

My biggest disappointment in this book and, I must admit, with the prevalent attitude of most of those working in the hazardous waste field, is the stress on after-the-fact approaches. I would very much like to see more stress on reduction of generation of waste. It is in this area where I believe innovative ideas and concepts are most needed.

I do not recommend this book. The title, *Hazardous Waste Management*, implies more than it contains.

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Heat Exchangers—Thermal-Hydraulic Fundamentals and Design

Editors S. Kakac, A. E. Bergles, and F. Mayinger
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Reviewer Karl Hornyik

This volume is the third of a series published in conjunction with the North Atlantic Treaty Organization (NATO) Advanced Study Institutes held biannually since 1976. It contains a total of 50 papers covering the material presented at the last institute along with a selection of research reports. The authors of individual contributions indeed represent an international elite in this field; their contributions are of high quality and represent the state of the art. The contents are ordered into the following broad topics: Thermal-Hydraulic Fundamentals (Single-Phase and Two-Phase), Radiative Heat Transfer in Heat Exchangers, Heat Exchanger Design, Advanced Surface Selection and Performance, Operational Considerations, Problems and Prospects.

The objectives of the papers are quite evenly distributed over the following categories: broad overviews, fundamentals, special topics, and recent advances. In general, a high level of background is required for the reader to benefit from the presentations, even from those dealing with fundamental aspects.

For the reviewer, it was refreshing to see a truly international effort with authors representing 11 different countries from both the western and the eastern hemispheres. This is intensified by the comprehensive bib-

liographies given with most papers, again covering the international scene. All papers are written in English, although in some cases foreign language syndromes are noticeable. It is probably beyond the means of the American editor to assume a stronger role in achieving smoother translations and the knowledgeable reader can be expected to improve on certain formulations as he works his way through the details.

The variety of topics reflects the variety of phenomena encountered in heat exchangers as well as the variety of applications found in industry. Phenomena discussed include those caused by nonconventional geometries, fluidized beds, heat transfer when using multicomponent mixtures, film evaporation and condensation, and others. Applications addressed in this volume include some rather special cases such as desalination, off-shore heat exchangers, geothermal plants, and nuclear power plants. Operational problems include tube vibration, fouling and corrosion, and instabilities. The methods for design and analysis employed by individual authors cover the entire spectrum from closed analytic solutions of simplified models to finite difference representations and finite element representations. As expected, there is a rather extensive coverage of correlations used for computing heat transfer and pressure drop under a great variety of conditions.

The reader with a strong interest in nuclear technology perhaps will find that his field has not received sufficient attention. Nuclear power plant steam generators are discussed in a generic manner only, and some of the special problems associated with nuclear plant steam generator operation and analysis are hardly mentioned. The same is true for cooling towers, although it can be argued that they do not belong to heat exchangers. However, the specialist reader is virtually guaranteed his compensation by finding alternate and new methods and points of view that will broaden his horizon and stimulate his work.

This volume cannot be recommended as a class text, simply because it contains more material than could be covered in a class on any topic and of any normal duration. However, it will be valuable as resource to the instructor preparing his class notes. Its real value is for the researcher who seeks to get into the field or wants to broaden his background, as well as for the practicing engineer who wants to review the state of the art. Complemented by the volumes of the preceding NATO Advanced Study Institutes, it presents as complete and current a treatment of this broad subject as one is likely to find on any comparable topic.

Karl Hornyik is associate professor of nuclear engineering at Oregon State University. Previous professional engagements include a position as research associate at the Gesellschaft für Kernforschung, Karlsruhe, Federal Republic of Germany, and as assistant professor at Virginia Polytechnic Institute, Blacksburg, Virginia. His current research includes the steady state and transient analysis of nuclear steam supply systems for light water reactors with an emphasis on thermal-hydraulic phenomena. He has been associated with the Nuclear Safety Division of the Electric Power Research Institute through several summer appointments and with Gesellschaft für Reaktorsicherheit, Garching, Federal Republic of Germany, where he spent a sabbatical leave in 1979-1980. His MS and PhD degrees are in nuclear engineering and were received in 1961 and 1965 from the University of Illinois.