

**Exhibit K**



## U.S. Environmental Protection Agency

# 1997 Summary Report

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### Highlights

#### Background

#### Long-Term Emissions Trends

#### Summary of Air Quality Emissions Trends

#### Six Principal Pollutants

##### Carbon Monoxide (CO)

##### Lead (Pb)

##### Nitrogen Dioxide (NO<sub>2</sub>)

##### Ozone (O<sub>3</sub>)

##### Particulate Matter (PM-10)

##### Sulfur Dioxide (SO<sub>2</sub>)

#### Acid Rain

#### Visibility

#### Toxic Air Pollutants

#### Stratospheric Ozone

#### Global Warming

#### Conclusion

#### Acronyms

## Particulate Matter (PM-10)

**Nature and Sources of the Pollutant:** Particulate matter (PM) is the general term used for a mixture of solid particles and liquid droplets found in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. These particles, which come in a wide range of sizes ("fine" particles are less than 2.5 micrometers in diameter and coarser-size particles are larger than 2.5 micrometers), originate from many different stationary and mobile sources as well as from natural sources. Fine particles (PM-2.5) result from fuel combustion from motor vehicles, power generation, and industrial facilities, as well as from residential fireplaces and wood stoves. Coarse particles (PM-10) are generally emitted from sources, such as vehicles traveling on unpaved roads, materials handling, and crushing and grinding operations, as well as windblown dust. Some particles are emitted directly from their sources, such as smokestacks and cars. In other cases, gases such as sulfur oxide and SO<sub>2</sub>, NO<sub>x</sub>, and VOC interact with other compounds in the air to form fine particles. Their chemical and physical compositions vary depending on location, time of year, and weather.

**Health and Environmental Effects:** Inhalable PM includes both fine and coarse particles. These particles can accumulate in the respiratory system and are associated with numerous health effects. Exposure to coarse particles is primarily associated with the aggravation of respiratory conditions, such as asthma. Fine particles are most closely associated with such health effects as increased hospital admissions and emergency room visits for heart and lung disease, increased respiratory symptoms and disease, decreased lung function, and even premature death. Sensitive groups that appear to be at greatest risk to such effects include the elderly, individuals with cardiopulmonary disease, such as asthma, and children. In addition to health problems, PM is the major cause of reduced visibility in many parts of the United States. Airborne particles also can cause damage to paints and building materials.

**Revised Particulate Matter Standards:** In 1997, EPA added two new PM-2.5 standards, set at 15 micrograms per cubic meter (µg/m<sup>3</sup>) and 65 µg/m<sup>3</sup>, respectively, for the annual and 24-hour standards. In addition, the form of the 24-hour standard for PM-10 was changed. EPA is beginning to collect data on PM-2.5 concentrations. Beginning in 2002, based on 3 years of monitor data, EPA will designate areas as nonattainment that do not meet the new PM-2.5 standards.

**Trends in PM-10 Levels:** Between 1988 and 1997, average PM-10 concentrations decreased 26 percent. Short-term trends between 1996 and 1997 showed a decrease of 1 percent in monitored PM-10 concentration levels.

Emissions of PM-10 shown in the chart are based on estimates of anthropogenic emissions including fuel combustion sources, industrial processes, and transportation sources, which account for only 6 percent of the total PM-10 emissions nationwide. Between 1988 and 1997, PM-10 emissions for these sources decreased 12 percent. Emissions of PM-10

between 1996 and 1997 decreased 1 percent.

The emissions estimates presented above do not include emissions from natural and miscellaneous sources, such as fugitive dust (unpaved and paved roads), agricultural and forestry activities, wind erosion, wildfires, and managed burning. These emissions estimates also do not account for PM that is secondarily formed in the atmosphere from gaseous pollutants (i.e., SO<sub>2</sub> and NO<sub>x</sub>).

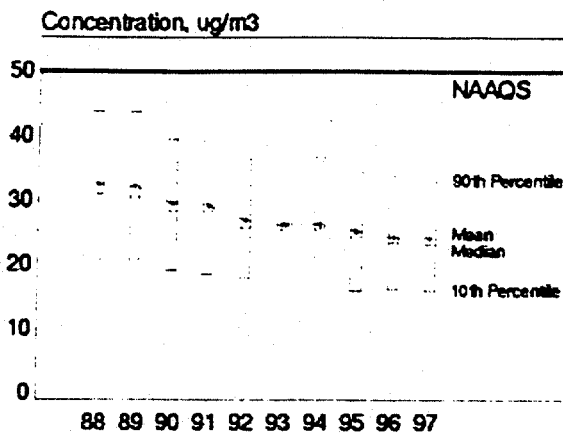
### PM-10 Air Quality, 1988-97

Annual Arithmetic Mean

1988-97: 26% decrease

1996-97: 1% decrease

*Bold line indicates national air standard.*

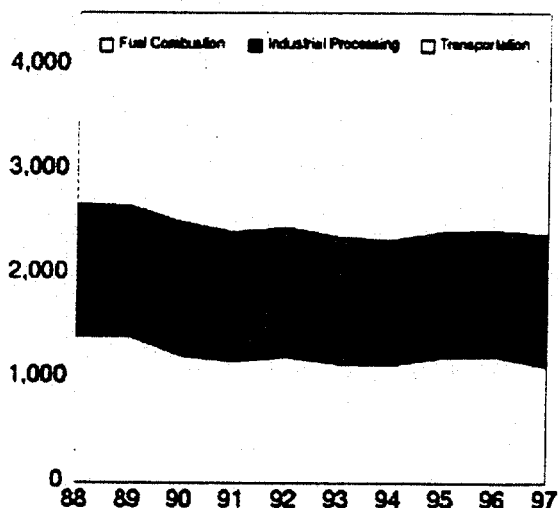


### PM-10 Emissions, 1988-97

1988-97: 12% decrease

1996-97: 1% decrease

Thousand Short Tons Per Year



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