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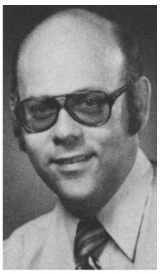
AUTHORS — MID-DECEMBER 1979

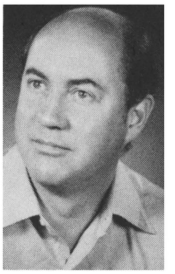
NUCLEAR POWER REACTOR SAFETY

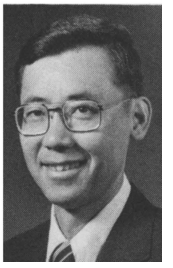
FLOW BEHAVIOR OF VOLUME-HEATED BOILING POOLS: IMPLICATIONS WITH RESPECT TO TRANSITION PHASE ACCIDENT CONDITIONS

T. Ginsberg
O. C. Jones, Jr.
J. C. Chen



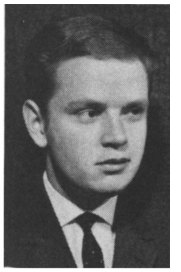
Theodore Ginsberg (top) (BChE, Pratt Institute, 1963; MS, 1966, and PhD, 1969, nuclear engineering, The Pennsylvania State University) is presently senior staff scientist-mechanical engineer at Brookhaven National Laboratory (BNL). Since 1974, he has contributed to liquid-metal fast breeder reactor (LMFBR) safety technology in the areas of accident analysis and experimental modeling. His current LMFBR interests, both analytical and experimental, include multiphase heat and mass transfer in volume-heated boiling systems, application of microwave technology for simulation of the nuclear heat source, the impact of fluid instabilities on hypothetical core disruptive accident energetics, and "transition phase" accident analysis. He is also presently involved in light water reactor (LWR) related studies of condensation-induced water hammers and in experimental studies of pressure pulse propagation in multiphase media. **Owen C. Jones, Jr.** (center) (BSME, University of Massachusetts, 1962; MS, mechanical engineering, Rensselaer Polytechnic Institute, 1966; PhD, mechanical engineering, Rensselaer Polytechnic Institute, 1973) is presently head of the Thermal Hydraulics Development Division in the Nuclear Safety Programs at BNL. He worked for 12 years at Knolls Atomic Power Laboratory, where he gained experience in the thermal-hydraulics aspects of nuclear reactors. From 1974 to 1976, he worked in the Reactor Analysis and Safety Division of Argonne National Laboratory, where he gained experience in the thermal-hydraulic aspects of LMFBRs and continued his research activities in LWR safety. His current research interests are in LWR research—measurement of nonequilibrium vapor generation rates in flashing flows, instrumentation development for two-phase flows, condensation-induced water hammer, and pressure-induced bubble growth—and in LMFBR safety research—heat transfer from volume-boiling pools to boundaries, multiphase solidification dynamics, and flow behavior of volume boiling pool systems. **John C. Chen** (bottom) (BChE, Cooper Union, 1956; MS, chemical engineering, Carnegie-Mellon University, 1959; PhD, chemical engineering, University of Michigan, 1961) is presently professor of mechanical engineering and mechanics and director of the Institute of Thermo-Fluid Engineering and Science at Lehigh University. From 1960 to 1976, he worked at BNL in the area of liquid-metal-cooled reactor heat transfer and fluid mechanics. His current interests are in thermofluid problems related to LMFBR and LWR safety technology and in coal combustion technology.

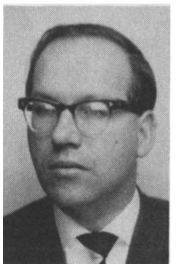




DETERMINATION OF THE SOURCES OF THE AIRBORNE PHYSICO-CHEMICAL IODINE-131 SPECIES IN A PRESSURIZED WATER REACTOR POWER PLANT

H. Deuber
J. G.Wilhelm

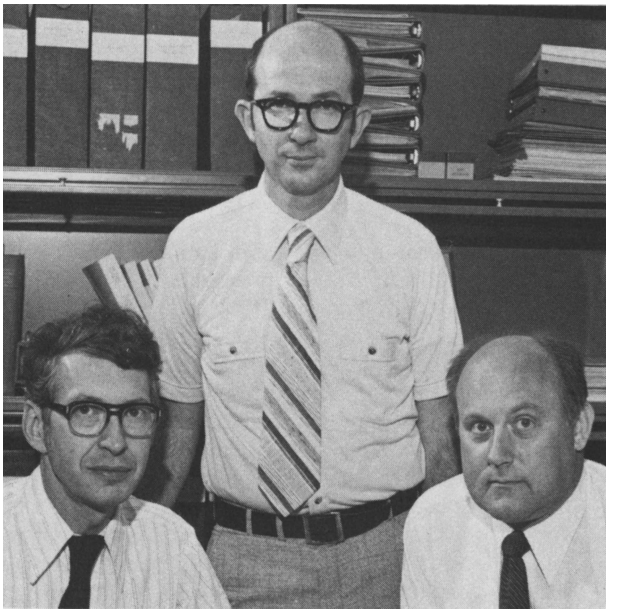




H. Deuber (top) (PhD, physical chemistry, University of Bonn, 1972) has worked at the Karlsruhe Nuclear Research Center (KFK), Federal Republic of Germany, since 1973. His work includes research on the removal of airborne radioiodine by iodine filters and the environmental impact of airborne radioiodine released by nuclear facilities. **J. G. Wilhelm** (MS, chemistry, University of Mainz, 1962) has worked at KFK since 1962. From 1963 to 1966, he spent two and a half years as a guest scientist at Oak Ridge National Laboratory. His primary research interest is in the field of nuclear filter technology. Since 1974, he has been the managing director of the Laboratory for Aerosol Physics and Filter Technology at KFK.

