NOTICE: THIS MATERIAL MAY BE PROTECTED BY COPYRIGHT LAW (TITLE 17, U.S. CODE)

PLAINTIFF'S EXHIBIT 1587

COMMENTARY

Benzene and Leukemia

Key words: benzene, leukemia, risk assessment, regulation, occupational disease

The question of whether to regulate and at what level of certainty is perennial in occupational health [Robins *et* al, 1985]. Advocates of aggressive regulatory intervention point to John Snow's triumph in halting the London cholera epidemic by removing the handle of the Broad Street pump more than three decades before discovery of the Vibrio *cholerae.* Proponents of a more cautious approach cite scientific prudence, the risk of provoking unnecessary anxiety, costs, and the undoubted benefits to modern life of the chemical revolution as base!! for their position.

These are serious issues. They embody profoundly differing views of the nature of science [McNeil and Parker, 19841. Not surprisingly, regulators and members of the judiciary, particularly the large majorities of those bodies not formally trained in science, approach them with trepidation.

Unfortunately, regulatory delay, as much or more than regulation itself, may be costly. Regulators and the courts should be wary of the argument that a chemical is innocent until proven guilty [Wilson et al, 1985]. Also they must come to appreciate the difference between a "negative" study, which truly exonerates a chemical from suspicion of hazard, and an inconclusive study. The proper verdict in the latter instance is "not proven," rather than "innocent" [Hernberg, 1983].

In the case of benzene, data recently generated by the National Institute for Occupational Safety and Health indicate that the risk of death from leukemia is elevated approximately 150 times above background in workers exposed for a 40-year working lifetime at the current legally enforceable standard of 10 parts per million (ppm) [Rinsky et al, 1987]. The risk of leukemia from lifetime exposure at 5 ppm is approximately 12 times above background. At 1 ppm, the standard proposed by the Occupational Safety and Health Administration in 1977, but overturned by the Supreme Court, a doubling of risk is evident. In the decade since the Supreme Court decision on benzene, many thousands of workers in the United States have been

Accepted for publication January 5, 1987.

© 1987 Alan R. Liss, Inc.

This document was delivered via the digital fax services of the Utah Education Network

exposed to benzene at levels between 1 and 10 ppm [OSHA, 1985]. For several hundred of these men and women the cost of regulatory delay will be *death.*

Philip J. Landrigan, MD, MSc,
Director, Division of Environmental and Occupational Medicine,
Mt. Sinai School of Medicine,
New York, NY 10029

REFERENCES

Hernberg S (1983): Fact and fiction in occupational epidemiology - The Lucas Lecture 1982. J Roy Coll Phys London 17: 139-143.

McNeil BJ, Pauker SG *(1984):* Decision analysis *for* public health: Principles and illustrations. Ann Rev Public Health 5:135-161.

Occupational Safety and Health Administration, U.S. Department of tabor (1985): Occupational exposure to benzene: Proposed rule and notice of hearing. Federal Register 50:50512-50586.

Rinsky RD, Smith AB, Hornung R, Filloon TG, Young RJ, Okun AH, Landrigan PJ (1987): Benzene and leukemia: an epidemiologic risk assessment. New Engl J Med 316:1124-1131.

Robins JM, Landrigan PJ, Robins TG, Fine LJ (1985): Decision-making under uncertainty in the setting of environmental health regulations. J Public Health Policy 3:322-328.

Wilson R, Crouch E, Zeise L (1985): Uncertainty in risk assessment. In Banbury Report 19: Risk Quantitation and Regulatory Policy. Cold Spring Harbor, NY: Cold Spring Harbor Laboratory.