State of California
AIR RESOURCES BOARD

Resolution 89-53

July 13, 1989

Agenda Item No.: 89-13-3

WHEREAS, Section 39600 and 39601 of the Health and Safety Code authorize the Air Resources Board (the "Board") to do such acts and to adopt such regulations as may be necessary for the proper execution of the powers and duties granted to, and imposed upon, the Board by law;

WHEREAS, Chapter 3.5 (commencing with Section 39650) of Part 2 of Division 26 of the Health and Safety Code establishes procedures for the identification of toxic air contaminants by the Board;

WHEREAS, Section 39655 of the Health and Safety Code defines a "toxic air contaminant" as an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health;

WHEREAS, Section 39662 of the Health and Safety Code directs the Board to list, by regulation, substances determined to be toxic air contaminants, and to specify for each substance listed a threshold exposure level, if any, below which no significant adverse health effects are anticipated;

WHEREAS, in California, methylene chloride (dichloromethane, hereinafter "methylene chloride") is emitted from many activities including paint stripping, use of aerosols and degreasers, and the manufacture of polyurethane foam; and studies establish that methylene chloride will not break down in the atmosphere at a rate that would significantly reduce the resulting public exposure;

WHEREAS, pursuant to the request of the Board, the Department of Health Services (DHS) evaluated the health effects of methylene chloride in accordance with Section 39660 of the Health and Safety Code;

WHEREAS, DHS concluded in its evaluation that methylene chloride is an animal carcinogen and a potential human carcinogen; that health effects other than cancer are not expected to occur at existing or expected ambient levels of methylene chloride; that the unit risk from a lifetime continuous exposure to 0.29 ppb (1 ug/m^3) of methylene chloride ranges from 0.3×10^{-6} to 3×10^{-6}; and that the most likely estimate of the unit risk based on application of the PBPK model high-to-low dose adjustment, is 1×10^{-6} per (1 ug/m^3), which is equivalent to 4×10^{-6} per ppb;

WHEREAS, for the reasons set forth in its evaluation, DHS treats methylene chloride-induced carcinogenesis as a nonthreshold phenomenon, because there are several short-term studies suggesting that methylene chloride is mutagenic and because DHS found no evidence that there is a carcinogenic threshold level for methylene chloride;

WHEREAS, upon receipt of the DHS evaluation, staff of the Board prepared a report including and in consideration of the DHS evaluation and recommendations and in the form required by Section 39661 of the Health and Safety Code and, in accordance with the provisions of that section, made the report available to the public and submitted it for review to the Scientific Review Panel (SRP) established pursuant to Section 39670 of the Health and Safety Code;

WHEREAS, in accordance with Section 39661 of the Health and Safety Code, the SRP reviewed the staff report, including the scientific procedures and methods used to support the data in the report, the data itself, and the conclusions and assessments on which the report was based, considered the public comments received regarding the report, and on April 18, 1989, adopted for submittal to the Board findings which included the following:

1. Methylene chloride has been identified as an animal carcinogen and should be regarded as a potential human carcinogen.

2. Methylene chloride is emitted into the air by a variety of stationary sources in California.

3. Based on its gas-phase reactivity with hydroxyl radicals, methylene chloride has an atmospheric lifetime estimated to range from 80 to 250 days.

4. Approximately 20.3 million people in California are estimated to be exposed to a population-weighted mean methylene chloride concentration of 1.1 to 2.4 parts per billion.

5. Adverse health effects other than cancer are not known to occur at predicted concentrations of methylene chloride in ambient outdoor air.

6. Based on available scientific information, a methylene chloride exposure level below which carcinogenic effects are not expected to occur cannot be identified.

7. Based on an interpretation of available scientific evidence, DHS staff estimated risks using both the applied dose and a physiologically based pharmacokinetic model (PBPK). The range of lifetime excess cancer risk from exposure to 1 ppb (3.5 ug/m^3) of atmospheric methylene chloride based on the upper 95% confidence limit is from 9 x 10^{-8}/ppb (PBPK model without surface area correction) to 10 x 10^{-6}/ppb

(applied dose). This includes EPA's application of the PBPK model which would estimate a risk of 1×10^{-6}/ppb (with a surface area correction). DHS uses a PBPK model with a high-to-low dose adjustment which generates a risk of 4×10^{-6}/ppb, which, based on available data, is the most plausible estimate of the upper limit of risk. These upper bound excess lifetime risks are health-protective estimates; the actual risk may be below these values.

