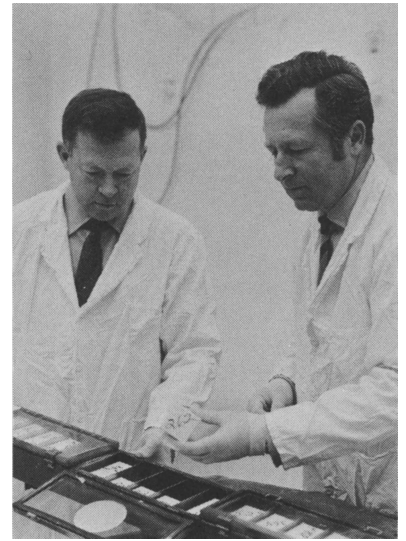
Donald J. Hill (top) (MS, engineering sciences, Purdue University; additional post-graduate work in nuclear science at Carnegie-Mellon University) has been a senior engineer in the Radiation and Shielding Design group since 1968 performing radiation analysis for the NERVA program at the Westinghouse Astronuclear Laboratory (WANL). From 1963 to 1968 he was in the NERVA Nuclear Design group. Don Hill is also chairman of the WANL Design Engineering Methods Committee and secretary of the WANL Nuclear Safety Committee. William D. Rankin (MS, physics, Massachusetts Institute of Technology) is a senior engineer at the Westinghouse Astronuclear Experimental Facility where he has been involved since 1963 primarily in gamma and neutron dosimetry measurements for the NERVA program. He was previously at the Martin-Marietta critical facility working with water-moderated reactors.



## CRITICAL EXPERIMENTS WITH UNMODERATED PLUTONIUM OXIDE

S. R. Bierman (left) and E. Duane Clayton are associated with the Plutonium Critical Mass Laboratory of the Pacific Northwest Laboratory operated by Battelle-Northwest. S. R. Bierman is a senior research engineer at the Critical Mass Laboratory and is primarily involved with criticality and neutron kinetic measurements on systems of plutonium and plutonium-uranium mixtures. E. Duane Clayton is manager of BNW's Criticality Research and Analysis Department and Research Associate Professor in the University of Washington's Department of Nuclear Engineering. He is past chairman of the Nuclear Criticality Safety Division of the American Nuclear Society.

*S. R. Bierman  
E. D. Clayton*

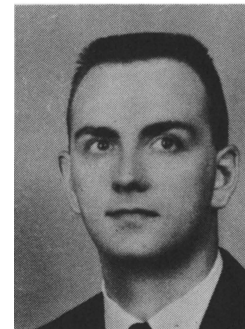
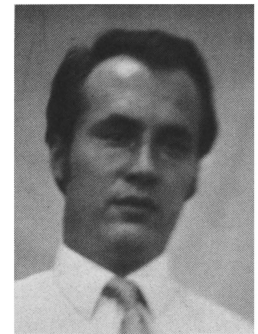


## FUELS

### A CAPILLARY VALVE FOR USE IN THE VENTILATION OF FAST BREEDER CONTROL RODS

David T. Camp (top) (PhD, chemical engineering, Carnegie-Mellon University) taught four years at Carnegie-Mellon before coming to the University of Detroit in 1966. He has served as assistant dean for engineering graduate studies and is currently associate professor of chemical engineering. He is primarily interested in the application of chemical engineering techniques in engineering systems design and in process metallurgy. William A. Heenan (D. Eng., chemical engineering, University of Detroit) is an assistant professor at the University of Puerto Rico. He is primarily interested in the field of optimum process design and the computation of chemical equilibria. He previously worked as an engineer with Monsanto and then with Atomic Power Development Associates, Inc.

*William A. Heenan  
David T. Camp*



### APPARATUS FOR STUDY OF IN-PILE CREEP OF FUELS

R. A. Robinson (center) (MS, mechanical engineering, University of Michigan, 1966) has been a project engineer at Battelle Columbus for the past four years. He is responsible for design of mechanical devices for reactor experiments. S. J. Basham (left) (BS, mechanical engineering, University of Kentucky, 1952) is an associate chief and is manager of the Battelle Research Reactor. He has been associated with a wide range of reactor experiments over the past 17 years at Battelle Columbus. J. S. Perrin (right) (PhD, materials science, Stanford University, 1969) has been associated with mechanical property studies of reactor cladding and fuel components since joining Battelle Columbus in 1966. He is currently program manager of the In-Pile Creep Program.

