



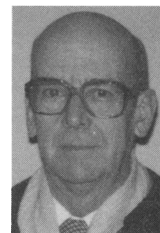
## AUTHORS — AUGUST 1989

### DECONTAMINATION AND DECOMMISSIONING

#### PREFACE: DECONTAMINATION AND DECOMMISSIONING

**Ulrich Löschhorn** (top) (PhD, physics and meteorology, University of Innsbruck, Austria, 1977) has been a member of Kernforschungszentrum Karlsruhe (KfK) since 1977. He has conducted studies on safety analysis for final repositories and has been project manager for decommissioning of nuclear facilities since 1981. **Karl Wirtz** (PhD, physics, University of Breslau, Poland, 1934) has been a member of KfK since 1957. During World War II, he was a member of the German group working under W. Heisenberg on exponential experiments.

*Ulrich Löschhorn  
Karl Wirtz*



#### THE INTERNATIONAL ATOMIC ENERGY AGENCY'S PROGRAM ON DECONTAMINATION AND DECOMMISSIONING

**Melville A. Feraday** (photo not available) (BSc, mechanical engineering, Queen's University, Canada, 1954; MSc, mechanical engineering, Waterloo University, Canada, 1970) was head of the International Atomic Energy Agency's (IAEA's) Decontamination and Decommissioning (D/D) program from 1984 to 1989. Before joining the IAEA, he worked at the Chalk River Nuclear Laboratories from 1956 to 1984 on waste management and fuel development. He is currently a private consultant on D/D, waste management, and postaccident recovery.

*Melville A. Feraday*

#### THE WINDSCALE ADVANCED GAS-COOLED REACTOR STAGE 3 DECOMMISSIONING PROJECT

**Philip J. Thomas** (right) (BSc, cybernetics and instrument physics, Reading University, United Kingdom, 1973) joined the United Kingdom Atomic Energy Authority (UKAEA) in 1978. His initial work concerned control engineering for nuclear power and fuel reprocessing plants. Following periods at Winfrith and Harwell, he was posted to Windscale in 1985 to take charge of

*Philip J. Thomas  
Tim Boorman*



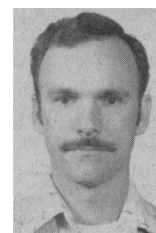
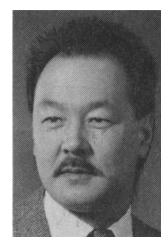
the Engineering Development Group, and subsequently to set up the decommissioning group. He moved to Risley in 1988 where he currently heads the Inspection Applications Group. **Tim Boorman** (right) (graduate, electrical engineering, City College, London, United Kingdom, 1964) has spent all of his working life with the UKAEA. As an instrumentation and control engineering specialist, he provided systems for measuring and recording parameters from reactors and the evaluation of nuclear fuel before and after irradiation. In 1982, his work broadened considerably when he moved to reactor decommissioning, successively working on decommissioning development, decommissioning operations, and, from June 1988, as head of the decommissioning group, which includes project management of the Windscale Advanced Gas-Cooled Reactor.



### DECOMMISSIONING A 60-m-TALL EXHAUST STACK

**Robert L. Louie** (top) (BS, civil engineering, University of Washington, 1966) is a project engineer for Westinghouse Hanford Company (WHC). He worked on the construction of the Washington Public Power Supply System Nuclear Plant No. 2 prior to joining Rockwell Hanford Operations, the operations contractor that preceded WHC. **Dwayne R. Speer** (BS, engineering technologies, Oklahoma State University, 1973) is the manager of decommissioning engineering for WHC. He came to Hanford in 1975 and has been associated with decommissioning since 1983 when he became activity manager for decommissioning with Rockwell Hanford Operations. Prior to 1983, he was a senior health physicist and a program representative in the health, safety, and environmental department.