8. Exposure to the range of mean ambient concentrations (weighted by population) of 1.1 to 2.4 ppb for a population of 20.3 million people, could result in up to 2 to 500 excess lifetime cancers, based on the upper-bound of the 95 percent confidence interval of the models.

WHEREAS, the SRP found the staff report to be without serious deficiency, and the SRP agreed with the staff recommendation that methylene chloride should be listed by the Air Resources Board as a toxic air contaminant, and found that based on available scientific information, a methylene chloride exposure level below which carcinogenic effects are not expected to occur cannot be identified;

WHEREAS, the California Environmental Quality Act and Board regulations require that no project having significant adverse environmental impacts be adopted as originally proposed if feasible alternatives or mitigation measures are available;

WHEREAS, a public hearing and other administrative proceedings have been held in accordance with provisions of Chapter 3.5 (commencing with Section 11340), Part 1, Division 3, Title 2 of Government Code;

WHEREAS, in consideration of the staff report, including DHS' evaluation and recommendations, the available evidence, the findings of the SRP, and the written comments and public testimony it has received, the Board finds that;

Methylene chloride is an animal carcinogen and a potential human carcinogen;

Health effects other than cancer are not anticipated at existing or expected methylene chloride exposure levels in ambient outdoor air;

That DHS and the SRP agree that the most plausible estimate of the unit risk based on application of the PBPK model high-to-low dose adjustment, is 1×10^{-6} per (1 ug/m^3), which is equivalent to 4×10^{-6} per ppb;

There is not sufficient available scientific evidence to support the identification of a threshold exposure level for methylene chloride; Methylene chloride is an air pollutant which, because of its carcinogenicity, may cause or contribute to an increase in mortality

or an increase in serious illness, or which may pose a present or potential hazard to human health; and

WHEREAS, the Board has determined, pursuant to the requirements of the California Environmental Quality Act and Board regulations, that this regulatory action will have no significant adverse impact on the environment.

NOW, THEREFORE BE IT RESOLVED, that the Board adopts the proposed regulatory amendment to Section 93000, Titles 17 and 26, California Code of Regulations, as set forth in Attachment A.

I hereby certify that the above is a true and correct copy of Resolution 89-53, as adopted by the Air Resources Board.

Cary Allison, Board Secretary

Attachment A

Amend Titles 17 and 26, California Code of Regulations, Section 93000 to read as follows:

93000. Substances Identified as Toxic Air Contaminants. Each substance identified in this section has been determined by the state Board to be a toxic air contaminant as defined in Health and Safety Code Section 39655. If the state Board has found there to be a threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, that level is specified as the threshold determination. If the Board has found there to be no threshold exposure level below which no significant adverse health effects are anticipated from exposure to the identified substance, a determination of "no threshold" is specified. If the Board has found that there is not sufficient available scientific evidence to support the identification of a threshold exposure level, the "Threshold" column specified "None identified."

Substance	Threshold Determination
Benzene (C_6H_6)	None identified
Ethylene Dibromide ($BrCH_2CH_2Br$; 1,2-dibromoethane)	None identified
Ethylene Dichloride ($ClCH_2CH_2Cl$; 1,2-dichloroethane	None identified
Hexavalent Chromium (Cr(VI))	None identified
Asbestos [asbestiform varieties of serpentine (chrysotile) riebeckiate (crocidolite) cummingtonite-grunerite (amosite), tremolite, actinolite, and anthophyllite]	None identified

Dibenzo-p-dioxins and Dibenzofurans chlorinated in the 2,3,7 and 8 positions and containing 4,5,6,or 7 chlorine atoms	None identified
Cadmium (metallic cadmium and cadmium compounds)	None identified
Carbon Tetrachloride (CCl_4; tetrachloromethane)	None identified
Ethylene Oxide (1,2-epoxyethane)	None identified
Methylene Chloride (CH_2Cl_2, Dichloromethane)	None identified

NOTE: Authority cited: Sections 39600, 39601 and 39662, Health and Safety Code. Reference: Sections 39650, 39660, 39661 and 39662, Health and Safety Code.