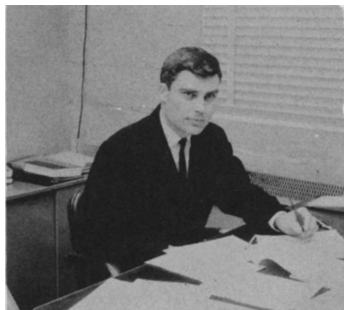


AUTHORS AND PAPERS

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.



SUBCRITICAL DETECTOR RESPONSE

The interpretation of detector response to changes in a subcritical reactor is only qualitatively understood. In this article, a calculation model and method permit quantitative interpretation of detector response to material and geometric changes in a subcritical reactor.

J. F. Walter, associated with Bettis Atomic Power Laboratory since 1957, has been involved in the nuclear design and development of the reactor propulsion plants employed in most of the Navy's nuclear submarine fleet. His PhD in Chemical Engineering is from the University of Pittsburgh (1963).



FAST-THERMAL FUEL MANAGEMENT

This analysis of variations in design parameters during irradiation for large fast-thermal coupled reactor systems includes an estimate of the effects of several types of fuel management on values of the parameters. The relative parametric trends reported are expected to hold for designs other than that considered in the analysis.

Alexander Sesonske is a joint Professor of Chemical and Nuclear Engineering at Purdue University. His nuclear interests include reactor design, heat removal, fuel cycle analysis, economics, and radiation applications. From 1958-1959, while in residence at Los Alamos, he coauthored the textbook Nuclear Reactor Engineering. Joseph J. Prabulos, Jr., a graduate of Purdue University, currently has a postdoctoral research appointment with the Reactor Division of Los Alamos where he is doing depletion analyses of liquid-plutonium fast breeder reactor designs.



FISSION PRODUCT DISPERSION

This work modifies Sutton's diffusion equation to account for the effect of atmospheric dilution due to mixing clean air with contaminated air prior to discharge from a building. The effect of radioactive decay is also considered.

Ira Charak is Safety Coordinator for the Argonne Advanced Research Reactor and serves as a member of ANL's Reactor Safety Review Committee. He joined the ANL staff in 1958 after receiving his MS in Nuclear Engineering from Georgia Tech.



PREPARATION OF ThC₂ MICROSPHERES

This process for preparing dense spherical particles of ThC₂ and (Th,U)C₂ consists of heating dense sol-gel oxide microspheres with lampblack in a rotating crucible under a flow of argon. The products have a high degree of sphericity and surface smoothness.

R. L. Hamner and T. M. Kegley, Jr. (shown l to r) are with the Metals and Ceramics Division of ORNL. Hamner (BS, University of Alabama, 1949) has been involved primarily with fabrication of reactor fuel and moderator materials, while Kegley (MS, University of Alabama, 1951) has been concerned largely with the evaluation of reactor components and materials. R. L. Pilloton (shown alone) obtained his doctorate from the University of Paris, France. Prior to his work on the recycle of thorium fuels at ORNL, he was Manager of Extractive Metallurgy Research with Union Carbide.



ZIRCALOY-URANIUM CORES FOR HWCTR

The casting procedure for uranium-Zircaloy cores for a new set of driver tubes for HWCTR required attention to the form of the charge, heating schedule, and mold design.

William J. Richmond (left) developed the casting procedures and applied them for the most recent driver tubes, and has worked on the fabrication and casting of various other nuclear materials. Saul Isserow (PhD, Pennsylvania State University, 1950) was Project Manager for SROO programs at Nuclear Metals during the development of the fabrication procedures for the driver tubes. He is now Manager of Materials Research.



ATMOSPHERIC DENSITY BY GAMMA SCATTERING

Mathematical models, used to study design parameters of the gamma-ray scattering technique for measuring atmospheric density, predict that the streaming of gamma rays down the space-vehicle walls is the source of an observed high background. The models should prove useful in optimizing design for space applications.

