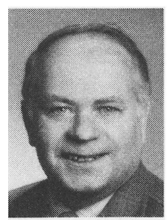
nuclear technology®

AUTHORS — JUNE 1983

NEW DIRECTIONS IN NUCLEAR ENERGY WITH EMPHASIS ON FUEL CYCLES

EVALUATION OF POTENTIAL HEAD-END PROCEDURES FOR GRAPHITE-CONTAINING FUEL ELEMENTS

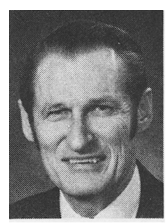
Norbert G. Hoogen
Erich R. Merz



Norbert G. Hoogen (top) [Dr.-Ing., mechanical engineering, Technical University of Aachen, Federal Republic of Germany (FRG), 1982] joined Kernforschungsanlage Jülich (KFA) in 1977. He is working on the head-end of high-temperature reactor fuel element reprocessing, especially on fluidized bed burning of crushed graphite fuel elements. **Erich R. Merz** (Dr. rer. nat, nuclear chemistry, University of Mainz, FRG, 1957, professor of Nuclear Technology Rheinisch Westfälische Technische Hochschule Aachen, 1970) has been director of the Institute for Chemical Technology of KFA since 1968. He is a member of the German Reactor Safety Commission. His work has been in the area of the backend of the nuclear fuel cycle including radioactive waste disposal.

REPROCESSING IN BREEDER FUEL CYCLES

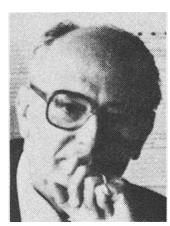
William D. Burch
W. S. Groenier



William D. Burch (top) (BS/MS, chemical engineering, University of Missouri-Rolla; graduate, Oak Ridge School of Reactor Technology) is director of the Fuel Recycle Division at Oak Ridge National Laboratory (ORNL), and director of the Consolidated Fuel Reprocessing Program (CFRP) at ORNL. The CFRP, under the direction of the U.S. Department of Energy, has the responsibility for the development of technology for reprocessing breeder and other advanced reactor fuels. **W. S. Groenier** (BS, chemical engineering, 1958, and MS, chemical engineering, 1959, Northwestern University) is head of the Process and Engineering R&D Section of the Fuel Recycle Division at ORNL. His interests include the application of basic chemical engineering techniques to advanced nuclear fuel reprocessing systems for the CFRP

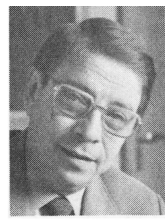
REPROCESSING OF PLUTONIUM-ENRICHED LIGHT WATER REACTOR FUELS

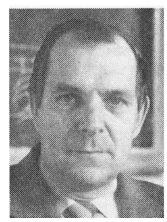
E. J. Detilleux
Werner Hild
L. Geens



E. J. Detilleux (right) (doctor, chemistry, State University of Liège, 1954) helped prepare the basic technical concept of the Eurochemic reprocessing plant where he served as manager and, since 1972, has supervised plant shutdown, decontamination, and the waste conditioning program. He is currently with the

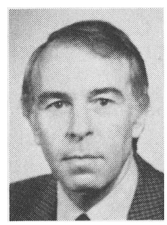
Belgian National Organization for Radioactive Waste Management and teaches reprocessing technology at the University of Liège. **Werner Hild** (top) (diplom chemiker, 1959, and Dr. rer. nat., 1962, Technische Hochschule Darmstadt) has been an assistant professor in nuclear chemistry at the Technische Hochschule Darmstadt, section head of R&D in reprocessing and waste management at Eurochemic, division head of R&D in waste management at the Nuclear Research Center at Karlsruhe, and is currently the department head of plant operation at Eurochemic. **L. Geens** (bottom) is a chemist at the Technical High School of Geel. He spent five years doing research work in the extraction field and nine years in the operation of the Eurochemic reprocessing plant, after which he led the decontamination operations.

