



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

July 19, 1988

OFFICE OF
THE ADMINISTRATOR
SAB-EHC-88-033

Honorable Lee. M Thomas
Administrator
U. S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Subject: Science Advisory Board's review of the ETHYLBENZENE
health criteria document

Dear Mr. Thomas:

The Drinking Water Subcommittee of the Science Advisory Board's Environmental Health Committee has completed its review of the Drinking Water Health Criteria Document for Ethylbenzene dated March 1987. The review was conducted February 4-5, 1988, at the Washington Circle Hotel in Washington, D.C.

The Subcommittee made the following conclusions and recommendations concerning this document on ethylbenzene:

- although it has some drawbacks, the Wolf et al study is acceptable in calculating a DWEL;

- since the proposed DWEL is greater than the odor threshold and the taste threshold a secondary standard should be set for ethylbenzene;

- further research is needed regarding interaction with other toxic substances such as acrylonitrile and xylene;

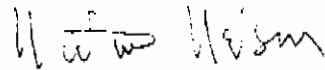
- classifying ethylbenzene as D on the weight of evidence scale is sound; and

- the exposure section is incomplete and misleading. A more detailed discussion of these points is attached.

Additional chapter-specific comments have already been forwarded from individual members to the Office of Drinking Water.

We appreciate the opportunity to conduct this particular scientific review. We request that the Agency formally respond to the scientific advice provided here.

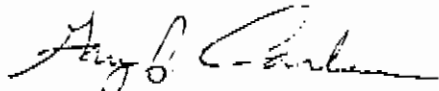
Sincerely,



Norton Nelson, Chairman
Executive Committee



Richard A. Griesemer, Chairman
Environmental Health Committee



Gary P. Carlson, Chairman
Drinking Water Subcommittee

SUBJECT: SCIENCE ADVISORY BOARD'S REVIEW OF THE ETHYLBENZENE
HEALTH CRITERIA DOCUMENT

SCIENCE ADVISORY BOARD COMMITTEE: DRINKING WATER SUBCOMMITTEE OF
THE ENVIRONMENTAL HEALTH COMMITTEE

DATE OF REVIEW: FEBRUARY 4-5, 1988

PLACE OF REVIEW: WASHINGTON CIRCLE HOTEL, WASHINGTON, D.C.

The Criteria Document for Ethylbenzene ("EB") is a clear improvement over the previously reviewed Health Advisory ("HA"). Previous suggestions have been incorporated. The overall inclusion of currently available and updated information regarding uses, metabolism, level of exposure, general toxicology and environmental impact helps to support the assessment of the HA's Drinking Water Equivalent Level ("DWEL") and carcinogenicity weight of evidence developed in the document. EB is a fugitive compound in petroleum gasoline and gasoline products and is a contaminant in ambient air (including tobacco smoke). Industrial exposure occurs in production of petroleum products and especially in the production of styrene for which it is a chemical intermediate. It is considered a sentinel compound for xylene, which can have as high as 20% EB in technical grade. This relationship between ethylbenzene and xylene is generally well stated throughout the document.

The basic issue concerning the calculation of the DWEL is whether the subchronic study of Wolf et al (1956) using rats given four dose levels of EB orally in olive oil over a six month period should be used. The only other available data were from abstracts of incompletely reported studies of questionable reliability. The Wolf et al study has some uncertainties, such as the usefulness of data derived from bolus administration in olive oil, and incomplete toxicological profiling in that only liver, blood and kidneys were examined. The study did establish a dose response effect and a no observed effect level (NOEL) of 136 mg/kg/day. Subsequent evidence has indicated the relatively rapid metabolism of ethylbenzene in humans to nontoxic intermediates or metabolites. The chemical does not bioaccumulate, is not in itself embryo or fetotoxic, is not mutagenic and does not cause chromosomal damage where tested. On the basis of these data the Subcommittee concurs that the Wolf et al study should be used in calculating a DWEL for EB.

As with similar compounds, such as xylene, the DWEL is greater than the odor or taste threshold. (DWEL is 3.4 mg/ml, odor threshold is 0.2 mg/L and taste threshold is 0.1 mg/L) The USEPA has set the ambient water quality level at 1.4 mg/L. We recommend that the USEPA consider establishing a secondary standard for EB based on odor and taste. The 10 day Health Advisory has been derived by dividing the 1 day HA by 10 and not on the basis of any direct data. The one day HA is based on the somewhat soft data from the eight hour inhalation study of

Bardodej and Bardodejova (1970). The toxicokinetics are suggestive, but not proof, that metabolism may have a limiting effect on toxicity.

It is recognized that there are limited experimental data to establish the toxicity of EB. This does not negate the possibility of its having harmful effects when it is involved with interactions with other chemicals, such as EB's potentiating acrylonitrile mortality in rats and increasing teratogenic effects in a xylene mixture. The Subcommittee recommends future research regarding ethylbenzene's teratogenic potential and its interaction in mixtures.

The Subcommittee agrees with the rating of D, not classified as a human carcinogen, because of the lack of data. The Subcommittee notes that the NIEHS started a 90 day bioassay study using ethylbenzene on April 1, 1988. It will be followed by a two year chronic study.

The exposure section does examine all potential routes of exposure. Table IV-1, however, is misleading and should be revised. The average ambient air and personal air concentrations are significantly lower than the high exposure levels. If the table included average exposure levels for rural/remote, urban/suburban, and source-dominated areas, a more representative description of exposure would be presented. Additional data are available on EB's occurrence in drinking water and food which should be included in this section--see the following papers; Otsen, R., D.T. Williams and P.D. Bothwell (1982) Volatile Organic Compounds in Water at Thirty Canadian Potable Water Treatment Facilities, J. Assoc. Off. Anal. Chem., 65:1370-1374 and Min, D.B.S., K. Ina, R. J. Peterson and S.S. Chang (1979), Preliminary Identification of Volatile Flavor Compounds in the Neutral Fraction of Waste Beef, J. Food. Sci., 44:639-642.

U.S. Environmental Protection Agency
Science Advisory Board
Drinking Water Subcommittee

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