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.

REACTOR DATA PROCESSING

On-line and off-line computers are used in an evolving information system to assist in day-to-day and long-term maintenance and operation of Hanford's N-Reactor.

David W. Leiby (MS Eng., Union University, 1956) was Manager of Controls, Instruments, and Systems Analysis at the GE Hanford Research and Engineering Operation when this paper was written; he is presently Manager of Diagnostics of the Installation Engineering Operation at GE's Evendale Flight Propulsion Division. C. F. Poor (PhD, chemical engineering, Montana State University, 1959) has devoted eight years to the use of computers for reactor optimization studies and related problems. Charles T. Hayner (MS, industrial engineering, Oregon State University, 1956), with Hanford's Information Systems Operation when the paper was written, has ten year's experience in systems planning. (no picture)

DIRECT REACTIVITY METER

The reactor mathematical model was simplified in an interesting way permitting a general-purpose analog computer to be used for calibrating control rods. Actual tests on two reactors were significantly successful.

This work was a joint effort by three branches of the Euratom Research Center. R. Dierckx (shown on upper left), who specializes in startup and critical experiments, is a civil engineer with the Reactor Physics Department. A. Van Wauwe (shown at right), a specialist on analog devices, is with the Scientific Data Processing Center. A. Marchal, with the Reactor Exploitation Service, has about 12 years' experience in experimental reactor physics.

MOLTEN-CHLORIDE FAST REACTORS

Molten-chloride-fueled fast reactors have the favorable characteristics of high breeding ratios, large negative temperature coefficients of reactivity, and low fuel-cycle costs. However, the unattractive characteristics of large plutonium inventory, large volume, complex design, and container-material problems indicate that a sizable program to develop these reactors would be required.

M. G. Chasanov, P. A. Nelson, D. Meneghetti, and D. K. Butler (left to right) are on the staff of Argonne National Laboratory. Nelson is Leader of the Fast-Reactor Fuels Group in the Chemical Engineering Division, and Chasanov is a member of the Division's Reactor Safety Group. Meneghetti is a physicist in the Reactor Physics Division, and Butler is a member of the Physics Section of the Liquid-Metal Fast-Breeder Reactor Program Office.

GAMMA ABSORPTION COEFFICIENTS

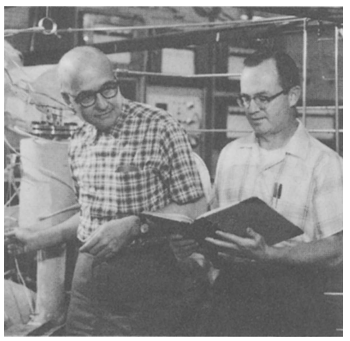
Even though more exact methods of determining the gamma-ray spectrum in a reactor are being developed, crude methods will continue to be used for convenience. This note discusses their limitations and the reliance that can be put on such approximations.

William G. Unruh, a physics student at the University of Manitoba and the recipient of several honors awards, spends his summer vacations on computer calculations in reactor physics at AECL. Michael Tomlinson, a Research Associate at the Whiteshell Nuclear Research Establishment, Manitoba, and a chemistry graduate of the University of Leeds, specializes in radiation chemistry problems in reactors.

LIQUID Pu REVIEW

A review of the physical properties of liquid plutonium reveals some similarities and a few very unique properties when compared with more common liquid metals.

Dr. Layton J. Wittenberg (left), Reactor Fuels Manager, Nuclear Operations Department, and William G. Rohr (center), Research Physicist, both of Monsanto Research Corporation, and Donald Ofte, formerly with Monsanto Research Corporation, now with the Dayton Area Office of USAEC, have been actively engaged in physical-property measurements of liquid plutonium since 1959. This work was performed as part of the study of low-temperature plutonium alloys.



TANTALUM CORROSION RESISTANCE

The presence of oxygen in tantalum decreases its corrosion resistance to molten Pu-Ce-Co alloy, whereas the presence of nitrogen is without effect.

Ralph H. Perkins (right) is Leader of the Los Alamos Reactor Division's Nuclear Materials Group. Since his PhD (University of Utah, 1956), he has been in the applications of liquid metals to reactors. Felix B. Litton (MS, Virginia Polytechnic, 1937) pioneered in the commercial development of refractory metals and recently has investigated the containment of liquid Pu alloys.

SOLID-STATE FISSION CHAMBER

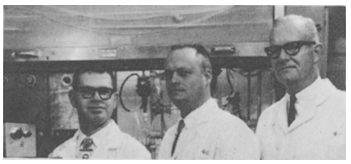
A collimated fissile foil in a solid-state fission counter improves the particle discrimination without sacrificing other advantages.