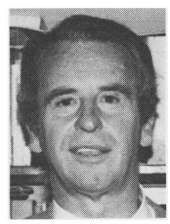


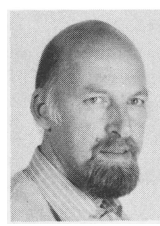


IRRADIATION PERFORMANCE OF ADVANCED COATED PARTICLES FOR HIGH-TEMPERATURE GAS-COOLED REACTOR FUEL CYCLES

Rainer P. Conrad
Cesare Merlini
Alfred-W. Mehner



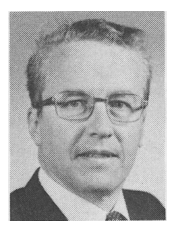




Rainer P. Conrad (top) [Dipl.-Ing., chemical engineering, Fachhochschule Niederrhein, Krefeld, Federal Republic of Germany (FRG), 1963; specialization nuclear engineering, 1964] is employed in the HFR Division of Petten Joint Research Centre of the Commission of European Communities. His current interests include irradiation technology for high-temperature gas-cooled reactor (HTGR) fuel elements. **Cesare Merlini** (center) (Dr. Ing., electrical engineering, Politecnico di Torino, 1959; specialization nuclear engineering, 1961) is currently a professor of nuclear technology at the Politecnico of Turin, first worked on heat transfer in reactor cores (including one year at Argonne National Laboratory). His research activities have more recently concerned nuclear fuel materials and performances. He is director of the advanced course on nuclear engineering at the same university. **Alfred-W. Mehner** (bottom) (Dr. rer. nat., physics, Joh. Gutenberg University, Mainz, FRG, 1971) is employed at NUKEM. Since 1974 he has worked at Kernforschungsanlage Jülich on the high-temperature reactor project. His current interests include the qualification of the uranium/plutonium fuel cycle for HTGRs.

PLUTONIUM-ENRICHED THERMAL FUEL PRODUCTION EXPERIENCE IN BELGIUM

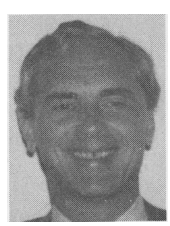
J. M. Leblanc



J. M. Leblanc (civil engineer, chemistry, University of Liège, 1955) joined Belgonucleaire in 1957. Since 1958 his work has been devoted to the development of plutonium fuels for fast and thermal reactors and to the development of plutonium technology in general. He is now manager of the Belgonucleaire plutonium fuel fabrication plant located at Dessel, Belgium.

THE RADIOACTIVE WASTE MANAGEMENT PROGRAM OF THE COMMISSION OF THE EUROPEAN COMMUNITIES: PAST, PRESENT, AND FUTURE TRENDS

Serge M. Orlowski

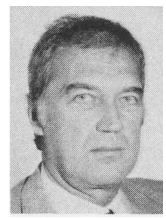


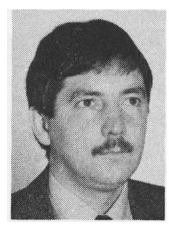
Serge M. Orlowski (Licencié es Sciences, Paris University of Sciences, 1953; Civil Eng., National High School for Naval Architecture, Paris, 1954; Eng., nuclear engineering, Saclay Nuclear Institute, 1957) entered private industry in 1956 in charge of building the early gas-cooled reactor; he was involved

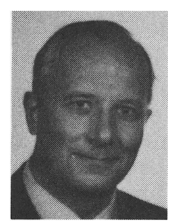
in heavy water reactor R&D with the Commission of the European Communities from 1960 until 1970. Since 1971, he has been in charge of the Nuclear Fuel Cycle Division and his current technical interests are concerned mainly with fuel reprocessing, waste management, and plutonium recycling.

