touched upon include planning, installation, operating problems, shutdowns and availability, equipment decontamination, postaccident component verification, failures and reliability, staffing, use of on-line computers, physics experiments, regulation and commissioning, and development of prestressed concrete pressure vessels. One of the outstanding papers in this section is "United States Light-Water Reactors: Present Status and Future Prospects" by W. K. Davis et al.; this paper gives a very good bird's-eye view of the light water reactor field.

The section on techniques for costing nuclear power plants and recent cost trends contains only five papers and 66 pages. Two of the papers are by U.S. authors and one each from Canada, the United Kingdom, and India. The U.S. papers provide insight into capital cost factors and historical cost trends for light water reactors and some of the economic pressures that led to selection of the Liquid Metal Fast Breeder Reactor for development as the reactor of the future. The other papers in this section tend to be less detailed, but point up the difficulty of obtaining benefit from consolidated worldwide cost data due to differences in reactor type, labor conditions, industrial advancement, costing methods, and monetary systems.

The section on fuel management contains, in its 11 articles and 163 pages, discussions of in-reactor fuel management, out-of-reactor fuel supply management and processing, transport of irradiated fuels, and problems of refueling scheduling with a highly seasonal power demand. Six of the papers presented by the United States, the United Kingdom, the Federal Republic of Germany, Belgium, Sweden, and Norway discuss in-core fuel manipulation and the large computer programs required to achieve economical optimization in fuel management. Of particular interest are the discussions of "Optimized Fuel Management in Nuclear Power Stations," by H. Schenk of the Federal Republic of Germany and "A Multilevel Data-Based Computer Code System for In-Core Fuel Management in Light-Water Reactors," by T. O. Savar et al. of Norway. Another outstanding paper by C. W. Smith et al. of the United States gives an excellent overview of the problems facing the nuclear power industry as the need for shipment of irradiated fuel increases.

In summary, this book contains something for nearly everyone in the nuclear power industry. Although it will not serve as a textbook for any of the subject areas covered, it meets its objective of providing a broad view of performance of the world's nuclear power plants and the present state-of-the-art in nuclear plant costing and fuel management.

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Radioactive Tracers in Hydrology

Author	E. Gaspar and M. Oncescu (This is the revised version of *Introducere in Radiohidrologie*, translated from Romanian by Magdalena Marinesca.)
Publisher	American Elsevier Publishing Company (1972)
Pages	342
Price	$18.95
Reviewer	David D. Rabb

The aim of *Radioactive Tracers in Hydrology* is not stated in an introduction, but the book appears to be a compendium of loosely related articles or series of lecture notes on two different but associated subjects: radioactivity and hydrology. Each of the 14 chapters essentially stands by itself with little or no continuity between chapters.

From a cursory study of the references, it appears that Oncescu is the radiologist and Gaspar, the hydrologist. Evidently neither author has been a prolific writer although they have collaborated on two other papers on the same subjects.

The first five chapters deal with characteristics and principles of radiometry and properties of tracers, and the choice of detection radioactive tracers used in hydrology; the chapters emphasize protective measures [including a discourse on maximum permissible concentrations (MPC)]. No factual MPC are listed, however.

The next seven chapters are essentially concerned with hydrology and theoretical hydraulic engineering: flow velocities and parameters affecting aquifers, flow-rate measurement, sediment transport, sewage disposal, detection of fluid losses, and the employment of radioactive tracers in such operations.

The final two chapters cover the age-dating of ground water and water purification by nuclear radiation.

Three appendixes cover the following: (a) the calculation of the counting rate of a detector immersed in a radioactive liquid, (b) the deduction by integration methods of the relationship used to estimate flow rates, and (c) the disintegration schemes of 31 selected radionuclides which may be utilized in radiohydrology.

The lack of introductions in all chapters results in some confusion as to the context of the subject. The authors assume that the user of this book has more than an elementary knowledge of radioactivity and hydrology. They profess their faith in quantitative measurements by presenting, particularly in the sections on hydrology, detailed formulas which stress the importance of mathematical derivations, without explanations of the why and how of the problems.

The book is well produced, with an attractive cover. There is no full index, but each chapter has a detailed table of contents and also italicized paragraph subheadings. Some chapters on radioactivity do not have a

reference list at the end, but the hydrology chapter reference lists are quite lengthy. A total of 190 references are cited, and 148 figures and illustrations are presented. The more than 300 different symbols employed in the text are listed and defined.

The reviewer believes that the authors have provided information that will be useful to students and research workers. Sections on theory and practice should be useful to those educators who are actively engaged in research work, but the material as presented may be beyond the understanding of the more practical reader.

David D. Rabb received his BSc, MSc, and professional engineering (1964) degrees from the University of Arizona. He spent five years with the Special Weapons Branch, U.S. Army, seven years at Battelle Memorial Institute, and fourteen years with the nuclear testing programs at the Lawrence Radiation Laboratory, University of California. Mr. Rabb's publications include subjects related to nuclear explosives and radioactivity in mining and extractive metallurgy. Since 1971 he has been associated with the Arizona Bureau of Mines at Tucson, Arizona.