

INTRODUCTION TO THE SODIUM TECHNOLOGY PARTIAL SPECIAL ISSUE—PART 2

The April 2005 issue and part of the current issue of *Nuclear Technology* are devoted to the technology of sodium as a reactor coolant. The papers constituting Part 2 of the Sodium Technology Partial Special Issue are as follows: “The Development of SIMMER-III, an Advanced Computer Program for LMFR Safety Analysis, and its Application to Sodium Experiments,” by Y. Tobita, Sa. Kondo, H. Yamano, K. Morita, W. Maschek, P. Coste, and T. Cadiou, which deals with the safety analysis of sodium experiments; and “Evaluation of the Accident Scenario Initiated by a Total Instantaneous Blockage in a Phénix Subassembly,” by T. Cadiou and J. Louvet, “Phénix Steam Generator Module Repair: Sodium Removal Process, Ultrasonic Controls, and Repair Method,” by Ch. Cavagna, O. Gastaldi, L. Martin, and V. Grabon, and “Contribution of Phénix to the Development of Transmutation Fuels and Targets in Sodium Fast Breeder Reactors,” by S. Pillon, F. Sudreau, and G. Gaillard-Groléas, all of which deal with the Phénix reactor, a pioneering Na-cooled fast reactor which in more than 20 yr of operation provided and still provides valuable experience and information regarding sodium use.

It has been estimated that there are ~300 reactor yr of experience with sodium-cooled reactors worldwide. This experience has shown that sodium is an excellent reactor coolant and that sodium-cooled reactors can be operated reliably with high plant availability factors. Certain properties make sodium an attractive coolant for fast reactors. The first is that sodium does not act as a moderator, thus allowing its use as a fast-reactor coolant; second are its thermal properties—very high thermal conductivity (more than 100 times greater than water) and high boiling point (882°C at atmospheric pressure); third is its noncorrosiveness with reactor structural materials. Some drawbacks to the use of sodium are its rapid oxidization when exposed to air and its reaction with water.

Since the use of sodium as a reactor coolant is well established and the probability is high that we will continue to use sodium in fission reactors, the editor feels that the April 2005 special issue and this partial one will serve as valuable references to reactor engineers.

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Editor