3.4 AIR QUALITY

3.4.1 REGIONAL METEOROLOGY

The Madera site is located in southwest Madera County, just north of the City of Madera and adjacent to State Route 99 in the San Joaquin Valley (SJV). The North Fork site is also in Madera County, but in the mountainous areas at around 3,000 feet elevation. Madera County is part of the SJVAB. The California Air Resources Board (CARB) has divided California into regional air basins according to topographic air drainage features. The SJVAB is approximately 250 miles long and averages 35 miles in width, and is the second largest air basin in the State. Air pollution is directly related to a region's topographic features. The entire SJVAB is defined by the Sierra Nevada mountains in the east (8,000 to 14,000 feet in elevation), the Coast Ranges in the west (averaging 3,000 feet in elevation), and the Tehachapi mountains in the south (6,000 to 8,000 feet in elevation). The valley is basically flat with a slight downward gradient to the northwest. The valley opens to the sea at the Carquinez Straits where the San Joaquin-Sacramento Delta empties into San Francisco Bay. Thus, the SJV could be considered a "bowl" open only to the north.

Although marine air generally flows into the basin from the San Joaquin River Delta, the region's topographic features restrict air movement through and out of the basin. The Coast Ranges hinder wind access into the SJV from the west, the Tehachapis prevent southerly passage of airflow, and the high Sierra Nevada range is a significant barrier to the east. These topographic features result in weak airflow, which becomes blocked vertically by high barometric pressure over the SJV. As a result, the valley floor of the SJVAB is highly susceptible to pollutant accumulation over time. Most of the surrounding mountains are above the normal height of summer valley inversion layers (1,500 to 3,000 feet).

CLIMATE

Local climatological effects, including wind speed and direction, temperature, inversion layers, and precipitation and fog, can exacerbate the air quality problem in the valley portion of the SJVAB. In addition, microclimate conditions can exist that influence air quality within the mountainous areas of the SJVAB.

Wind Speed and Direction

Wind speed and direction play an important role in dispersion and transport of air pollutants. Wind at the surface and aloft can disperse pollution by mixing vertically and by transporting it to other locations.

During the summer, wind speed and direction data indicate that summer wind usually originates at the north end of the SJV and flows in a south-southeasterly direction through the SJV, through

Tehachapi pass, into the Southeast Desert Air Basin. The dominant wind flow pattern (day or night) in the valley portion of the SJVAB is from the northwest to the southeast, along the axis of the valley.

During the winter, wind speed and direction data indicate that wind occasionally originates from the south end of the SJV and flows in a north-northwesterly direction. Also during the winter months, the SJV experiences light, variable winds, less than 10 mph.

Superimposed on this seasonal regime is the diurnal wind cycle. In the SJV this cycle takes the form of a combination of sea breeze-land breeze and mountain-valley regimes. The sea breeze-land breeze regime has a sea breeze flowing into the SJV from the north during the day and a land breeze flowing out of the SJV at night. The mountain-valley regime has an upslope (mountain) flow during the day and a downslope (valley) flow at night. These phenomena add to the complexity of regional wind flow and pollutant transport within the SJVAB.

At night, the same general wind flow pattern continues, with some important exceptions. First, the air is no longer able to exit the southern end of the SJVAB because it encounters cooler drainage winds from the surrounding mountains. Consequently, it is forced back north to set up a circular flow pattern known as the Fresno eddy. The eddy circulates pollutants in a counterclockwise pattern, and returns polluted air to urban areas where more precursors are added the next day. Another important difference about the nighttime winds in the SJVAB is that they typically are caused by a jet stream of fast moving air at an altitude of about 1000 ft and a speed of up to 30 mph. Lastly, some of the pollutants transported to higher altitudes from daytime heating return to the valley at night because of drainage winds from the mountains.