FISSION PRODUCT SOURCE TERMS FOR THE LIGHT WATER REACTOR LOSS-OF-COOLANT ACCIDENT

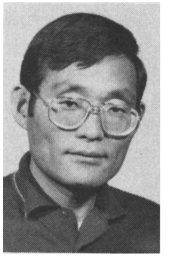
R. A. Lorenz
J. L. Collins
A. P. Malinauskas

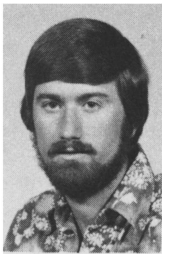


R. A. Lorenz (left) (BS, chemical engineering, Iowa State University, 1951) has worked in nuclear reactor safety at Oak Ridge National Laboratory (ORNL) since 1960. His main interest has been in fuel rod failure and fission product release. **J. L. Collins** (center) (BS, chemistry, University of Tennessee, 1963) has been involved in the fission product release studies program at ORNL since 1975. He has a special interest in the chemical behavior of fission products in light water reactor fuel under accident conditions. **A. P. Malinauskas** (right) (PhD, physical chemistry, Massachusetts Institute of Technology, 1958) is head of the Chemical Development Section at ORNL. In addition to fuel and fission product chemistry, his interests also include nuclear fuel recycle, reaction kinetics, transport phenomena, and separations systems research.

TRAC ANALYSIS OF LOSS-OF-FLUID TEST NON-NUCLEAR TEST L1-4

J. J. Pyun
K. A. Williams

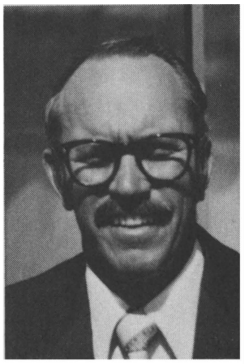




J. J. Pyun (top) (BS, Seoul National University, Seoul, Korea, 1965; MS, State University of New York at Buffalo, 1970; PhD, The University of Michigan, 1973) is a staff member of Los Alamos Scientific Laboratory (LASL). His current interests include reactor safety analysis, thermal-hydraulic analysis of nuclear reactors, and computational fluid dynamics. **K. A. Williams** (BME, MSME, Georgia Institute of Technology, 1974) is section leader for TRAC code assessment at LASL. His current interests include thermal-hydraulic aspects of nuclear reactor safety and numerical hydrodynamics.

ANALYSIS OF A SIMULATED SMALL BREAK IN THE SEMISCALE SYSTEM UNDER LOSS-OF-COOLANT ACCIDENT CONDITIONS

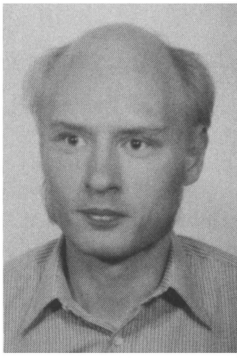
Charles E. Cartmill



Charles E. Cartmill (BS, 1962, and MS, 1963, mechanical engineering, Brigham Young University; PhD, mechanical engineering, University of Arizona, 1970) is an associate professor in the College of Engineering at the University of Idaho. He has done nuclear reactor safety research at the Idaho National Engineering Laboratory, with emphasis on the loss-of-coolant accident. His special interests include thermohydraulic analysis of power systems.

COUPLED VIBRATIONS OF A STRUCTURE AND FLUID EXCITED BY PRESSURE SHOCKS

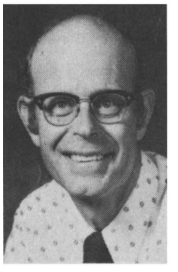
Jorma Arros

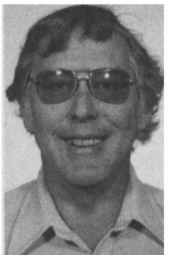


Jorma Arros (Dipl. Eng., technical physics, Helsinki University of Technology, 1978) is a research engineer in the Structural Analysis Group of the Nuclear Engineering Laboratory of the Technical Research Centre of Finland, working in the field of structural dynamics.

VENT CLEARING DURING A SIMULATED LOSS-OF-COOLANT ACCIDENT IN A MARK I BOILING WATER REACTOR PRESSURE-SUPPRESSION SYSTEM

J. H. Pitts
E. W. McCauley

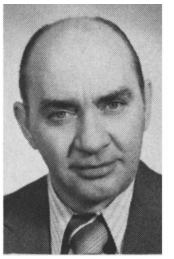


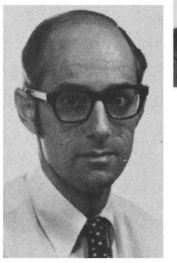


John H. Pitts (top) (BS, mechanical engineering, Stanford University, 1955; PhD, University of California, Davis, 1976) has conducted research on nuclear safety, fluid dynamics, and heat transfer at the Lawrence Livermore Laboratory (LLL) since 1959. From 1978 to 1979, he was on professional research leave at Gesellschaft für Reaktorsicherheit mbH, Garching, Federal Republic of Germany. Recently, he has directed his attention to power conversion for future inertial confinement fusion reactors. **Edward W. McCauley** (BS, Seattle University, 1953; MS, 1962, and PhD, 1967, nuclear engineering, University of Washington) is project leader for nuclear containment safety research in the Safety Section of LLL's Assistance Program for the U.S. Nuclear Regulatory Commission. His present activities address loss-of-coolant accident response to a Mark II boiling water reactor (BWR) and are closely tied to cooperative liaison with foreign large-scale experiments. Since joining LLL in 1967, he has also carried out containment-related analyses in the areas of plasma flow, shock wave interaction with structures, and problems addressing flow of radionuclides through porous media. Pitts and McCauley were principal investigators for the $\frac{1}{5}$-scale Mark I BWR pressure-suppression experiment which was used as a basis for their paper.

