though much of the material, by nature, must be descriptive, ground work in previous chapters has been so thorough that a complex sequence of events and system responses can be presented in a concise fashion. New regulatory requirements, standards, and codes are presented. The student will recognize the relationship between the materials, components, and systems evolved in previous chapters, and the entire plant as a safety-engineered system. The only omissions I have detected in this excellent chapter are natural circulation as a safety feature, and the brief, rather idealistic, discussion of quality assurance.

Only rarely does a reviewer have the opportunity to review a book by authors with the knowledge and literary skill of Samuel Glasstone and Alexander Sesonske. Welcome back to our classrooms, *Nuclear Reactor Engineering*, 3rd ed.!

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About the Reviewer: Andrew Robeson, now professor emeritus of nuclear engineering, recently concluded a lengthy academic career, which began at Virginia Polytechnic Institute in 1955. Interspersed were periods at the Oak Ridge National Laboratory and the Babcock and Wilcox Company. He is now associated with Management Analysis Company on matters related to the nuclear power programs. Dr. Robeson's graduate training was at Virginia.

Nuclear Reactor Safety Heat Transfer. Edited by Owen C. Jones, Jr., Hemisphere Publishing Corporation, Washington, D.C. (1981). 959 pp. $99.00.

This book contains something for everyone. It combines a historical overview, textbook material, handbook information, and a bit of the editor's personal philosophy on the safety of nuclear power plants. The main part of the book is a collection of lectures prepared by leading experts in thermal hydraulics and reactor safety. These lectures were given at the International Centre for Heat and Mass Transfer in Dubrovnik, Yugoslavia, August 25-29, 1980. As stated in the author's Preface, the purpose was to "... bring together in one course the major areas of concern in the field of nuclear safety heat transfer and to describe the state-of-the-art at the turn of the decade."

The text is divided into five parts: Overview, Fundamental Concepts, Design Basis Accident–Light Water Reactors (LWRs), Design Basis Accident–Liquid-Metal Fast Breeder Reactors (LMFBRs), and Special Topics.

The first section contains three chapters that cover a historical overview of nuclear safety, a systems overview that includes all general classes of power reactors, and a review of a safety issue from the standpoint of thermal-hydraulic considerations. As the opening part of this section, the editor has prepared an abbreviated history of the development of nuclear power starting with the major scientific events leading up to the first criticality.

The second section discusses the transient response of LWRs and LMFBRs that follows initiating events, such as normal operating transients, and various accident scenarios. Also included are chapters on single- and two-phase flow, single- and two-phase heat transfer, and nuclear systems safety modeling. The section contains material on startup and shutdown procedures, as well as information on transient response during normal and upset conditions.

The third section discusses the design basis accident for LWRs. Descriptions are provided for the large break loss-of-coolant accident (LOCA) as well as the small break accident. Acceptance criteria for emergency core cooling systems are presented. The blowdown phase of a large pipe break is the subject of a separate chapter. Emergency cooling water injections and heat transfer during reflood are covered broadly. The section closes with information on the application of computer codes, such as RELAP and TRAC, to safety analysis.

The fourth section discusses the design basis accident for LMFBRs. The section begins with a description of core disruptive accidents followed by separate chapters on accident initiation and fuel motion that results from melting of fuel during a LOCA. The problem of debris cooling within a reactor vessel is followed by a treatment of ex-vessel heat removal for the more severe accidents. The last chapter in this section deals with an LMFBR system safety analysis utilizing current state-of-the-art computational methods employed in the United States for analysis of hypothetical core disruptive accidents. Emphasis is placed on the phenomenological basis and numerical methods of the SAS, VENUS-II, SIMMER, and REXCO codes.

The remaining section is devoted to special topics that are receiving particular attention and study in today's safety climate. These subjects include vapor explosions, natural convection cooling, blockages in LMFBR subassemblies, sodium boiling, and experimental methods in two-phase flow.

The last chapter in the book is devoted to the accident at Three Mile Island Unit 2 reactor in Pennsylvania. The sequence of events during the first 16 hours of the incident is described along with the fundamental heat transfer processes that took place during that time.

In the opinion of this reviewer, the text meets the objective stated in the Preface of providing a state-of-the-art summary. Some of the chapters contain considerably more depth of treatment and detail than others, but that can be attributed to individual authorship and viewpoint in the selection of information and to the presentation style of each author. Generally speaking, the text provides a good starting point for those interested in studying the safety aspects of nuclear power generation.

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About the Reviewer: For more than three decades at Argonne National Laboratory, Paul Lottes has contributed to the knowledge of heat transfer in general and of boiling phenomena in particular. He completed his graduate training at Purdue in mechanical engineering in 1950. Additionally, Dr. Lottes has been active in Society affairs, and is currently chairman of the committee that oversees the publication of its archival journals.