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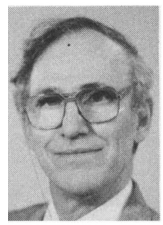
AUTHORS — FEBRUARY 1983

RADIATION EFFECTS AND THEIR RELATIONSHIP TO GEOLOGICAL REPOSITORIES

A REVIEW OF RADIATION EFFECTS IN SOLID NUCLEAR WASTE FORMS

William J. Weber
Frank P. Roberts



William J. Weber (top) (BS, physics, 1971; MS, nuclear engineering, 1972; and PhD, nuclear engineering, 1977, University of Wisconsin) is a senior research scientist in the Materials Department at the Pacific Northwest Laboratory (PNL). He has been active in radiation damage research for the past 12 years and in the characterization of solid nuclear waste forms for the past 5 years. His current technical interests include the fundamental behavior of ceramic materials under irradiation, the kinetics of recovery processes in irradiated materials, and the radiation and thermal stability of high-level nuclear waste forms. **Frank P. Roberts** (BSc, chemistry, University of Washington, 1951) is a senior research scientist in the Chemical Technology Department at PNL. He has worked for many years in radiochemistry and chemical process development related to the nuclear fuel cycle. His current interests include the long-term behavior of solidified nuclear wastes, particularly their stability toward radiation.

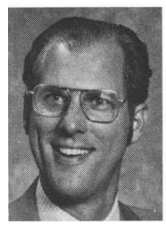
RADIATION EFFECTS IN SILICATE GLASSES PERTINENT TO THEIR APPLICATION AS A RADIOACTIVE WASTE STORAGE MEDIUM

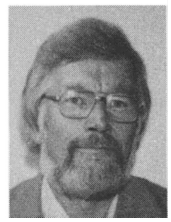
William Primak

William Primak (PhD, physical chemistry, Polytechnic Institute of Brooklyn, 1946) has been investigating radiation effects in a variety of materials at the Argonne National Laboratory since 1946.

RADIATION EFFECTS IN SYNROC-D

R. A. Van Konynenburg
M. W. Guinan



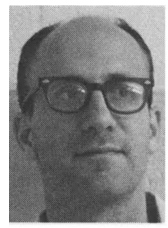


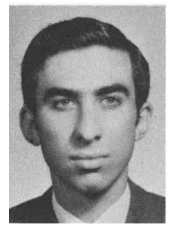
R. A. Van Konynenburg (top) (BS, engineering, 1963; MS, engineering-applied science, 1965; and PhD, engineering-applied science, 1974, University of California-Davis) is a member of the Nuclear Chemistry Division of Lawrence Livermore National Laboratory (LLNL). His research interests have included applied radiation effects in metals, ceramics, polymers, and superconductors and neutron dosimetry for the magnetic fusion energy program, risk analysis for nuclear waste management, use of neutron activation for geochemical analysis of stream sediments, and tube denting in pressurized water reactor steam generators, in addition to radiation effects in high-level nuclear waste and geologic media. **M. W. Guinan** (BS, 1959, and PhD,

1966, physics, University of California-Berkeley) is also a member of the Nuclear Chemistry Division of LLNL. His interests have included fundamental studies of radiation effects in metals, both experimental and theoretical, defect properties in solids, elastic properties of solids, and constitutive relations at high pressures.

GAMMA RADIOLYSIS OF AQUEOUS MEDIA AND ITS EFFECTS ON THE LEACHING PROCESSES OF NUCLEAR WASTE DISPOSAL MATERIALS

Aaron Barkatt
Alisa Barkatt
William Sousanpour

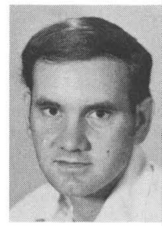




Aaron Barkatt (top) (PhD, chemistry, Hebrew University, Jerusalem, Israel, 1974) is an associate research professor at the Vitreous State Laboratory of The Catholic University of America. He joined The Catholic University of America in 1976 after two years of postdoctoral work at Purdue University. His work has been in the area of the science and technology of glass, particularly chemical durability, surface properties, radiation effects, relaxation phenomena, spectroscopy, and novel glass-forming compositions. **Alisa Barkatt** (center) is a research assistant at the Vitreous State Laboratory, The Catholic University of America. She joined The Catholic University of America in 1978. **William Sousanpour** (bottom) (MS, chemistry, The Catholic University of America, 1980) joined the Vitreous State Laboratory in 1980 and is doing research in the areas of the development of tests and models and analyzing the mechanisms of leaching processes involving nuclear waste form materials.

