

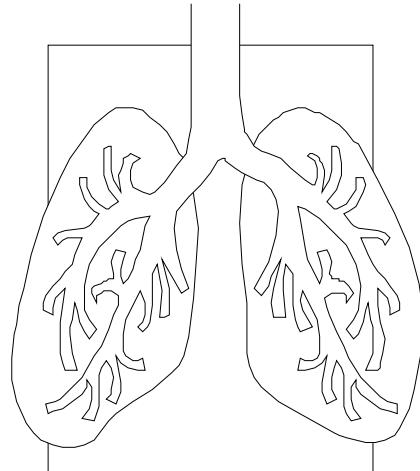
AIR QUALITY ELEMENT

4.7 INTRODUCTION

Overview of factors contributing to air pollution. One of the best ways to control air pollution is to develop transportation infrastructure and land use goals and policies which compliment and work in harmony towards air pollution control objectives. Air quality in the City of Arcata is regulated by the North Coast Unified Air Quality Management District (NCUAQMD). The NCUAQMD's primary responsibility is to achieve and maintain federal and state air quality standards. NCUAQMD currently meets all federal standards, but is classified as non-attainment (exceeds maximum limits) for California Ambient Air Quality Standards for airborne particles that are ten microns in diameter and smaller (PM-10).

Federal and state ambient air quality standards also include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Of these pollutants, motor vehicles are a major contributor of carbon monoxide, nitrogen dioxides, and ozone. While engine and fuel improvements have significantly reduced these emissions from motor vehicles, measures to reduce vehicle travel can further improve air quality from these pollutants.

Particulate matter includes a wide range of solid or liquid particles including smoke, dust, aerosols, and metallic oxides. Two significant sources of PM-10 include motor vehicle exhaust with its associated secondary reactions in the atmosphere related to exhaust gases, and wood-burning stoves/fireplaces. PM-10 emissions associated with motor vehicles include vehicle exhaust and tire and brake wear. However, most particulate releases from motor vehicles are a result of road dust suspension. For example, road dust comprises 77% (580 tons/year) of vehicle-related PM-10 releases in the Arcata/Eureka area. Because road dust sources cannot be controlled, reductions in vehicle use are needed to significantly reduce PM-10 emissions caused by suspended road dust.



Wood-burning stoves, fireplaces, and residential open waste burning are also a source of PM-10 emissions. Research on human health effects of PM-10 show a correlation between elevated PM-10 concentrations and aggravation of chronic illnesses and elevated mortality rates. Fine particulate matter can affect health more than larger particles because it can bypass respiratory filtration systems and lodge deep in the lungs¹.

Overview of Arcata's air quality. Air quality is affected by both emissions and

meteorological conditions. Arcata air quality is influenced by its coastal location and relatively stable temperatures are throughout the year. Temperatures average 50 degrees Fahrenheit, with a yearly average range of 40-60 degrees Fahrenheit. Prevailing winds are from the northwest in summer and southwest in the winter. During winter months moderate temperatures, frequent fog, and moderate to heavy precipitation cause inversions which impact air quality.

Arcata is within the northwestern most air district in the State, the NCUAQMD, which encompasses 7,100 square miles including the counties of Humboldt, Del Norte, and Trinity, and serves a population of nearly 170,000. The NCUAQMD presently meets all federal and state air quality standards, except for the state standard for particulate matter of ten microns and smaller (PM-10). The table below shows the federal and state PM-10 standards.

TABLE AQ-1 AMBIENT AIR QUALITY STANDARDS FOR PM-10 EMISSIONS

AVERAGING TIME	FEDERAL STANDARD	CALIFORNIA STANDARD
Annual Arithmetic Mean	50 ug/m ³	30 ug/m ³
24 Hour Average	150 ug/m ³	50 ug/m ³

Source: North Coast Unified Air Quality Management District Particulate Matter (PM10) Attainment Plan, Draft Report, 1995. ug/m³ = micrograms per cubic meter.

The NCUAQMD began measuring North Coast PM-10 concentrations in 1985. Of the total suspended particulates measured, PM-10 comprise approximately 60% of particulate matter. Table AQ-2 shows local PM-10 measurements.

