



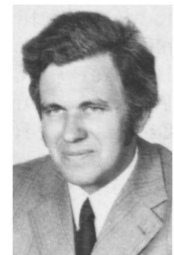
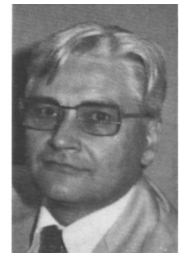
AUTHORS — DECEMBER 1977

INTERNATIONAL SAFEGUARDS

PREPARING THE IMPLEMENTATION OF NON-PROLIFERATION TREATY SAFEGUARDS IN THE U.S.

Wolfgang Frenzel (top) (Dr. rer. nat., chemistry, Technical University Braunschweig, Germany, 1961) is the head of the Africa and Latin Section in the Division of Operations A in the Department of Safeguards with the International Atomic Energy Agency (IAEA). His current interests are diversion path analysis, development of safeguards systems for nuclear plants and fuel cycles, and the analysis and processing of information. Vladimir Shmelev (center) (Doctor of Technical Science, nuclear technology, 1973) is the director of the Division of Safeguards Information Treatment with the Department of Safeguards at IAEA. His current interests include nuclear power, reactor technology, nuclear fuel cycles, Non-Proliferation Treaty safeguards, and information processing systems. Adolf H. E. von Baeckmann (bottom) [Dr. rer. nat. (Separation of Zr and Hf), University of Gottingen, 1961] is the director of the Division of Development and Technical Support with the Department of Safeguards at IAEA. His current interests include analytical chemistry of nuclear fuels, radiochemistry, methods and techniques for safeguards, and x-ray fluorescence analysis.

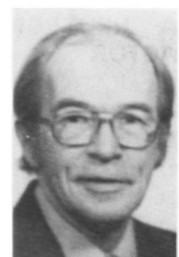
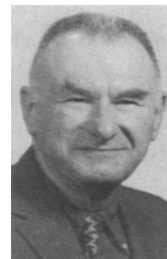
*Wolfgang Frenzel
Vladimir Shmelev
Adolf von Baeckmann*



REPORT ON AN INTERNATIONAL ATOMIC ENERGY AGENCY INVENTORY VERIFICATION

George H. Winslow (top) (BS, 1938, MS, 1939, and DSc, 1946, Carnegie Institute of Technology) is a member of the Nondestructive Assay Section of the Special Materials Division at Argonne National Laboratory (ANL). In addition to his interests in error analysis and measurement control, he is continuing a long-time activity in the study of the thermophysical properties of nuclear fuels at high temperatures. A. Lee Harkness (BSc, chemistry, 1943, MSc, chemistry, 1945, McMaster University) is a member of the Nondestructive Assay Section at ANL. He joined the ANL staff in 1950 with the initiation of the analytical mass spectrometry laboratory in the Special Materials Division. He helped develop the mass spectrometric procedures, provided the statistical interpretation of the data, and wrote the computer programs that are currently in use to provide a rigorous propagation of errors to the final results.

*George H. Winslow
A. Lee Harkness*



THE USE OF FUEL REPROCESSING PLANT INSTRUMENTATION FOR INTERNATIONAL SAFEGUARDS

Arnold L. Ayers



A. L. Ayers (BS, chemical engineering, Iowa State University) is technical assistant to the president of Allied-General Nuclear Services, currently on special assignment with responsibilities for safeguards and planning and scheduling. Prior to his current assignment, he was director of the Plant Support Division, and had responsibility for safety and environmental control and training. Ayers has also served as a consultant in reprocessing to several branches of the U.S. Government, to Euratom, and to Eurochemic.

REACTORS

IMPURITY RADIATION FROM MEDIUM DENSITY PLASMAS

*G. R. Hopkins
John M. Rawls*

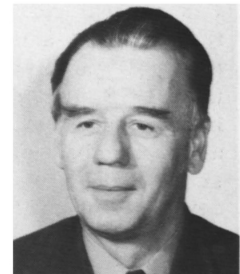
George R. Hopkins (top) (BS, physics, Allegheny College, 1948; MS, University of Rochester, 1951; PhD, physics, Iowa State University, 1954) is a senior staff engineer in the Fusion Division at General Atomic Company. His current interests are in engineering and materials for fusion reactors, particularly in the application of ceramic materials of low atomic number to the development of low induced radioactivity fusion devices. John M. Rawls (BS, physics, Michigan State University, 1965; PhD, physics, Brandeis University, 1970) is manager of the Reactor Physics Branch of the Fusion Division of General Atomic Company. His present research activities center around plasma transport, impurity phenomena, and computer modeling of tokamak operation.



RADIOGRAPHIC CONTROL OF MATERIALS TESTING REACTOR FUEL ON X-RAY PAPER

J. C. Domanus

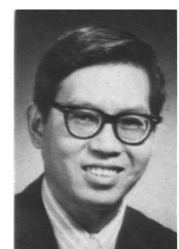
Jozef C. Domanus (MS, electrical engineering, Warsaw Technical University, 1945) joined Danish Atomic Energy Commission Research Establishment, Risø, in 1969. Since 1970, he has been doing research as senior scientist on nondestructive testing of nuclear fuel (x-ray and neutron radiography) in the Nuclear Department of Elsinore Shipbuilding and Engineering Co., Ltd.



A NEUTRON-GAMMA CHEMONUCLEAR FUSION REACTOR

*Vi-Duong Dang
Meyer Steinberg*

Vi-Duong Dang (right) (BS, chemical engineering, National Taiwan University, 1966; MS, chemical engineering, 1968, and PhD, 1971, Clarkson College of Technology) has worked on projects at Brookhaven National Laboratory (BNL) that include process flowsheet calculations, equipment sizing, plant design, and economic/technical feasibility studies.



