

Memorandum

To : Steven A. Book, Ph.D., Chief
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714 P Street, Room 460
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Date : November 5, 1990

Subject: Risk Specific Intake
Level for Vinyl Chloride

Via : Richard J. Jackson, M.D., M.P.H., Chief
Hazard Identification and Risk
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From : Reproductive and Cancer
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8/571-2084

Vinyl chloride was listed on February 27, 1987 as a chemical known to the State to cause cancer under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65; California Health and Safety Code 25249.5 et seq.). This memorandum is written to recommend for the purposes of Proposition 65 a risk specific intake level (associated with a 10^{-5} risk of cancer) for vinyl chloride.

In October 1990, the California Department of Health Services' (DHS) Air Toxicology and Epidemiology Section published *The Health Effects of Airborne Vinyl Chloride* (Attachment I), which presents an assessment of the cancer risks from inhalation of vinyl chloride and recommends that it be identified as a toxic air contaminant. The earlier drafts of the DHS report received wide distribution and review by the public. The final report was approved in October, 1990 by the California Air Resources Board's (ARB) statutory Scientific Review Panel (SRP). In addition, DHS assessed the ingestion risks of vinyl chloride in developing a drinking water standard as part of its Maximum Contaminant Level program (Attachment II). The water standard was subject to public review and comment prior to its adoption.

In its analyses, DHS derived cancer potency and unit risk values by fitting the multistage models to dose response data from epidemiologic studies and animal cancer bioassays; analyses included adjustments for uptake and metabolism.

Unit risk values estimated from the animal inhalation bioassay data fell in the range 3.7×10^{-5} to 20×10^{-5} per ppb. The estimates from the occupational study with the best dose-response data were 2.5×10^{-5} per ppb for liver cancers and 4.5×10^{-5} per ppb for several sites combined. If the ratio of male to female unit risk from the human data follows that seen for the rat, the unit risk calculated from the human data (all tumors combined) corresponds to 14×10^{-5} per ppb.

Based on this analysis, DHS recommends that the value 20×10^{-5} per ppb be used in estimating risks from inhaling low levels of vinyl chloride. The DHS

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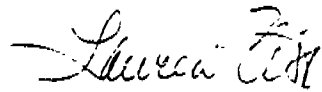
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unit risk for inhalation is equivalent to a cancer potency value of 0.27 per mg/kg-d. This estimate applies to both the inhalation and ingestion routes of exposure because 1) the uptake by either route is estimated to be the same - 40%; and 2) it is also consistent with the values found by analyzing the bioassay data on animals exposed orally to vinyl chloride.

Thus, we recommend a potency value of $0.27 \text{ (mg/kg-d)}^{-1}$ be used to estimate the risks of vinyl chloride for the purposes of Proposition 65. For this potency value, the intake associated with a 10^{-5} risk of cancer is 3 μg per day.



Lauren Zeise, Ph.D.
Acting Chief

Attachments

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