TABLE AQ-2 PM-10 MEASUREMENTS IN THE ARCATA/EUREKA AREA

MONITORING LOCATION	MAX. 24 HOUR VALUE	ANNUAL AVERAGE
Arcata (1990)*	43.0	11.8
Eureka (1985)	75.0	32.7
Eureka (1990)	83.0	24.4
Eureka (1996)	87.3	15.9

Source: Summary of NCUAQMD Air Monitoring Data, June 1997.

All values are in ug/m³ = micrograms per cubic meter.

* The 1990 measurement in Arcata was part of a special purpose study performed by the state.

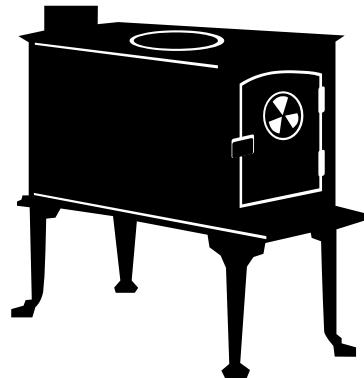
While the values shown in Table AQ-2 do not indicate that Arcata or Eureka always exceed state standards, the NCUAQMD as a whole has a non-attainment classification and all communities within the district contribute to that status.

Primary sources of PM-10 contributors in the Arcata/Eureka area include residential fuel combustion (24%); industrial wood and paper manufacturing (19%); paved road dust (16%); construction and demolition (14%); and unpaved road dust (7%). During periods of high PM-10 releases, wood-burning fireplaces account for approximately 50%,

automobiles 31%, pulp mills 14%, and other sources 5%. Table AQ-3 shows general overall sources of pollution by major category, and the percent contribution of each source to the various pollutants.

The last district study conducted by the NCUAQMD was the Chemical Mass Balance Study of Composition of Particulate Matter, in 1992. That study did find that diesel emissions constituted a fairly large component of PM-10. Diesel emissions have been declared a toxic emission by the State, and the State Air Resources Board is instituting a diesel engine replacement/retrofitting program.

Measurements indicate that the Eureka area has the greatest measured PM-10 concentrations in the Humboldt Bay area of the NCUAQMD. While the Eureka area air quality is improving, several days during the winter months still exceed state PM-10 standards. District-wide, the number of days which exceed standards have decreased from about 24% in 1985 to about 8% in 1993; 3% in 1994; 2% in 1995; 3% in 1996; and 2% in 1997. This represents a 92% decrease over the past twelve years. The months with highest PM-10 concentrations are December, January and February due to meteorological conditions² and increased use of wood burning stoves and fireplaces.



Although air quality is improving, air quality is only measured on 1/6 of the days in the year. The general criterion for non-attainment is one exceedance of the standard during a calendar year. Generally, the NCUAQMD must record no exceedances for three consecutive years to be considered in attainment for pollutants.

Significance criteria for air contaminants. The NCUAQMD publishes significant emission rates for stationary sources of air contaminants (Regulation I, Rule 130). Emissions are considered significant (defined in terms of tons emitted per year) if a new or modified stationary source exceeds the values shown in Table AQ-4. There are no established significance criteria for mobile sources of emissions, but large projects (such as residential subdivisions and shopping centers) can be compared with stationary source criteria to identify the cumulative impacts of many mobile sources such as motor vehicles.

North Coast Unified Air Quality Management District PM-10 attainment plan. As required by the California Clean Air Act, the NCUAQMD adopted an attainment plan in 1995 to identify major PM-10 sources and develop and implement control measures to meet state ambient air quality standards. The NCUAQMD's attainment plan established goals to reduce PM-10 emissions and eliminate the number of days in which standards are exceeded. Exceptions are made for uncontrollable events such as wildfires, structure fires, and unusually high winds. The plan includes three areas of recommended control strategies to meet these goals: transportation, land use, and burning. The table below identifies the categories of measures included in each control strategy. The draft PM-10

attainment plan developed by the North Coast Unified Air Quality Management District was adopted May 11, 1995.