IRRADIATION EFFECTS ON LEACHING OF SYNROC

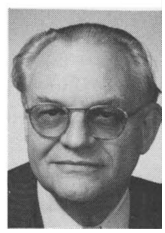
Vijay K. Sethi
John K. Bates



Vijay K. Sethi (top) (PhD, metallurgy and materials science, Case Western Reserve University, 1976) is currently a senior metallurgist at the University of Kentucky Institute for Mining and Minerals Research (IMMR) in Lexington, Kentucky. He is conducting research in the areas of corrosion and erosion in coal liquefaction, materials for shale retorting, and corrosion in fluidized bed combustors. Before joining the IMMR in January 1982, he was employed as an assistant metallurgist at Argonne National Laboratory (ANL), where he worked in the areas of nuclear waste management and irradiation effects on material performance. **John K. Bates** (PhD, physical chemistry, University of Michigan, 1975) has been a chemist in the Fuel Cycle Section of the Chemical Technology Division at ANL since 1977. He has been involved with the reprocessing of nuclear fuels and currently is interested in the technical aspects of nuclear waste disposal.

RADIATION DAMAGE STUDIES ON NATURAL ROCK SALT FROM VARIOUS GEOLOGICAL LOCALITIES OF INTEREST TO THE RADIOACTIVE WASTE DISPOSAL PROGRAM

Paul W. Levy



Paul W. Levy (BS, physics, University of Chicago, 1943; PhD, solid-state physics, Carnegie Institute of Technology, 1954) has been a staff member of the Physics Department at Brookhaven National Laboratory since 1952. His primary interest is basic research on radiation damage and related phenomena in nonmetals.

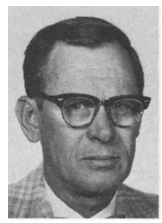
THERMOLUMINESCENCE FOR SELF-DOSIMETRY IN CLIMAX STOCK QUARTZ MONZONITE

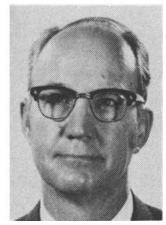
Richard C Carlson

Richard C. Carlson (BA, physics, San Francisco State College, 1963) has been a staff member at Lawrence Livermore National Laboratory for 18 years. His major interest has been development and use of *in situ* methods of earth properties measurement for site characterization. This has involved acoustic, nuclear, gravimetric, and other types of well logging as well as seismic surveys. As subtask leader for scientific aspects of the SFT-C, a practical demonstration of geologic storage of spent commercial nuclear reactor fuel in granite, his interest in thermoluminescence arose from the need to document rock dose.

FUSION OF ACID OXIDES FOR POTENTIALLY RADIATION-RESISTANT WASTE FORMS

Claude C. Herrick
Robert A. Penneman





Claude C. Herrick (top) (BS, 1950, and PhD, 1957, physical chemistry, Illinois Institute of Technology) is a staff member in the Chemistry-Materials Science Division of Los Alamos National Laboratory (LANL). His research interests include thermodynamics, kinetics, and high-temperature chemistry. **Robert A. Penneman** (PhD, inorganic chemistry, University of Illinois, 1947; ScD (h.c.), Millikin University, 1961) is a group leader in the Chemistry-Nuclear Chemistry Division of LANL. His research interests include the chemistry of the actinide elements and structural chemistry.