Projects involved the application of controlled thermonuclear fusion reactor to synthetic fuel production, methanol synthesis, food production, neutron-gamma reactor, and extraction of lithium from brine and sea water. He also did studies of cross flow moving bed reactor for coal conversion, computer simulation, and fundamental research on heat and mass transfer. Previously, he did bench scale experiments and plant improvement of electrochemical systems particularly applied to capacitor and battery manufacturing. Meyer Steinberg (right) (BS, chemical engineering, Cooper Union School of Engineering; MS, chemical engineering, Polytechnic Institute of Brooklyn) holds a professional engineering license. After several years on the Manhattan Project and subsequently in the heavy chemical industry, he joined the Department of Applied Science at BNL, where he became associate head of the Radiation Division and now head of the newly formed Process Technology Division. Steinberg's major fields of interest include the development of the use of nuclear energy for the synthesis and production of industrial chemicals, materials sciences, and more recently, the development of novel energy and fuel conversion processes.



INTRUSION OF MOLTEN STEEL INTO CRACKS IN SOLID FUEL IN A TRANSIENT-UNDERCOOLING ACCIDENT IN A LIQUID-METAL FAST BREEDER REACTOR

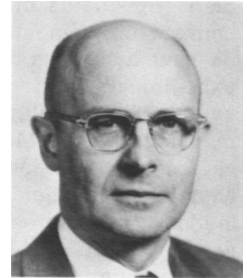
Raymond W. Ostensen (top left) (BS, physics, Brooklyn College, 1960; MS, physics, University of Dayton, 1967; PhD, nuclear engineering, University of Illinois, 1963) is presently engaged at Sandia Laboratories in theoretical studies of core disruptive accidents in liquid-metal-cooled fast breeder reactors. Prior to 1977, he was engaged in similar work at Argonne National Laboratory (ANL). William F. Murphy (top right) (BS, 1937, MS, 1939, chemistry, Syracuse University; BS, metallurgy, Carnegie Institute of Technology, 1945) is a metallurgist in the Materials Science Division of ANL, where he has studied radiation effects and conducted hot-cell examinations since 1949. For several years, he has done post-test examinations of the TREAT experiments in the Reactor Analysis and Safety Division at ANL. Bernard J. Wrona (center left) (BS, 1972, MS, 1974, metallurgical engineering, Illinois Institute of Technology) has been working on nuclear fuels as a member of the Materials Science Division of ANL since 1962. He is presently principal investigator in the development of the direct-electrical-heating apparatus and lead experimentalist in several programs that use the apparatus to study the response of nuclear oxide and carbide fuels to transient heating. L. Walter Deitrich (bottom right) (BME, Cornell University, 1961; MS, Rensselaer Polytechnic Institute, 1963; PhD, Stanford University, 1969, all in mechanical engineering) is manager of the Fuel Behavior Section in the Reactor Analysis and Safety Division at ANL. His present responsibilities include modeling and phenomenological studies of the behavior of reactor fuel during hypothetical accidents. Joseph C. Florek (bottom left) has worked at ANL for 20 years. His areas of activity have been chiefly metallography, transmission electron microscopy, and scanning electron microscopy.

*R. W. Ostensen
W. F. Murphy
B. J. Wrona
L. W. Deitrich
J. C. Florek*



THE ISOLATION OF RADIOIODINE WITH PORTLAND CEMENT. PART I: SCOPING LEACH STUDIES*Walter E. Clark*

Walter E. Clark (BS, chemistry, Virginia Military Institute, 1937; MA, chemistry, George Washington University, 1939; PhD, inorganic chemistry, University of Wisconsin, 1949) is a research staff member of the Chemical Technology Division at Oak Ridge National Laboratory. His interests include the reprocessing of nuclear fuels and the separation, processing, and disposal of radioactive wastes.



FUELS

DIFFERENCES IN THE ^{103}Ru AND ^{106}Ru AXIAL DISTRIBUTIONS IN (U,Pu) O_2 FUEL PINS*J. R. Phillips
T. K. Marshall*

J. R. Phillips (top) (PhD, analytical chemistry, University of New Mexico, 1973) is alternate group leader in analytical chemistry at the Los Alamos Scientific Laboratory. His interests include the application of nondestructive gamma scanning to the examination of irradiated fuels, assessment of foreign technology, and nondestructive analysis applied to safeguards. T. K. Marshall (BS, chemistry and mathematics, Wisconsin State University at La Crosse, 1962) has ten years of experience in trace analysis of plutonium materials and three years of experience in the gamma-scanning section obtaining postirradiation data from irradiated fuel materials. His present interests include special nuclear material inventory problems.



REACTORS

REACTOR HYDRODYNAMICS DURING THE REFLOOD PHASE OF A LOSS-OF-COOLANT ACCIDENT*Rodney R. Gay*

Rodney R. Gay (BS, mechanical engineering, West Virginia University, 1969; MS, PhD, nuclear engineering, Stanford University, 1974) was a project engineer with the Electric Power Research Institute (EPRI) at Palo Alto, California, when the work reported herein was conducted. He is currently an assistant professor at Rensselaer Polytechnic Institute at Troy, New York. At EPRI, he was responsible for contract management and research in thermal hydraulic aspects of nuclear safety. His current interests are in the understanding and modeling of two-phase steam-water phenomena of importance to the nuclear power industry.