J. Gourdon (left) and J. Mitaine are in charge, respectively, of physics measurements and special electronics for the startup of Rapsodie, built at Cadarache by the Fast Neutron Project of the Commissariat à l'Énergie Atomique and Euratom.

PURIFICATION OF INERT ATMOSPHERES

Two systems for purifying inert atmospheres maintain very low levels of contamination from oxygen, nitrogen, and water vapor. The first, for helium, uses an activated charcoal bed at liquid nitrogen temperature, while the other, for argon, uses heated titanium sponge and copper wool beds.

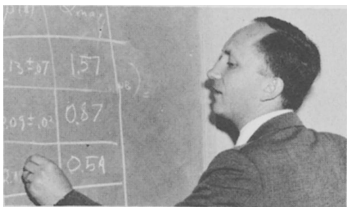
C. E. Johnson (left) and M. S. Foster are Associate Chemists in the Chemical Engineering Division of Argonne National Laboratory. Johnson (PhD, Michigan State) is involved in studies of thermodynamics and phase relationships in molten salt mixtures. Foster (PhD, Iowa State) has been active in the study of thermally regenerative bimetallic cell systems. Mr. Kyle (MS, Purdue) is an Assistant Chemical Engineer whose interest in inert-gas purification arose from their use in pyrochemical processes for the recovery of nuclear fuels. His primary field of research is in materials development for pyrochemical processes.



PURIFICATION OF ACTINIDES

This paper describes part of the effort involving about 40 members of the Los Alamos Radiochemistry Group in the analysis and interpretation of results of heavy elements produced by multiple neutron capture in underground thermonuclear explosions.

Shown together from left to right are Kurt Wolfsberg (PhD, Washington University, 1959), William R. Daniels (PhD, University of New Mexico, 1965), and George P. Ford (PhD, Columbia University, 1949), staff members in the Los Alamos Radiochemistry Group. Eldon T. Hitchcock (PhD, University of Michigan, 1961), shown separately, is an Associate Professor of Chemistry at Colorado College and was a Visiting Staff Member at Los Alamos during the academic year 1965-1966.



REACTOR SHUTDOWN MARGIN MEASUREMENTS

Experimentally confirmed theoretical treatment of the behavior of ionization chambers operating in high gamma environments has led to the development of a low-cost chamber suitable for subcriticality measurements in power reactors.

Dominique P. Roux (PhD, Physics University of Geneva, Switzerland, 1958) has been a member of the ORNL Instrumentation and Controls Division since 1960. He is currently in charge of the Reactor Controls Research and Development group. He is also Associate Professor in the Nuclear Engineering Dept., University of Tennessee.

$^{14}N_2O$ and $^{15}N_2O$ DOSIMETERS

Studies using $^{14}N_2O$ - $^{15}N_2O$ mixtures show that $^{14}N_2O$ and $^{15}N_2O$ dosimeters can discriminate between ionizing radiation and thermal-neutron effects.

R. D. Brown (shown on upper left) is a research chemist in charge of the high-resolution mass spectroscopy laboratory at the Jackson Laboratory of E. I. Dupont and Company. S. Dondes (shown at right) is a Senior Research Associate in chemistry at Rensselaer Polytechnic Institute, where P. Harteck is a Distinguished Research Professor in Physical Chemistry. All three hold the PhD degree.

LETTER TO THE EDITOR

THE EARTH'S PROBLEMS

Dear Sir:

I read with great interest your recent commentary on "Problems from the Breakfast Table" (*Nucl. Appl.*, **3**, 202 April 1967). It might interest you that our institute is carrying out research work on related problems, parallel to our normal research problems.

You might wonder why an institute for space technology is interested in economic problems and worth analysis type studies. The reason is that space research now receives a good share of the national budget in the USA, and sooner or later this will be the case in the European countries. So one has to ask questions: "What percentage of the budget is justified for space research?" "Would it not be more worthwhile to build more hospitals or help underdeveloped nations?" Questions like this can only be answered if all relevant internal (e.g., society) and external (e.g., relation to other countries) factors are taken into account. The model we are working with is called: "Socio-Economic Model of the Planet Earth." Two reports on this work,[1,2] may be of interest to you.

Günter W. Tumm

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June 29, 1967

1. H. H. KOELLE, "Sozio-Ökonomisches Modell des Planeten Erde [Socio-Economic Model of the Planet Earth ('SEMPRE')]," TUB-IR 1965/3, Institut für Raumfahrttechnik, Technische Universität Berlin (1965).

2. H. H. KOELLE, "Sozio-Ökonomisches Modell des Planeten Erde ('SEMPRE'). 1. Zwischenbericht," TUB/IR No. 2/1966, Institut für Raumfahrttechnik, Technische Universität Berlin (1966).