RADIATION EFFECTS IN SOLUTION AND ON THE SOLID/LIQUID INTERFACE

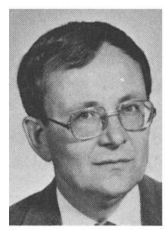
K. L. Nash
S. Fried
A. M. Friedman
N. Susak
P. Rickert
J. C. Sullivan

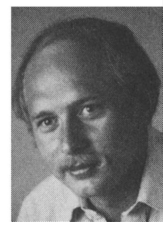
Photographs and biographies not available.

FISSION REACTORS

PUMP BEHAVIOR AND ITS IMPACT ON A LOSS-OF-COOLANT ACCIDENT IN A PRESSURIZED WATER REACTOR

Wolfgang Kastner
Gerd J. Seeberger



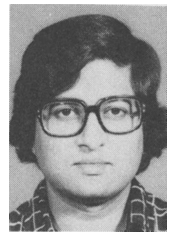


Wolfgang Kastner (top) [Dipl. Ing., mechanical engineering, Technical University of Braunschweig, Federal Republic of Germany (FRG), 1967] has been involved since 1967 in research programs of nuclear and fossil heated power plants of Maschinenfabrik Augsburg-Nürnberg (MAN), and since 1974, in the nuclear programs of Kraftwerk Union (KWU). He is presently a senior supervisor with research projects on the failure of piping and components in pressurized water reactors and on heat transfer in nonnuclear power plants. **Gerd J. Seeberger** (Dipl. Ing., mechanical engineering, Technical University of Hannover, FRG, 1976) has been involved in safety analysis for nuclear power plants since 1976 at KWU. For the past four years he has also worked part time on experimental investigations for code development and verification.

NUCLEAR SAFETY

ANEXDI—A TWO-DIMENSIONAL COUPLED THERMOHYDRODYNAMIC AND POINT KINETICS COMPUTER MODEL FOR ANALYSIS OF EXTENDED DISASSEMBLY ACCIDENTS OF FAST POWER REACTORS

Subhash Chandra

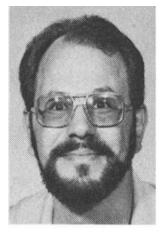


Subhash Chandra (MSc, physics, Aligarh University, India) has been working in the Theoretical Reactor Physics Section of Bhabha Atomic Research Centre since 1970 on various problems of reactor kinetics and safety. His current interest is the modeling aspects of two-phase flows arising in fast and thermal reactor accidents.

NUCLEAR FUELS

AN ANALYSIS OF PROMPT FISSION GAS RELEASE FROM A CLADDING BREACH

Mohamed S. El-Genk
Rajinder M. Kumar
Douglas W. Croucher

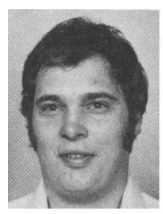


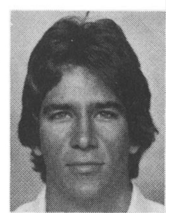
Mohamed S. El-Genk (top) (BS, nuclear engineering, University of Alexandria, Egypt, 1968; MS, 1975, and PhD, 1978, nuclear engineering, University of New Mexico) is an assistant professor of chemical and nuclear engineering at the University of New Mexico, where he teaches and conducts research in the areas of thermal-hydraulic design of nuclear systems, flow through porous media, vapor explosion phenomena, and the collection and utilization of solar energy. He previously worked at EG&G Idaho, Inc. in the areas of light water reactor (LWR) fuel behavior, oxidation kinetics of Zircaloy cladding, and fission product release. **Rajinder M. Kumar** (center) (MS, chemical engineering, Texas A&M University, 1975) is an engineer in the LWR Fuel Research Division at EG&G Idaho, Inc. His current research interests include mathematical modeling of LWR fuel rod behavior phenomena and analysis of fission-product release from fuel rods undergoing severe damage. **Douglas W. Croucher** (bottom) (BS, engineering physics, University of California, Berkeley, 1969; MS, 1971, and PhD, 1975, nuclear engineering, University of New Mexico) is a supervisor of fission product behavior research in the Thermal Fuels Behavior Program at EG&G Idaho, Inc. His research interests include fission product and aerosol release and transport, transient fuel rod behavior, and reactor safety.

