

25. Management of Cyanide in Municipal Wastewaters.
 26. Management of Cyanide in Industrial process Wastewaters.
 27. Cyanide Management in Groundwater and Soil.

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To say the least, coverage is comprehensive. Cyanide, its problems and solutions and thereto, is well discussed (and very well referenced, with approximately 60 references per chapter; numerous of these references are to the editors' own published works). Although the early chapters in the book that describe the sources, problems and fate of cyanide in the environment were of interest to me, I (as an engineer) was more interested in the treatment process aspects discussed later in the book. Chapter 18, for example, reviews the regulation of cyanide in water and in soil (in this chapter, all three editors collaborated with two colleagues in the writing process). Allowable concentrations of cyanide in the water (drinking, surface, groundwater, and effluents) soils and wastes were thoroughly reviewed from the United States perspective mainly; however, selected international standards were reported in a few places in this chapter.

Given that I consulted on industrial wastewater problems as well as hazardous chemical spills and the disposal of hazardous wastes, it is not surprising that I found Chapters 19–27 of particular interest.

Cyanide treatment is discussed in a short overview in the first of these chapters. Reviewed are: waste characteristics, cyanide content of wastes, waste matrix, other constituents of concern, treated waste quality requirement and cost.

The serious discussion of treatment processes begins with Chapter 20. Discussed are treatment processes: (1) alkaline chlorination technologies, (2) oxidation technologies with ozone and hydrogen peroxide, (3) photocatalytic oxidation technology and (4) INCO's air/SO₂ process. Each of the foregoing sub-chapters discussing treatment processes had the following sections: process description and implementation, achievable treatment levels, design considerations, cost of technology and technology status.

Chapter 22, entitled "Thermal and High Temperature Technologies for the Treatment of Cyanide," follows the same format as Chapter 20. The six treatment technologies described were: (1) high temperature alkaline hydrolysis, (2) high temperature alkaline chlorination, (3) incineration/thermal treatment, (4) electrolytic decomposition or oxidation, (5) polysulfide process and (6) wet oxidation.

I thoroughly enjoyed reviewing this book. It is well written and, to say the least, extremely comprehensive in the discussion of cyanide problems and solutions.

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Waste Treatment in the Process Industries, L.K. Wang, Yung-Tse Hung, H.H. Lo, C. Yapijakis (Eds.). CRC/Taylor & Francis Group, Boca Raton, FL (2006). 647 pp., US\$ 129.95, ISBN: 0-8493-7233-X

Waste treatment is an ever changing, increasingly important sphere of industrial production problems. This book addresses the topic initially in general terms in the first four chapters and in specific terms in the last nine chapters.

While the latter chapters are industry-specific, the initial chapters are general in nature. Their titles are as follows:

- Implementation of industrial ecology for industrial hazardous waste management.
- Bioassay of industrial and waste pollutants.
- In-plant management and disposal of industrial hazardous substances.
- Application of biotechnology for industrial waste treatment.

As noted above, the bulk of the book is devoted, chapter by chapter, to single industries. In each chapter, the authors describe the wastes (liquid, mainly) produced by that industry. Process flow diagrams, lists of types and amounts of wastes, and treatment schemes are described for each of the following industrial operations:

- Pharmaceutical.
- Oil field and refinery.
- Soap and detergent.
- Textile.
- Phosphate.
- Pulp and paper.
- Pesticide.
- Rubber.
- Power.

Of the above chapters, I found the chapter dealing with pharmaceutical wastes of most interest, not the least because the authors included 17 worked example problems and 14 unworked problems for student exercises (with answers given). Unfortunately, none of the other chapters followed this format which I have to admit impressed me because of my teaching background.

That criticism aside, I must commend the authors for an interesting and well written book that contains a plethora of data on industrial wastes and the treatment processes thereof as described by the press release accompanying the book:

"The book contains in-depth discussions of environmental pollution sources, waste characteristics, control technologies, management strategies, facility innovations, process alternatives, costs, case histories, effluent standards, and future trends for the process industry."

As one might expect, each chapter has an extensive bibliography.

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