Temperature

The SJVAB has an "inland Mediterranean" climate averaging over 260 sunny days per year. The valley floor (including the Madera site) is characterized by warm, dry summers and cooler winters. Summer high temperatures in the valley floor often exceed 100 ºF, averaging in the low 90s in the northern valley and high 90s in the south. In the entire valley, high daily temperature readings in summer average 95 ºF. Over the last 30 years, the valley averaged 106 days a year 90 ºF or hotter, and 40 days a year 100 ºF or hotter. The daily summer temperature variation can be as high as 30 ºF.

Climate in the North Fork site area is demonstrated by data from the Western Regional Climate Center (2005) for the North Fork Ranger Station, approximately 2 miles south southwest of the North Fork site. Maximum high temperatures at the North Fork Ranger station since 1948 have averaged 90.7 ºF during the summer months and the minimum nighttime temperatures have averaged 31.3 ºF during the winter months. This station has recorded extremes of up to 110 ºF in

October of 1951 and down to 6 ºF in January of 1950. In the summer, the site can expect over 60 days above or equal to 90 ºF and in the winter, over 50 days of sub freezing nights.

In winter, as the cyclonic storm track moves southward, the storm systems moving in from the Pacific Ocean bring a decidedly maritime influence to the SJV. The high mountains to the east prevent the cold, continental air masses of the interior from influencing the valley. Thus, winters are mild and humid. Temperatures below freezing are unusual. Average high temperatures in the winter are in the 50s, but highs in the 30s and 40s can occur on days with persistent fog and low cloudiness. The average daily low temperature is 45 ºF.

Temperature Inversions

The vertical dispersion of air pollutants in the SJV is limited by the presence of persistent temperature inversions. Because of expansional cooling of the atmosphere, air temperature usually decreases with altitude. A reversal of this atmospheric state, where the air temperature increases with height, is termed an inversion. Inversions can exist at the surface, or at any height above the ground. The height of the base of the inversion is known as the "mixing height". This is the level to which pollutants can mix vertically. Semi-permanent systems of high barometric pressure fronts frequently establish themselves over the SJVAB, deflecting low-pressure systems that might otherwise bring cleansing rain and winds.

Air above and below the inversion base does not mix because of differences in air density. Warm air above the inversion is less dense air than below the base. The inversion base represents an abrupt density change where little exchange of air occurs. This phenomenon is similar to that of the abrupt density change that separates skim and whole milk. Pollutant concentration levels are often directly related to inversion layers due to the limitation of mixing space.

Precipitation and Fog

Precipitation and fog tend to reduce or limit some pollutant concentrations, especially those reliant on sunlight. Precipitation in the SJV is strongly influenced by the position of the semi-permanent subtropical high-pressure belt located off the Pacific coast (Pacific High). In the winter, this high-pressure system moves southward, allowing Pacific storms to move through the SJV. These storms bring in moist, maritime air that produces considerable precipitation on the western, upslope side of the Coast Ranges. Significant precipitation also occurs on the western side of the Sierra Nevada. On the valley floor, however, there is some downslope flow from the Coast Ranges. The resultant evaporation of moisture from associated warming results in minimal precipitation. Nevertheless, the majority of the precipitation in the SJV is produced by those storms during the winter. Precipitation during the summer months is in the form of convective rain showers and is rare. It is usually associated with an influx of moisture into the SJV through the San Francisco area during an anomalous flow pattern in the lower layers of the atmosphere.

Although the hourly rates of precipitation from these storms may be high, their rarity keeps monthly totals low.

Precipitation on the SJV floor and in the Sierra Nevada decreases from north to south. Stockton in the north receives about 20 inches of precipitation per year; Fresno in the center receives about 10 inches per year; and Bakersfield at the southern end of the valley receives less than 6 inches per year. This is primarily because the Pacific storm track often passes through the northern part of the State while the southern part of the State remains protected by the Pacific High. Precipitation in the SJVAB is confined primarily to the winter months with some also occurring in late summer and fall. Average annual rainfall for the entire SJV is 9.25 inches on the SJV floor. The North Fork Ranger Station has had an average of 31.59 inches of rain per year since 1948 with 67 percent occurring in the months of December through March.

