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Book Reviews

Toxic Watch 1995, compiled and published by Inform, Inc., 120 Wall street, 16th floor, New York, NY 10005-4001, 1995, 522 pages plus approx. 400 pages of appendices, US$ 125

The issue of many toxic chemical regulations, some complex, in the past 30 years, have been organized and explained.

Toxic Watch 1995 (introduction 12 pages) reviews environmental toxins during the past century. The book reminds us of the problems related to the use of major industrial toxic chemicals. Synthetic chemicals, whose growth began in the 1940s, now involve 200,000 facilities in the US alone. Over 72,000 (of the known 13,000,000, which are increasing at the rate of 685,000 per year), are in commerce. Over 24,000 manufacturing plants produce the 340 toxic chemicals that make them subject to federal reporting requirements, and at least 38 billion pounds of these were produced in 1992.

Conventional "toxic" common chemicals, smokes with CO, SO_x, smog, BOD in water, and pH in water, are not discussed in detail. Rather, the toxic chemicals in this book are those found in many governmental toxics chemical lists. Special attention is given to the halogen compounds containing the four, including the widely-discussed CFC compounds.

The main thrusts of the book is what are major causes of environmental toxic contamination by industrial chemicals; how they move in commerce, and disposal; what information does the major databases provide about waste generation, pollution prevention, and waste management.

Chapter 2, Tracking the Source of Environmental Toxics (58 pages), discusses the attempts to control by regulations since the Clean Air Act, the Clean Water and Safe Drinking Water Acts, the Federal Insecticide, Fungicide and Rodenticide Act, Resource Conversion and Recovery Act, and the Toxic Substances Act, starting in the 1970s. Often called "end-of-the-pipe" programs, the original intent was to monitor and eventually control by understanding the release of toxic substances to the air, water and land. Gradually, we have learned that progressive action must be taken, such as the Montreal Protocol, which sets an accelerated timetable for reduction or elimination of compounds containing the halogens, due to their effect on the ozone in upper atmosphere by producing a "hole" in the ozone layer. Lead is another chemical whose effect, especially on young children (age 1 to 5 years) is important, since 1.7 million American children have elevated blood levels. The problem dates back some 5 thousand years, since lead may have contributed to the decline of the Roman Empire. Final action to replace lead tetraethyl from gasoline in the US will be

on 1 January 1996, but discussion is still underway (as of mid-1995) what will replace lead as an additive. Toxic chemicals in air, as well as carcinogens in outdoor air are still high on the agenda for future action. Emissions from use of commercial products indite 54 to 90% of the cancer causes are from airborne pollution.

Chapter 3, Toxics in Commerce (63 pages), is devoted to the movement of chemicals, and stresses that 10 elements account for 99.2% of all matter. In the human body, oxygen, carbon, hydrogen and nitrogen are in the greatest percentage, followed by nitrogen, phosphorus, potassium, sulfur and sodium with a few others in smaller amounts. No clear picture of US chemical production or use is available since EPA respects claims to confidentially, withholding data from the public. The same properties that make a chemical attractive for commerce are often the same properties giving environmental concerns. Carbon, oxygen and hydrogen compounds are often called "organic". Some of the properties that make a chemical attractive for commercial use produce concerns for environmental issues. The 100 non-confidential chemicals are tabulated by production amounts in 1989.

Chapter 4, Toxics in Waste: Overview and Key Facilities (65 pages), gives priority to pollution. The Pollution Prevention Act of 1990 (PPA) gives priority to prevention of pollution or by reducing waste at its source. Recycling, energy recovery, and treatment are options for management of toxic waste. Release of data from the Toxic Release Inventory (TRI) and the biennial reporting systems of RCRA, known as BRS, are noted in detail. Air, surface water, underground injection, and on-site land releases are presented with change of each in 1988–1992. The 50 facilities with the largest 1991 toxic waste generation are tabulated.

Chapter 5, Chemicals in Waste (56 pages), analyzes waste profiles and composition where, in 1992, TRI facilities reported a total of 37.3 billion pounds waste containing 272 of the 336 TRI chemicals.

Chapter 6, Toxics in Waste by Industry (44 pages), discusses that since 1986, major chemical producers and the CMA have been dedicated to responsible care, with source reduction, recycling, and reuse, and treatment where necessary to achieve the goal of reduction. As in other chapters, extensive tabulation is given.

Chapter 7, Geography and Waste (30 pages), deals with the air, water, and land contamination. 53 chemicals are listed as having been carefully evaluated for both environmental and human harm, each with its CAS number.

Chapter 8, Toxics in the Environment (29 pages), notes that measurement of toxics in the environment are more closely associated with human and ecosystem exposures and risk than data on environmental releases of chemicals in waste. The source of the data from stations that sample air, as well as 800,000 sampling sites on 14,000 water quality parameters, but no national database exists for land contamination.

Chapter 9, Environmental Justice (43 pages), emerged in the late 1960 and many agree with the concept, although specific cases are widely discussed.

Chapter 10, State Data Databases in New Jersey and Massachusetts (75 pages), records how these two states collect and use information that goes beyond that required by the Federal TRI inventory.

Chapter 11, Tackling Industrial Toxic Waste Through Voluntary Action (31 pages), discusses the EPA 33/50 program aiming at reducing toxic chemical pollution

through voluntary direct action by industry. Reports on 17 chemicals are used to measure improvement in toxic chemical management. Note also Appendix P for further data.

In conclusion, the book is a very valuable guide to the whole scene where toxic chemicals are concerned or considered. The publisher promises another edition in 1997; we look forward to it with much interest.

HOWARD FAWCETT

Practical Handbook of Ground-Water Monitoring, by D.M. Nielson (Ed.), Lewis Publishers, 1991, 715 pp., US$ 99.00, ISBN 0-87371-124-6

This book truly lives up to its title and more as a comprehensive handbook on most aspects of ground-water monitoring. The 15 chapters are well organized and cut across the different circumstances under which monitoring may be required. As a consequence, the book gives a well rounded perspective on technical issues. Each chapter is written by an expert or team of experts with hands-on, practical experience.

The book begins with a review of the requirements in different regulatory programs that give rise to the need for monitoring ground water systems. The second chapter is an extensive treatise on the design of ground-water monitoring systems. It contains numerous examples of different geologic settings and varying contaminant scenarios which will affect the nature of an optimal design. As such, the text promises to be a handy look-up reference.

Chapter 3 contains a brief discussion of the philosophy and purpose of site investigations as relates to environmental restoration programs. This is followed by a very quantitative chapter on technology for monitoring the vadose zone which describes the basic phenomena that dictate water and contaminant movement in the vadose zone and the methods available for measuring that movement. The fifth chapter discusses the nature and utility of technical approaches to remote sensing and geophysical surveys. Guidance is provided to help select the best technique for a given task. Chapter 6 contains a discussion of drilling technology and soil sampling/characterization techniques. A practical guide is included to aid in the selection of the best drilling technology for a particular application.

Chapter 7 addresses the design of monitoring wells themselves and the selection of materials of construction. The eighth chapter provides information on post construction considerations such as well development, surveying maintenance, rehabilitation and abandonment, while the ninth chapter is a treatise on the collection and interpretation of water level measurements. Chapter 10 provides definitions of important aquifer properties and a description of methods and procedures for measuring the same. It is followed by chapters on water sample collection and sample analysis that summarize available methods and indicate proper approaches to sample program design. The thirteenth chapter is directed to a discussion of the organization and evaluation of water quality data. The final two chapters cover health and safety