State of California
AIR RESOURCES BOARD

Resolution 82-63

December 9, 1982

Agenda Item No.: 82-24-4
82-28-1

WHEREAS, Health and Safety Code Section 39601 requires the Air Resources Board (the "Board") to adopt rules and regulations necessary for the proper execution of the powers and duties granted to and imposed upon the state board;

WHEREAS, Health and Safety Code Section 39606(b) requires the Board to adopt standards of ambient air quality for the protection of the public health, safety and welfare, including but not limited to health, illness, irritation to the senses, aesthetic value, interference with visibility, and effects on the economy;

WHEREAS, Health and Safety Code Section 39606(b) provides that standards relating to health effects shall be based upon the recommendation of the State Department of Health Services;

WHEREAS, the current statewide ambient air quality standards for particulate matter of 100 ug/m^3 (24-hour average) and 60 ug/m^3 (annual geometric mean), set forth in Title 17, California Administrative Code, Section 70200, apply to all suspended particles regardless of size;

WHEREAS, the Board staff has proposed that air pollution control efforts be redirected to focus on the health-related size range of particulate matter, and that the current standards for particulate matter be redefined to apply only to "inhalable" particles, i.e., those particles less than 10 micrometers aerodynamic diameter (PM_{10});

WHEREAS, the Board has received and considered a recommendation from the Department of Health Services, dated October 15, 1982, for PM_{10} standards of 50 ug/m^3 24-hour average and 30 ug/m^3 annual geometric mean;

WHEREAS, the Board has held a duly-noticed public hearing at which it has received and considered a substantial body of evidence, both written and oral, presented to it by staff, other scientists, industry representatives, and other members of the public relating to the proposed amendment of the standard;

WHEREAS, the California Environmental Quality Act and Board regulations require that action not be taken as proposed if feasible mitigation measures or alternatives exist which would substantially reduce any significant adverse environmental effects of the proposed action; and

WHEREAS, the Board finds that:

The current ambient air quality standards for total suspended particulate matter are not related precisely to adverse health effects because they include a substantial and variable fraction of particles larger in size than is considered "inhalable" by humans;

Laboratory studies in both animals and humans demonstrate that inhaled particulate matter impairs lung function. Inhaled particulate matter can increase airway resistance and result in increased mortality in laboratory animals;

Human epidemiological studies demonstrate that exposure to inhalable particulate matter is associated with adverse health effects including increased risk of asthma attack, reduced pulmonary function in children, increased risk of respiratory illness in children, worsening condition in bronchitis patients, and increased mortality;

It is not now possible to identify precisely the level at which these adverse health effects occur and below which they do not occur in all segments of the population. Evidence shows increased mortality associated with concentrations of PM_{10} of 60 ug/m^3 and suggests adverse health effects at levels of 41 ug/m^3 or below;

A standard for particulate matter which specificially addresses the inhalable fraction of total suspended particles will provide greater protection to the public health than the present standard, which applies to all particles regardless of size. Morever, such a standard will ensure that control efforts will be directed to address inhalable particles;

A 24-hour standard of 50 ug/m^3 PM_{10} and of a 30 ug/m^3 PM_{10} annual geometric mean are necessary to protect the public health from both acute and chronic health effects;

The PM_{10} standards set forth above are reasonably equivalent to the current standards for total particulate matter of 100 ug/m^3 (24 hours) and 60 ug/m^3 (annual geometric mean) and are an expression of the current standards in a form more relevant to human health;

The availability of improved methods of measurement affords the opportunity to express a standard for inhalable particles;

Proven sampling methods, for example the dichotomous sampler and the high-volume sampler with size-selective inlet, for monitoring attainment of a thoracic (i.e., less than 10 micrometers aerodynamic diameter) particle standard with a 50 percent cut point at 10 micrometers aerodynamic diameter are available;

The U.S. Environmental Protection Agency is also establishing performance criteria for sampling methods for thoracic particle monitoring;

Natural sources of inhalable particles fall into two categories, controllable and uncontrollable, and natural sources which are uncontrollable may cause or contribute to exceedances of the 24-hour standard for PM_{10};

Both natural and anthropogenic sources contribute to ambient levels of inhalable suspended particles and particles of less than 10 micrometers aerodynamic diameter, regardless of origin in excess of the PM_{10} standards, are injurious to the public health;

The annual geometric mean standard for PM_{10} recommended by the Department of Health Services is an appropriate precautionary standard to protect the public health; and

The standards adopted by this resolution will have a beneficial effect on air quality and will have no adverse environmental impacts.

