

search, Hiperon process, Hyan process, Biosulfix Process, Celrobic Process and the Dorr-Oliver treatment system.

Lastly, there are several general papers on the following topics: advances in anaerobic technology, microbiological aspects of anaerobic digestion and reactor design aspects.

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Sorbents for Liquid Substance Cleanup and Control, by R.W. Melvold, S.C. Gibson and R. Scarberry, Noyes Data Corp., Park Ridge, NJ, 1988, ISBN No. 0-8155-1159-0, 153 pp., price: US\$36.

This book provides information on the selection and use of sorbents for cleanup and control of liquids designated as hazardous substances, under regulations promulgated in accordance with the mandates contained in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA). Provided in this handbook are data which will be useful to those who have to clean up or direct the cleanup of hazardous chemical spills.

This handbook was originally published as a contractors report for the U.S. EPA Release Control Branch, Hazardous Waste Emergency Laboratory, Edison, New Jersey, under the title of "A Guidance Manual for Selection and Use of Sorbents for Hazardous Substance Cleanup and Control".

The key to this book are the 26 guides which present information on adsorbents to be used with 26 different chemical classes. In this context, (grouping chemicals by classes and referring to generic guides), the authors have copied the format of the U.S. Department of Transportation's Spill Manual carried by almost all first responders. For example, when one is confronted by a spill of an inorganic acid, one consults Guide # 1, but if the acid is organic, Guide # 2 is used.

Each guide gives information on the use of sorbents for one of the three applicable major spill scenarios: land spill, floating spill and landfill release. Also given is a prioritized list of sorbents for each scenario, along with application method, collection technique, limitations and disposal cost. Approximately 20 pages are devoted to specific adsorbents, i.e., sorbent sorption capacity data and hazardous liquid/water preference; there are data for 12 major general classes of sorbents. The guides, along with the list of CERCLA liquids for which the guides are applicable and the guide to use for each class of chemicals, take up about half the book.

The remainder of the book contains the following chapters:

- Technical/logistical information (how to apply and collect the sorbents)
- Cost estimation procedures and data
- Test methods (for sorption capacity)

- Spill scenario rationale
- Sources of information
- CERCLA liquid chemical information (physical property data)
- Sorbent selection rationale

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Treatment of Hazardous Waste Leachate: Unit Operations and Cost, by J.L. McCardle, M.M. Arozarena and W.E. Gallagher, Noyes Data Corp., Park Ridge, NJ, 1988, ISBN No. 0-8155-1160-4, 111 pp., price: US\$36.

Comparative capital and operating costs of pollution control equipment are very difficult to find, and comparative costs based on the same assumptions are rare. This book thus fills a very definite void in the literature – in providing comparative costs on the treatment system. Although the book purports to discuss costs of data and the use applicable to only the treatment of leachate, the data used are applicable to the treatment of industrial wastes, as both wastestreams contain similar contaminants and utilize similar treatment sequences.

The authors have briefly discussed the generation of leachate, its constituents and treatability. All this information is presented briefly and found in process publications. The utility of the book, however, is its discussion and comparison of the costs for 20 different unit operations used for leachate/industrial wastewater pretreatment/treatment.

These 20 unit operations were divided into four different categories:

1. Pretreatment
 - equalization
 - sedimentation
 - granular media filtration
 - oil–water separation
2. Physical/Chemical
 - neutralization
 - precipitation/flocculation
 - oxidation/reduction
 - carbon adsorption
 - steam stripping
 - air stripping
 - reverse osmosis
 - ultrafiltration
 - ion exchange
 - wet oxidation