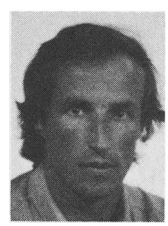
INCENTIVES FOR INTEGRATING AN ALPHA WASTE MANAGEMENT STRATEGY INTO THE FUEL CYCLE

Heinz Dworschak
Brian A. Hunt
Francesco Mannone
Francis Mousty





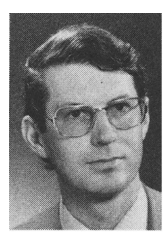


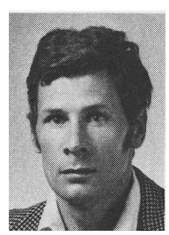


Heinz Dworschak (top right) (doctorate, natural chemistry, Technical University of Munich, 1962) worked from 1966 until 1978 in nuclear fuel reprocessing, initially in process development and optimization, then was responsible for plant operation, and finally plant manager at the Eurex pilot plant, Saluggia Italy. Since 1978 his activity at the Joint Research Centre (JRC), Ispra, has followed chemical process engineering in general, with particular attention to problems of safe and reliable conditioning and disposal possibilities in nuclear waste management. **Brian A. Hunt** (top left) (BSc, 1972, and PhD, fuel and combustion science, 1977, University of Leeds) was employed from 1975 to 1978 by the SRD Directorate Branch of the United Kingdom Atomic Energy Authority where he worked on the safety of chemical plants with particular emphasis on the fast breeder reactor nuclear fuel reprocessing facility at Dounreay. Since 1978 he has been at the JRC working on process engineering assessment studies in the field of nuclear waste management. He is currently involved in waste management strategies and optimization. **Francesco Mannone** (bottom right) (doctorate in industrial chemistry, Milan University, 1956) is employed in the Radiochemistry Section at the JRC and has been involved in various aspects of the chemistry of the reprocessing fuel cycle since 1960. His early interests were in the uranium-thorium cycle, while more recently he has been engaged in the development of chemical processes for the separation of actinides from highly active liquid waste streams. He is currently involved in waste management strategies and optimization. **Francis Mousty** (bottom left) (BSc, 1964, and PhD, 1971, chemistry, University of Liège) has been involved in the nuclear waste management program for the development of chemical processes for the separation of actinides from high- and medium-active liquid waste streams since 1974. His current technical interests are in the decontamination of active equipment with particular emphasis on analytical techniques.

METHODOLOGY FOR A CONSEQUENCE ANALYSIS OF A NUCLEAR WASTE DISPOSAL FACILITY

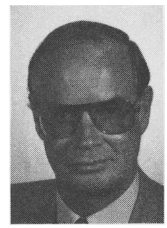
Bernd K. Buchheim
Hans Bunschi
Franz J. Hoop
James Fitzpatrick

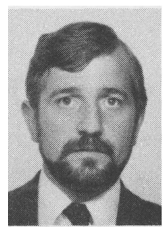




Bernd K. Buchheim (top) (graduate chemical engineer, Jülich Engineering College, Federal Republic of Germany, 1968) is senior engineer in the Out-of-Core Fuel Management Group at Electrowatt Engineering Services Ltd., Zurich. He has been working for ten years in the area of nuclear fuel cycle and waste management including quality control of nuclear fuel, shielding of spent-fuel transport casks, plutonium recycling, decontamination, and as a consultant for the Swiss National Cooperative for the Storage of Radioactive Wastes (NAGRA). **Hans Bunschi** (bottom) (PhD, nuclear engineering, Swiss Federal Institute of Technology, Zurich, 1977) has been involved in fuel management for the Leibstadt nuclear power station since 1976. He investigated the methodology for a consequence analysis of a final repository for radioactive waste as well as

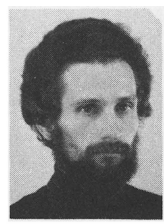
the anticipated risks of geologic disposal of radioactive wastes on behalf of NAGRA. He is currently working for Oerlikon-Buehrle Holding, Zurich. **Franz J. Hoop** (top) (PhD, nuclear physics, University of Zurich, 1973) has worked for NAGRA since 1975 on the entire nuclear fuel cycle including reactor core performance, storage and disposal of spent fuel, and the safety of a final repository. His current interests lie in fuel management for the Leibstadt nuclear power station coming on line in 1984. Currently he is head of the Nuclear Fuel Department at Elektrizitäts-Gesellschaft Laufenburg AG, Zurich Office. **James Fitzpatrick** (bottom) (PhD, Imperial College, London, 1976) is head of the Nuclear Fuel and Waste Group at Electrowatt Engineering Services Ltd., London. He is currently working on the dry storage of spent fuel and the management of radioactive waste from generation to disposal.