TABLE AQ-3 EMISSIONS SOURCES AND CONTRIBUTION TO VARIOUS POLLUTANTS

SOURCE TYPE	EXAMPLES OF EMISSION CONTRIBUTORS				
Industrial	pulp mills, sawmills, power plants, other heavy industry				
Commercial	gas stations, restaurants, dry cleaners, body shops, etc.				
Residential	home heating, residential open waste burning, solvent/ paint use, lawn equipment etc.				
Mobile	cars, planes, trains, road dust and other transportation sources				
Agriculture and Forestry	forest management burning, field burning, herbicide use, etc.				
POLLUTANTS	INDUSTRIAL	COMMERCIAL	RESIDENTIAL	MOBILE	AGRICULTURAL
Nitrogen Dioxide	17.2%	1.0%	3.0%	78.8%	0%
Carbon Monoxide	7.1%	2.0%	4.1%	46.9%	39.8%
Sulfur Dioxide	59.0%	1.0%	1.0%	39.0%	0%
PM-10	13.1%	7.1%	6.1%	58.6%	15.2%
Total Organic Gases	7.1%	47.5%	6.1%	30.3%	9.1%

TABLE AQ-4 SIGNIFICANT EMISSION RATES FOR STATIONARY SOURCES (TONS/YEAR)

CONTAMINANTS	TONS PER YEAR
Carbon Monoxide	100
Nitrogen Oxides	40
Sulfur Dioxide	40
Particulate Matter	25
PM-10	15
Ozone	40
Various Other Contaminants [1]	0.0004 to 10

Source: Regulation I of the NCUAQMD, Rule 130-Definitions

[1] Other contaminants include lead, asbestos, beryllium, mercury, vinyl chloride, fluorides, sulfuric acid mist, hydrogen sulfide, and reduced sulfur compounds. Contact NCUAQMD for detailed information on emission rates and significance criteria.

TABLE AQ-5 NCUAQMD CONTROL MEASURES

CATEGORY	CONTROL MEASURES
Transportation	Public transit, rideshare programs, park and ride lots, vehicle buy back and smoking vehicle programs, traffic flow improvements, bike routes.
Land Use	Pedestrian and transit oriented development, walkable communities, integration of land use and transportation planning.
Burning	Residential open waste burning restrictions, conventional fireplace replacements, improved woodstoves, new development requirements, woodstove curtailments on high smoke days, education, and home weatherization.

The control measures described above are included in the NCUAQMD's PM-10 Attainment Plan and provide additional measures to reduce air pollution emissions. The NCUAQMD has existing control measures for commercial, non-residential burning, industry, forestry and agricultural burning, and construction. These measures are not included in the attainment plan because emissions reductions resulting from them are already reflected in the air quality monitoring. This element's objectives and policies include many of the NCUAQMD PM-10 Attainment Plan's control measures, particularly for transportation and land use planning.

Guiding Principles and Goals.

- A. Reduce motor vehicle related air pollution.
- B. Participate in regional efforts to improve air quality.
- C. Educate the community about effects of air pollution and how it can be reduced.
- D. Reduce emissions from wood-burning stoves and fireplaces.
- E. Reduce emissions from forest management and burning.
- F. Reduce emissions from industrial sources.
- G. Reduce emissions from residential open waste burning.

4.8 POLICIES

The Air Quality Element includes the following policies:

- AQ-1 Reduce Point and Area Sources of Air Pollutants
- AQ-2 Reduce Mobile Sources of Air Pollutants
- AQ-3 Regional Air Quality Standards, Monitoring, and Education
- AQ-4 Odor

POLICY AQ-1 POINT AND AREA SOURCES OF AIR POLLUTANTS

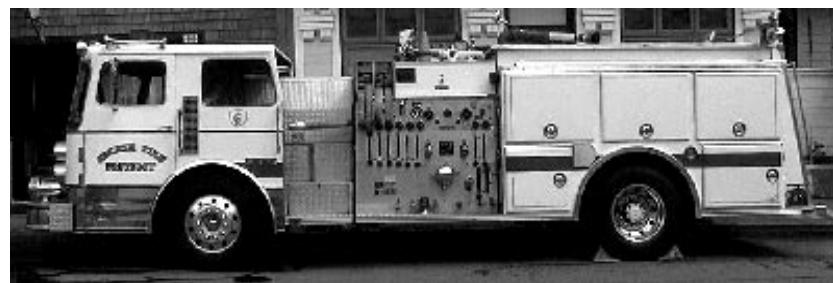
Objective. Improve air quality by reducing emissions from stationary point sources of air pollution (e.g., equipment at commercial and industrial facilities), and stationary area sources (e.g., wood-burning fireplaces and gas powered lawn mowers) which cumulatively emit large quantities of emissions.

