



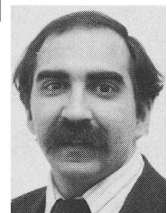
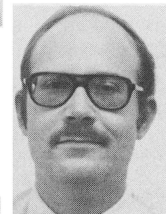
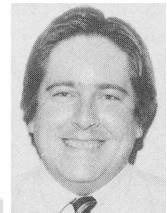
AUTHORS — JANUARY 1985

FISSION REACTORS

REDUCTION IN REACTOR VESSEL IRRADIATION THROUGH FUEL MANAGEMENT

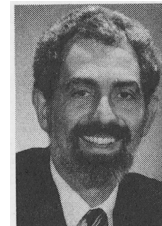
Charles W. Bagnal, Jr. (top right) (BS, nuclear engineering, Georgia Institute of Technology, 1980) is a consulting engineer at GRP Consulting, Inc., currently engaged in reactor physics methods development and nuclear engineering support services. He has been involved in nuclear reactor design analysis and software development for six years. His experience includes advanced light water reactor (LWR) and heavy water reactor designs, including extended burnup fuel cycles using gadolinia burnable poison. **Gerard P. Cavanaugh** (top left) (BS, physics, Massachusetts Institute of Technology, 1969; MS, 1970, and PhD, 1976, nuclear engineering, University of Illinois, Urbana-Champaign) worked from 1973 to 1975 in the Neutronics Physics Division at Oak Ridge National Laboratory. He is currently supervisor of radiation physics and criticality analysis at Combustion Engineering, Inc. (C-E). His primary technical interests are in the areas of radiation transport, stochastic sampling methodologies, and computer applications ranging from mainframes to personal computers. **Robert P. Harris** (center right) (BS, 1974, and MS, 1975, nuclear engineering, and MS, 1984, metallurgy, Rensselaer Polytechnic Institute) has worked in the core design, safety analysis, and licensing of C-E pressurized water reactors since 1973. He is currently involved in the neutron design of advanced burnable poisons and fuel assemblies. He consults in the areas of core fuel management, safety analysis, and startup physics testing. **Regis A. Matzie** (bottom left) (BS, physics, U.S. Naval Academy, 1965; MS, 1971, and PhD, 1976, nuclear engineering, Stanford University) is currently the manager of analog plants in the nuclear engineering department at C-E. His current technical interests include advanced LWR designs, methods of improving fuel utilization and fuel cycle costs in current design LWRs, and alternate fuel cycles for advanced converter reactors. **Laszlo B. Tarko** (bottom right) (BS, physics, University of Connecticut, 1980) is currently the lead engineer in the radiation physics group at C-E. His current technical interests include radiation transport, ex-core radiation physics, dose rates, energy deposition, and associated computer techniques.

*Charles W. Bagnal, Jr.
Gerard P. Cavanaugh
Robert P. Harris
Regis A. Matzie
Laszlo B. Tarko*



REDUCING THE COBALT INVENTORY IN LIGHT WATER REACTORS

Howard Ocken



Howard Ocken (D. Eng., metallurgy, Yale University, 1966) is a project manager in the Nuclear Power Division of the Electric Power Research Institute. He has managed projects that addressed materials performance in nuclear core components. His current interests include materials aspects associated with reducing radiation fields, especially replacing cobalt sources and decontamination and preconditioning technology.

NUCLEAR SAFETY

SHIELDING FACTORS FOR GAMMA RADIATION FROM ACTIVITY DEPOSITED ON STRUCTURES AND GROUND SURFACES

Per Hedemann Jensen



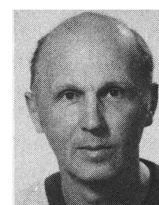
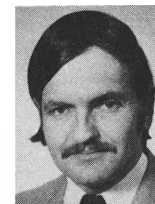
Per Hedemann Jensen (BSc, electronic engineering, Technical University, Aarhus, Denmark, 1970) is a senior health physicist at Risø National Laboratory, where he is head of the Section for Applied Health Physics. He has been involved in studies of radiological consequences from hypothetical core-melt accidents at nuclear power plants. His current technical interest is experimental work on internal dosimetry problems.