HEAT TRANSFER AND FLUID FLOW

DISPERSED-FLOW FILM BOILING HEAT TRANSFER DATA NEAR SPACER GRIDS IN A ROD BUNDLE

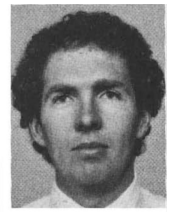
Graydon L. Yoder, Jr.
David G. Morris
Charles B. Mullins
Larry J. Ott

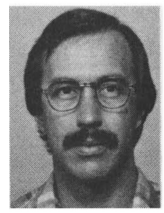




Graydon L. Yoder, Jr. (top) (BS, mechanical engineering, Penn State University, 1973; MS, mechanical engineering, University of California, Berkeley, 1975; PhD, mechanical engineering, Massachusetts Institute of Technology, 1980) is currently interested in multiphase heat transfer. **David G. Morris** (bottom) (BS, 1978, and MS, 1979, nuclear engineering, University of Florida) has worked in the area of post-critical heat

flux heat transfer for the past two years and is currently interested in this area of research. **Charles B. Mullins** (top) (BS, physics, 1975, and MS, mechanical engineering, 1977, University of Texas at Austin) has been studying boiling heat transfer for the past three years. **Larry J. Ott** (bottom) (BS, 1968, and MS, 1978, chemical engineering, University of Tennessee) has been employed for five years at the Tennessee Eastman Company as a process systems engineer and, since 1975, as a development engineer at Oak Ridge National Laboratory (ORNL). His primary responsibilities at ORNL have included the calibration, simulation, and analysis of fuel pin simulators and electric core response in the Thermal-Hydraulic Test Facility.

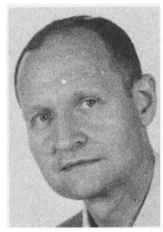




TRUE MASS FLOWMETER—A MASS FLOWMETER FOR NONSTEADY-STATE TWO-PHASE FLOW

Gottfried Class
Klaus Hain

Gottfried Class (top) (Diplom, mechanical engineering, Universität Stuttgart, 1959; Dr., mechanical engineering, Universität Stuttgart, 1963) is a section manager in the Institute for Reactor Development at the Karlsruhe Nuclear Research Center, Federal Republic of Germany (FRG). After working in the fields of feedwater chemistry and corrosion in conventional power plants, he has been engaged in liquid-metal fast breeder and light water reactor safety for the last 15 years. **Klaus Hain** [Diplom-Ingenieur (FH), mechanical engineering, Fachhochschule Karlsruhe, 1956) is a project leader in the Hauptabteilung Ingenieurtechnik at the Karlsruhe Nuclear Research Center, FRG; this group is working on the design and construction of experiment facilities investigating reactor safety. He has been engaged in the design of low-temperature radiation facilities and high-temperature pressurized water loops for more than 20 years.



EDUCATION

RECONFIGURATION OF THE RENSSELAER POLYTECHNIC INSTITUTE CRITICAL FACILITY TO LOWER CRITICAL MASS

Peter R. Nelson
Donald R. Harris

Peter R. Nelson (top) [BS, 1977, and ME, 1980, nuclear engineering, Rensselaer Polytechnic Institute (RPI)] is a senior engineer in the Safeguard Systems Design Group of Plant Engineering for Combustion Engineering (C-E). Prior to joining C-E in 1981, he was the facility supervisor of the RPI Critical Facility and served in the U.S. Navy Nuclear Power Program. **Donald R. Harris** (BS, physics, and MS, mathematics, 1949, Carnegie Mellon University; PhD, nuclear engineering, RPI, 1976) is an associate professor of nuclear engineering at RPI. His interests include reactor core analysis, transport methods, nuclear data, shielding, and criticality safety. He was formerly at Bettis Atomic Power Laboratory, where he was a fellow scientist, and at Los Alamos National Laboratory, where he was leader of the Nuclear Data Group from 1971 to 1975.