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

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August 7, 1989

OFFICE OF
THE ADMINISTRATOR

Honorable William K. Reilly
Administrator
U.S. Environmental Protection Agency
401 M Street, S.W.
Washington, D.C. 20460

Subject: Science Advisory Board's review of scientific documents involved in the regulation by the Office of Drinking Water of hexachlorocyclopentadiene and 1,1,2-trichloroethane

Dear Mr. Reilly,

The Halogenated Organics Subcommittee of the Science Advisory Board's Environmenal Health Committee has completed its review of the scientific background documents involved in the regulation by the Office of Drinking Water of hexachlorocyclopentadiene and 1,1,2-trichloroethane at it's meeting in Washington, D.C. May 17 1989.

The Subcommittee recommends that no drinking water standard for hexachlorocyclopentadiene be developed at the present time because exposure is extremely unlikely and the toxicology data base is minimal.

The Subcommittee agrees with the Office of Drinking Water's recommendation that the RfD for 1,1,2-trichloroethane of 0.004 mg/kg/day be accepted as the basis of the standard as it appears to be based on sound scientific data.

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

Sincerely,

Raymond C. Loehr

Raymond Loehr
Chairman, Executive Committee

Arthur R. Upton

Arthur Upton
Chairman
Environmental Health Committee

Martha Radike

Martha Radike
Vice-Chairman
Halogenated Organics
Subcommittee

REPORT ON HEALTH CRITERIA DOCUMENTS FOR HEXACHLOROCYCLOPENTADIENE AND 1,1,2-TRICHLOROETHANE BY THE HALOGENATED ORGANICS SUBCOMMITTEE OF EPA'S SCIENCE ADVISORY BOARD'S ENVIRONMENTAL HEALTH COMMITTEE

1.0 INTRODUCTION

The Halogenated Organics Subcommittee of EPA's Science Advisory Board's Environmental Health Committee met May 17, 1989 to review the scientific background documentation for promulgation of regulations by the Office of Drinking Water for hexachlorocyclopentadiene and 1,1,2-trichloroethane. This report covers the recommendations of the Subcommittee for both these compounds.

2.0 HEXACLOROCYCLOPENTADIENE

The Subcommittee recommends that no drinking water standard for hexachlorocyclopentadiene (abbreviated HEX in this report) be developed at the present time for two principal reasons:

1) exposure to HEX via drinking water is extremely unlikely;
2) the toxicology data base for HEX is minimal; the key citation on which the proposed standard is based appears flawed.

The Subcommittee seriously considered whether a drinking water standard for HEX is needed. First it was noted that the primary use of HEX has been as a precursor in the synthesis of chlorinated hydrocarbon insecticides. This use has decreased dramatically in recent years. Consequently, HEX is unlikely to be present in drinking water. If it were, it would appear only as a point source contaminant that undergoes rapid degradation. To our knowledge, HEX has never been detected in drinking water.

Second, some of the concentrations proposed for protection of humans from HEX toxicity exceed its water solubility limit. Third, the taste and odor threshold for HEX is much lower than concentrations that produce toxicity. This would serve to minimize consumption of HEX contaminated water. Exposure to HEX via drinking water is thus thought to be highly unlikely.

Review of the Drinking Water Criteria Document for HEX highlights the significant paucity of data, especially concerning acute, sub-chronic, and chronic toxic effects; toxicokinetics; biotransformation routes; and identification of biotransformation products. Additionally, substantial reliance has been placed on documents obtained from proprietary sources that have not been subject to peer review, and that are not widely available. This reliance has been necessitated by the lack of published data, but it significantly weakens the scientific basis of the proposed standards.

Several inconsistencies were noted in the Abdo et al. (1984) data on which derivation of the RfD for HEX is based. The Subcommittee recommends that the Southern Research Institute (SRI) (1981a,b) data be retrieved so that publication inconsistencies can

be resolved:

* the Abdo et al. (1984) abstract states that chemically induced deaths occurred at 150 and 300 mg/kg in rats; the abstract and data indicate that a 300 mg/kg dose was not administered to rats but to mice.

* discussion states that "the no observed toxic effect levels" of HEX were 19 mg/kg for male and female rats. The data indicate that 2 of 10 female rats given 19 mg/kg HEX developed stomach lesions (epithelial hyperplasia) and the same 2 female rats developed focal inflammation of the stomach. The 19 mg/kg dose in mice is a NOAEL.

* discussion states that "rats and female mice are approximately equally susceptible" to the toxic effects of HEX while the data given in the publication indicate that male rats and male and female mice are equally susceptible.

* it appears that the data for mice and rats are reversed in the tables.

The use of death, as opposed to clinical signs, as the basis for the NOAEL from the SRI (1980a) study with rats seems inappropriate for determination of the 1-day HA. At lower doses, the rats exhibited "ruffled fur" and "wet fur in the anal area." Since death is a relatively insensitive toxicity end point, a NOAEL of 150 mg/kg may be too high. Furthermore, an advisory level (i.e., 115 mg/l) greatly exceeding the water solubility level of the compound (i.e., 3.4 mg/l) appears unrealistic.

With regard to the 10-day HA, the SRI (1980b) study found inhibition of weight gain in treated rats of both sexes (8 and 11% for males and females, respectively) at the low dose (25 mg/kg/day), but it was chosen as the NOAEL. As it seems possible that there may have been no true NOAEL in this study, the rationale for use of the 25 mg/kg/day dose should be stated.

HEX is much less toxic by oral administration than by inhalation. This is probably because much of the toxicity of HEX is a local effect rather than a systemic effect. Therefore, since the National Toxicology Program (NTP) is presently completing a chronic inhalation study of HEX, the data from this study should be included in the final document to provide further information on HEX: these data probably should not be used to calculate safe levels for drinking water.

3.0 1,1,2-TRICHLOROETHANE

The committee recommends acceptance of the proposed RfD of 0.004 mg/kg/day based on the 90 day studies of White et al. (1985) and Sanders et al. (1985). The Subcommittee believes that the RfD is conservative since the health effects used as endpoints are of

questionable or minor toxicological significance.

There are a number of minor inconsistencies in the report which should be corrected. For example:

1) the metabolic scheme on page III-9 incorrectly names the first metabolic intermediate (it is not a chlorohydrin), mislabels the chloroacetyl chloride toxic intermediate as chloroacetaldehyde and incorrectly refers to the latter compound as the toxic agent in the text; the scheme should be titled the "metabolic pathway" not "oxidative pathway;"

2) there are several inconsistencies in the physicochemical properties summarized in Table II-1 in the Criteria Document (Final Draft, August, 1988) and in Table I-1 in the "Occurrence and Exposure Assessment of 1,1,2-TCE in Public Drinking Water Supplies" (July, 1988, Preliminary Draft) document.

U.S. Environmental Protection Agency
Science Advisory Board
Halogenated Organics Subcommittee
May 17, 1989

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