NUCLEAR FUELS

POSTIRRADIATION BEHAVIOR OF UO₂ FUEL II: FRAGMENTS AT 175 to 275°C IN AIR

Ian J. Hastings
Elio Mizzan
Alan M. Ross
John R. Kelm
Real J. Chenier
D. H. Rose
J. Novak

Ian J. Hastings (top right) (PhD, metallurgical science, University of Queensland, 1968) is head of the Fuel Properties and Behaviour Group in the Fuel Materials Branch at the Chalk River Nuclear Laboratories (CRNL) of Atomic Energy of Canada Limited. His current interests are in oxide fuel behavior under irradiation, particularly release of short-lived fission products under normal and accident conditions, and in fusion ceramics. **Elio Mizzan** (top left) (BA Sc, chemical engineering, University of Toronto, 1949) is a supervisor at the Fuel Materials Branch Hot Cell Facility at CRNL. His interests have been in the areas of postirradiation examination of reactor fuels and materials, particularly postdefect handling of spent UO₂ fuel. **Alan M. Ross** (center right) (BSc, general, University of London, 1953) is a supervisor at the Recycle Fuel Fabrication Laboratories of the Fuel Materials Branch of CRNL. His interests include the fabrication, nondestructive assay, properties, irradiation behavior, and neutron radiography of current and advanced thermal reactor fuels. **John R. Kelm** (bottom left) is a research technician in the Fuel Materials Branch at CRNL. His research responsibility is the operation of a special project hot cell. His current interest is UO₂ oxidation and stress corrosion cracking. **Real J. Chenier** (bottom right) is a research technician in the Fuel Materials Branch at CRNL. His current research responsibility is operation of the postirradiation metallographic facilities.



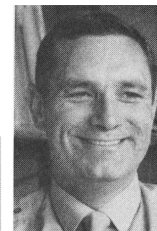
D. H. Rose (top) is a research technologist in the Fuel Properties and Behaviour Group of the Fuel Materials Branch at CRNL. His current responsibility is fabrication and operation of instrumented in-reactor experiments. **J. Novak** (bottom) (BASC, engineering science, University of Toronto, 1974) is employed in Central Nuclear Services, Nuclear Generation Division of Ontario Hydro. Since 1976 he has been engaged in the areas of nuclear fuel production and development. His current technical interests include behavior of irradiated fuel in air, UO₂ powder characteristics, and fuel performance improvement.



THE SODIUM-BONDING PIN CONCEPT FOR ADVANCED FUELS. PART III: CALCULATION OF THE SWELLING PERFORMANCE

Claudio Ronchi (top) (Dr. rer. nat. phys., State University, Milan, Italy, 1965) is a research officer at the Joint Research Centre (JRC) of the Commission of European Communities. After having worked in the research and development of advanced fuels for fast breeders, he is now engaged in reactor safety studies. **Jacques van de Laar** (center) (Ingenieur Fysische Techniek, H.T.S., Heerlen, The Netherlands, 1974) works in the mathematical modeling department of JRC-Karlsruhe. He is currently involved in the development and execution of computer programs for reactor fuel performance and safety analysis. **Hubert Blank** (bottom) (PhD, metal physics, Technical University of Stuttgart, 1957), head of the Physics Division of the European Institute for Transuranium Elements, Karlsruhe, has directed the "Swelling of Advanced Fuels" project at this institute since 1973.

