

BOOK REVIEWS

Selection of books for review is based on the editor's opinions regarding possible reader interest and on the availability of the book to the editor. Occasional selections may include books on topics somewhat peripheral to the subject matter ordinarily considered acceptable.



Equity Issues in Radioactive Waste Management

Editor Roger E. Kasperson
Publisher Oelgeschlager, Gunn & Hain Publishers, Inc., Cambridge, Massachusetts (1983)
Pages 395
Price \$30.00
Reviewer Donald A. Daavettila

The word equity means, in part, a free and reasonable conformity to accepted standards of natural right, law, and justice without prejudice or favoritism and without undue hardship. Siting discussions for a high-level waste (HLW) repository face, at the outset, the inherent inequity of any location, because, while many share the benefits of nuclear-generated electricity, only a few local regions will suffer the hardship of a repository.

A National Science Foundation grant for an interdisciplinary group of scholars centered at Clark University to study the equity issues related to the disposal of radioactive (and other hazardous) waste has resulted in this book. The 380-page book contains 15 chapters, of which the book editor was author or coauthor of three, including the extremely well-written final summary chapter. The book covers five problems: perspective (social issues), locus (siting issues), legacy (containment time and morality issues), labor (radiation exposure and compensation of workers, including temporary help), and public policy (including modest proposals for a socially just and acceptable program). Each chapter is extensively referenced, and the book has a useful index with some well-done tables to support the text.

The authors feel that the benefits of nuclear power are largely concentrated in this and the next generation, and that it is the obligation of this generation to internalize harm and to avoid exporting it to the future. They also recognize that it's not likely that a purely voluntary system will deliver any sites. That is, full voluntary consent to the risk bearing (hardship) is not possible to achieve.

In reading the book as a book (rather than just specific chapters for topical information), I found the first few chapters a bit irritating, perhaps similar to the reception most

social science courses find in engineering programs, because they state the obvious with a lot of words. The first chapter conclusion includes the statement that radioactive wastes necessarily involve formidable philosophical problems (and metaphysical issues). Maybe technical people don't feel comfortable with these aspects because, after having discussed them at length, the problems yet remain. Still the early chapters are worthwhile, since they so clearly show the variety and complexity of the issues and do open the door to the social aspects of disposal problems. The final chapter includes a list of the 12 key features of a just and socially acceptable management system, a few of which are

1. interim spent fuel storage at reactors or possibly several away from reactors for the next 40 yr or so and postponing a reprocessing decision
2. delay of current HLW repository timetables until multiple sites can begin accepting waste simultaneously
3. a lottery of site exemption among qualified candidate sites
4. lowering of the occupational radiation exposure by a factor of 10 and restrictions on the use of temporary workers in waste facilities
5. creation of a legacy fund for local region mitigation and compensation for repository and tailing sites.

Of the books I have seen of this type, this one is a scholarly effort and well worth having for background on issues related to the public acceptance of nuclear power, for it is public acceptance of the waste problem solution that will pave the nuclear power road.

I found the inclusion of mill tailings as a problem in the legacy-, locus-type analysis sort of pointless, since only the location of material has been changed. Also, the fast breeder reactor (while mentioned in the index only once) surely makes the nuclear benefits continue for many generations instead of just the next one. And applying an equally long-term positive concern for the generations of the next thousands of years in regard to their oil or coal supplies instead of just the negative aspects of giving them nuclear waste problems would drastically affect our current life-style. Perhaps our individual fair share now is a gallon of oil per year in order to save them their gallon. In other words, it doesn't make sense to me to be only concerned about avoiding

exporting harm to the future, without an equal concern for exporting the peculiar benefits of coal and oil.

Since 1964, Donald A. Daavettila has been a teacher of nuclear-power-related courses at Michigan Technological University where he is an associate professor of physics. After receiving his master's degree from Michigan Tech in 1958, through a cooperative thesis program with Argonne National Laboratory, he attended and taught at the International School of Nuclear Science and Engineering at Argonne. Then, following a year as an experimental physicist at the Enrico Fermi Nuclear Plant, he joined the Tech faculty. His interests include environmental effects of power production, radiation measurements, and nuclear waste disposal. Parts of two recent summers were spent with nuclear waste study groups at Battelle's Pacific Northwest Laboratories and Rockwell Hanford Operations as a NORCUS summer faculty appointee.