NOW, THEREFORE, BE IT RESOLVED that the Board hereby approves amendment of the regulations contained in Title 17, California Administrative Code, as set forth in Attachment A and directs the Executive Officer to adopt such amendments, and any other necessary conforming changes, after making them available to the public for at least fifteen days. It is the intent of the Board that the 24-hour PM_{10} standard and the annual PM_{10} standard be severable, and the validity or invalidity of one have no legal effect on the other.

BE IT FURTHER RESOLVED that the Board directs the staff to establish performance criteria for sampling equipment to collect suspended particulate matter 10 micrometers or less in aerodynamic diameter which shall be, to the maximum extent feasible, identical to the criteria established by the U.S. Environmental Protection Agency.

BE IT FURTHER RESOLVED that the Board directs the staff, in cooperation with the state's Air Monitoring Technical Advisory Committee and local districts, to determine PM_{10} levels in each of the state's air basins through a network of approved samplers. It is the intent of the Board that the most cost-effective means possible be utilized, including the modification of existing equipment and the use of available federal funds subsequent to EPA adoption of a PM_{10} standard.

BE IT FURTHER RESOLVED that the Board directs the staff, in cooperation with the local districts and the Air Monitoring Technical Advisory Committee, to develop uniform procedures for determining the relative contributions of emissions from "natural and uncontrollable" as opposed to "controllable" (both natural and anthropogenic) sources of PM_{10} and that the ARB staff and the districts shall consider such contributions to total PM_{10} concentrations when determining attainment and developing control strategies and specific control measures.

Attachment A

PROPOSED AMENDMENT TO TITLE 17, CALIFORNIA ADMINISTRATIVE CODE

Amend Section 70100(j), Title 17, California Administrative Code, to read as follows:

70100. Definitions.

(j) Suspended Particulate Matter. Suspended particulate matter refers to atmospheric particles, sold and liquid, except uncombined water. Atmospheric suspended particulate matter is to be measured by the high volume sampler method or by an equivalent method for purposes of determining total suspended particulate and by a PM_{10} sampler for purposes of monitoring for compliance with the Suspended Particulate Matter standard (PM_{10}).

Amend Section 70200, Title 17, California Administrative Code, to read as follows:

70200. Table of Standards, Applicable Statewide.

Substance	Concentration and Methods*	Duration of Averaging Periods	Most Relevant Effects	Comments
Oxidant (as ozone)	0.10 ppm ultraviolet photometry	1 hour	Aggravation of respiratory diseases	This level is below that associated with aggravation of respiratory diseases.
Carbon Monoxide	10 ppm NDIR	12 hours	2-2 1/2% COHb	This level is below those associated with impairment in time discrimination, visual function, and psychomotor performance.
	40 ppm NDIR	1 hour	2-2 1/2% COHb	
Carbon Monoxide (Applicable only in the Lake Tahoe Air Basin)	6 ppm NDIR	8 hours	Will increase COHb by 1-1 1/2%	At altitude the lowered oxygen tension leads to greater absorption of CO. Persons participating in strenuous recreational activities at higher altitudes are often unacclimated.
Sulfur Dioxide (SO_2)	0.5 ppm conductimetric method	1 hour	a. Approximate odor threshold. b. Possible alteration in lung function.	Alteration in lung function was found at this level in only one study. Other studies reported higher concentrations to cause this effect.
	0.05 ppm conductimetric method with oxidant, (ozone) equal to or greater than the state standard, or with suspended particulate matter equal to or greater than the state 24-hour suspended particulate matter standard.****	24 hours	a. Will help prevent respiratory disease in children b. Higher concentrations associated with excess mortality.	a. Further studies on cocarcinogenic role are necessary. b. Does not include effects on vegetation, ecosystems and materials. c. May not include a margin of safety.
Visibility Reducing Particles	In sufficient amount to reduce visibility*** to less than 10 miles when relative humidity is less than 70%	1 observation	Visibility impairment on days when relative humidity is less than 70%.	
Visibility Reducing Particles (Applicable only in Lake Tahoe Air Basin)	In sufficient amount to reduce the prevailing visibility*** to less than 30 miles when relative humidity is less than 70%	1 observation	Reduction in scenic quality on days when the relative humidity is less than 70%	