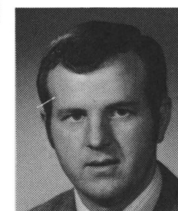
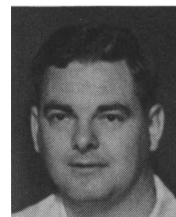
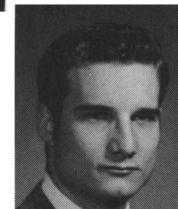
*R. A. Robinson  
S. J. Basham  
J. S. Perrin*



### NONDESTRUCTIVE TESTING OF ENCAPSULATED RADIOACTIVE CESIUM AND STRONTIUM

R. W. Steffens (top left) (BSEE, University of Idaho, 1962) employed at NORTEC Corporation, Richland, Washington, is presently engaged in ultrasonic instrument development. Before joining NORTEC, he spent eight years at Battelle-Northwest where he concentrated on development of ultrasonic methods and equipment used to establish integrity of isotope containment vessels. J. C. Crowe (bottom left) (BSEE, Washington State University, 1968) is currently a member of the Applied Physics and Instrumentation Department of Battelle-Northwest where he is involved in the development and design of ultrasonic inspection systems. His research interests also include acoustic emission monitoring techniques and eddy current coil designs for nondestructive evaluation applications. G. L. Borsheim (top right) (BSChE, Washington State University, 1960) is a senior engineer with the Atlantic Richfield Hanford Company. He is currently responsible for the process engineering development associated with a new plant designed to encapsulate  $^{90}\text{Sr}$  and  $^{137}\text{Cs}$ . In previous positions he worked as a process engineer in an irradiated fuels reprocessing plant and in a plant separating and isolating radioactive fission products. J. C. Wormeli (bottom right) (BS, Le Tourneau College, 1960) is a senior welding engineer with Atlantic Richfield Hanford Company in Richland, Washington. His responsibilities include all welding production and development activities.

*R. W. Steffens  
J. C. Crowe  
G. L. Borsheim  
J. C. Wormeli*



### SELECTION OF STEAM GENERATOR TUBING MATERIAL FOR THE WESTINGHOUSE LMFBR DEMONSTRATION PLANT

Stuart A. Shiels (left) (PhD, metallurgy, University of Newcastle-upon-Tyne, England) is a senior engineer in the Mass Transfer Division at Westinghouse Advanced Reactor Division. Currently, he is lead engineer on carbon and nitrogen transfer in sodium system studies and previously worked on the evaluation of structural materials for LMFBR system components. W. E. Ray (left, center) (MS, physical metallurgy, Pennsylvania State University) has held managerial positions in the nuclear industry since 1960 and currently is manager, Materials and Processes Engineering at WARD. In this position he is responsible for the development and specification of all materials and processes for LMFBR core and system components. Kenneth C. Thomas (right, center) (PhD, metallurgy, University of Wales) is manager, Materials Engineering at WARD and is responsible for all aspects of materials engineering application to LMFBR systems. He has worked for the Westinghouse Atomic Power Divisions since 1962 and worked on PWR materials problems before joining the Advanced Reactors Division. Steven L. Schrock (right) (PhD, chemical engineering, Purdue University) is manager, Mass Transfer Studies Group at WARD and is responsible for all in-sodium materials testing within the division. His liquid metal experience started in 1963 with the Allison Division of General Motors.