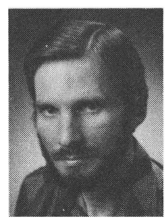


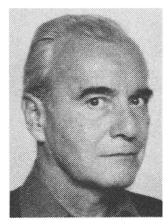


THE DECONTAMINATION OF SOFT-PLATED NICKEL SURFACES COMPARED TO ALTERNATIVE SURFACE MATERIALS USED IN RADIOACTIVE TRANSPORT AND STORAGE CONTAINERS

Hans-Urs Zwicky
Ian M. Böhringer
Ferdinand Petrik
Dieter O. Bedenig



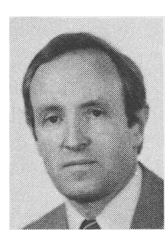




Hans-Urs Zwicky (top right) (lic. phil., chemistry, physics, mathematics, 1974; Dr. phil., nuclear chemistry, University of Berne, Switzerland, 1979) is a research scientist at the Swiss Federal Institute for Reactor Research. He has worked in Switzerland and at the Studsvik Science Research Laboratory in Sweden in the field of fission yield determinations. He is currently involved in postirradiation examination and in the destructive and nondestructive analysis of radioactive materials. **Ian M. Böhringer** (top left) (MS, soil physics, University of The West-Indies, Trinidad, 1976; PhD, soil chemistry, Federal Institute of Technology, Zürich, Switzerland, 1980) was formerly a research scientist at the Swiss Federal Institute for Reactor Research where he was involved with thermochemical reactions for application in heat pumps. Since 1982 he has been working with Motor Columbus Consulting Engineers in their Environmental Engineering Group. His current activities are centered on radioactive waste disposal. **Ferdinand Petrik** (bottom right) (Ing. Chem., VSChT Prague, 1958) is a research chemist, and since 1969 he has been working at the Swiss Federal Institute for Reactor Research. He is currently involved in the development of sphere-pac carbide fuels. His main interests are in the chemistry of irradiated fuels and thermogravimetric studies of sintering mechanisms. **Dieter O. Bedenig** (bottom left) (Dr. Eng., technical physics, Technical University Vienna, 1966; SMP, Harvard, 1982) is vice-president of corporate planning and engineering at Von Roll AG, Switzerland. He has served as area manager of Germany for GA Technologies' European headquarters, Zürich, in the field of gas-cooled high-temperature reactors and earlier worked in the research laboratories of Brown Boveri Reaktorbau GmbH, Jülich, Federal Republic of Germany, in the same field. His current interests include nickel coating of cast iron surfaces for nuclear technology applications.

NUCLEAR WASTE MANAGEMENT POLICY IN FRANCE

Jean F. Lefevre

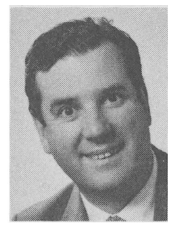


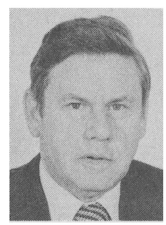
Jean F. Lefevre (graduate, chemistry, Ecole Nationale Supérieure de Chimie de Paris and the Paris Faculty of Sciences, 1954) joined the Commissariat à l'Energie Atomique (CEA, the French Atomic Energy Commission) in 1955. From 1955 to

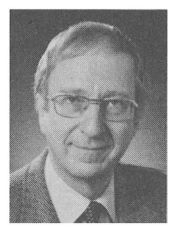
1971, he worked on fission product recovery, then on radionuclide application, eventually becoming CEA coordinator for the transuranic research program. In 1976 he became the CEA spent fuel reprocessing program coordinator, which included the corresponding waste management responsibilities. Since 1982 he has been in charge of the CEA waste management program.

