- Dust monitors
- Personal air samplers, such as used in work place monitoring
- Passive dosimeters

Once the trainer had shown the various types of instruments, he then discussed the need for sampling and the order of use (i.e. radiation first, then other components). Topics discussed were: instrument failure, second instrument verification, relativity of readings (i.e. versus calibration gas) and decontamination (of both personnel and monitoring instruments). A technique used to protect instruments from contamination during sampling, which I had not seen before, was to wrap them in plastic (or plastic bags) with the plastic, of course, not covering the detecting sensor and the admonition to be aware of the potential for some instruments to overheat.

The second video film, entitled *Direct Reacting Instruments*, provides, according to the jacket, fundamental lessons about atmospheric sampling equipment used in emergency response, explaining instrument capabilities, how they work, calibration checks, basic use and interpretation of readings from:

- Combustible gas detectors
- Reaction monitors
- Survey instruments: flame ionization detectors and photoionization detectors
- Detector tubes
- Oxygen meters

As a chemical engineer who has spent much time in the laboratory with analytical equipment, I was keenly interested in the video cassettes' description of how the instruments work. To say the least, I was pleased with their treatment of the topic. Their descriptions were simplistic, but scientifically correct coupled with a good demonstration. I asked our local hazardous material response team to view the tapes. They were quite complimentary, but want to acquire all the instruments shown on the tape. Unfortunately, the Battalion Chief pointed out the cost to obtain all the instruments shown in the video was well beyond the department's budget.

GARY F. BENNETT

Cryogenics Safety Manual, third edition, by British Cryogenics Council, published by Butterworth–Heinemann, Oxford, or 80 Montvale Avenue, Stoneham, MA, 1991, ISBN 0-7506-0225-2, 105 pp., £20/$54.95.

Cryogenic fluids are substances normally manufactured, stored, used, handled or processed at temperatures at or below minus 85 °C (188 K). In practice,

they may be produced on the spot from chemicals of known purity, or purchased in large quantities in special liquid containers, pipelines, rail, road or tanker ships. Eleven cryogens are discussed ranging from very light (hydrogen and helium) to xenon.

Chapter 1 presents general safety requirements in making, using, and disposal of cryogenics. Four of the eleven have serious fire/explosion potential (namely, hydrogen, methane, ethane and ethylene), a reality which must be carefully controlled. All eleven have the ability to introduce serious contact hazards of skin and eyes. Safety control procedures for all include treatment of cryogenic burns, anoxia, precautions when working in confined spaces (including rescue and first-aid), appropriate warning signs, toxicity (low except in the case of carbon monoxide), thermal burns from the substances which are flammable, hypothermia, safety devices and instruments, with emergency control, toughness of materials which may be considerably reduced, overpressure and safety work permits.

Chapter 2 covers oxygen, nitrogen and argon. Oxygen is especially critical with respect to ignition or adding intensity to fire, and information such as the list which is provided deserves special attention in this regard. Oil-lubricated compressors in nitrogen or oxygen-service should not be switched to compressing air without a thorough cleaning. It is also noted that ambient air will condense into liquid nitrogen, producing an unexpected hazard.

In Chapter 3, similar detailed treatment is given to natural gas, ethylene and ethane.

Chapter 4 deals with the high energy fuel, hydrogen, which when mixed with air or other oxidizers produces large amounts of energy. Small leaks have been known to ignite spontaneously (reverse of Joule–Thompson).

Chapter 5 on helium and other relatively rare gases, notes the specific properties of these cryogenics in detail.

This is an excellent volume, with many pictures, charts and tables. A well-organized index concludes the work. It is recommended to anyone making, using, shipping or storing any cryogen.

HOWARD H. FAWCETT

Principles of Environmental Toxicology, by S.F. Zakrzewaki, American Chemical Society, Washington, D.C., 1991, 240 pp. (hard cover), ISBN 0-8412-2125-1, $59.95; (paperback) ISBN 0-8412-2170-7, $44.95.

As the title indicates, this book is slanted toward the environment. None the less, the first five chapters do provide the essentials for an elementary course in toxicology. Various pharmacological concepts are reviewed, while metabo-