FOREWORD

SPECIAL ISSUE ON THE FUKUSHIMA DAIICHI ACCIDENT

Guest Editors

ANDREW KLEIN
Oregon State University

and

AKIRA TOKUHIRO
University of Idaho

The events that occurred in March of 2011 at the Fukushima Daiichi nuclear power station in Japan, triggered by the Tohoku earthquake and the resulting tsunami, again marked a decisive time for the worldwide nuclear power industry. As many of us know, the loss of on-site and off-site power combined with the loss of emergency diesel generators due to water ingress initiated a post-scram emergency response challenge to maintain core cooling in these boiling water reactor plants. Ultimately, we now know that there are three partially to fully melted cores, following several hydrogen explosions. The impacts and analysis by the nuclear technical community of the sequence of events that followed the earthquake and tsunami will be studied for many years to come, with the intent of avoiding future incidents, both similar and different. Immediately after the situation in Japan had stabilized, researchers and analysts in the nuclear industry began using their tools to try to better understand the nature of the sequence of events and the outcomes from the accident.

This special issue of *Nuclear Technology* contains the efforts of many of those researchers to better understand accidents of this type. Of the 13 papers in this special issue, most were originally presented in San Diego, California, at the International Meeting on Severe Accident Assessment and Management: Lessons Learned from Fukushima Daiichi, an embedded topical meeting of the American Nuclear Society's 2012 Winter Meeting. A few of the papers were solicited from experts on specific aspects of the events at Fukushima Daiichi. Thus, these papers represent an early assessment of the accident sequence base by an interested expert community.

Most of the papers in this special issue present a variety of analytical approaches to better understand the events that took place in Japan since the instrumentation to collect reliable data was unavailable both during and after the accident. Other papers in this issue present approaches to better managing the impacts of long-term station blackout events through better understanding of materials behavior and severe accidents. We anticipate that these initial efforts will likely be followed by additional analysis and research as the nuclear industry learns the lessons from Fukushima Daiichi and applies them to the current fleet of nuclear power plants and to future designs. There are also lessons to be learned from the Fukushima Daiini, Onagawa, and Tokai nuclear power stations, which experienced the same earthquake and tsunami.

We hope that this special issue will help researchers and the nuclear industry better understand the events that occurred at Fukushima Daiichi and that future research and review of emergency preparedness will lead to continuously safer nuclear power plant designs and operation to first avoid severe accidents and, if that is not possible, to better manage the key emergency response when it is needed.