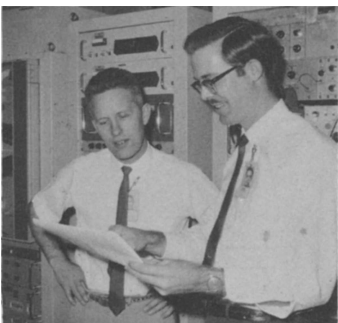
Robin P. Gardner and Donald R. Whitaker (l to r), members of the Measurement and Controls Laboratory of the Research Triangle Institute, have been active in studying and using radioisotope techniques in engineering applications.

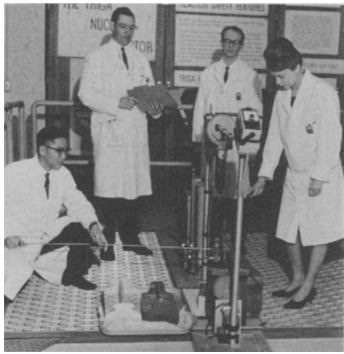


SENSITIVITY IMPROVEMENT

A scheme for improving the sensitivity of determining pure positron emitters is described. Coincidence counting electronically removes counts that are associated with those impurities that emit both gammas and positrons. The determination of oxygen in sodium illustrates the method.

Dale M. Holm (PhD, Oregon State College, 1955) and W. Mort Sanders (MS, University of New Mexico, 1966) (shown l to r) have done work in ³He, neutron, and photon activation analysis, and have extensive experience in unfolding complex gamma-ray spectra obtained from irradiated fuel elements. Both are members of the staff of Los Alamos Scientific Laboratory.





DETERMINATION OF MANGANESE IN TISSUES

A technique for determining manganese concentration of tissue utilizing a histological preparation of the tissue and neutron activation analysis has been developed. This study was undertaken to investigate the effect of varying the standardized procedure in a manner which might be anticipated in actual application.

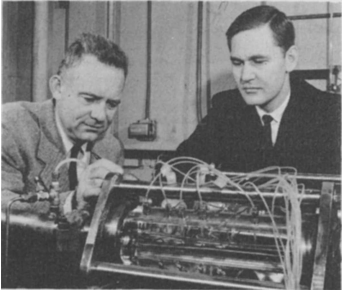
Pictured from l. to r. K. Hahn, Dr. M. Quaife, D. Tuma, and M. Haven. Dr. Quaife is Chief of the Special Laboratory of Nuclear Medicine and Biology. Messrs. Hahn and Tuma and Mrs. Haven are members of the Chemistry Section of the Special Laboratory. Dr. Richard E. Ogborn (separate photo) formerly Chief of the Special Laboratory is Director of Nuclear Medicine, United States Veterans Administration, Department of Medicine and Surgery, Washington, D. C.



CONDUCTIVITY PROBE FOR VOID FRACTIONS

This paper describes a dc conductivity probe developed for determining local void fractions in two-phase flow.

Frederick G. Hammitt and James F. Lafferty (shown l to r) performed this work at the Laboratory for Fluid Flow and Heat Transport Phenomena, Nuclear Engineering Department, The University of Michigan. Hammitt (PhD, The University of Michigan, 1958) is a professor in that department and Director of the Laboratory. Lafferty is currently on leave from his position as Associate Professor of Nuclear Engineering, Mechanical Engineering Department, University of Kentucky.



MICRO-THERMOBALANCE FOR IRRADIATED FUEL

The utility of a sensitive thermobalance, constructed for gravimetric analysis of small samples of irradiated oxide fuels, was demonstrated by measuring the oxygen-to-metal ratio in specific regions within failed fuel elements and at specific radial locations within fuel that has undergone the steep thermal gradient associated with irradiation at high neutron flux.

Ward L. Lyon (BS, ChE, Iowa State University) is a member of the Plutonium Fuels Development Sub-Section at General Electric's Vallecitos Nuclear Center, where he has contributed to the development and testing of plutonium-bearing fuels for thermal and fast reactors.