DAMAGE MECHANISMS TO CABLES IN REACTOR LOSS-OF-COOLANT ACCIDENT ENVIRONMENTS

R. E. Leadon
N. A. Lurie

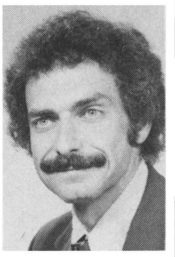


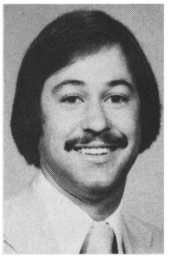


Roland E. Leadon (top) (PhD, physics, University of California, San Diego, 1967) was formerly leader of the Theoretical Solid State Physics Group and manager of the Electromagnetics Department at IRT Corporation in San Diego. His interests are primarily in theoretical solid-state physics, particularly radiation effects in solids. He recently joined Jaycor, where he is working in the area of system-generated EMP. **Norman A. Lurie** (PhD, nuclear engineering, The University of Michigan, 1969) is program manager for research in the Nuclear Systems Division of IRT. His interests span the applications of nuclear physics. In recent years, he has worked on problems associated with the qualification of equipment for nuclear power plants.

THERMAL-HYDRAULIC ANALYSIS OF FUEL BLOCKAGES FORMED DURING TRANSIENT OVERPOWER ACCIDENTS IN LIQUID-METAL FAST BREEDER REACTORS

V. K. Dhir
W. E. Kastenberg
D. W. Varela

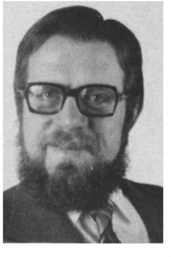


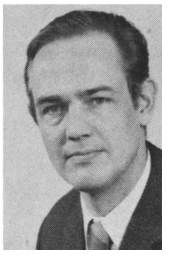


Vijay K. Dhir (top) (PhD, mechanical engineering, University of Kentucky, Lexington, 1972) has been assistant professor of engineering and applied science at the University of California, Los Angeles (UCLA) since 1974. His research interests include thermal-hydraulics of nuclear reactors and reactor safety problems. **William E. Kastenberg** (center) (PhD, nuclear engineering, University of California, Berkeley, 1966) is professor of engineering and applied science at UCLA. His research interests include liquid-metal fast breeder reactor (LMFBR) safety, fusion technology, and risk assessment. **D. W. Varela** (bottom) (BS, nuclear engineering, University of Arizona, 1976; MS, nuclear engineering, UCLA, 1978) is a member of the technical staff at Sandia Laboratories. He was involved in a recent study of the application of event trees to LMFBR systems and is currently project leader of the Molten Fuel Pool Program. He is conducting in-pile and high-temperature furnace experiments to examine interactions and containment of molten reactor core materials.

COMPARATIVE STUDY OF HETEROGENEOUS AND HOMOGENEOUS LIQUID-METAL FAST BREEDER REACTOR CORES IN SOME ACCIDENT CONDITIONS

A. Renard
G. Evrard
U. Wehmann

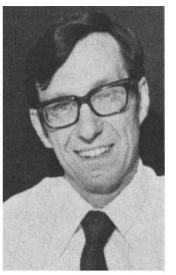


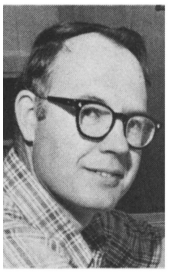


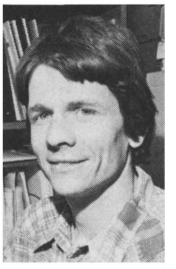
Alfred F. Renard (top) (Civil Engineer, electronics, 1962, and applied nuclear science, 1964, University of Brussels, Belgium) joined Belgonucleaire in 1966. Since then, he has been involved in the nuclear reactor safety field [fast breeder reactor (FBR) and light water reactor (LWR)]. He is in charge of the group for dynamic and safety studies of nuclear reactor core and fuel design. **Guy Evrard** (center) (Lic. Sc. Phys., University of Brussels, Belgium, 1964) joined Belgonucleaire in 1966. From 1966 to 1970, he was involved in reactor physics (LWR and FBR). Since 1970, he has participated in safety studies, mainly for FBRs. In this frame, he was assigned to Kernforschungszentrum Karlsruhe in 1973-1974, where he worked principally on hypothetical core disruptive accident studies. **Udo K. Wehmann** (bottom) (Dipl. Phys., Dr. rer. nat., Universities of Göttingen and Bonn) has been involved since 1967 in the German FBR Program. Nuclear core design of FBRs, evaluation of critical experiments, and general core optimization studies are his main areas of interest.

ROD BUNDLE CRITICAL HEAT FLUX AT LOW PRESSURE

Robert P. Wadkins
Richard G. Ambrosek
Michael W. Young



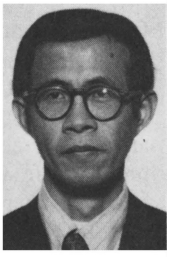


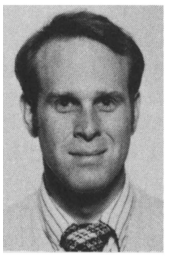


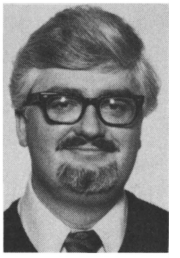
Robert P. Wadkins (top) (BS, chemical engineering, Washington State University, 1960; MS, chemical engineering, University of Idaho, 1967) is currently section leader of reactor safety analysis for EG&G Idaho, Inc. His special interest is in core safety studies during steady-state and transient conditions. **Richard G. Ambrosek** (center) (BS, chemical engineering, University of Nebraska, 1962; MS, nuclear engineering, University of Idaho, 1968) is currently a senior project engineer at EG&G Idaho, Inc. He has been associated with thermal-hydraulic evaluations for nuclear test reactors and their associated experiments and has been involved in safety analyses and generation of technical specifications for the same. **Michael W. Young** (bottom) (BS, nuclear engineering, University of Maryland, 1974; MS, nuclear engineering, University of New Mexico, 1975) is a thermal-hydraulic engineer with EG&G Idaho, Inc. He has conducted safety analyses associated with various blowdown transients and high-energy insertion accidents of light water reactor systems.

