

compressed gases are used in large quantities and wide variety in laboratories and production units.

Gases reviewed range from hydrogen to silane, and cover the wide spectrum of prudent handling and use. The program is very practical and "down-to-earth" in its approach. Each video tape (whose production reflects high professional standards) is accompanied by a written curriculum outline and instruction manual, suitable for use by professors, management, and supervisors in conducting training courses.

This reviewer was especially impressed by modules I and II, which ideally should be part of the training and orientation of all graduate students and industrial research workers who use or are exposed to compressed or cryogenic gases. The hazards of several gases are discussed in a "no-nonsense" manner that should appeal to anyone interested in safe use of gases. Modules III and IV are more oriented to management and the procedures and hardware aspects. Frequent mention is made of the Compressed Gas Association, the National Fire Protection Association, the National Electrical Code, and the American National Standards Institute – of whom all have important inputs.

If a program such as this could be incorporated into graduate courses, as well as industry training as required now under OSHA Hazard Communication Rule and the reporting aspects of Title III of PL 99-499, as well as for the forthcoming OSHA laboratory regulations, the cause of safety would be greatly advanced.

It is hoped that increased distribution of the program will result in lower prices for the modules. The course is an excellent education achievement.

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Ground Water Quality Protection, by Larry W. Canter, Robert C. Knox and Deborah M. Fairchild, Lewis Publishers, Inc., 121 South Main Street, Chelsea, MI 48118, U.S.A., 1987, ISBN 0-87371-018-5, 562 pages, \$54.95.

This book summarizes a broad body of knowledge on methods and strategies for investigating ground water quality. Only in the final two of the book's eleven chapters do the protection and management of groundwater come into focus. Prior to selecting management strategies and protection technologies, however, engineers and regulators must understand a broad spectrum of factors. The strength of this book is its comprehensive listing of technical issues and critical questions that must be dealt with prior to selecting and implementing remedial steps to protect groundwater. Any ground-water professional will find this reference useful for reviewing material outside one's area of specialization.

Selected references at the end of each chapter can guide further research if detailed information is necessary.

As in *Ground Water Pollution Control*, the authors combine technical information with how such data are needed for making decisions. The main advantage of this over their previous book is the clear and comprehensive outline of specific data needs. Material covered is too broad for use as a textbook, in my opinion, but a number of courses could be taught by expanding on material any one of several chapters.

Chapters 1 and 2 outline groundwater use in the United States and ground water hydrology, respectively. Aquifer tests are discussed in quantitative terms with sufficient detail to explain concepts without attempting to provide the equations for all possible configurations. Chapter 3 consists mainly of tables listing addresses of organizations and institutions cited as sources of ground water information. Some of these addresses may lack sufficient detail ("Oklahoma State University, Stillwater, Oklahoma 74074") to direct an inquiry to appropriate persons and the lists are by no means complete. It is, however, a good beginning.

Chapter 4 deals with sources of ground water pollution. Tables are used to effectively summarize information published by the Office of Technology Assessment. Septic tanks, agricultural activities and other common (and often underrated) potential pollution sources are also discussed. Selected histories illustrate pollution caused by a number of different source types. Chapter 5 discusses processes that modify contaminants as they move with ground water. Many of the 141 references listed at the end of this chapter are briefly summarized in tables. Considerable attention is paid to pesticides and to factors influencing movement of agricultural chemicals through soil.

Chapter 6 on modeling flow and solute transport is perhaps the least satisfactory chapter of the book. Partial differential equations governing such flow are written but there is insufficient room to really discuss how solutions are obtained. Case histories and examples of how models have been used to resolve specific problems are well chosen and informative. More space should have been devoted to discussing "Problems with Computer Models", the last topic of the chapter. This issue is of particular concern to me because of the weight granted by some regulators to computer output. Chapter 7 summarizes methods for prioritization of pollution investigations.

Chapters 8 and 9 outline essential elements of ground water monitoring: planning and analysis. Examples of statewide monitoring programs illustrate how data collection is planned to address specific concerns. Chapter 9 covers topics ranging from geophysical methods to selection of the appropriate drilling method and well casing. Tables listing advantages and disadvantages of numerous potential technologies or materials place a great deal of information in a very accessible format. Chapter 10 outlines aquifer restoration and protection technologies, again in tabular formats discussing advantages and dis-

advantages of many strategies. Brief summaries of results flesh out the discussion. Finally, Chapter 11 compares various federal, state and local programs for protecting ground water quality. A subject index appears adequate and useful. A detailed Table of Contents and List of Figures adds to the ease with which specific material can be rapidly found.

This book is packed with information. The authors have done an outstanding job of summarizing essential concepts from a broad variety of sources. References cited include some *Proceedings* papers and technical reports that may be difficult to obtain, but knowing the paper exists is often half the battle. As a reference, this book is essential to managers and regulators responsible for aquifer restoration, to students and scientists involved in ground water contamination studies, and to citizens who require technical information on ground water restoration technology.

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