AQ-1a **Reduce emissions from stationary point sources: commercial and industrial.**

Coordinate with energy providers to develop incentive programs encouraging the use of less polluting, energy efficient designs and equipment in commercial and manufacturing uses. Encourage commercial and industrial uses to self-enforce emissions reductions by maintaining and repairing equipment, correcting leaks, installing control devices, and minimizing accidental releases. Coordinate with NCUAQMD to establish buffer zones between point sources and the public, particularly sensitive receptors such as schools, hospitals, and convalescent facilities.

AQ-1b **Reduce emissions from stationary area sources: residential, commercial, and industrial.** Limit wood-burning fireplace installations in new construction to low-emitting, State and EPA certified fireplace inserts or woodstoves, pellet stoves, or natural gas fireplaces. New construction retrofits must comply with energy efficient construction codes to reduce energy consumption including high efficiency windows, water heaters, and furnaces.

AQ-1c **Coordination between NCUAQMD and Arcata Fire Protection District.** Arcata Fire Protection District officials shall coordinate with the NCUAQMD to develop procedures for identifying, monitoring, and informing the public of high pollutant incidents related to fires and accidental or intentional releases of toxic or unknown materials. Coordination should encompass current air quality levels, meteorological conditions (stagnant air), prevailing wind directions, location of nearby sensitive receptors, potentially affected land uses, and types of potential toxic materials. Coordination and required permits are particularly important during the planning and implementation of controlled burns.



AQ-1d Review of development projects for emissions reductions. Evaluate new construction plans to reduce point and area sources of pollution. Consult with the NCUAQMD during the environmental review process to ensure that:

1. Air quality impacts of development projects are assessed using analytical methods and significance criteria for emission rates approved by the NCUAQMD.
2. Air quality mitigation is feasible, workable, monitorable, and cost effective.
3. Impacts of projects that may be individually insignificant, but cumulatively significant are minimized or mitigated.
4. Innovative measures are incorporated into the project design to reduce air quality impacts.

Encourage the NCUAQMD to enforce these measures and their related policies.

POLICY AQ-2 MOBILE SOURCES OF AIR POLLUTANTS

Objective. Improve air quality by reducing emissions from transportation sources, particularly motor vehicles, and other mobile sources. Reduce vehicle miles of travel and encourage shifts to alternative modes of travel.

AQ-2a Implement land use measures to reduce vehicle trips, miles traveled, and air pollutant emissions. Implement or encourage the land use and development measures which reduce motor vehicle travel as outlined in the Transportation Element. These measures are also effective in reducing mobile sources of air pollutants.

AQ-2b Implement transportation measures to reduce vehicle trips, miles traveled, and air pollutant emissions. Implement or encourage the following measures to reduce vehicle miles traveled and provide alternatives to the single occupant motor vehicle, as outlined in the Transportation Element.

1. Provide as direct and safe a travel route as possible for all travel modes.
2. Implement and support public education programs explaining the negative impacts of single occupant vehicle use, and encourage the development of employer-based measures to reduce employee automobile travel.
3. Require A&MRTS and encourage other fleet operators to convert vehicles to run on less polluting alternative fuels at the earliest feasible time (See Policy RC-8a).

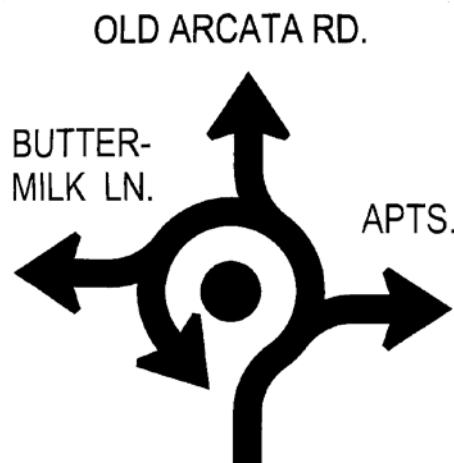


AQ-2c Reduce or minimize the creation of “hot spots” or localized places of concentrated automobile emissions. Implement or encourage the following measures to reduce hot spots, which occur where groups of vehicles are required to idle (e.g., at congested intersections, driveways and drive-through facilities).

