EPA Environmental Engineering Sourcebook, Russell Boulding (Ed.), Ann Arbor Press, Chelsea, MI, 1996, 404p., $69.95, ISBN: 1-57504-002-6.

The U.S. Environmental Protection Agency (EPA) has published a wealth of information on an infinite variety of pollution topics. Nowhere is the publishing activity more evident than in the hazardous chemical-contaminated site remediation.

But for the ordinary engineer, even the researcher, EPA material (reports, etc.) is difficult to find. Even though my University library has an extensive government document section, I find it difficult, on occasion, to find the document I want. Thus, the book serves a major purpose in publishing synopses of 28 EPA reports prepared by EPA personnel and EPA consultants.

This book is divided into two equal sections:

- Part I: Containment, pump-and-treat, and in situ treatment;
- Part II: Ex situ treatment methods for contaminated soils, ground water and hazardous waste.

While I was tempted to reproduce the table of contents listing the titles of all 28 chapters, I resisted. Suffice it to say that the editor selected a wide variety of reports covering, among others, the following topics: (1) ex situ processes included air stripping, soil washing, solvent extraction, chemical oxidation, chemical dehalogenation, slurry biodegradation, rotating biological contractors, solidification/stabilization, thermal desorption, pyrolysis, and supercritical water oxidation; and (2) a host of in situ processes among which are vitrification, bioremediation, and soil vapor extraction

All reports, as one might expect from an EPA project, are very well-referenced.

G.F. BENNETT

PII: S0304-3894(00)00164-3

Industrial water reuse and wastewater minimization, James G. Mann and Y.A. Liu, McGraw-Hill, New York, NY, 1999, 524 p. plus CD-ROM disk, US$99.95, ISBN: 0-07-134855-7.

Anyone opening this book expecting a conventional approach to wastewater use and reuse will be very surprised as the text is a very modern, mathematical approach to a very old problem. Water-pinch technology is a radically modern computational analysis. This new approach allows engineers ‘‘. . . to analyze water-using processes before design and operation, as well as after, to minimize both freshwater consumption and wastewater generation.’’

The book’s authors review the application of the new water-pinch technology and its use. By combining an analysis of the theoretical principles underlying the technology, including a detailed discussion of the theoretical principles which they combine with a step-by-step analysis of methodologies for the practical applications of these principles,

they show how to analyze, synthesize, and retrofit water-using operations as well as effluent treatment systems in manufacturing processes.

The technology underlying that work began in the 1970s in the design and retrofitting of heat exchange networks. Using the basic principle of thermodynamics and energy balances, engineers can analyze the heat flows across various temperature intervals throughout a manufacturing process and identify a temperature called the pinch point. Below the pinch point, extended heating utilities are unnecessary; above the pinch point, extended cooling systems are equally unnecessary.

Extension of this technology to water-using operations allows engineers to maximize water reuse while simultaneously minimizing wastewater generation and treatment. Essentially, this technology treats a water-using operation as a problem of mass transfer from a contamination-rich process to a water stream. Contaminants may include suspended solids, chemical oxygen demand or other reuse-limiting chemicals. As in the heat-exchange application, a pinch-point (in this case, water-pinch point) is determined based on contaminant concentration basis. The reduction in water use is attained by reusing contaminated streams in systems that do not need fresh water.

An example of a water-using network is given in Chapter 1 to illustrate the authors' point. A petroleum refinery is modelled. Conventionally, 135 te/h of water are used. But by using water-pinch analysis and the reuse of some streams, that flow is reduced approximately 20% to 107 te/h. If regeneration is added, the water rate decreases to 55.5 te/h.

The concepts embodied in the book are graphically illustrated in the five figures in Chapter 1. There are four blocks shown (and the relevant chapters identified):

1. Wastewater Minimization Through Water Reuse:
   Chapters 2 and 3 (single contaminant);
   Chapters 7 to 9 (multiple contaminants).
2. Wastewater Minimization Through Regeneration, Recycle and Reuse:
   Chapter 5 (single contaminant);
   Chapters 7 to 9 (multiple contaminants).
3. Wastewater Minimization Through Process Changes:
   Chapter 6 (single contaminant);
   Chapter 7 (multiple contaminants).
4. Design of Distributed Effluent-Treatment Systems:
   Chapter 4 (single and multiple contaminants);
   Section 9.5.5 (multiple contaminants).

The final chapter (9) entitled ''Wastewater Minimization Through Mathematical Optimization,'' clearly illustrates the unique aspect of this book that differentiates it from conventional wastewater minimization texts — it's a strongly mathematical analysis approach to the problem. That approach is assisted by an inclusion of a CD-ROM disc that has three components: (1) Water Design installation files, (2) Water Design example files and (3) TK Solver files.

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.

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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