John S. Niederkorn studied metallurgical engineering and materials science at Ural's Polytechnical Institute in Sverdlovsk and earned his doctorate at the Institute of Non-Ferrous Metals and Gold in Moscow, USSR. His scientific and engineering activity in the field of metallurgy and materials science includes mostly interdisciplinary topics concerned with energy-related materials.

He has completed numerous research and engineering projects on nuclear materials, radioactive waste management, rare metals ore processing, and semiconductor materials. His research interests are in the fields of advanced chemical and physical separation methods and mass transfer in homogeneous and heterogeneous systems. He has published several textbooks and numerous papers; he has also endeavored to disseminate the state of scientific knowledge in the communication media and in books.

From 1966 he was head of the research laboratory and from 1974, head of the research division at the Research and Engineering Center for Radioactive and Rare Metals in Bucharest, Rumania. In 1982 he joined the Research and Development Division of New Mexico Institute of Mining and Technology.

Reliability and Risk Analysis—Methods and Nuclear Power Applications

Author	Norman J. McCormick
Publisher	Academic Press, Inc., New York (1981)
Pages	446
Price	$39.50
Reviewer	Jose G. Martin

In the Preface of this book, the author states that a "practical itinerary is provided for senior-level or first-year graduate students who want a summary of . . . reliability and risk studies primarily for nuclear power applications." Those students -and their instructors- should consider themselves fortunate that the author has taken such care to make the itinerary a smooth one.

The quality of smoothness does not guarantee uniform standards throughout, and it does not offer protection from an occasional wrong signal along the way. However, the many strengths of this book may well turn it into a classic.

It is comprehensive and well organized. Furthermore, it is extremely readable. The author develops the material progressively, pulling together subjects that are not particularly manageable and turning them into a consistent whole. New terms are defined in context with perfect timing. There is no table of symbols for quick reference; it can be argued that this book does not really need one, partly because of its careful organization, but mostly because it is written so well. The author gives credit to LaDonna Kennedy for transferring illegible script into readable form; it is not clear from the acknowledgment whether the "transfer" refers just to script or to composition as well. There is no question that "sombody in charge" has a beautiful command of English written for the purpose of teaching and informing.

The discussions about the reliability of simple systems and availability with repairs are particularly lucid. Professor McCormick manages to make the reader feel at ease among Markov processes.

In the same way that spots are more obvious in good linen, the care taken in the organization of the text makes some weaknesses more apparent. For example, the division of the material into chapters emphasizes that the manipulation of failure data is more carefully treated than the origin of the failure data itself. The book introduces failures via probabilities, instead of the other way around. The very first example of the book refers to an uncompensated ionization chamber, which, "according to manufacturers' data," has a probability of failure "under the period of interest and at the reactor operating conditions of 0.02. . . . " This may be self-explanatory, but a student may best be served by some insight into this "0.02" before he is asked to manipulate the figure.

The effort made in Chaps. 3, 4, and 5 to provide this insight seems half-hearted. Manipulation should follow understanding, like carts follow horses. The helpful questions at the ends of the chapters give a clue to the author's placement of the carts. Chapter 3 on probability distributions has 17 questions, Chap. 4 on data manipulation has 10, and Chap. 5 on failure data has none. The reviewer had to suppress a mischievous impulse to manipulate *these* data.

In a more serious vein, it is self-evident that a tool is made more useful when one knows something about its limitations. There is little hint in this text about the possible limitations of the suggested analytical tools. There is a reference to this subject in the reactor safety study, but this is slightly off the main "itinerary." It may be justifiable to waive disclaimers when lecturing about the manipulation of probability distributions. It may also be justifiable (barely) to waive disclaimers when lecturing about the probability that the toss of a coin will yield a tail. However, the "richest, longest-lived, best-protected, most resourceful civilization" has a right to demand that its engineers have an understanding of the limitations of its analytical tools. If the engineers can see no such limitations, then that civilization has reasonable grounds to be frightened.

Chapter 17 on risk-benefit assessment deserves comment. There is a precarious quality to this topic. Maybe our descendants will be able to put discussions about dollars per life on the same logical level as we now put medieval discussions about the angelic capacity of pinheads, but those descendants will have to give the present discourses credit for gruesomeness. In the meantime, anybody attempting to deal with the subject will cautiously refer to "several approaches" taken by others. This is what the author has done. It is of course easy to criticize maladroitness whenever such a topic appears, while thinking, "There, but for the grace of God, go I."

The epilogue is almost banal. Its breast-pounding advocacy reeks of irritating sophomoric inspiration from a normally bright student.