1. Minimize the delay and congestion at unsignalized and signalized intersections to reduce emissions from idling vehicles. Attempt to achieve this through reducing automobile travel, minor capacity improvements, or fine-tuning of intersection operations. Discourage major capacity improvements at intersections, minimize new signalized intersections, or any other improvement which discourages walking, bicycling, or transit use.
2. Minimize or restrict land uses with drive-through facilities located in areas of concentrated traffic or near congested intersections.
3. Construction of projects with large parking lots or high volume driveways shall identify traffic impacts and provide evidence that project design will optimize internal circulation and minimize delay. Ensure that mitigation measures balance the needs of automobiles, pedestrians, bicyclists, and transit riders.

AQ-2d Design Arcata’s highest traveled arterials to minimize stopping. Recognize that automobiles are most efficient and less polluting at constant, moderate speeds between 25 and 35 miles per hour. Minimize idling delay, excessive congestion, and excessive speeds with the following measures:

1. Encourage Caltrans to coordinate traffic signals on Samoa Boulevard to maximize progression.
2. Eliminate traffic bottlenecks with traffic flow improvements (such as re-allocating turning lanes, or converting all-way stop control to roundabouts or two-way stop control), without impacting the safety of pedestrians, bicyclists, or transit facilities.
3. Review access plans for commercial driveways to ensure designs minimize idling vehicles and concentrations of traffic. For larger projects require multiple driveways rather than single driveways and consider turn restrictions where delays to existing driveways could be significant.
4. Encourage and support law enforcement’s efforts to expeditiously manage traffic incidents.



AQ-2e **Recognize that poor air quality is caused by the combination of high pollutant emissions and meteorological conditions which do not allow for dispersal of pollutants.** The City shall coordinate a joint effort with the NCUAQMD to minimize the impact of high pollutant incidents and notify the public about meteorological conditions that contribute to poor air quality. The joint effort shall include employing the following measures:

1. Implement added air pollution control measures during predictable meteorological events of stagnant air. Inform the public of high pollutant incidents and encourage measures which minimize impacts, such as limiting use of wood-burning fireplaces, gas powered equipment, and avoiding non-essential vehicle travel.
2. Promote and encourage employer-based Transportation Demand Measures (such as subsidized bus fare, flexible work hours, and incentives to carpool) to reduce automobile travel, particularly during periods of poor air quality.
3. Support and encourage local industrial and commercial efforts to reduce emissions and particulate pollution from industrial plants and trucks, particularly during periods of poor air quality.
4. Require traffic and construction site dust control measures at construction projects. Require measures which reduce emissions from construction activity and maximize efficiency of traffic flow during inversion conditions.

AQ-2f **Enforce air quality control measures and monitoring at construction sites.**

Construction emissions shall be controlled because, although they are temporary in nature, they can often be the greatest air quality impact of a project. Require the following control measures for construction activities when necessary:

1. Water all active construction areas twice per day and use erosion control measures to prevent water runoff containing silt and debris from entering the storm drain system.
2. Cover trucks hauling soil, sand, and other loose material.
3. Pave, water, or apply non-toxic soil stabilizers on unpaved access roads and parking areas.
4. Sweep paved access roads and parking areas daily.
5. Sweep streets daily if visible material is carried onto adjacent public streets.

For larger construction sites (four acres or greater) require the following measures when necessary in addition to those above:

6. Hydroseed or apply non-toxic soil stabilizers to inactive construction areas.
7. Enclose, cover, water, or apply non-toxic soil binders to open materials stockpiles.
8. Limit traffic speeds to 15 mph on unpaved access roads.

9. Install erosion control measures to prevent silt runoff onto public roadways.
10. Replant vegetation in disturbed areas within 30 days after project completion.

For construction sites near sensitive receptors, require the following measures when necessary, in addition to those above:

11. Install wheel washers for exiting trucks, or wash all equipment leaving site.
12. Install wind breaks, or plant trees/vegetation at windward sides of construction areas, or avoid removing existing vegetation which acts as a windbreak.
13. Suspend excavation and grading activity when winds exceed 25 mph.
14. Limit area subject to excavation, grading, and other construction activities at any one time.

AQ-2g Enforce air quality control measures and monitoring for agricultural operations.

Air emissions from agricultural operations, including field burning, airborne soils, and over-spray from herbicide applications, shall be controlled and monitored through air quality standards as well as adherence to the Land Use Code.

POLICY AQ-3 REGIONAL AIR QUALITY STANDARDS, MONITORING AND EDUCATION

Objective. Participate in regional efforts to improve and monitor air quality and meet air quality goals, coordinate transportation and land use development planning with the North Coast Unified Air Quality Management District, and educate the public.