*Claudio Ronchi
Jacques van de Laar
Hubert Blank*



RADIOACTIVE WASTE MANAGEMENT

INCINERATION OF ION EXCHANGE RESINS USING CONCENTRIC BURNERS

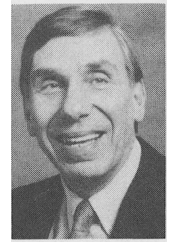
Tetsuo Fukasawa (top right) (BS, 1976; MS, 1978; and Dr. Eng., 1981, nuclear engineering, Tohoku University) is a researcher in the Energy Research Laboratory (ERL), Hitachi, Ltd. He has specialized in the radiochemistry of actinide elements and is currently working in the field of low-level radioactive waste treatment and spent fuel reprocessing. **Koichi Chino** (top left) (BS, 1972, and MS, 1974, mechanical engineering, Tokyo Institute of Technology) is a researcher at ERL. His primary areas of interest are transport phenomena and radioactive waste management. **Osamu Kuriyama** (center right) (BS, 1973, and MS, 1975, Tohoku University) is a researcher at ERL. His current interests include the radioactive waste management and chemistry of nuclear waste. **Fumio Kawamura** (bottom left) (BS, chemical engineering, Gunma University, 1970; MS, 1972, and Dr. Eng., 1976, Tohoku University) is a researcher at ERL where he is involved in radioactive waste management and reactor water chemistry. **Hideo Yusa** (bottom right) (BS, physics, Tohoku University, 1959; Dr. Eng., Osaka University, 1969) is a chief researcher at ERL. He is responsible for the research and development of radioactive waste management systems.

*Tetsuo Fukasawa
Koichi Chino
Osamu Kuriyama
Fumio Kawamura
Hideo Yusa*



A SIMPLE PROBABILISTIC RISK ANALYSIS FOR HIGH-LEVEL WASTE REPOSITORIES

Bernard L. Cohen



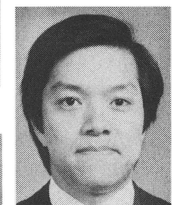
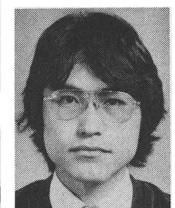
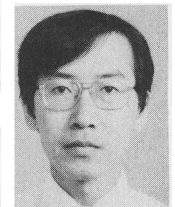
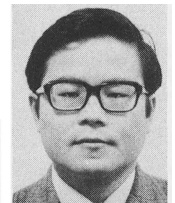
Bernard L. Cohen (BS, Case Institute of Technology, 1944; MS, University of Pittsburgh, 1948; DSc, Carnegie Institute of Technology, 1950) did basic research on nuclear structure using accelerators at Oak Ridge National Laboratory from 1950 to 1958 and at the University of Pittsburgh until the mid-1970s. He then turned his research efforts to the environmental impacts of energy generation, including studies of radioactive waste, health effects of radiation, risk and risk aversion, radon problems, and reactor safety. He is a professor of physics at the University of Pittsburgh and a former director (1965 to 1978) of its Scaife Nuclear Laboratories.

HEAT TRANSFER AND FLUID FLOW

ROSA-III DOUBLE-ENDED BREAK TEST SERIES FOR A LOSS-OF-COOLANT ACCIDENT IN A BOILING WATER REACTOR

K. Tasaka (top right) (PhD, nuclear engineering, University of Tokyo, 1976) first worked in breeder reactor safety and fission product characteristics research for ten years and in light water reactor (LWR) safety research for nine years at the Japan Atomic Energy Research Institute (JAERI). He is the project leader of the Rig of Safety Assessment (ROSA) program, and his current interests include analysis of thermal-hydraulic behavior during a loss-of-coolant accident (LOCA) and an anticipated transient without scram in LWRs. **M. Suzuki** (top left) (MS, mechanical engineering, Kyoto University, 1971) has worked for the ROSA program since 1974. His current interests include safety evaluation of an LWR. **Y. Anoda** (second from top right) (PhD, mechanical engineering, University of Tokyo, 1979) is a research engineer for the ROSA program. His current interests include two-phase flow during a LOCA. **Y. Koizumi** (second from top left) (PhD, mechanical engineering, University of Tokyo, 1977) is a research engineer for the ROSA program. His current interests include analysis of thermal-hydraulic behavior during a LOCA with emphasis on two-phase flow characteristics and heat transfer. **T. Yonomoto** (third from top right) (MS, nuclear engineering, University of Osaka, 1982) is a research engineer for the ROSA program. His current interests include analysis of thermal-hydraulic behavior during a LOCA. **H. Kumamaru** (third from top left) (PhD, nuclear engineering, University of Tokyo, 1980) is a research engineer for the ROSA program. His current interests include core heat transfer under LOCA conditions. **H. Nakamura** (bottom right) (MS, crystalline material engineering, Nagoya University, 1981) is a research engineer for the ROSA program. His current interests include analysis of thermal-hydraulic behavior during a LOCA. **M. Shiba** (bottom left) (MS, mechanical engineering, Waseda University, 1959) is the general manager of Reactor Safety Laboratory 1 at JAERI. He has worked for 22 years at JAERI in the field of reactor engineering and safety and is currently responsible for simulated LOCA experiments.

