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.

FUEL ELEMENT WATERLOGGING

Excessive clad distortion in waterlogged cylindrical fuel elements subjected to rapid power excursions has been predicted in two simulated reactor experiments and in one in-pile water logging incident.

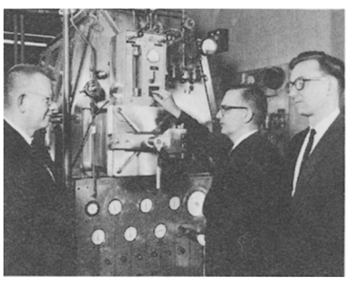
At Bettis Atomic Power Laboratory W. A. Coffman (seated) and L. L. Lynn (left) have specialized in core thermal and fluids problems and mathematical solutions to reactor plant problems, respectively, while remaining academically active at the Carnegie-Mellon University. F. T. Dunkhorst (center) (PhD, Pittsburgh, 1964) leads core thermal analysis model development. J. E. Meyer (PhD, Carnegie Tech, 1955) led thermal, hydraulics, and mechanical analysis prior to his present assignment in fuel element analysis.

^{252}Cf NEUTRON SOURCES

Design data given will aid in estimating the available neutron flux from a ^{252}Cf source and its shielding requirements. The computed flux is accurate within ± 25% (for a CH_2 moderator-reflector), and neutron and gamma dose rates are accurate within a factor of 2.

Jere P. Nichols, a chemical engineer with ORNL's Chemical Technology Division for eleven years, has been involved with problems of shielding, criticality, and safety of radiochemical plants and reactor systems.

UC PREPARATION



Uranium monocarbide is synthesized by the reaction between uranium and carbon in a liquid zinc-magnesium alloy. This process can convert uranium from pyrochemical fuel recovery into a form suitable for new fuel fabrication.

E. J. Petkus (center) (MS, Illinois Institute of Technology), an Associate Chemical Engineer in Argonne's Metallurgy Division, is interested in fuel reprocessing and synthesis and fuel element fabrication. T. R. Johnson (right) (PhD, University of Michigan) is an Associate Chemical Engineer working on pyrochemical methods of recovering fast reactor fuels. R. K. Steunenberg (PhD, University of Washington), a Senior Chemist, is in charge of the Chemical Engineering Division's group investigating pyrochemical fuel recovery.

REACTOR CONTROL MATERIALS

As an introduction to the subsequent papers, this paper reviews the performance requirements and physical characteristics of reactor control materials.

Thomas J. Pashos is Manager of Balance-of-Plant Engineering for GE's Domestic Turnkey Projects. A metallurgist and ceramicist with over 20 years in the atomic energy field, he has specialized in the development of fuel elements, cladding, and reactor structural materials. Pashos received his BS degree from Washington University (St. Louis) in 1943.


LANTHANIDE OXIDE NEUTRON ABSORBERS

Europium, as the oxide, molybdate, or titanate, in a stainless steel matrix is shown to perform very well as a control rod material for nuclear reactors.

Carl F. Leitten, Jr., (left) Technology Manager for Refractory Materials and Coatings Service at Union Carbide's Materials Systems Division at Indianapolis, was, until 1966, group leader for materials processing at Oak Ridge, where the work described in this paper was performed. R. J. Beaver is the technical manager of work associated with material selection and specification improvement for fuel elements and control rods at ORNL, where he has been for 17 years. Both have Master's degrees (Tennesse and Kentucky, respectively), and both are experienced in nuclear fuel and control material development.

HFBR CONTROL BLADES

A dispersion of the oxides of europium and dysprosium in stainless steel is satisfactorily controlling BNL's High Flux Beam Reactor.

J. B. Godel (left), Mechanical Engineering Section Head of Brookhaven's Chemistry Department, was a charter member of the HFBR staff. J. M. Hendrie (PhD, physics, Columbia, 1957), the HFBR Project Engineer, is now Associate Head of the Engineering Division of the Nuclear Engineering Department.

BORON CONTROL RODS

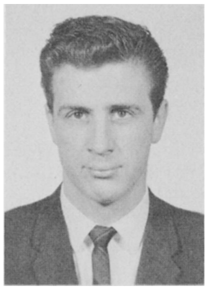
Three types of boron-bearing control rods whose fabrication and performance are described are boron dispersions, boron-stainless steel alloys, and B_4C-filled tubes. The latter is most reliable and economical for use in water cooled power reactors.

C. R. Mefford (right), with GE since 1958, is the senior designer responsible for the mechanical design of control rods and all other non-fuel components of the core for GE's boiling water reactor. H. E. Williamson, manager of GE's Fuel Engineering Unit with responsibility for design of water-cooled reactor fuels, has been working in all phases of water reactor nuclear fuels since joining the company in 1960. They are from California State Polytechnic and Case Institute of Technology, respectively.

PERFORMANCE OF Ag-In-Cd

A stainless steel clad alloy of silver, indium, and cadmium is shown to perform well as a control rod material for several reactors.

W. R. Smalley, a Fellow Engineer in the Irradiation Technology Section of the Nuclear Fuel Division and a Metallurgical Engineering graduate of Lehigh, has been with the Westinghouse Atomic Power Division since 1960. With previous experience in development and examination of reactor materials, he is responsible for planning and conducting irradiation tests in support of nuclear fuel element design.



HEXAFLUOROBENZENE GAMMA DOSIMETER

A detector using C_6F_6 as a solvent for the scintillator can measure low gamma dose rates in a neutron field. Sensitivity was increased by pulse integration and a Monte Carlo calculation made to obtain response curves.

Gary D. Wait (MSc, University of Alberta, 1964) was a Defence Research Board staff member involved with radiation transport studies at the Defence Chemical, Biological, and Radiation Laboratories near Ottawa. He is presently working towards a PhD at the University of Saskatchewan's Linear Accelerator Laboratory.