

The book contains, at the end of each chapter, problems to be worked by the students. And solutions (surprisingly to me) are given in the Appendix. Personally, as a faculty member, I'd prefer a separate answer book.

G.F. BENNETT

PII: S0304-3894(00)00165-5

The Wiley Encyclopedia of Environmental Pollution and Cleanup, Volumes 1 and 2, Robert A. Meyers, (Ed.-in-Chief), Diane Kender Dittrick, Ed., Wiley, New York, NY, 1999, 2 vols., 1890 p. (8 1/2 × 11 format), US\$249.00, ISBN: 0-471-31612-1.

Any review of such a massive, comprehensive multi-topic work presents an editor with a daunting task. All he/she can do (in a reasonable period of time) is leaf through the book, reading the topics of interest and if the reader is, like this reviewer, perusing the references.

As I have often said in reviews, it is simple to criticize a book for what the author/editor has omitted; or to detect inequalities between various writers of a multi-authored work. This book is no exception, but I believe the editors have done better than most. The book is massive and should, I believe, be a standard work found on the shelves of most libraries both academic and public.

This encyclopedia is a condensation of Wiley's "critically acclaimed eight-volume Encyclopedia of Environmental Analysis in Remediation." I cannot imagine how difficult it was to make the "cuts" necessary to reduce the encyclopedia by 75%.

My evaluation, based on a sample of areas of interest — oil spills, industrial waste treatment, air pollution and nuclear power among others — is that this is an excellent book. I fail to see how it could have been improved (although in a few cases, the reference sections were not up to standard).

G.F. BENNETT

PII: S0304-3894(00)00166-7

Surfactants and cosolvents for NAPL remediation: a technology practices manual, Donald F. Lowe, Carroll L. Oubre and C. Herb Ward (Eds.), CRC Press, Boca Raton, FL, 1999, 472 p., US\$69.96, ISBN: 1-8493-4117-5.

In 1993, the U.S. Department of Defence (DOD) awarded a US\$19.3 million grant to a University consortium of environmental research centers led by Rice University in Houston, TX. The goal of the project was to "enhance the development of innovative remediation technologies for DOD by facilitating the process from academic research to full-scale utilization." The goal was to "...select, test, and document performance of innovative environmental technologies for the remediation of DOD sites." This volume, *Surfactants and Cosolvents for NAPL Remediation*, is one of a 10-monograph series of

books resulting from this work. The other nine manuscripts in the series are listed below:

- Sequenced Reactive Barriers for Groundwater Remediation
- Modular Remediation Testing System
- Phytoremediation of Hydrocarbon-Contaminated Soil
- Steam and Electro-Heating Remediation of Tight Soils
- Soil Vapor Extraction Using Radio frequency Heating: Resource Manual and Technology Demonstration
- Laser-Induced Fluorescence for Subsurface Contaminant Monitoring
- Reuse of Surfactants and Cosolvents for NAPL Remediation
- Remediation of Firing-Range Impact Berms
- NAPL Removal: Surfactants, Roams, and Microemulsions.

This report addresses the problem of groundwater contamination by nonaqueous solvents and polychlorinated biphenyl (PCB) oils. These contaminants present a major cleanup problem, especially for pump-and-treat remediation technology. The problem is that NAPLs exist in the surface as a separate liquid phase, slowly dissolving into groundwater. These new techniques are being studied to improve the efficacy of removing NAPLs. Consequently, “this manual has been prepared to assist with the evaluation and potential application of surfactant/cosolvent flushing for the remediation of subsurface contamination. The target audience for the manual is decision makers involved in the selection and implementation of remediation projects.”

Specifically, the objectives of the book are to provide the reader with the following:

- a basic understanding of surfactant/cosolvent flushing technologies
- an understanding of what surfactant/cosolvent flushing can and cannot achieve at a site
- an understanding of the factors to be considered when evaluating and implementing surfactant/cosolvent flushing projects
- an appreciation of the major design, construction, start-up, and operations and maintenance considerations that impact the cost of surfactant/cosolvent flushing projects.

The information is presented in nine chapters entitled:

- Introduction
- Technology Description and Current Status
- Geology and Contaminant Distribution
- Surfactant/Cosolvent Enhanced Recovery of NAPL
- Produced Fluids Management and Surfactant/Cosolvent Recycling
- A Stepwise Approach to Implementation of Surfactant/Cosolvent Flushing
- Cost Considerations
- Future Research
- References

Other very interesting features were a cost analysis chapter (7), recommendations for future research (8), and a reference section (9) where approximately 250 works were cited.

The last half of the book is devoted to:

- field project case histories
- literature summary database
- hypothetical site cost studies.

G.F. BENNETT

PII: S0304-3894(00)00167-9

Soil Vapor Extraction Using Radio Frequency Heating: Resource Manual and Technology Demonstration Donald F. Lowe, Carroll L. Oubre, and C. Herb Ward, Eds., Lewis Publishers, Boca Raton, FL, 1999, 328 p., US\$69.95, ISBN: 1-56670-464-2.

A work product of a Department of Defense-funded Advanced Applied Technology Demonstration Facility at Rice University in Houston, TX was a series of 10 manuals (published as texts by Lewis Publishers) [the first book reviewed by the reviewer was entitled *Surfactant and Cosolvents for NAPL Remediation: a Technology Practices Manual*].

This text (which appears to be the second in the series) discusses one of the most widely used techniques for treating soils contaminated with volatile organic compounds — soil vapor extraction (SVE). In the text, the SVE system is modified by heating the soil, thus increasing the vapor pressure and enhancing the removal of semi-volatile compounds. Soil can be heated in situ by injecting hot air or steam by direct resistive heating or by applying electromagnetic energy in the radio frequency range. To date, experiments with this method of soil treatment have been entirely successful, since the project was initiated at Kirtland Air Force Base, Albuquerque, NM.

The test site used for the demonstration of this technology was a former fire training pit that contaminated a variety of fuels, oil and lubricants at concentration (of total petroleum hydrocarbons) from 500–2900 mg/kg of dry soil. Based on their tests, the researchers evaluated a hypothetical RF-SVE design for a full-scale process. Studied were both the economics and the design sensitivity of the RF-SVE process. They concluded that the process can be efficient, but less so on a cost basis if soil volumes are large. Thus, they recommend consideration of this technology for small volumes of soil and relatively high molecular weight compounds, and soils that are moist and permeable.

The report has six chapters entitled:

1. Introduction
2. Measurement Procedures
3. Summary of Technology Demonstration