REFLOOD HEAT TRANSFER CORRELATION

Hsu-Chieh Yeh
Cleon E. Dodge
Lawrence E. Hochreiter



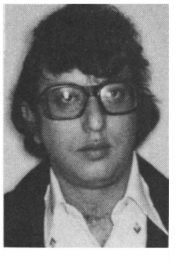


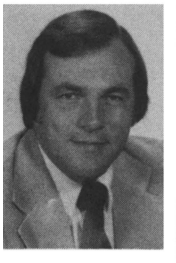


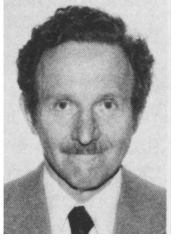
Hsu-Chieh Yeh (top) (BS, Cheng-Kung University, 1959; MS, University of Toledo, 1963; PhD, University of Michigan, 1967) is a fellow engineer at Westinghouse Nuclear Energy Systems. His current interests include heat transfer and general theories on potential field problem with applications to the potential flow and heat conduction in nuclear reactions. **Cleon E. Dodge** (center) (BS, Lehigh University, 1974; MS, Lehigh University, 1976) works with Westinghouse Electric Corporation on FLECHT reflood data reduction and analysis. **Lawrence E. Hochreiter** (bottom) (BSME, University of Buffalo, 1963; MS, PhD, Purdue University, 1971) is an advisory engineer at Westinghouse Nuclear Energy Systems in the Nuclear Safety Department. He has held engineering and management positions at Westinghouse since 1971, and has been involved in the thermal-hydraulic aspects of light water reactor safety since 1972.

FUEL-COOLANT INTERACTIONS IN A SHOCK TUBE GEOMETRY

A. Segev
R. E. Henry
S. G. Bankoff



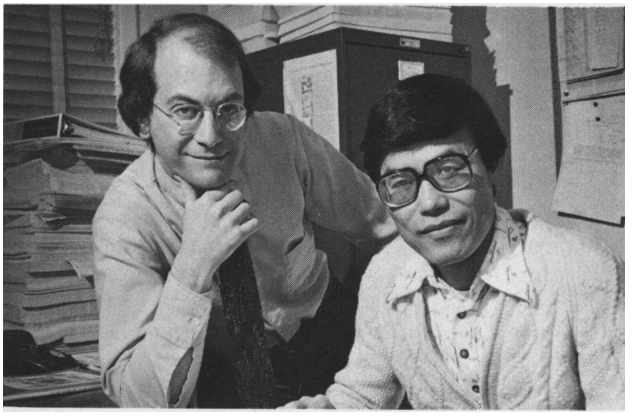




Aryeh Segev (top) (BS, 1972, and MS, 1974, mechanical engineering, Technion-Israel Institute of Technology; PhD, chemical engineering, Northwestern University, 1978) is a research scientist at Battelle Columbus Laboratory. His research interests include hydrodynamic and heat transfer aspects of nuclear reactor safety. **Robert E. Henry** (center) (BS, 1962, MS, 1964, and PhD, 1967, mechanical engineering, University of Notre Dame) is currently an associate division director of the Reactor Analysis and Safety Division at Argonne National Laboratory. His areas of interest include two-phase critical flow, transient critical heat flux, film boiling, sodium boiling, and vapor explosions. He is a member of the CSNI International Committee of Experts on the Science of Vapor Explosions. **S. G. Bankoff** (bottom) (PhD, chemical engineering, Purdue University, 1952) is Walter P. Murphy Professor of Chemical and Nuclear Engineering and chairman of the Energy Engineering Council at Northwestern University. His research interests are in two-phase flow and heat transfer related to both liquid-metal fast breeder reactor and light water reactor safety.

HIGHER ORDER EFFECTS IN CALCULATING BOILING WATER REACTOR DOPPLER AND VOID REACTIVITY FEEDBACK

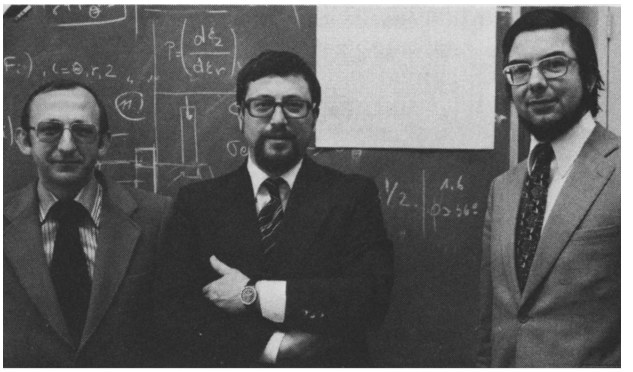
David J. Diamond
Hsiang-Shou Cheng



David J. Diamond (left) (PhD, nuclear engineering, Massachusetts Institute of Technology, 1968) and **Hsiang-Shou (Sam) Cheng** (PhD, nuclear engineering, Massachusetts Institute of Technology, 1968) are members of the Reactor Core Safety Analysis Group at Brookhaven National Laboratory, for which D. J. Diamond is the group leader. Their interests lie in the areas of reactor physics and thermal-hydraulics and the application of these disciplines to core safety problems. They have been involved in the development of physics and engineering models and numerical methods used in safety analysis codes. In addition, they have done analyses of a wide range of light water reactor safety and core performance problems. This includes static and transient analysis of power distributions and reactivity effects, and the interpretation of in-core and ex-core instrumentation.