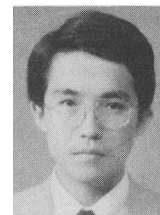
*K. Tasaka
M. Suzuki
Y. Anoda
Y. Koizumi
T. Yonomoto
H. Kumamaru
H. Nakamura
M. Shiba*



NEUTRON RADIOGRAPHY WITH A SEALED-TUBE GENERATOR IN A HOT LABORATORY WATER POOL AT NAGOYA UNIVERSITY

Genichi Matsumoto (top right) (BS, physics, Tokyo University, 1946) has been an associate professor of nuclear engineering at Nagoya University from 1963 to the present, where he is responsible for research and education in nuclear reactor engineering. He worked as a member of the Scientific Research Institute of Tokyo following his graduation from Tokyo University, and from 1950 to 1963, he served on the technical staff of the Research Reactor Operation Division of the Japan Atomic Energy Research Institute. His current research field includes nuclear safety, neutron radiography (especially neutron television technology), and heat pipe technology. **Soichi Doi** (top left) (BS, 1976, and MS, 1978, nuclear engineering, Nagoya University) has been employed by the Mitsubishi Atomic Power Industry Co. since 1978, where he is responsible for the nuclear fuel engineering of light water reactors. **Kohei Ohkubo** (bottom right) (BS, mechanical engineering, Aichi Institute of Technology, 1975) is a staff member of Nagoya University. **Yasushi Ikeda** (bottom left) (BS, physics, 1963, and PhD, nuclear engineering, 1982, Nagoya University) has been an assistant staff member of Nagoya University from 1964 to the present. He has investigated thermodynamics of nuclear materials using mass spectrometric technology; neutron radiography technology is also included in his research interests.

*Genichi Matsumoto
Soichi Doi
Kohei Ohkubo
Yasushi Ikeda*



DEVELOPMENT OF NUCLEAR POWER PLANT NOISE DIAGNOSTICS INTO A PROCESS-MEASURING METHOD

Günther Hessel (top right) [BS, physics, Technical University Dresden, German Democratic Republic (GDR), 1970] is a research scientist at the Central Institute of Nuclear Research (CIN), Rossendorf. He is involved in experimental investigations and developments for technical diagnosis, especially at nuclear power plants. **Hans-Erich Köppen** (top left) (BS, computer science, Technical University Dresden, 1973) is a research scientist at the CIN. His area of expertise is microprocessor hard- and software and the construction of autonomously working monitors. **Peter Liewers** (center right) (BS, physics, University of Halle, GDR, 1957; PhD, physics, University of Leipzig, GDR, 1962) is the scientific leader of the group for reactor diagnostics at the CIN. His interests and activities have shifted from reactor physics to technical diagnostics. **Peter Schumann** (bottom left) (BS, nuclear engineering, Technical University Dresden, 1963; PhD, physics, Bergakademie Freiberg, GDR, 1970) is a staff scientist at the CIN where he is concerned with digital signal processing and computer software. Formerly he worked in the field of in-core measuring techniques and neutron spectrometry. **Frank-Peter Weiß** (bottom right) (BS, physics, Technical University Dresden, 1973) is a research scientist in the group for technical diagnostics at the CIN. His current interest is the application of statistical pattern recognition to technical diagnostics.

*Günther Hessel
Hans-Erich Köppen
Peter Liewers
Peter Schumann
Frank-Peter Weiß*