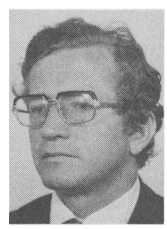
HIGHLY DENSE GRAPHITE MATRIX: A NEW MATERIAL FOR THE CONDITIONING OF RADIOACTIVE WASTES

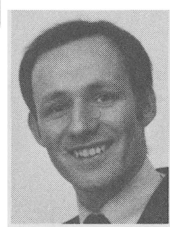
Milan Hrovat
Karl-Gerhard Hackstein
Hans Huschka
H. A. Pirk
Thomas Schmidt-Hansberg











Milan Hrovat (top right) (Dr.-Ing., TH Aachen; MS, University of Ljubljana, Yugoslavia) is head of the development department for ceramic materials at NUKEM. He joined NUKEM in 1962 where he developed molded graphite fuel spheres and invented and developed molded graphite fuel blocks for high-temperature gas-cooled reactors. His current activities include development of hot impact densification procedures for fabrication of liquid-metal fast breeder reactor (LMFBR) and light water reactor (LWR) fuel pellets, development of ThO_2-based fuel pellets for LWRs, and development of aluminum-plate-type dispersion fuels suitable for application to low-enriched uranium in MTRs. **Karl-Gerhard Hackstein** (top left) [Dr. rer. nat., 1948 to 1955 attended University of Regensburg and Technical University of Hannover, Federal Republic of Germany (FRG)] became a member of the Nuclear Energy Development Department at DEGUSSA. In 1972 he became managing director of HOBEG GmbH and since 1979 has been the technical managing director of NUKEM GmbH, where he is responsible for R&D work as well as for the production of nuclear fuel and fuel cycle activities. **Hans Huschka** (center right) (PhD, University of Wien) is head of the R&D Department at NUKEM. His current responsibilities are R&D development for high-temperature reactors, LMFBRs, and the MTR, as well as high-, medium-, and low-active waste management. **H. A. Pirk** (bottom left) (Dipl. Ing., chemical engineering, Technical University of Munich, FRG, 1959) is employed as head of the Chemical Engineering Department at NUKEM. His interests focus mainly on chemical engineering in all areas of the nuclear fuel cycle, with emphasis on problems at the back end of the cycle. **Thomas Schmidt-Hansberg** (bottom right) (Dr. phil. nat., University of Frankfurt, FRG) has been a member of the R&D Department at NUKEM since 1979. His interests are in alternative embedding materials for the long-term fixation of high-level radioactive waste—especially the development of a highly dense graphite-nickel sulfide matrix.

NUCLEAR SAFETY

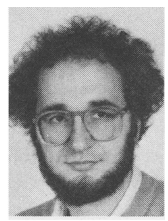
A COMPUTER PROGRAM FOR ASSESSMENT OF EMERGENCY OPERATION PROCEDURES UNDER NON-LOCA TRANSIENT CONDITIONS IN BWRs

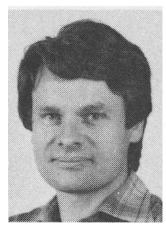
Yukiharu Ohga

Yukiharu Ohga (MS, nuclear engineering, Kyoto University, Japan, 1976) is working in the area of reactor safety analysis at the Energy Research Laboratory of Hitachi Ltd., Japan. His current interests are in the area of computer-aided operation support systems for nuclear power plants.

DIFFUSION OF SILVER AND CESIUM IN SILICON-CARBIDE COATINGS OF FUEL PARTICLES FOR HIGH-TEMPERATURE GAS-COOLED REACTORS

Winfried Amian
Detlev Stöver

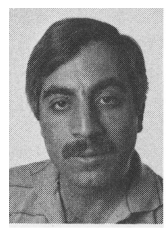


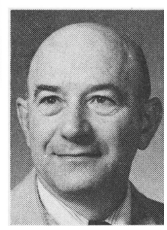


Winfried Amian (top) [Dr. rer. nat., RWTH Aachen, Federal Republic of Germany (FRG), 1981] is a scientific member at the Institut für Reaktorentwicklung of Kernforschungsanlage Jülich (KFA Jülich). His main interest is in fission product transport in high-temperature reactor (HTR) fuel. He is presently involved in the study of spallation products and neutron spectrometry. **Detlev Stöver** (Dr. rer. nat., nuclear engineering, Technical University of Aachen, FRG, 1972) leads the Reactor Technology Section at the Institut für Reaktorentwicklung of KFA Jülich. He has worked on fission product release from HTR fuel since 1972. His current technical interest focuses on tritium permeation in metallic and ceramic materials.