SAFETY ASPECTS OF USING GADOLINIUM AS BURNABLE POISON IN PRESSURIZED WATER REACTORS

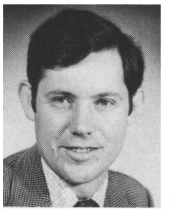
Cl. Vandenberg
H. Bonet
A. Charlier
F. Motte

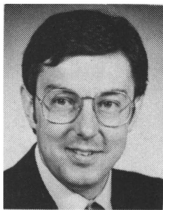


Claude Vandenberg (top photo, center) (electrical and mechanical engineering, University of Liège, 1960; nuclear engineering, University of Liège, 1966) joined Belgonucleaire in 1962 and worked first in reactor physics of light water reactors (LWRs) and fast breeder reactors. He is in charge of the BR3 core project. He is presently head of the LWR Fuel Design and Safety Department. He is also a lecturer in nuclear engineering at the University of Liège. **Henri Bonet** (top photo, right) (engineer in physics, University of Liège, 1968) joined Belgonucleaire in 1970 and worked in physics of LWRs. Since 1976, he has been a senior engineer involved in licensing and safety analysis for LWRs. Recently, his attention has focused on transient analysis and environmental impact of nuclear plants. **Albert Charlier** (top photo, left) (licence in physics, University of Louvain, 1966) joined Belgonucleaire in 1968 as physicist. He was mainly involved in the Belgian plutonium recycle program, in the development of physics calculation methods, and in the nuclear design of fuel reloads. He is presently head of the Thermal Reactor Physics Group. **François Motte** (bottom) (graduate engineer, electrical engineering, Louvain University, 1954) joined the Centre d'Etude l'Energie Nucléaire/Studiecentrum voor Kernenergie in 1956. He is currently superintendent of the BR3 experimental power plant. He was head of the Reactor Study Department from 1964 to 1974. In addition, since 1966, he held various professorial positions, teaching reactor physics at the Liége University.

SPACE-TIME NEUTRONIC ANALYSIS OF POSTULATED LOSS-OF-COOLANT ACCIDENTS IN CANDU REACTORS

J. C. Luxat
G. M. Frescura





John C. Luxat (top) (PhD, electrical engineering, University of Windsor, 1972) is a nuclear design engineer-specialist in the Nuclear Studies and Safety Department of Ontario Hydro. His interests are in the areas of space-time kinetics, control and safety systems analysis and design, and accident analysis for CANDU reactors. **Gianni M. Frescura** (Doctor of Physics, University of Padua, 1969) is supervising engineer for reactor physics in the Nuclear Studies and Safety Department of Ontario Hydro. His main professional interests are in the areas of core physics, safety and control systems design, and accident analysis for CANDU reactors.

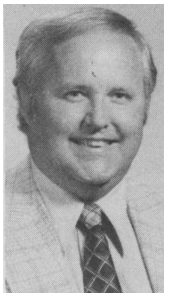
A CRITICAL EXPERIMENTAL STUDY OF INTEGRAL PHYSICS PARAMETERS IN SIMULATED LIQUD-METAL FAST BREEDER REACTOR MELTDOWN CORES

S. K. Bhattacharyya
D. C. Wade
R. G. Bucher
D. M. Smith
R. D. McKnight
L. G. LeSage

Samit K. Bhattacharyya (standing, right) (B Tech, mechanical engineering, Indian Institute of Technology, Kharagpur, India, 1968; MS, 1970, and PhD, 1973, nuclear engineering, University of Wisconsin) is presently leader of the Physics Design Group of the Safety Research Facilities (SAREF) Projects of the Applied Physics Division at Argonne National Laboratory (ANL) (Illinois). His current research interests are in the areas of fast critical experiments and analysis and physics design of fast and thermal reactors. **David C. Wade** (seated, right) (BS, mechanical engineering, University of Illinois, 1959; MS, nuclear engineering, University of Illinois, 1960; ScD, nuclear engineering, Massachusetts Institute of Technology, 1965) is currently head of the Critical Experiments and Analysis Section of the Applied Physics Division at ANL (Illinois) and the associate director for physics of the SAREF Projects. He has worked on analytical methods development, critical experiment analysis, and reactor design in the fast and thermal reactor physics areas. **Ronald G. Bucher** (standing, left) (BS, physics, Virginia Polytechnic Institute, 1968; MS, 1969, and PhD, 1975, physics, University of Illinois) is a staff physicist in the Critical Experiments and Analysis Section in the Applied Physics Division at ANL (Illinois). His current research interests are in the area of experimental reactor physics. **Dale M. Smith** (standing, center) (BS, mathematics, Illinois Institute of Technology, 1969) is a scientific assistant in the Critical Experiments and Analysis Section of the Applied Physics Division of ANL (Illinois). His present interests are in the area of experimental reactor physics. **Richard D. McKnight** (seated, left) (BS, chemical engineering, 1967; MS, 1969, and PhD, 1974, nuclear engineering, University of Cincinnati) is a nuclear engineer with the Zero Power Reactor (ZPR) Theory and Analysis Group of the Applied Physics Division at ANL (Illinois). His current research interests are the analysis of critical experiments with special emphasis on nuclear data evaluation. **Leo G. LeSage** (seated, center) (BS, engineering physics, University of Kansas, 1957; MS, engineering science, 1962, and PhD, nuclear engineering, 1966, Stanford University) is an associate director of the Applied Physics Division and manager of the ZPR Critical Experiments Program of ANL. His present research interests are in reactor physics and associated areas of reactor technology.

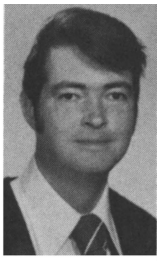
LOW SODIUM VOID CORES

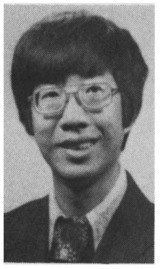
W. P. Barthold
J. C. Beitel
P. S. K. Lam
Y. Orechwa
S. F. Su
R. B. Turski



Wolfgang P. Barthold (right) (BS, physics, University of Goettingen, Germany, 1958; Dr. rer. nat., theoretical physics, University of Kiel, Germany, 1961) is director of reactor engineering at Science Applications, Inc. (SAI) in Oak Brook, Illinois. His interests include nuclear, mechanical, and thermal design and analysis of advanced reactor concepts, reactor safety, as well

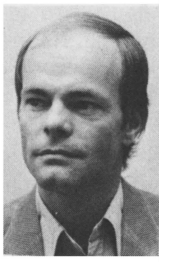
as model and methods development for design analysis. **Jon C. Beitel** (top) (BS, mathematics, Aurora College, 1966) has been on the staff of the Argonne National Laboratory (ANL) Applied Physics Division since 1968. He has worked in fast reactor analysis and methods development, and has been involved in systems design for the last four years. **Peter S. K. Lam** (bottom) (BS, Oregon State University, 1967; MS, Stanford University, 1968; PhD, Stanford University, 1971) is currently manager of engineering analysis at SAI, where he is involved in both boiling water reactor (BWR) and liquid-metal fast breeder reactor (LMFBR) reactor analysis. He previously worked at ANL (1975-1979) and at General Electric Company (1972-1975) on LMFBR and BWR core design, method verification, and reactor safety. Photographs and biographies for **Y. Orechwa**, **S. F. Su**, and **R. B. Turski** were not available at the time of publication.

