AUTHORS AND PAPERS

The highly condensed summaries of papers and technical notes (below) are intended to assist the busy reader in determining the order in which to read the technical material. Biographical comments are for human interest.

CAVITY REACTOR CRITICAL EXPERIMENTS

For a cavity propulsion reactor concept, in which fuel in the gaseous core does not contact structural material, critical experiments revealed that with a cavity size 6 ft in diameter × 4 ft long, cold criticality will be achieved with < 30 kg ^{235}U.

Jay Kunze (left) (PhD, Carnegie Institute of Technology, 1959) is Manager of Operations and Analysis, and George D. Pincock (right) (BA, Brigham Young University, 1953) is Reactor and Analysis Engineer at General Electric's Idaho Test Station. Robert Hyland (BS, Cleveland State University, 1955) is Project Manager on the cavity reactor program at NASA's Lewis Research Laboratory.

REDUCED COOLANT FLOW IN EBR-II

Linear components of the power coefficient were subtracted from the measured total coefficient to reveal the magnitude of subassembly bowing effects. Reduced flow experiments have created temperature patterns that verify the bowing model and also reveal interesting changes in the thermal properties of the fuel with burnup.

John K. Long (PhD, Ohio State University, 1953) has been with Argonne National Laboratory for 13 years, associated with the ZPR-III fast critical assembly until 1967, and more recently with the EBR-II reactor project. In addition to being the author of papers on critical experiments and hazards analyses, he is a part-time rancher in the Snake River Valley.

LOSS-OF-COOLANT ANALYSIS

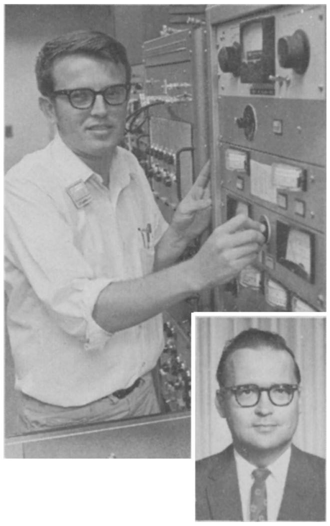
A variety of reactor plant geometries are considered in FLASH-2, a flexible loss-of-coolant analysis model. Results agree with theory for pipe decompression, and with experiment for blowdown of water-filled tanks.

J. A. Redfield (left) (PhD, University of Pittsburgh, 1963), a fellow engineer in the A4W Kinetics Group, has worked on many phases of reactor plant dynamics since joining Westinghouse in 1955. J. H. Murphy received his PhD from Carnegie Institute of Technology (1965) prior to coming to Bettis as a senior engineer.

ON-LINE STABILITY MEASUREMENT IN EBR-II

Stability of the Experimental Breeder Reactor II is determined rapidly and accurately by an on-line digital data reduction system that measures the transfer function. From these data, the reactivity feedback function and individual feedback components may be resolved.

R. W. Hyndman (left) is a nuclear systems analyst. His BSEE (1957) and MS (1958) degrees are from the University of Wyoming, and he has five years' experience in nuclear instrumentation and control with GE's ANP Department. M. R. Tuck (BS, 1964, Idaho State University) is a computer programmer. Both have been with Argonne's Idaho Branch since 1964.



HIGH FREQUENCY NEUTRON WAVES

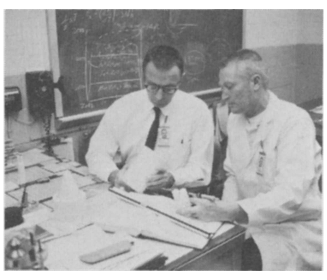
Neutron waves of frequencies $\leq$100 000 Hz, with little harmonic distortion and large amplitudes, are produced by alternately spreading and converging the ion beam from a 2-MeV Van de Graaff accelerator striking a neutron-producing target such as tritium.

John E. Foley (left), a nuclear engineering graduate student at the University of Arizona, is currently investigating the application of neutron pulse and wave techniques. Robert L. Seale (PhD Physics, 1953, University of Texas) is Professor of Nuclear Engineering at Arizona, where he has been since 1961.

PRODUCTION OF PuF_6

Plutonium tetrafluoride (2.3 kg) was fluorinated with elemental fluorine in a fluidized alumina bed at 550°C for 3 to 5 h, and the resulting PuF_6 was collected in cold traps and sorbed on NaF. Production rates of 2.4 to 4.1 lb PuF_6 h^{-1} ft^{-2} were achieved, and $>$96% of the plutonium charge was recovered.

The authors, (left to right, seated, E. L. Carls, N. M. Levitz, and D. Grosvenor, and standing, W. Murphy, D. Raue, G. J. Vogel, and B. Kullen) have participated as a group in engineering-scale development of volatility processes for separating uranium and plutonium from fission products in spent nuclear fuel elements and in processes for converting the hexafluoride products to a form acceptable to the fuel-element manufacturers. Fluidized-bed reactors have been used extensively in the process work.



CERAMICS FOR Pu ELECTROREFINING

Techniques for manufacture of high-purity monolithic impervious Al_2O_3 and MgO sheaths, stirrers, and melt containers used in the electrorefining of Pu include material preparation, slip casting, drying, and firing.

S. D. Stoddard (left) is leader of the Ceramics Section and D. E. Nuckolls the senior technologist of that section in the Chemistry and Metallurgy Division of LASL. They have extensive experience in ceramic materials for nuclear applications and are authors of a number of papers and US patents on this subject.

GLASS DOSIMETERS

Lithium borate glass dosimeters, activated with <0.5% silver, show less tendency to fade, even at elevated temperatures, and are less sensitive to photon energy (less than ±20% variation between <10 keV and several MeV) than conventional phosphate glasses.

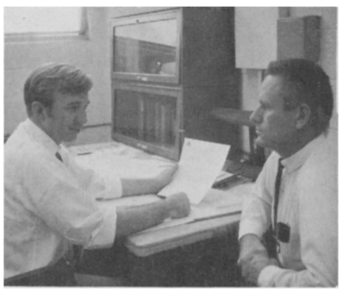
Joseph S. Cheka (right) (BA, Physics, Clark University, 1933), a member of the Health Physics Division at ORNL since 1944, is known for his earlier work on fast-neutron dosimetry with nuclear track emulsions and for his recent solid-state dosimetry studies with glass. Klaus Becker (PhD, Physical Chemistry, Munich, 1961) joined ORNL in 1967 to head the Applied Dosimetry Research Group after being in charge of personnel dosimetry and dosimetry research at Jülich.

FAST-NEUTRON COLLIMATOR STUDIES

A collimator to determine angular- and spatial-dependent neutron leakage spectrum from the TSF-SNAP reactor was designed using a Monte Carlo technique for a geometry in which sources and detectors were considered to be finite disks.

E. A. Straker, a member of ORNL's Neutron Physics Division, is involved in the development of shielding methods. His degrees comprise a BS (University of Tennessee, 1960) and an MS and PhD (University of Michigan, 1962 and 1965), all in nuclear engineering.

SEPARATION OF SOLIDS IN SODIUM



Solids are separated from liquid sodium by a force that is generated by applying a magnetic field to the confined liquid metal and passing a direct current at right angles to the magnetic field.

Peter Vilinskas (left) (PhD, University of Connecticut, 1964) has been involved in liquid-metals research for the past year at Argonne's Reactor Engineering Division, and before that at Atomic Power Development Associates, Inc. Robert J. Schiltz, a member of the same division, has been at ANL since 1948 working in the fields of fuel irradiation and liquid metals.