OPTIMIZED DEPLETION OF LUMPED BURNABLE POISONS IN PRESSURIZED WATER REACTORS

Ziad H. Kodah
Samuel H. Levine

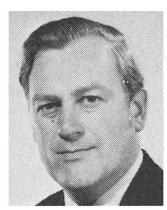


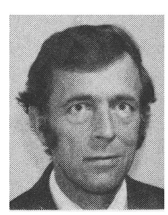


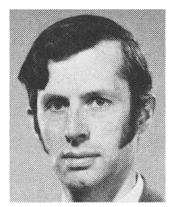
Ziad H. Kodah (top) (PhD, nuclear engineering, The Pennsylvania State University, 1982) is on the faculty of the Yarmouk University, Irbid, Jordan. He is currently engaged in teaching basic engineering and reactor physics courses. He is interested in computer code development and applications to in-core fuel management. **Samuel H. Levine** (PhD, nuclear physics, University of Pittsburgh, 1954) is professor of nuclear engineering and director of the Breazeale Nuclear Reactor at The Pennsylvania State University. His technical interests currently are in fuel management, neutron spectrum measurements, research with radiation sources, and TRIGA reactors.

THE SIGNIFICANCE OF LEACH RATES IN DETERMINING THE RELEASE OF RADIOACTIVITY FROM VITRIFIED NUCLEAR WASTE

Antony E. Hughes
J. Angwin C. Marples
A. Marshall Stoneham





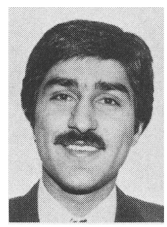


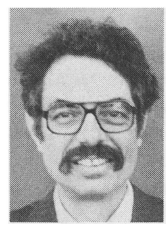
Antony E. Hughes (top) (MA, physics, Oxford University, 1963; D. Phil., physics, Oxford University, 1966) is leader of the Solid State Sciences Group at the Atomic Energy Research Establishment-Harwell (AERE-Harwell). His interests include defects in solids, radiation effects, and the mechanisms of corrosion, and his group is also responsible for the development and application of physical techniques for microscopic and surface analysis of materials. He has recently been concerned with evaluating the consequences of radiation effects in the disposal of radioactive waste. **J. Angwin C. Marples** (center) (BA, natural sciences, physics, Cambridge University, 1954) has been at AERE-Harwell since 1954. With an overall interest in x-ray diffraction, he has worked on plutonium alloy phase diagrams, the behavior of actinide metals and compounds at cryogenic temperatures, and the constitution and high-temperature properties of fast reactor fuels. Since 1976 he has been in charge of the Glass Technology Section in the Chemistry Division with a special interest in the radiation stability of solidified high-level radioactive waste. **A. Marshall Stoneham** (bottom) (BSc, physics, Bristol, 1961; PhD, physics, Bristol,

1964) heads the Theory of Solid State Materials Group at AERE-Harwell. His interests cover a wide range of basic solid-state physics, including quantum diffusion of hydrogen in metals and nonradiative transitions in semiconductors as well as the wide range of topics on which his book "Theory of Defects in Solids" is based. The work in his group emphasizes modeling in nondestructive testing and related disciplines.

