



Book Reviews

Biopile Design, Operation, and Maintenance Handbook for Treating Hydrocarbon-Contaminated Soils, F.M. von Fahnestock, G.B. Wickramanayake, R.J. Kratzke and W.R. Major, Battelle Press, Columbus, OH, 1998, US\$54.95 + US\$3.50 shipping, 168 pp. (8-1/2 × 11), ISBN: 1-57477-035-7

A little theory; a lot of practical advice. The foregoing statement is the best way I can describe this very practical book. It is probably one of the best, most useful, well-written books I have reviewed recently. It is needed as evidenced by the following statement. Much to my surprise, the USEPA reported (in 1996, *Biotreatment News*) that biopiles have been used in remediating 8873 UST (underground storage tank) sites. The biopile process is a cost-effective, successful cleanup method.

Essentially the process consists of placing petroleum-contaminated soils in piles above ground and stimulation environmental activity within the accumulated soil by moisture, nutrient and air addition.

The advantages of this technology include:

1. Effective contaminant destruction for most petroleum products
2. Simple design and construction
3. Cost-effective contaminant reduction
4. Effective in decomposing organics that are difficult to thermally desorb

Biological degradation does have its limitations, which are:

1. Five- and six-ring polycyclic aromatic hydrocarbons are restricted to biological degradation
2. High concentrations of organic (750 000 mg/l of total petroleum hydrocarbons) may resist biodegradation
3. Significant heavy metals (concentration > 2500 mg/l) may inhibit microbial growth

The Foreword, written by a Consulting Chemical Engineer, highlights the usefulness of this book. "One of the unique features of this volume is the example illustrating a real-world project for treating 500 yd³ of contaminated soil. The authors not only illustrate the step-by-step methodology by teaching the reader–user how to calculate all the technical requirements, but also demonstrate how to cost-estimate both capital investment and production." [Assisted by the inclusion of a floppy disc to enable cost estimation.]

But there is more, with chapters on:

- Regulatory issues and permitting strategy
- Profile of existing contaminated soils

- Predesign activities
- Biopile construction
- Biopile system management
- Sampling and analysis procedures
- Regulatory requirements
- Health and safety requirements

There are 18 short appendices with useful information and worksheets.

Although I claim no deep expertise in site remediation, I do understand the topic and engineering design needs. This book should be an extremely useful tool for bioremediation engineers as a guide for planning, costing and design of above ground bioremediation projects.

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Discovering Industrial Ecology: An Executive Briefing and Sourcebook, E.A. Lowe, J.L. Warren and S.R. Moran, Battelle Press, Columbus, OH, 1997, \$19.95, 202 pp., soft cover. ISBN: 1-57477-034-9

The challenge to society in general and industry in particular is outlined in the first sentence of this book: “The level of resource consumption and environmental degradation involved in our current economic/industrial system is one of the major challenges facing the world in the 21st century.” This level of resource consumption by the expected 10 billion population of the world in 2030 would generate 400 billion tons of solid waste every year—enough to bury Los Angeles 100 miles deep.

Further on in the introduction, the author states, “The challenge to already industrialized and emerging economies is to create sustainable industrial systems. The source of value for economic systems must be transformed from maximizing throughput and consumption of resources to optimizing quality of life within the constraints of natural systems. This requires integration of human economic activity and material management with biological, chemical, and physical global systems. Industrial ecology offers a framework for achieving this transition.”

The basis for action is therefore an adaptation of industrial ecology which is a dynamic system-based framework that enables management of human activity on a sustainable basis by:

- Minimizing energy and materials usage
- Ensuring acceptable quality of life for people
- Minimizing the ecological impact of human activity to levels natural systems can sustain
- Maintaining the economic viability of systems for industry, trade, and commerce.

The authors note there are five things to remember about industrial ecology (IE):

1. Industrial systems are living systems that operate in living systems.
2. Industrial ecology opens new opportunities for business.
3. Industrial ecology opens new opportunities for government.
4. Strategies for creating and implementing IE are emerging.