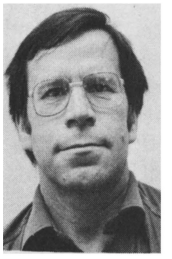


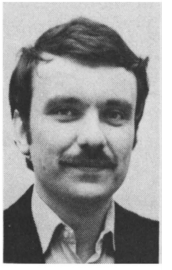


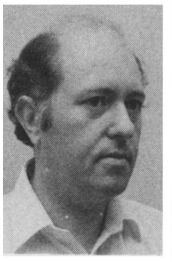
PRESSURE FIELD AND CORE BARREL LOADINGS DURING PRESSURIZED WATER REACTOR BLOWDOWN

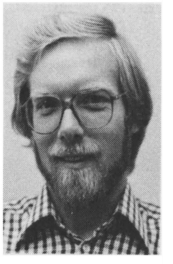
G. Enderle
F. Katz
H. Mösinger
E. G. Schlechtendahl
K. Stölting







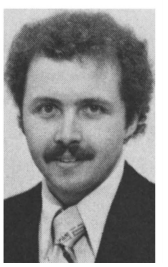




Günter Enderle (top right) (Dipl. Ing., electrical engineering, Karlsruhe University, 1971; Dr. Ing., mechanical engineering, Karlsruhe University, 1975) works at the Institut für Reaktorentwicklung at Kernforschungszentrum Karlsruhe (KFK), where he participates in the development of pressurized water reactor blowdown codes and works in the field of computer graphics, especially for the visual representation of experimental and computational results. **Fritz Katz** (top left) (Dipl. Ing., electrical engineering, Karlsruhe University, 1962) is currently involved in developing codes for fluid-structure interaction and using them for blowdown calculations within the HDR experimental program at KFK. **Heinrich Mösinger** (center right) (Dipl. Ing., mechanical engineering, Kaiserslautern Technical University, 1975) is presently investigating two-phase flow phenomena and doing accompanying calculations and surveillance work for the HDR blowdown experiments at KFK. **Ernst-Günther Schlechtendahl** (bottom left) (Dipl. Ing., reactor technology, Stuttgart University, 1962; Dr. Ing., mechanical engineering, Karlsruhe University, 1969) is head of the department for fluid dynamics and data processing of the Institut für Reaktorentwicklung at KFK. He originally worked in liquid-metal fast breeder reactor (LMFBR) design and safety analysis. Since 1972, he has concentrated on safety-related code development for light water reactors (LWRs) and on computer-aided design methods. **Klaus Stölting** (bottom right) (Dipl. Ing., mechanical engineering, Darmstadt Technical University, 1972) has been doing fluid dynamics code development and calculations in a number of application areas related to LWR safety. He is presently doing accompanying calculations for LMFBR fuel-coolant interaction experiments.

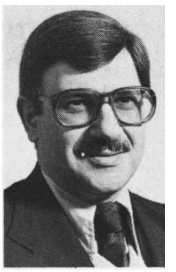
APPLICATION OF FLUID-STRUCTURE INTERACTION FOR STEAM GENERATOR FORCE ANALYSIS

D. J. Kowalski
V. J. Esposito



David J. Kowalski (right) (BS, nuclear engineering, Lowell Technological Institute, 1972; MS, nuclear engineering, Purdue University, 1974) is a senior engineer with Westinghouse Electric Corporation. His principal area of responsibility is loss-of-coolant-accident calculations. His special interests include

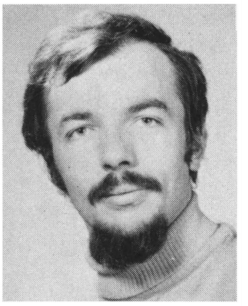
thermal-hydraulic design transients in pressurized water reactors (PWRs). **Vincent J. Esposito** (BS, chemical engineering, Polytechnic Institute of Brooklyn, 1964; DSc, nuclear engineering, University of Virginia, 1968) is manager of safeguards engineering for Westinghouse Electric Corporation. He has been involved in the development and utilization of analytical models for simulating thermal-hydraulic behavior of PWR systems.



TWO-PHASE CRITICAL FLOW IN LONG NOZZLES

J. Y. Boivin

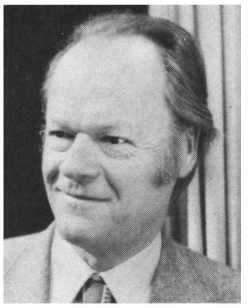
J. Y. Boivin (diplôme d'ingénieur, l'Ecole Centrale de Paris, 1973) joined the Studies and Research Department of Electricité de France in 1975. His recent work, mainly experimental, concerns two-phase flow through nozzles and components such as valves.



ANALYTICAL SIMULATIONS IN THE FIELD OF TWO-PHASE FLOW: A PROMISING SCALING LAW FOR THE INTERPRETATION OF EXPERIMENTS

H. Karwat

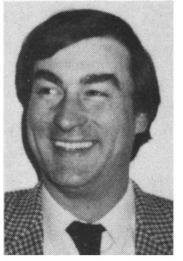
Helmut Karwat (Dr. Ing., Munich Technical University, 1958), a professor of nuclear engineering, is actively engaged in nuclear safety research work, specifically in the analytical simulation of transient two-phase flow. He has served as a consultant in the field of independent reactor safety assessment to TÜV, Euratom, and GRS.



