

# INTRODUCTION TO THE SPECIAL ISSUE OF *NUCLEAR TECHNOLOGY* ON “HIGH-LEVEL RADIOACTIVE WASTE MANAGEMENT”

Dedicated to the Memory of  
Gudmundur “Bo” Bodvarsson

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This special issue of *Nuclear Technology* is dedicated to the memory of Gudmundur “Bo” Bodvarsson, the director of the Earth Sciences Division (ESD) at Lawrence Berkeley National Laboratory (LBNL). Bo passed away unexpectedly on November 29, 2006, at age 54, from a pulmonary embolism. A native of Iceland, Bo earned his PhD in hydrogeology from the University of California at Berkeley in 1981 and became internationally known for his research in geothermal reservoir simulation and optimization. Starting in the mid-1980s, Bo became increasingly involved in nuclear waste isolation research. He and his team at LBNL constructed three-dimensional models of subsurface flow and transport at Yucca Mountain, Nevada, in order to interpret various field data collected at the site. As the Nuclear Waste Program Lead at LBNL, he initiated and directed various testing programs in the underground Exploratory Studies Facility at Yucca Mountain, including seepage testing at niches, heater tests, and a fracture-matrix interaction test. While holding the ESD directorship at LBNL since 2001, Bo remained deeply committed to the nation’s nuclear waste program. He was appointed to be the Natural Barrier Thrust Lead for the U.S. Department of Energy’s Science and Technology Program, Office of Civilian Radioactive Waste Management, formulating a multi-university and multinational lab research program.

Bo is sorely missed for his scientific achievement, his dynamic leadership, his enthusiasm, and his long-term vision. His death has deeply saddened all the

people who were fortunate enough to know and work with him.

The papers included in this special issue were selected from those presented at the 2006 International High-Level Radioactive Waste Management Conference (IHLRWM) held in Las Vegas from April 30 to May 4, 2006. These papers were selected based on their archival value as representing a cross section of the state-of-the-art at the time of the conference. The papers have been peer reviewed and revised following the usual practice of this journal. For interested readers, the entire set of the original papers presented at the 2006 IHLRWM is available from the American Nuclear Society.

The safe management of high-level radioactive waste has matured significantly over the last decade. A few countries, notably the United States and Sweden, are close to developing license applications for building deep underground repositories for high-level radioactive waste, while other countries are at various stages of development varying from conceptual formulations, site selection, and detailed site investigation to sophisticated risk assessment. This variability was reflected in the breadth of the papers in the conference. Also represented at this conference was the broad multidisciplinary nature of the endeavor. In our selection of the papers for this special issue, we have tried to capture this multidisciplinary nature of the subject.

All of the papers except one are related to post-closure performance of the repository. These include

papers on moisture transport in unevenly heated emplacement drifts; coupled thermal, hydrologic, and mechanical modeling; probabilistic methods for radionuclide transport; analyses of uncertainties; use of natural analogs; volcanic and seismic disruptive scenarios; total system performance; and the potential impact of advanced fuel cycles. The sole exception is one paper on preclosure safety analysis. The reason for this imbalance

stems primarily from the greater complexity of, greater uncertainties in, and lack of experience in the long-term performance of the repository compared to preclosure safety analysis.

The guest editor wishes to thank the authors and the reviewers for their contributions to this special issue. Thanks are also due J. T. Birkholzer of LBNL for contributing to this Introduction.