ACTINIDE HAZARD REDUCTION BY PARTITIONING AND TRANSMUTATION IN A COUPLED REACTOR SYSTEM

Alireza Haghighat
Maurice A. Robkin

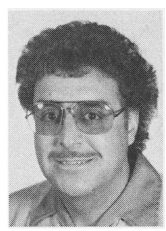


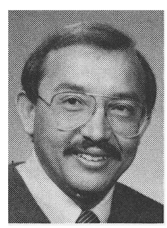


Alireza Haghighat (top) [BS, Shiraz (Pahlivi) University, Iran, 1978; MS, nuclear engineering, University of Washington, 1981; doctoral candidate, nuclear engineering, University of Washington) is interested in research in the areas of reactor physics, nuclear waste management, health physics, and neutron noise analysis in boiling water reactors. **Maurice A. Robkin** (BS, physics, Cal Tech, 1953; Certificate, reactor technology, Oak Ridge School of Reactor Technology, 1954; PhD, nuclear engineering, Massachusetts Institute of Technology, 1961) has worked at the Bettis Atomic Laboratory (Westinghouse) in shielding and the Vallecitos Atomic Laboratory (General Electric) in the Plutonium Utilization Program for light water reactors. He has been on the faculty of the University of Washington since 1967 and is currently professor of nuclear engineering and professor of environmental health in the Radiological Sciences Division. His current interest is in the area of radiation measurement and control.

MEASURED THERMAL RESPONSE OF FULL-SCALE SPENT FUEL CASK TO A TORCH ENVIRONMENT

Manuel G. Vigil
Amado A. Trujillo
H. Richard Yoshimura





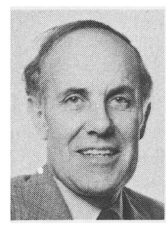
Manuel G. Vigil (top) (BS, mechanical engineering, New Mexico State University, 1966; MS, mechanical engineering, University of New Mexico, 1968) has been with Sandia National Laboratories (SNL) for 17 years. His work has involved the environmental testing of weapons systems and included work in the explosive technology, shockwave physics, gas dynamic, and instrumentation design fields. One of his activities included the design of a 6-m-diam blast tunnel. He is currently concerned with nuclear materials transportation systems including the analysis and testing of these systems to meet the Nuclear Regulatory Commission requirements for licensing. **Amado A. Trujillo** (center) (BS, mechanical engineering, University of New Mexico, 1960; MS, mechanical engineering, University of New Mexico, 1962) worked on unique rocket nozzle concepts for the Aerojet-General Company from 1962 to 1965. Since 1965, he has been with SNL where he was involved in experimental aerodynamics and nuclear reactor safeguards groups. His recent activities include responsibility for the development of generic technology that can be used in the design and licensing of shipping casks for the transportation of radioactive materials. **H. Richard Yoshimura** (bottom) (BS, mechanical engineering, San Jose State College, 1967; MS, mechanical engineering, University of New Mexico, 1969) has been employed by SNL since 1967. He has worked in the area of nondestructive testing. One of his activities during that period involved the development of a neutron radiography facility at the Annular Core Pulsed Reactor Facility. Since 1975, he has been involved with the analyses and testing of radioactive material transportation systems. The systems evaluated included packagings for spent fuel and contact-handled transuranic waste.

ECONOMICS

PRELIMINARY STUDY OF COST BENEFITS ASSOCIATED WITH DUPLEX FUEL PELLETS OF THE LOWI TYPE

John Brian Ainscough
David Norman Coucill
David Anthony Howl
Arne Jensen
Ib Misfeldt