RELEASE OF FISSION AND ACTIVATION PRODUCTS DURING LIGHT WATER REACTOR CORE MELTDOWN

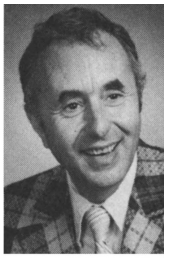
H. Albrecht
V. Matschoss
H. Wild

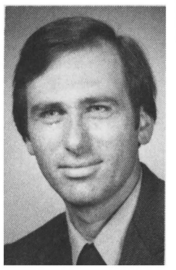
Helmut Albrecht (top) (Dipl. Phys., Dr. rer nat., Universities of Göttingen and Karlsruhe, 1971) has been working at Kernforschungszentrum Karlsruhe (KFK) since 1963 in the fields of nuclear physics and radiochemistry. Since 1972, he has been investigating activity release problems during nuclear reactor accidents. He is a member of the Core Melt Expert Group of the BMFT (Secretary of Research and Technology, Bonn). **V. Matschoss** (center) (Dr. Ing. TH-Darmstadt, 1976) was involved for three years in the development of separation methods in the gas phase. Since 1976, he has been a research scientist at KFK. His primary interests include activity release during core meltdown and reactor safety problems. **H. Wild** (bottom) (Dipl. Phys., Universities of München and Bonn, 1966) was engaged at first in the field of ionization sources. After one year of industry activity, he began work at KFK in the fields of aerosol physics and radioactive inventories of reactors. His current interest is safety research of light water reactors. He is a member of a standardization committee of nuclear technology.



RADIOACTIVITY RELEASE VERSUS PROBABILITY FOR A STEAM GENERATOR TUBE RUPTURE ACCIDENT

A. J. Buslik
R. E. Hall

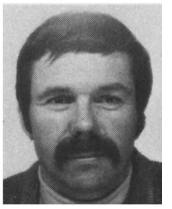


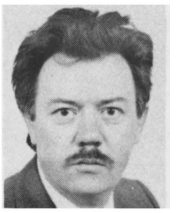


Arthur J. Buslik (top) (BA, physics, University of Pennsylvania, 1954; MA, physics, Columbia University, 1956; PhD, physics, University of Pittsburgh, 1962) is currently involved with probabilistic nuclear safety and risk assessment at Brookhaven National Laboratory (BNL) in the Department of Nuclear Energy. **Robert E. Hall** (BS, aerospace engineering, Hofstra University, 1970; MS, mechanical engineering, State University of New York, 1975; PhD candidate, engineering, State University of New York) is currently group leader in nuclear safety at BNL. Areas within his responsibility include plant system analyses directed toward operating reactor design and licensability, risk assessment, and human factors engineering. In this position, he is a consultant to the U.S. Nuclear Regulatory Commission.

FISSION PRODUCT RELEASE FROM A PRESSURIZED WATER REACTOR DEFECTIVE FUEL ROD: EFFECT OF THERMAL CYCLING

Gérard Kurka
Alain Harrer
Pierre Chenebault

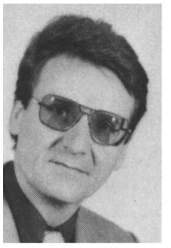


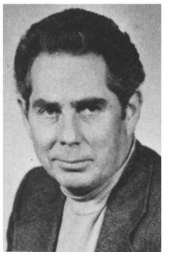


Gérard Kurka (top) (Ecole Nationale Supérieure de Chimie de Paris, 1958, Licence es Sciences, Université de Paris) has been concerned with high-temperature chemistry, thermodynamics, and fission gas release studies since 1961. Since 1973, he has been responsible for experiments related to defective fuel behavior in pressurized water loops performed in the Siloe reactor at Grenoble. **Alain Harrer** (center) is a technician at Electricité de France on leave at Commissariat à l'Energie Atomique, Grenoble and is presently completing a thesis at the Université de Paris. For two years, he worked in the exploitation and modelization of results of fission product release experiments in pressurized water loops. **Pierre Chenebault** (bottom) (Ecole Supérieure de Chimie Industrielle de Lyon, 1959, Licence es Sciences, Université de Lyon) is a leader of a group for defective fuel behavior in the Division de Métallurgie et d'Etude des Combustibles Nucléaires at Grenoble. Since 1963, he has been in charge of fission gas release studies from high-temperature gas-cooled reactor, liquid-metal fast breeder reactor, and pressurized water reactor fuels.

LMFBR STEAM GENERATORS: BEHAVIOR OF HEAT EXCHANGE TUBES FACED WITH A THROUGH CRACK RESULTING IN CONTACT BETWEEN SODIUM AND WATER

J. L. Quinet
L. Lannou

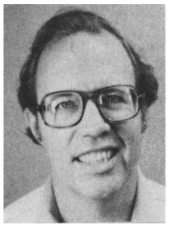


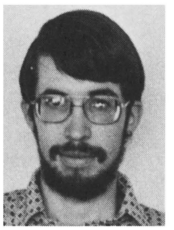


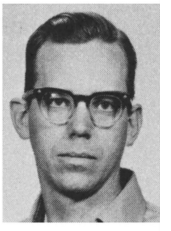
Jean-Louis Quinet (top) (certificated engineer, Ecole Nationale Supérieure de Mécanique, 1964) is the head of the Liquid Metal Department at the Electricité de France (EdF) Research and Development Division. The main part of his work deals with the development of fast breeder reactor steam generators. **Louis Lannou** is an engineer attached to the Research and Development Division of EdF. He is a specialist in the detection of water leaks in liquid-metal fast breeder reactor steam generators. His work in this field, since 1967, has helped in defining the complex behavior of hydrogen inside a fast reactor secondary system. In 1973, he revealed the phenomenon of water leak self-development into sodium, and since then he has continued investigating their development kinetics.