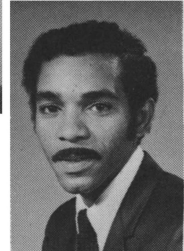
*W. E. Ray  
S. L. Schrock  
S. A. Shiels  
K. C. Thomas*



**REENTRY PROTECTION FOR RADIOISOTOPE HEAT SOURCES**

S. E. Bramer (top right) is a member of the technical staff, Nuclear Systems Department of TRW Systems. He has 15 years experience in fabrication and testing of nickel-base alloys, cobalt-base alloys, refractory metals, and graphites. Most recently, he has been associated with the Transit RTG program. H. Lurie (left) (PhD, mechanical engineering, Berkeley) has been associated since 1965 with radioisotope heat source design, and with the application of radioisotopes to gauging technology. As head of the Heat Source Development Section, he is responsible for the design, development, fabrication, and all verification testing of the Transit heat source. T. H. Smith (bottom right), a member of the technical staff, is managing the Pioneer Radioisotope Heater Program, coordinating the design, analysis, fabrication, and testing efforts.

*S. E. Bramer  
H. Lurie  
T. H. Smith*



**A CALCULATION OF NEUTRON-INDUCED PHYSICAL DOSES IN HUMAN TISSUES**

J. J. Ritts (center) (MS, University of Tennessee, 1970) is a nuclear engineer working on shield design of the FFTF in the Advanced Reactors Division of Westinghouse. M. Solomito (right) (MS, Rensselaer Polytechnic Institute, 1963) is a PhD candidate in nuclear engineering at the University of Tennessee. Paul N. Stevens (left) is professor of nuclear engineering at the University of Tennessee and is a shielding consultant to the Neutron Physics Division of Oak Ridge National Laboratory.

*J. J. Ritts  
M. Solomito  
P. N. Stevens*



**AN IN-CORE FURNACE FOR THE HIGH-TEMPERATURE IRRADIATION TESTING OF REACTOR FUELS**

Edwin E. Anderson (left) (BS, San Diego State College) of the Research & Development (R&D) Division staff of Gulf General Atomic Company has, in recent years, been utilizing on-line and off-line computer techniques for high resolution gamma-ray spectrometry in connection with direct radioisotope analysis of samples with highly complex gamma-ray spectra. S. Langer (left, center) (PhD, Illinois Institute of Technology) is currently group leader of the Nuclear Fuels Group in the R&D Division of Gulf General Atomic Company. His interests include fission product release, fuel processing and reprocessing, and in-pile fuel behavior for gas-cooled reactor fuels. Norman L. Baldwin (right, center) (BS, San Diego State College) is also a member of the R&D Division staff. His current areas of study include the transport and release mechanisms of gaseous fission products from nuclear fuel materials. Francis E. Vanslager (right) (PhD, University of California at San Diego) has been associated with Gulf General Atomic since 1959. He is currently in charge of the Fission Product Transport Section of the High-Temperature Gas-Cooled Reactor project.

*E. E. Anderson  
S. Langer  
N. L. Baldwin  
F. E. Vanslager*



**AN INEXPENSIVE PUMP FOR LIQUID SODIUM***R. R. Schlueter  
W. E. Ruther*

R. R. Schlueter and W. E. Ruther are employed by Argonne National Laboratory and are involved in the Sodium Chemistry and Material-Coolant Interaction Programs sponsored by the U.S. Atomic Energy Commission.

**A NOTE ON THE USE OF THE TCHEBYCHEFF CRITERION FOR DETERMINATION OF PARAMETERS IN EMPIRICAL APPROXIMATIONS TO GAMMA-RAY BUILD-UP FACTOR DATA***A. F. Vetter  
A. B. Chilton*

A. F. Vetter (right) (MS, North Carolina University) was associated with the Aircraft Nuclear Propulsion project and on the faculty of the Air Force Institute of Technology while serving in the USAF. He is currently on leave at the University of Illinois, Urbana, from a faculty position in the Chemical Engineering Department at the University of Iowa. His interests include radiation safety and protection and the effects of radiation on the environment. A. B. Chilton (PhD, physics, Ohio State University) is a faculty member at the University of Illinois, Urbana, in the nuclear engineering program. He has worked mainly in radiation shielding and radiation protection. He is a past chairman of the American Nuclear Society Division of Shielding and Dosimetry and is presently on the Board of Directors.

