

tems and suggests a coordinating methodology that may prove more effective than traditional command control structures.

Chapter 10 focuses on the roles and responsibilities of senior official in the management of strategic response. It suggests that the normal involvement of the senior officials in the emergency operations center may be counter-productive and suggests new ways of managing disasters using crisis management principles.”

The writing in the book is excellent and the advice given by the author clear. This book should serve professionals in the emergency management field very well.

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Beryllium: Sampling and Analysis, K. Ashley (Ed.). ASTM International, West Conshohocken, PA (2006). 119 pp. US\$ 55.00 (soft cover), ISBN: 0-8031-3499-1

This relatively short book resulted from an ASTM Symposium on Beryllium Sampling and Analysis which was held in Reno, Nevada in 2005. Nine of the 18 papers presented have been published in three sections of this book:

- (1) Beryllium disease—exposure monitoring and standardization issues.
- (2) Beryllium exposure measurement and reference materials—national and international perspectives.
- (3) On-site monitoring for beryllium—sampling and analytical aspects.

The editor describes the content of these three sections as follows:

- (1) *Beryllium disease*. The intent of this section was to present an overview of beryllium disease and efforts to reduce worker exposures through improved monitoring methods and the development of standard methodologies. Some of the papers presented discuss the industrial uses of beryllium and the history of beryllium disease. Other papers dealt with occupational monitoring and standardization of sampling and analytical methods.
- (2) *Beryllium exposure, measurement and reference materials*. This portion of the symposium covered global efforts and progress in beryllium occupational monitoring, as well

as the development and characterization of beryllium reference materials. Applications of sampling and analytical methods to industrial hygiene chemistry and practice were highlighted, and needs for reference materials containing beryllium oxide were identified.

- (3) *On-site monitoring for beryllium*. The ability to carry out on-site beryllium analysis has been a desire for many years, and this part of the symposium covered recent developments in this area. New portable analytical methods for determining trace beryllium in samples from air and services have been developed and evaluated, and advances in this research arena are continuing. These methods include both real-time qualitative and semi-quantitative methods, as well as near real-time quantitative techniques for ultra-trace beryllium analysis. Given that occupational exposure to beryllium can cause a lung disease that is ultimately fatal, timely and accurate sampling and analysis of the work place environment is essential in providing for worker health as well as insuring that the facility meets exposure limits for that element in the air as well as on surfaces.

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Industrial Waste Treatment: Contemporary Practice and Vision for the Future, N.L. Nemerow. Butterworth-Heinemann/Elsevier, Burlington, MA (2007). 585 pp., Price: US\$ 99.95, ISBN: 0-12-372493-7

This book is distinctly different from the normal course of environmental books that I review. It has two distinct parts that I have classified as “the past” and “the future.”

The material in the “past” section is very familiar to me—as this section contains a concise discussion of conventional treatment processes. I found innumerable references to articles that I have read, some very old but still historically relevant; many of these articles were written by Nemerow himself.

In this book, Nemerow has clearly fulfilled his intentions “. . . for the book to be an overview of the subject of industrial waste treatment and disposal as used in the twentieth century and how it is evolving into a new conceptual field as we enter the twenty-first century.” In my opinion, he has achieved his goal very well, covering current (or perhaps I should say past) waste treatment unit operations in the following chapters: (1) theories and practices, (2) contaminant concentration reduction, (3) neutralization, (4) equalization and proportioning, (5) removal of

suspended solids, (6) removal of colloidal solids, (7) removal of inorganic dissolved solids, (8) removal of organic dissolved solids, (9) treatment and disposal of sludge solids, (10) joint treatment of raw industrial waste with domestic sewage, (11) hazardous wastes and (12) removal of industrial air contaminants.

The above chapters are relatively short with each covering a single wastewater unit operation. Review questions follow each chapter; so do references, many of which are to older, but very familiar to me, articles by friends and colleagues of the past. Nemerow's long career in the wastewater treatment field is evidenced by the use of many of the above-mentioned articles from the literature including the Purdue Industrial Waste Conference. Old these articles are, but each citation that I looked at is still technically relevant. Along the way, Nemerow introduces water minimization and water reuse as pointing the way to the future.

Nemerow writes clearly and concisely, liberally including tables, equipment diagrams and photographs. Many of the designs he discusses are included in detail, leading me to suspect they were drawn from his consulting activities. For example, he includes a complete description of the design of a treatment process for paper mill wastewater that included flow equalization, primary clarification, activated sludge, secondary clarification and final treatment in an aerated stabilization basin.

I found his description of a "Case History of [a] Project for Joint Disposal of Untreated Industrial Wastes and Domestic Sewage" especially interesting. Again, I suspect this material was extracted from his work as a consultant. The writeup fills 70 pages of Chapter 10. The project evaluation from initial study to final design specifications plus cost data are well documented.

Chapter 11 contains a relatively good review of hazardous wastes, their generation, handling and disposal, although the 110 pages allotted to this topic means that voluminous available material on the topic had to be omitted.

The following chapter is a contrast. Entitled "Removal of Industrial Air Contaminants," the chapter does not fulfil the promise suggested by its title. The four pages (containing very little relevant material) devoted to the topic could well have been omitted from the book.

The second half of the book deals with the author's view of the future. He writes:

"At the risk of sounding melodramatic, I believe that the answer to saving our environmental planet is in Part B of this book. I have been studying, observing, and analyzing the plight of industry as well as municipalities in attempting to abate their pollution for over 50 years. In our present era of

merging forces for enhancing industrial economics, the time has come for industries and cities to use their wastes in ways that will result in zero pollution for the environment. Waste utilization must replace waste treatment in order to preserve our fragile environment."

In Chapter 14, Nemerow advances the concept of the "Environmentally Balanced Industrial Complex (EBIC)." He describes this concept as:

"... a selective collection of compatible industrial plants located together in one area (complex) to minimize (or eliminate) both environmental impact and industrial production costs. These objectives are met by using the waste materials of one plant as the raw materials for another with minimal transportation, storage, and raw material preparation. When a manufacturing plant neither treats its waste nor stores or pretreats certain of its raw materials, its overall production costs must be reduced significantly."

Nemerow then goes on to expand on his system description both on an operating system and potential ideas for future applications. Subsequent chapters are entitled: Procedures for industry in attaining zero pollution; Economic justification for industrial complexes; Realistic industrial complexes; Potential industrial complexes; Potential municipal-industrial complexes, Naturally evolving industrial complexes; and Benefit-related expenditures for industrial waste treatment. Many of the references are to his own publications.

Nemerow has authored an excellent book starting with the known and moving to the unknown. His grasp of the historical basis of past procedures leads him to the development of new concepts for the future. I commend him for reducing to paper his knowledge and perceptions.

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