The operative word is bright. One does not waste harsh criticism such as the one given above on the dull. Sophomoric advocacy or not, this book is one of the best technical books to reach my desk in a long time. I do not know how nuclear engineering departments managed for so long without a text such as this one. It is likely to become a classic. In this reviewer's humble estimation, two extra words in its Preface would have made it something of a masterpiece: *caveat emptor*.

José G. Martín is a professor of nuclear and energy engineering at the University of Lowell in Lowell, Massachusetts. He studied at Mississippi State University and the University of Wisconsin, and was granted his PhD degree from the latter in 1971. He taught at the Instituto Politécnico Nacional in Mexico City and at the Instituto Militar de Engenharia in Rio de Janeiro, Brazil, before joining the faculty at Lowell in 1975. He also acted as consultant for Los Alamos National Laboratories, Oak Ridge National Laboratory, and the Nuclear Regulatory Commission before joining the International Energy Agency's Small Solar Power Systems Project in Almería, Spain, under the sponsorship of Sandia National Laboratories. On leave from his academic duties at the University of Lowell, he is now senior evaluator for the international test and evaluation team for that project.

Planning for Rare Events: Nuclear Accident Preparedness and Management (IIASA Proceedings Series, Vol. 14)

Editor	John W. Lathrop
Publisher	Pergamon Press, Incorporated, Elmsford, New York (1981)
Pages	268
Price	$30.00
Reviewer	Gerald A. Schlapper

The International Institute for Applied Systems Analysis (IIASA) is a nongovernmental research institution founded to enable scientists of the 17 participating countries to work together to solve common problems. Recognizing the need for an appraisal of the special problems of accident management of rare events, like nuclear accidents, a workshop was proposed to bring together people who are involved in maintaining preparedness in the member countries. The IIASA Proceedings Series (of which this book is a volume) was established to ensure that the results of these workshops are distributed to a large audience. This volume contains 21 papers along with a discussion of the themes that emerged during the presentations.

Participants in the program included operators, regulators, emergency management groups, and representatives of local, state, and national governments. The presentations and comparisons are based on each nation's current accident management plans. The papers in general are not oriented toward analysis of what went wrong at Three Mile Island but emphasize international experience in accident planning.

Topics discussed range from problems in maintaining preparedness to concerns over liability. Workshop participants are key individuals in their countries and areas of responsibility, and thus their statements are noteworthy, even though it is indicated that the opinions expressed are those of the authors and not necessarily those of their employers or governments. The viewpoints presented are quite diverse, and these differences are clearly expressed. The need for variation in planning due to institutional differences is evident. One must remember when reading this volume that while the U.S. representatives could and did discuss the successes and failures of emergency planning at Three Mile Island, representatives of other nations discussed in theory how their plans would work.

It is noted by various authors that planning for nuclear accidents can be seriously degraded by basing plans on past accidents or hypothetical events where the situation is known. The central problem is that uncertain plant status, meteorological conditions, and other factors make it much more difficult during a real accident to predict possible radiation exposure of the public. The complications inherent in a risk-benefit analysis of a decision to implement countermeasures are discussed. Factors such as accidental loss of life during an unnecessary evacuation, mental stress, and financial penalties are addressed. The need for good communications between the technical staff, government agencies, and the public is emphasized.

The editor is to be commended for the organization of the presentations. Following a brief introduction, points that were discussed during workshop sessions are outlined. This section primarily addresses unresolved problems of emergency planning and convinces the reader to look for more detailed information in the technical papers that follow. The formal technical papers are divided into four areas: perspectives of the accident at Three Mile Island, international perspectives in emergency planning, broad historical and legal issues associated with nuclear power, and technical aspects of nuclear accident management.

This workshop was held in January 1980, and obviously emergency planning is not "standing still" in the United States. Some of the concerns that are noted have already been addressed by regulations and/or standards. However, the majority of the text material is still current. This volume should be on the recommended reading list for those involved with emergency planning and accident management.

While on the staff of the University of Missouri Research Reactor, Gerald A. Schlapper was involved with the Operational Health Physics Program. He also served as a research fellow in the nuclear medicine department of the Harry S. Truman Veterans Administration Hospital. In January 1981, Dr. Schlapper joined the faculty of the Radiological Health Engineering Program of the nuclear engineering department at Texas A&M University. He also serves on the consulting faculty in the Nuclear, Biological, and Chemical Protection Branch of the U.S. Army Academy of Health Sciences.

Nuclear Fuel Cycle Optimization (Methods and Modelling Techniques)

Author	P. Silvennoinen
Publisher	Pergamon Press, Incorporated, Elmsford, New York (1982)
Pages	138
Price	$25.00
Reviewer	Nicholas Tsoulfanidis

This relatively small book (114 pp. text) should be useful to practicing nuclear engineers, especially those who