

- In Situ Aquifer Bioremediation (Chapter 9)
- Lagoon Bioremediation (Chapter 10)
- Vadose Zone Bioremediation (Chapter 11)

Although the book claimed case histories are included, few are found. The two I did find, one on the cost of conceptual design of a soil, land treatment system and the other on good bioremediation were excellent. I just wish there had been more such examples.

The book is well-referenced (with references especially up-to-date) except that many of the references would be difficult, if not impossible, to obtain being conferences and newsletters (many of which were published by a now defunct organization). For a detailed look at the bioremediation literature, the reader should turn to a companion book, *Remediation of Petroleum Contaminated Soils: Biological, Physical and Chemical Processes*, also published by Lewis.

A short (9-page) glossary ends the book. Given the topic and the unusual words used, it is appropriate.

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*Bioremediation: Principles and Practice, Vol. 1: Fundamentals and Application*, \$149.95, 788 pp., *Vol. 2: Biodegradation Technology Developments*, \$149.95, 741 pp., *Vol. 3: Bioremediation Technologies*, \$149.95, 698 pp., Subhas K. Sikdar and Robert L. Irvine (Eds.), Technomic Publishing Co., Inc., Lancaster, PA, 1997–1998, ISBN: Vol. 1: 1-56676-308-8, Vol. 2: 1-56676-530-7, Vol. 3: 1-56676-561-7

This three-volume set represents a major contribution to the biodegradation literature [the authors use the word bioremediation broadly to cover biological processes whereas I usually restrict that term to cleanup of contaminated sites; but I defer to their definition for purposes of this review].

The authors state in three separate paragraphs, and I fully agree:

“This three-volume series, *Bioremediation: Principles and Practice*, will provide a state-of-the art description of advances in pollution treatment and reduction using biological means; identify and address, at a fundamental level, broad scientific and technological areas that are unique to the subject or theme and that must be understood if advances are to be made; and provide a comprehensive overview of new developments at the regulatory, desk-top, bench-scale, pilot-scale, and full-scale levels.”

“Glancing through the tables of contents, you will see that our objective for this series was to provide the theoretician and practitioner with an overview of bioremediation that will allow new research programs to be formulated and bioremediation technologies to be improved.”

“Developing this series has been a lengthy process because of the size of the project and because of the standard of excellence that has been set.”

As an editor, I truly appreciate the daunting task that Sikdar and Irvine faced in soliciting, getting written and submitted, having reviewed (as all papers were) and

revised and finally accepting 62 diverse manuscripts. They are to be commended on the quality of each. I found none wanting in quality and the quantity is almost overwhelming.

The series covers all media: air, water and soil/sediment. I will cite just three papers, one to illustrate each major area.

Air: Biodegradation of Vapor-Phase Contaminants.

Water: Biotreatment of Aqueous Wastes from Pesticide Manufacture Using Sequencing Batch Reactors (SBR) with PAC.

Soil/Sediment: Surfactant-Enhanced Aquifer Remediation: Fundamental Processes and Practical Applications.

In all, there are 62 papers by an estimated 200 contributors to a 3-volume series containing 2155 pages. As I said, a monumental effort and one, I believe, very worthwhile.

To do the series justice, I should really list the titles of all the papers. Space does not permit, but they run the gamut from how the law drives site cleanup to basic equations of flow and transport in porous media. The latter paper is an example of the basic theory found in many of the papers. Others, however (for example a paper on the Lasagna process) are quite practical, but practical papers are fewer in number than theoretical papers.

While the total price of three books may deter individuals from buying them, major corporations and University libraries should not be without this series. It will be cited for years to come.

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*Environmental Remediation Costs—A Compendium of Three Books and Computer Programs*, R.S. Means Company, Inc., Kingston, MA. 1. *Environmental Remediation Estimating Methods*, Richard R. Rast, 1998, \$99.95, 594 pp., ISBN: 0-87629-461-1; 2. *Environmental Remediation Cost Data—Unit Price*, 4th ed., 1998, \$149.95, 325 pp., ISBN: 0-87629-493-X; 3. *Environmental Remediation Cost Data—Assemblies*, 4th ed., 1998, \$149.95, 300pp., ISBN: 0-87629-494-8; 4. *Computer Disks from Above Books: Six floppies, Echo's Softbook*, 1998, Delta Technologies Group, Englewood, CO.

The purpose of the three-book package and the companion computer disks is to provide information to allow engineers to develop as accurate-as-possible estimates for remediation (site cleanup) projects. All three books are designed to be used together.

The first book provides general information in its first seven sections that is relevant to most types of remediation projects—a daunting task with much area to cover. To do this task effectively, the author (Rast) has had to write concisely on a wide variety of topics and, indeed, he has, covering 59 different technologies in less than 566 pages. Needless to say, no topic was treated in depth, but the topics I reviewed were covered reasonably adequately, often with diagrams of equipment and plots of performance data.