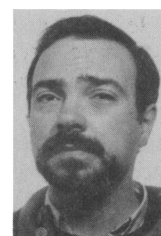
*Robert L. Louie  
Dwayne R. Speer*



### DISMANTLING THE RB-2 RESEARCH REACTOR: AN APPLICATION OF A RADIATION PROTECTION APPROACH RELEVANT TO ITALY'S DECOMMISSIONING METHODOLOGY

**Michele Laraia** (top right) (Dr., chemical engineering, University of Rome, Italy, 1973) is a project manager in the sector for plants in operation at Italy's Directorate for Nuclear Safety and Health Protection (ENEA/DISP). He is responsible for developing safety criteria and coordinating the safety analysis of decommissioning activities. **Giuseppe Brighenti** (top left) (Dr., electrotechnical engineering, University of Bologna, Italy, 1956; PhD, nuclear engineering, Centre d'Études Nucléaires Saclay, France, 1958) has worked with AGIP at the RB-2 reactor from the design stage to its decommissioning, as general manager and as decommissioning director. **Bartolomeo Camiscioni** (bottom right) (Dipl., electronical engineering, 1958) worked with AGIP at the RB-2 reactor from the design stage to its final shutdown, as maintenance manager and reactor supervisor. During the decommissioning phase, he was responsible for the nuclear spectrometry laboratory. He is currently a quality assurance and laboratory information management systems expert with TEMAV. **Giovanni Chessa** (bottom left) (Dr., physics, University of Bologna, Italy, 1970; PhD, radioprotection and health physics, University of Bologna, Italy, 1971) has been responsible for radioprotection surveillance at the Italian national service for radioactive waste management (NUCLECO) since 1983.

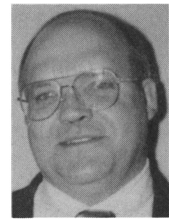
*Michele Laraia  
Giuseppe Brighenti  
Bartolomeo Camiscioni  
Giovanni Chessa*



## DECONTAMINATION OF THREE MILE ISLAND UNIT 2

**Michael D. Pavelek II** (top) (BS, sociology, University of Pittsburgh, 1971) was manager of decontamination at Three Mile Island Unit 2 (TMI-2) through April 1989. His responsibilities included the initial accident radiological response team, engineering of initial environmental characterizations within the sealed TMI-1 reactor building, preparation of the decontamination plan, and management of decontamination engineering and operations. His current technical interest is waste management. **Joann S. Epler** (center) (MS, environmental sciences, University of Tennessee, 1979) served as a technical writer for Bechtel at TMI-2 and is currently a training coordinator at Bechtel in Oak Ridge, Tennessee. **Robert J. Vallem** (bottom) (BS, applied mathematics, engineering, and physics, University of Wisconsin, Madison, 1976) was involved in planning and field work in the decontamination of TMI-2 from September 1982 through June 1988. His current interests include decontamination and decommissioning of nuclear reactors.

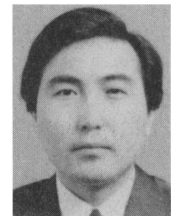
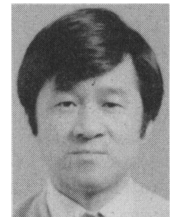
*Michael D. Pavelek II  
Joann S. Epler  
Robert J. Vallem*



## DISMANTLING TECHNIQUES FOR REACTOR STEEL STRUCTURES

**Satoshi Yanagihara** (top) (MS, nuclear engineering, Hokkaido University, Japan, 1976) is a research engineer in the Japan Power Demonstration Reactor (JPDR) department at the Japan Atomic Energy Research Institute (JAERI). He has worked in the area of reactor decommissioning and currently works with systems engineering for reactor decommissioning. **Yoshihiro Seiki** (center) (BS, mechanical engineering, Nihon University, Japan, 1965) is deputy general manager of the Reactor Decommissioning Division in the JPDR department at JAERI. He has developed reactor decommissioning technology and is manager of the actual JPDR decommissioning project. **Hisashi Nakamura** (bottom) (MS, mechanical engineering, Gunma University, Japan, 1981) is a research engineer in the JPDR department at JAERI. He has been engaged in dismantling technology development for concrete structures of nuclear facilities. His current research activity is related to the recycling of reactor decommissioning waste.