AQ-3a Air quality standards and monitoring. Identify potential emission sources of airborne toxins from mobile and stationary sources. This may be in coordination with the California Air Resource Board and the NCUAQMD, as appropriate. Enforce rigid high standards to restrict fumes, smoke, dust, or other environmental pollutants from stationary sources of pollution.

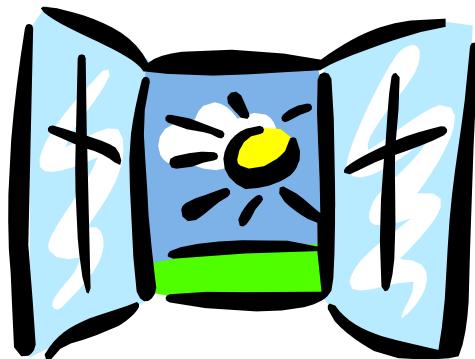
AQ-3b Develop and distribute material to educate the public on air quality issues. Work with Humboldt State University, the California Air Resources Board, and the NCUAQMD to develop educational material regarding air quality, impact of air quality on people, plants and animals, and what citizens can do to improve air quality. The City will make this information available.

AQ-3c Cooperation in enforcement activities and programs. Cooperate with the NCUAQMD in implementing and enforcing the district's rules and programs. Consider joint implementation of programs between the City and the district such as:

1. A voluntary wood-burning-devices dryness certification program.
2. Free cordwood moisture checks.
3. Brochures on wood burning.
4. Conversion of conventional wood burning devices to EPA certified devices.
5. Use of district non-compliance funds for low-cost replacements.

Develop stricter ordinances, guidelines, and development agreements for new residential development to limit wood burning devices. Use district techniques to identify improper wood burning device use, improperly dried fuel, and faulty equipment, and provide education to violators or take enforcement action.

AQ-3d Indoor air pollution. Factors such as sealed building interiors, inadequate ventilation, non-openable windows, and use of building materials that release toxic substances contribute to indoor air pollution. To maximize indoor air quality, the installation of openable windows and adequate ventilation systems, the use of pollution-reducing houseplants, as well as the selection of non-toxic building materials and interior finishes, is encouraged in all new buildings and in the retrofitting of existing buildings. The City shall maintain a list of non-toxic building materials and interior finishes, provide available information about building techniques and designs that reduce or eliminate indoor air pollution, and encourage a good-faith effort by private industry to use those materials and techniques.



POLICY AQ-4 ODOR

Objective. Minimize public exposure to noxious odors from industrial, manufacturing, processing, and food and beverage production operations.

AQ-4a Odor controls. Identify potential sources of noxious odors and regulate those sources to avoid adverse affects on adjacent sensitive receptors. Noxious odors are defined as foul smelling airborne emissions that are sufficiently concentrated to cause physical discomfort to those inhabiting adjacent areas. Regulations imposed to reduce effects of these odors shall include limiting hours for odor emissions, periodic monitoring, and filtering to reduce concentrations.

4.9 IMPLEMENTATION MEASURES

#	IMPLEMENTATION MEASURE DESCRIPTION	RESPONSIBLE PARTY	TIME FRAME
AQ -1	Air quality education and air emissions reduction programs Continue monitoring local air quality and setting high standards for air quality. The City, including the Fire Department, shall work with the NCUAQMD to establish an air quality monitoring station in Arcata.	NCUAQMD	On-going
AQ -2	Funding sources for wood-burning appliance retrofits for low income and elderly Research and apply for grant funding for qualifying low-income and elderly households to retrofit wood-burning appliances that have high emission rates.	Community Devel. Dept.	On-going

Endnotes

1. For further information on the health effects of PM-10 see the California Air Resources Board publication "Facts about Air Pollution and Health" (ARB Publications Department); the EPA document National Air Quality and Emissions Trends Report (EPA Office of Air Quality Planning and Standards, Research Triangle Park, NC); the Air Resources Board December 1982 publication California Ambient Air Quality Standards for Particulate Matter (PM-10); Federal Register Vol. 62, No. 138, 1997 for information on PM-2.5; and Health & Environment Digest Vol. 10, No. 4 "Airborne Particulates: A Deadly Public Health Concern."