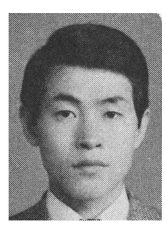


John Brian Ainscough (top right) (BSc, chemistry, Leeds University, 1952; PhD, physical organic chemistry, Leeds University, 1955) has been with the United Kingdom Atomic Energy Authority since 1955. His general interests are in the fields of UO_2 performance, fabrication, and property measurement. **David Norman Coucill** (top left) (MSc, nuclear reactor science and engineering, Imperial College, 1973; BSc, mechanical engineering, Manchester University, 1972) has been employed by British Nuclear Fuels Limited (BNFL) in fuel performance evaluation since 1977. His principal interests are the analysis of pellet/cladding interactions in water reactor fuel and pressurized water reactor (PWR) thermal hydraulics. **David Anthony Howl** (center right) (MA, physics, Cambridge University, 1958) is manager of fuel performance evaluation and the PWR project leader for BNFL at Springfields. Before moving to BNFL and his present post in 1979, he spent 20 years with the U.K. Atomic Energy Authority. In that time, after early work on fuel and clad properties, he worked largely on the development of fuel performance computer codes. **Arne Jensen** (bottom left) (BSc, mechanical engineering, 1965) joined the Nuclear Department of Elsinore Shipbuilding & Engineering Company in 1965. He has been manager of this department since 1972. He is also the general secretary for the Danish Nuclear Forum and is a board member of the Danish Nuclear Society. **Ib Misfeldt** (bottom right) (MS, nuclear engineering, 1975; PhD, structural engineering, Technical University of Denmark, 1979) is a research scientist employed by the Elsinore Shipbuilding & Engineering Company. He is working on the modeling of light water reactor fuel behavior on contract for Risø National Laboratory.

MATERIALS

RADIATION-INDUCED GAS EVOLUTION FROM COMMERCIAL LUBRICANT BASE OIL

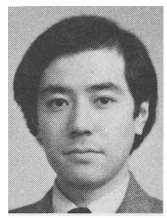
Kazuo Arakawa
Naohiro Hayakawa
Hiroshi Nakanishi



Kazuo Arakawa (top) (electronics, Nagano Technical High School, 1965) is employed at the Japan Atomic Energy Research Institute (JAERI). His areas of interest are to elucidate the role of ion on fundamental processes in radiation chemistry, especially the ion-molecule reaction and the negative ion formation process. His current research interests are radiation degradation of organic materials used in nuclear reactor. **Naohiro Hayakawa** (center) (BS, chemistry, The Nagoya University, 1958) is employed by JAERI. His interest is in radiation chemistry of polymer and radiation degradation of organic materials. **Hiroshi Nakanishi** (bottom) (M. Eng., hydrocarbon chemistry, Kyoto University, 1976) is employed at the Matsumura Oil Research Corporation. His interests are synthetic lubricants and the radiation resistant oil for use of nuclear power systems.

GENERALIZATION OF RADIOIODINE ADSORPTION ON GEOLOGICAL MATERIALS

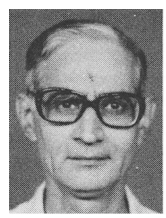
Toshiaki Ohe
Akira Nakaoka

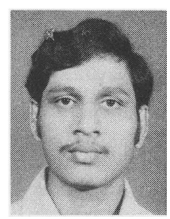


Toshiaki Ohe (top) (BE, 1975; ME, environmental chemistry, Keio University, Japan, 1977) is a research chemist at the Energy & Environment Laboratory of the Central Research Institute of Electric Power Industry (CRIEPI), Japan. His current interest is geochemical behavior of radionuclides, particularly chemisorption. **Akira Nakaoka** (BE, applied chemistry, Seikei University, Japan, 1969) is a senior research chemist at the Energy & Environment Laboratory of CRIEPI. His current interest is radionuclide behavior analysis on both natural and artificial nuclides in the environment.

DIGITAL SIMULATION OF THE PRESSURIZER IN A PRESSURIZED WATER NUCLEAR REACTOR

V. V. Athani
L. Vijaykumar





V. V. Athani (top) (BE, electricity, University of Poona, 1955; diploma, power engineering, Indian Institute of Science, 1957; MS, University of Illinois, 1962) joined the Indian Institute of Technology, Bombay, in 1958, where he is a professor of electrical engineering, with control systems as his field of specialization. His current research interests are microprocessor applications in control and instrumentation and development of stepping motors and controllers. **L. Vijaykumar** (BE, electrical engineering, University College of Engineering, Hyderabad, 1978; M. Tech., systems and control engineering, the Indian Institute of Technology, 1981) is presently a doctoral student in systems and control engineering at the Indian Institute of Technology. His research interests include research management, decision theory, and modeling and simulation of large-scale systems.