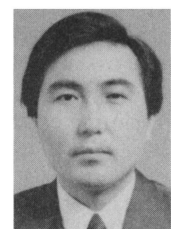
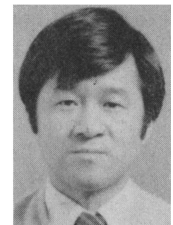
*Satoshi Yanagihara  
Yoshihiro Seiki  
Hisashi Nakamura*



## DISMANTLING TECHNIQUES FOR REACTOR STEEL PIPING

**Satoshi Yanagihara** (top) (MS, nuclear engineering, Hokkaido University, Japan, 1976) is a research engineer in the Japan Power Demonstration Reactor (JPDR) department at the Japan Atomic Energy Research Institute (JAERI). He has worked in the area of reactor decommissioning and currently works with systems engineering for reactor decommissioning. **Fujio Hiraga** (center) (MS, nuclear engineering, Hokkaido University, Japan, 1987) is a research engineer in the JPDR department at JAERI. He has been engaged in dismantling technology development for nuclear facilities. His current work includes development of demolition techniques for concrete structures. **Hisashi Nakamura** (bottom) (MS, mechanical engineering, Gunma University, Japan, 1981) is a research engineer in the JPDR department at JAERI. He has been engaged in dismantling technology development for concrete structures of nuclear facilities. His current research activity is related to the recycling of reactor decommissioning waste.

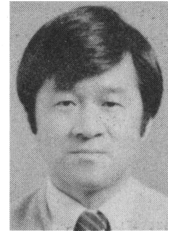
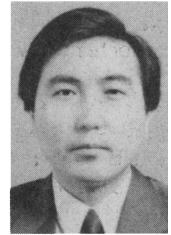
*Satoshi Yanagihara  
Fujio Hiraga  
Hisashi Nakamura*



## CUTTING TECHNIQUE AND SYSTEM FOR BIOLOGICAL SHIELD

**Hisashi Nakamura** (top) (MS, mechanical engineering, Gunma University, Japan, 1981) is a research engineer in the Department of the Japan Power Demonstration Reactor (JPDR) at the Japan Atomic Energy Research Institute (JAERI). He has been engaged in the development of the dismantling technique for concrete structures. His recent research activity is related to the recycling of decommissioning reactor waste. **Toshimasa Narazaki** (center) (MS, electrical engineering, Tohoku University, Japan, 1983) is currently an engineer at the Tohoku Electric Power Company and worked at JAERI from 1986 to 1988. He has been engaged in the development of the dismantling technique using a water jet. **Satoshi Yanagihara** (bottom) (MS, nuclear engineering, Hokkaido University, Japan, 1976) is a research engineer in the Department of JPDR at JAERI. He has worked in the area of reactor decommissioning. His current work includes systems engineering for reactor decommissioning.

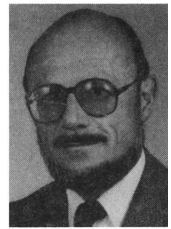
*Hisashi Nakamura  
Toshimasa Narazaki  
Satoshi Yanagihara*



## DISMANTLING BY EXPLOSIVES

**Hans Ulrich Freund** (top) [Dr., physics, Technical University of Munich, Federal Republic of Germany (FRG), 1967] is a senior research scientist at the Battelle-Institut e.V. in Frankfurt, FRG. He worked as postdoctoral fellow at Georgia Institute of Technology for 3 years and then joined Battelle. His interests include nuclear physics and engineering, analytical methods, and explosives applications. **Klaus Müller** (Dipl.-Ing., technical engineering, University of Karlsruhe, FRG, 1966) has worked at Kernforschungszentrum Karlsruhe in hot-cell and waste facility design and on irradiation experiments in Belgium. In 1974 he joined the HDR Safety Program as project manager responsible for full-scale safety experiments, such as long-term leak rate behavior of nuclear power plants, fire protection methods and calculations, and advanced dismantling techniques. His research interests are plant safety during severe accidents and safe decommissioning of nuclear power plants.

