QUANTIFYING TRACE BENZENE EXPOSURE

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INTRODUCTION

In a trace benzene case the plaintiff is unlikely to have worked with benzene or any products identifying benzene as an ingredient. Rather the plaintiff is likely to have used products such as paints, thinners, degreasers, turpentine, lubricants, penetrating oils, etc. Although these products do not contain benzene, they may contain aromatic hydrocarbons such as toluene, xylene, naphtha, and mineral spirits, none of which are carcinogens. Nevertheless, at trial all you will hear is testimony that these raw materials contain benzene, a carcinogen know to cause acute myelogenous leukemia (and argued by plaintiffs to cause other diseases including all leukemias, lymphomas, and myelomas).

One important aspect of defending these cases is to show a lack of causation. In order to do this, counsel must show that the plaintiff was not exposed to sufficient benzene to have caused his disease. However, in these case, there is unlikely to be any contemporaneous monitoring records of the plaintiff's benzene exposure. Thus the challenge is to find a surrogate for actual monitoring data.

There are two aspects to this: demonstrating the products and raw materials used in the products contained very low levels of benzene and demonstrating that products with such low levels do not generate sufficient level of airborne or dermal benzene exposure.

OSHA REGULATORY HISTORY

1970 Congress enacts Occupational Safety & Health Act
- Adopted industry standards as PEL
- OSHA PEL for benzene of 10 ppm 8 hr TWA

1977 OSHA promulgates Temporary Emergency Standard for Benzene
- PEL for benzene of 1 ppm 8 hr TWA
- Exclusion for liquid mixtures containing less than 0.1% benzene
- Standard stayed by court challenge

1978 OSHA promulgates Benzene Standard
- PEL for benzene of 1 ppm 8 hr TWA
- initially no de minimis exclusion, amended to exclude liquid mixtures containing less than 0.1% benzene
- Standard stayed by court challenge, and eventually permanently enjoined by Supreme Court

1983 OSHA promulgates Hazard Communications Standard (effective 1985)
- Requires warning for all carcinogens, including those in mixtures
- Exclusion for liquid mixtures containing less than 0.1% carcinogen

1987 OSHA promulgates Benzene Standard (same standard as 1978)
- PEL for benzene of 1 ppm 8 hr TWA
- Exclusion for liquid mixtures containing less than 0.1% benzene

DEMONSTRATING LOW LEVELS OF BENZENE CONTENT

- quality certifications from suppliers
- random sampling of raw material shipments to determine compliance with specifications
- raw material specifications imposed on suppliers
- raw materials specifications provided by suppliers
- material safety data sheets
- Evidence that the company and/or suppliers undertook efforts to ensure low benzene content in its products and raw materials used
- Evidence that the company and/or suppliers complied with the 0.1% limitation in the 1978 Benzene Standard, even though the standard was enjoined
- Evidence that the company and/or suppliers complied with the 0.1% limitation in the 1983 Hazard Communication Standard
- Evidence that the company and/or suppliers complied with the 0.1% limitation in the 1987 Benzene Standard

DEMONSTRATING LOW LEVELS OF AIRBORNE CONCENTRATIONS

OSHA has examined potential exposures:

- Federal Register: Occupational Exposure to Benzene, Final Rule, 52 F.R. 34460, 34461 (September 11, 1987)

  Record evidence indicates that liquid mixtures with less than 0.1 percent benzene are unlikely to cause exposures through dermal absorption and inhalation equivalent to the amount inhaled at the action level. [The "action level" was an eight hour time weighted average airborne concentration of 0.5 ppm. 29 C.F.R. § 1910.1028(a)(3)(b).]

Various studies in the open literature have measured airborne concentrations:

- Caldwell, et al, Hydrocarbon Solvent Exposure Data: Compilation and Analysis of the Literature, AIHAJ 61:881-894 (2000)
- Nelson, et al, Historical Characterization of Exposure to Mixed Solvents for an Epidemiologic Study of Automotive Assembly Plant Workers, Appl. Occup. Environ. Hyg. 8(8):693-702 (1993)
- Winder and Turner, Solvent Exposure and Related Work Practices Amongst Apprentice Spray Painters in Automotive Body Repair Workshops, Ann. Occ. Hyg., 36:385-394 (1992)
- Chen, et al, Exposure to mixtures of solvents among paint workers and biochemical alterations of liver function, Br. J. Indus. Med., 48:696-701 (1991)
- Medinilla and Espigares, Contamination by Organic Solvents in Auto Paint Shops, Ann. Occ. Hyg., 32:509-513 (1988)
- Jayjock and Levin, Health Hazards in a Small Automotive Body Repair Shop, Ann. Occ. Hyg., 28:19-29 (1984)
- Wallace, Major Sources of Benzene Exposure, Env. Health Persp., 82:165-169 (1989)

CAUTION: Some studies from foreign countries may show higher levels due to higher levels of benzene in the products than is found in the United States and/or workplaces conditions such as inadequately ventilated paint booths that do not rise to standards used in the United States

Special Monitoring set up in shops and work places to determine airborne exposures:

- New Hampshire Auto Dealers Association, Worker Exposure to Volatile Aliphatic and Aromatic Hydrocarbons in Eight Auto body paint shops in New Hampshire, 1987

- NIOSH Health Hazard Evaluation Report: HETA #2002-0418-2912, Richards Industries, Cincinnati, Ohio, September 2003

- NIOSH Health Hazard Evaluation Report: HETA 91-0341-2380, Bryan Custom Plastics, Bryan, Ohio, January 1994

- OSHA Inspection Number 102475225, Superior Auto Body, Inc., Eau Claire, Wisconsin, October 1991

- Some companies have performed special studies, usually at an operating facility, to determine airborne exposures