Suspended Particulate Matter (PM_{10})	~~60 µg/m3 high volume sampling~~	~~24 hour samples, annual geometric mean~~	~~Long continued exposure may be associated with increase in chronic respiratory disease.~~	~~This standard applies to suspended particulate matter in general. It is not intended to be a standard for toxic particles such as asbestos, lead, or beryllium. Because size distribution influences the effect of particulate matter on health, the standard will be reevaluated as data on health effects related to size distribution become available.~~
	~~100 µg/m3 high volume~~	~~24 hour sample~~	~~Exposure with SO_2 may produce acute illness.~~	
	50 µg/m3 PM_{10}**	24 hour sample	Prevention of excess deaths from short-term exposures and of exacerbation of symptoms in sensitive patients with respiratory disease. Prevention of excess seasonal declines in pulmonary function, especially in children.	This standard applies to suspended matter as measured by PM_{10} sampler, which collects 50% of all particles of 10 µm aerodynamic diameter and collects a declining fraction of particles as their diameter increases, reflecting the characteristic of lung deposition.
	30 µg/m3 PM_{10}**	24 hour samples, annual geometric mean		
Lead (Particulate)	1.5 µg/m3 AIHL Method No. 54, or equivalent	30 day average	Increased body burden, impairment of blood formation and nerve conduction	
Hydrogen Sulfide	0.03 ppm cadmium hydroxide STRactan Method	1 hour	Exceeds the odor threshold	
Nitrogen Dioxide	0.25 ppm, Saltzman	1 hour	a. At slightly higher dosage effects are observed in experimental animals, which imply a risk to the public health. b. Produces atmospheric discoloration.	
Sulfates	25 µg/m3 total sulfates, AIHL #61	24 hours	a. Decrease in ventilatory function b. Aggravation of asthmatic symptoms c. Aggravation of cardiopulmonary disease d. Vegetation damage e. Degradation of visibility f. Property damage	This standard is based on a Critical Harm Level, not a threshold value.

* Any equivalent procedure which can be shown to the satisfaction of the Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

** These standards are violated when concentrations exceed those set forth in the body of the regulation.

*** Prevailing visibility is defined as the greatest visibility which is attained or surpassed around at least half of the horizon circle, but not necessarily in continuous sectors.

****The standard referred to is that adopted by the Board in 1969, of 100 µg/m3 as measured by high volume sampler.

NOTE: Authority cited: Sections 39600, 39601(a), and 39606(b), Health and Safety Code. Reference: Sections ~~70200~~, 39014, 39606(b), 39701, and 39703(g), Health and Safety Code.

State of California

Memorandum

To : Gordon Van Vleck
Secretary
Resources Agency

Date : May 5, 1983

Subject: Filing of Notice of Decisions of the Air Resources Board

From : Harold Holmes
Board Secretary
Air Resources Board

Pursuant to Title 17, Section 60007 (b), and in compliance with Air Resources Board certification under section 21080.5 of the Public Resources Code, the Air Resources Board hereby forwards for posting the attached notice of decision and response to environmental comments raised during the comment period.

Attachments
Resolution 82-63
Resolution 83-4