*Hans Ulrich Freund  
Klaus Müller*



## RESULTS OF MELTING LARGE QUANTITIES OF RADIOACTIVE STEEL SCRAP

**Manfred Sappok** (PhD, nuclear physics, University of Heidelberg, Federal Republic of Germany, 1973) worked on the development of high-temperature reactors for electricity and nuclear process heat at Hochttemperatur-Reaktorbau GmbH from 1975 to 1980. He has been technical president at Siempelkamp Gieserei GmbH since 1980.

*Manfred Sappok*



## BEHAVIOR OF ACTINIDES AND OTHER DIFFICULT TO MEASURE RADIONUCLIDES IN THE MELTING OF CONTAMINATED STEEL

**Eberhard Schuster** (right) [chemistry, Rheinisch Westfälische Technische Hochschule Aachen, Federal Republic of Germany (FRG); Dr. rer. nat., inorganic chemistry, 1963] joined the Siemens-Schuckert-Werke research center in 1965, working in the areas of activation analysis with charged particles, radiochemical analysis on semiconductor materials, and postirradiation

*Eberhard Schuster  
Kurt A. Pflugrad*



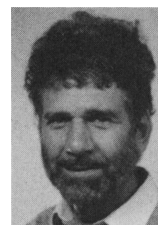
examination of nuclear materials. He is now manager of the radiochemistry and analytics department at Siemens AG, Kraftwerk Union group. His current interests involve chemistry and behavior of radionuclides in various areas of nuclear technology. **Kurt A. Pflugrad** (right) [Ing. (grad.), mechanical engineering, Bergische Universitat, FRG, 1961] is a scientific official at the Commission of the European Communities (CEC) Directorate General for Science, Research, and Development. From 1964 to 1979, he worked at the Cadarache Research Center for the Commissariat à l'Energie Atomique on fast breeder reactor development. In 1980, he joined the CEC research program on decommissioning nuclear power plants. His current research activities focus on treatment of low-radioactive metal waste by melting, with an emphasis on radionuclides that are difficult to measure.



#### **PRELIMINARY STUDIES OF PACKAGING AND DISPOSAL OF DECOMMISSIONING WASTE IN SWITZERLAND**

**Jean-Claude Alder** (Dipl., physical engineering and nuclear physics, 1960, and Dr. sc. techn., 1969, Ecole polytechnique fédérale de Lausanne, Switzerland) is a project manager with the Swiss National Cooperative for the Storage of Radioactive Waste (NAGRA) in the field of waste specification. Before joining NAGRA, he worked in nuclear and particle physics at various research laboratories in Switzerland and abroad.

*Jean-Claude Alder*



#### **DEEP-BED FIBERGLASS FILTER ASSEMBLY RADIOLOGICAL CHARACTERIZATION**

**Vishnu B. Subrahmanyam** (top) (PhD, chemistry, University of California, Berkeley, 1964) is a principal scientist at the Westinghouse Hanford Company. He was a research staff chemist at Yale University and worked on heavy-ion nuclear reaction mechanisms. As a member of the faculty at Boston College, he supervised graduate work in nuclear decay scheme investigations and fallout formation studies by neutron activation methods. He joined Lynchburg Research Center of Babcock & Wilcox in 1978 and engaged in characterization of irradiated nuclear fuel and addressed chemistry problems of commercial nuclear reactors. In 1982, he came to the Hanford Nuclear Reservation, where he is occupied with development and improvement of radiation monitoring equipment and methods for in-line, environmental, and process control purposes. **Dwayne R. Speer** (BS, engineering technologies, Oklahoma State University, 1973) is the manager of decommissioning engineering for Westinghouse Hanford Company. He came to Hanford in 1975 and has been associated with decommissioning since 1983 when he became activity manager for decommissioning with Rockwell Hanford Operations. Prior to 1983, he was a senior health physicist and a program representative in the health, safety, and environmental department.

*Vishnu B. Subrahmanyam  
Dwayne R. Speer*