FUEL PINS AND CORE RESPONSE UNDER LIQUID-METAL FAST BREEDER REACTOR TRANSIENT OVERPOWER ACCIDENT CONDITIONS

N. P. Wilburn
D. E. Smith
R. E. Baars
D. B. Atcheson
B. W. Spencer



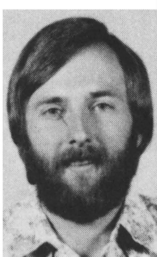




Norman P. Wilburn (top right) (PhD, chemical engineering, California Institute of Technology, 1958) has worked at Hanford Plant Laboratories since 1958. He had been with Hanford Engineering Development Laboratory (HEDL) since 1970, and since 1976 has been manager of the Reactor Dynamics Section, where he is active in the development of computer codes for the analysis of hypothetical core disruptive accidents. **Devin E. Smith** (top left) (BS, engineering physics, Oregon State University, 1976) was at HEDL for three years, where he did experiment analysis and computer code development and verification in the area of nuclear reactor safety. Currently, he is pursuing an MDiv degree in Old Testament studies at Conservative Baptist Theological Seminary in Denver, Colorado. **Ralph E. Baars** (center right) (BS, chemical engineering, University of Colorado, 1951) is a member of the Fuels and Controls Department of HEDL. Baars, a principal engineer in the Fuels Safety Section, has been with HEDL since 1973. Prior to that, he was associated with the Hanford production reactors while with General Electric Company and United Nuclear Industries. His current interests lie in transient behavior of mixed-oxide fuels, with the emphasis on pin failure thresholds under transient overpower (TOP) conditions. **D. Brent Atcheson** (bottom left) (BS, engineering physics, University of California, Berkeley, 1965; MS, nuclear engineering, University of Nevada, Reno, 1968) is a senior engineer in the Nuclear and Safety Subsection, Advanced Reactor Systems Department, at General Electric Company in Sunnyvale. His work has included thermal and mechanical design of liquid-metal fast breeder reactor (LMFBR) core components, with particular emphasis on probabilistic modeling of fuel rod behavior during normal operation. His current primary interest is modeling fuel rod mechanical behavior and cladding failure during hypothetical unprotected overpower transient. **Bruce W. Spencer** (bottom right) (PhD, nuclear engineering, University of Illinois, 1971) has worked in the Reactor Analysis and Safety Division at Argonne National Laboratory in the areas of LMFBR safety experiments and modeling since 1971. As an experimenter in the Transient Reactor Test Facility (TREAT) In-Pile Program, he was involved with the early fuel-coolant interaction energetics tests. Afterward, he was responsible for instrumentation and control on the TREAT R-Series Program, and was a lead experimenter in loss-of-flow and TOP tests of prototypic Fast Flux Test Facility fuel bundles. Since 1976, he has been a group leader in the Out-of-Pile Experiments Program, with responsibility for initiating-phase and transition-phase phenomenology.

AN ANALYSIS OF TRANSIENT OVERPOWER ACCIDENTS IN THE FAST TEST REACTOR USING THE LOS ALAMOS FAILURE MODEL

Peter K. Mast
James H. Scott

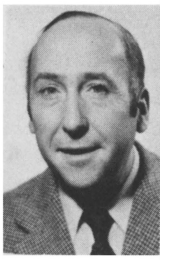


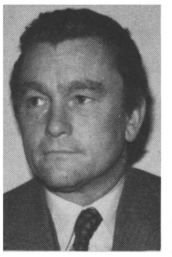
Peter K. Mast (right) (BS, engineering physics, 1973; MS, 1974, and PhD, 1979, nuclear engineering, University of Illinois, Urbana) has been working in the Fast Reactor Safety Group at the Los Alamos Scientific Laboratory (LASL) since 1975, when he came to work on a PhD thesis on modeling the behavior of fast reactor fuel pins during hypothetical transient overpower accidents. Since completing his PhD research in

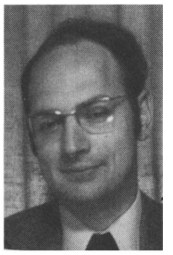
1978, he has continued working in this area, with emphasis on incorporating this modeling in whole-core accident analysis codes. **James H. Scott** (MS, nuclear engineering, University of Virginia, 1970) has worked at LASL since 1975 in the Fast Reactor Safety Group, Q-7, where he is currently associate group leader.

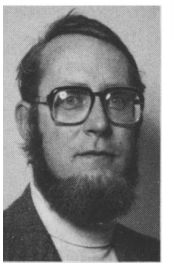
SAFETY ASPECTS OF LIGHT WATER REACTOR RADWASTE SOLIDIFICATION PROCESSES

L. Mergan
J. Storrer
R. Verbeke
J. P. Cordier









Leo M. Mergan (top right) (electrical civil engineer, University of Louvain, 1953; certificate, nuclear science, 1955) is department head in the Engineering Division at Belgonucleaire, Brussels. Prior to this assignment, he was section head at the Belgian Nuclear Research Center at Mol [Centre d'Etude de l'Energie Nucléaire/Studiecentrum voor Kernenergie (CEN/SCK)] until 1961. His interests include radwaste management and related technologies, nuclear auxiliary systems for nuclear power stations, hot laboratories, as well as the development of new processes and equipment for the above. **Jean Storrer** (top left) (civil engineer, University of Ghent, 1951; master of engineering, Yale University, 1951; graduate, International School for Nuclear Science and Engineering, Argonne National Laboratory, 1955) heads the Engineering Division at Belgonucleaire, Brussels. As project director, he has been active in thermal reactor projects and facilities, waste treatment systems, feasibility studies, fuel testing, etc. He also headed the Vulcain project. **Roger M. Verbeke** (bottom right) (chemical engineering, Faculté Polytechnique de Mons, 1968, DEA, 3rd cycle, reactor physics, University of Orsay, 1969; BS, economics, Brussels, 1977) joined Belgonucleaire in 1971. He served as project engineer in waste treatment plants for nuclear power plants and is now project leader for a liquid waste treatment plant for CEN/SCK, Mol. **J. Pierre Cordier** (bottom left) (chemical engineering, Faculté Polytechnique de Mons, 1969), after gaining experience in minerals treatment, joined Belgonucleaire in 1975. He acts as project engineer for solid waste treatment plants. His interests include solidificaion of radwaste in concrete or bitumen matrices with volume reduction.