

for reducing risk were evaluated and recommendations have been made for these approaches.

3. Technical options (for control of volatile chemicals) are discussed in the light of the most hazardous situation and recommendations are made for research where needed. Established, new and emerging technologies are discussed. Finally recommendations are made regarding actions which would improve preparation, training, mitigation and response.

This is one of the best government reports I have read recently, although I think it's mistitled. A better title would have been *Hazardous Material Releases: Response, Planning and Prevention*. The author really covered all the above topics well, especially the planning phase for volatile hazardous material release response.

True to the book's title the authors do discuss countermeasures (such as foaming and covers) for volatile chemicals (and they do a reasonable job controlling these materials for a short period of time). Not very well covered (for little space was devoted to the topic) is dispersion modeling.

Two unique developments I found were:

1. A plot of the number of spills versus amount of chemicals produced annually—they correlate well; I have tried without success to plot these data for a number of years and was delighted to see someone succeed where I could not.
2. The development of a methodology for ranking chemical hazards based on: (a) toxicity level of airborne gases, vapors or aerosols; (b) fire and explosion potential; (c) mobility of the substance after release; (d) domestic production and location of major production plants; and (e) domestic shipments, based on a numerical rating the authors defined four hazard levels. They are listed below with examples of chemicals in each:

- Very high risk material—acetaldehyde, ammonia, chlorine
- High risk material—cumene, phenol, xylene
- Moderate risk material—acetone, crude oil, sodium
- Low risk material—butyl acetate, hexane, kerosene

I highly recommend the book to someone who wants the basics of emergency planning response. It makes a good beginning.

GARY F. BENNETT

*Hazardous Waste Minimization*, by H.F. Freeman (Ed.), McGraw-Hill, New York, NY, 1990, ISBN 0-07-022043-3, 343 pp., \$ 42.50.

There is no more timely topic than waste minimization or as the U.S. Environmental Protection Agency (U.S. EPA) prefers to call it, 'Pollution Prevention'. This book is being reviewed as the U.S. Congress is discussing (and

I predict will pass) some form of mandated waste minimization requirement for industries.

Freeman is an acknowledged expert in the field of hazardous waste prevention (and I note is a member of this journal's editorial advisory board). From his viewpoint as Chief of the Waste Minimization Branch of the U.S. EPA's Risk Reduction Laboratory in Cincinnati, Ohio, he has an excellent overview of the field and the people working in it.

The book contains 19 chapters in four major sections, progressing from the general to the specific. Section titles are as follows:

1. Waste minimization overview (3 chapters)
2. Waste minimization in industry (7 chapters)
3. Waste minimization and public sector activities (4 chapters)
4. Case studies of successful waste minimization projects (5 chapters)

In the first section of the book, Freeman has placed three chapters overviewing the problem and sets the stage for its solution. He himself, along with a U.S. EPA co-author discusses waste minimization in general and in a forward reference to what the reader will find later in the book, they say:

"Like all innovative solutions to waste minimization requires careful planning, creative problem solving, changes in attitude, sometimes capital investment, and most important a real commitment."

In the Second Chapter, John Warren of the Center for Economic Research of Research Triangle Park in North Carolina, notes that the U.S. hazardous waste production is approximately 300 million tons per year and in a table shows various estimates of its potential reduction. A reading of the table shows a 50% reduction would be an optimistic figure but reported values are a low 14% and an unrealistically high 90%.

The third and fourth chapters of the opening section are by Gary Hunt of the government-run Pollution Prevention Program of the State of North Carolina — one of the earliest and, in my estimation, one of the most comprehensive programs in the United States. With well-referenced examples (many to his own program's reports) he discusses 'Waste reduction techniques and technologies' including:

- Inventory management
- Production process modification
- Volume reduction
- Recovery

Section Two focuses on the creation of industrial waste minimization programs and practices. The author notes the final goal is to reduce hazardous waste by 35% in 1990 when compared to 1982 rates. To do this, he shows how to set up a waste minimization program. Other chapters, along the same line, discuss waste minimization assessment, economics of waste minimization, business planning for waste minimization, and process development waste

minimization, problems of small quantity generators and marketing waste reduction. The assessment chapter is especially good, it has well detailed procedures and a plethora of forms to be used in developing an effective waste minimization programs, policies, organization and processes.

From generalities, the book proceeds to specifics in the last two sections – although a minor error crept in as a ‘gremlin’ inserted a two where a three should have been in the title paragraph of the section. In this section, the author focuses on the public sector and how it can help others as well as itself in its waste reduction activities. Local, county and state activities are discussed in three separate chapters. The last chapter in the section focuses on minimizing household hazardous wastes.

The last section of the book has five chapters dealing with industrial case studies. Having reviewed several Government Institute Conference Reports in the area (and had their reviews published in the Journal), I looked forward to this section. Unfortunately it was not up to my expectations. Some of the chapters (the first–on the General Dynamics program) were too general and I think focused on the impact of releases (i.e. CFCs on ozone depletion) rather than on the chemicals themselves. Almost all the chapters lacked references. But there was some excellent information especially in the chapters on the Department of Defense Activities and another chapter on solvent recycling. Chapter titles are:

- The General Dynamics zero discharge program
- Waste minimization within the Department of Defense
- Waste minimization in the petroleum refining industry
- Ozone depletion and waste minimization
- Case studies of successful solvent waste reduction

My overall assessment is that this is a very good book, which will be of significant assistance as governments and industries address the difficult task of hazardous waste generation.

GARY F. BENNETT

*Methods for Determination of Toxic Organic Compounds in Air: EPA Methods*, by W.T. Winberry Jr., N.T. Murphy and R.M. Riggan, Noyes Data Corp., Park Ridge, NJ, 1990, ISBN 0-8155-1247-3, 583 pp., \$ 64.00.

This book contains details of 14 different analysis procedures covering different compounds or groups of compounds in air. Specific guidance is given on the determination of selected toxic compounds in ambient air.

Each method is self-contained (including pertinent literature citations). Where possible the American Society for Testing Materials Standardized format was used.