Iodine-129: Evaluation of Releases from Nuclear Power Generation

Publisher National Council on Radiation Protection and Measurement (1983)

Pages 74

Price \$10.00

Reviewer Geoffrey G. Eichholz

Iodine-129 is a long-lived ($T^{1/2} = 1.57 \times 10^7$ yr) radioisotope of iodine produced with a relatively low yield in nuclear fission. As an anion and as an elemental species that is easily assimilated into the food chain, it has received a great deal of attention in assessments of the long-term impact of nuclear power plant effluents and of radioactive waste disposal. This little booklet summarizes concisely what is known about sources of ^{129}I , thyroid exposures from dietary sources, metabolic constraints on ^{129}I organ concentrations, control technology, and measurement techniques. An extensive bibliography, to 1982, rounds off the presentation.

Though the actual doses projected by the various calculational models are quite small, the report draws attention to the major discrepancies in the estimates obtained with some models that are based on assumptions that are considered unrealistic. The report does not deal with dose commitments associated with different waste disposal schemes, but it is evident that ^{129}I would not be expected to be a major contributor to any long-range population dose. The review of measurement methods seems excessively brief, consisting of little more than a literature review.

The overall format and coverage conform with that of other National Council on Radiation Protection reports. The report is a worthy addition to the series and can serve as a ready reference on matters concerning this radioisotope.

Geoffrey G. Eichholz is Regents' Professor of Nuclear Engineering at the Georgia Institute of Technology, which he joined in 1963. He obtained his PhD in physics at the University of Leeds, England, and was awarded the DSc degree in

1979. He has edited the book Radioisotopes Engineering and is the author of Environmental Aspects of Nuclear Power and Principles of Nuclear Radiation Detection, both published by Ann Arbor Science Publishers. His research interests include the migration of radioactive wastes, environmental surveillance problems, radiation detector development, industrial radiation applications, nuclear materials technology, and the health physics of nonionizing radiations.

Computational Methods for Turbulent, Transonic and Viscous Flows

Editor J. A. Essers

Publisher Hemisphere Publishing Corporation (1983)

Pages 360

Price \$49.95

Reviewer Efstathios E. Michaelides

This compendium edited by J. A. Essers presents the reader with recent advances in the field of numerical methods for turbulent, transonic, and viscous flows. Apparently, it emanates from a series of lectures the authors gave in 1981 at the Von Karman Institute. There are six review articles in it which present in detail the following topics:

1. "Numerical Methods for Coordinate Generation": The approach to this subject is based on numerical integration of Schwartz-Christoffel transformations and yields simple, accurate, and flexible grids. The technique of grid generation also generates body-fitted coordinates. Examples for grid generation are given for flow past a hexagon, a six-point cross, an airfoil, and a circular cylinder.

2. "Introduction to Multigrid Methods for the Numerical Solution of Boundary Value Problems": This part starts with a short summary of difference schemes and finite element methods. It then proceeds with a full exposition of the linear two-grid and multigrid methods with their modifications, as well as the multigrid method of the second kind. Among the examples given, there is one of the Bernard problem in natural convection and another of the steady-state Navier-Stokes equations.

3. "Higher Level Simulations of Turbulent Flows": This part is a thorough review of advanced turbulence modeling, one of the most comprehensive and informative this reviewer has seen. It is worth acquiring the book for this 90-page part alone. Here large eddy simulation is discussed with subgrid scale models and the numerical methods used in such simulation. Homogeneous flows, free shear flows, and bounded flows are examined. Examples of large eddy simulations are given in meteorological and environmental flows, as well as directions in which this branch of modeling is proceeding. The only drawback of this part is that its author seems to place more emphasis on advances made within his own research group.

4. The fourth part, "Numerical Methods for Two- and Three-Dimensional Recirculating Flows," presents a brief review of the alternatives encountered in the application of