Snowstorms, hailstorms, and ice storms occur infrequently in the SJV and severe occurrences of any of these are very rare. The winds and unstable air conditions experienced during the passage of storms result in periods of low pollutant concentrations and excellent visibility. Between winter storms, high pressure and light winds allow cold moist air to pool on the SJV floor. This creates strong low-level temperature inversions and very stable air conditions. This situation leads to the SJV's famous Tule Fogs[1]. The formation of natural fog is caused by local cooling of the atmosphere until it is saturated (dew point temperature). This type of fog, known as radiation fog, is more likely to occur inland. Cooling may also be accomplished by heat radiation losses or by horizontal movement of a mass of air over a colder surface. This second type of fog, known as advection fog, generally occurs along the coast.

3.4.2 REGULATORY CONTEXT

FEDERAL CLEAN AIR ACT (CAA)

The CAA was first signed into law in 1963 with the purpose of controlling air pollution and providing a framework for national, state, and local air pollution control efforts. Congress amended the CAA in 1970, 1977, and 1990 (42 USC 7401 *et seq.*). Basic components of the CAA and its amendments include national ambient air quality standards (NAAQS) for major air pollutants, hazardous air pollutants standards, state implementation plan (SIP) requirements, motor vehicle emissions standards, and enforcement provisions.

National Ambient Air Quality Standards (NAAQS)

The NAAQS are ambient air quality standards that define clean air and are established to protect even the most sensitive individuals. An air quality standard defines the maximum amount of a

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[1] Tule fog is a dense night and morning valley fog that is commonly known as "tule fog" because of its prevalence in marshy areas populated by tule reeds or cattails. Technically, it's a radiation fog, which forms as the ground cools off at night and radiates heat into space. (Null, 2001)

pollutant that can be present in outdoor air without harm to the public's health. NAAQS have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead.

State Implementation Plan (SIP)

The CAA requires states containing areas with air quality violating the NAAQS to prepare an air quality control plan, referred to as the State Implementation Plan (SIP). The SIP contains the strategies and control measures that states such as California will use to attain the NAAQS. The SIP is not a single document, but a compilation of new and previously submitted plans, programs, rules, regulations, and controls. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, rules, and regulations of air basins as reported by the agencies with jurisdiction over them. Many of California's SIP documents rely on the same control strategies, including emission standards for cars and heavy trucks, fuel regulations, and limits on emissions from consumer products.

CALIFORNIA CLEAN AIR ACT (CCAA)

The CCAA was first signed into law by the State in 1988 (and amended in 1992), with the purpose of providing additional air quality planning requirements and other standards independent of the CAA. The CCAA delineates California's air quality goals, planning mechanisms, regulatory strategies, and standards of progress. The CCAA requires air districts like the SJVAPCD to develop and implement plans to attain California ambient air quality standards (CAAQS) established by CARB. In general, the district plans must be designed to achieve and maintain State ambient air quality standards through emission reductions from stationary and transportation sources by the "earliest practicable date," and must reduce excessive emissions of pollutants by five percent or more per year.

IMPLEMENTING AGENCIES

U.S. Environmental Protection Agency (EPA)

The EPA has been charged with implementing the CAA at the national level. Unlike many Federal laws, the CAA calls for primary state and local oversight at the state and local level. If states are unsuccessful in regulating air quality, there are provisions in the CAA that allow the EPA to assume authority from the state. For instance, the EPA reviews SIPs to determine if they conform to the mandates of the CAA and will achieve air quality goals when implemented. If the EPA determines a SIP to be inadequate, it may prepare a Federal Implementation Plan (FIP) for the non-attainment area and impose additional control measures.

Thus, the EPA deals primarily with global, international, national, and interstate air pollution issues. Its primary role at the state level is one of oversight of state air quality agencies and programs. The EPA sets Federal standards for vehicle and stationary sources and provides research and guidance in air pollution programs.

California Air Resources Board (CARB)

CARB is the agency responsible for coordination and oversight of State and local air pollution control programs in California; for implementing the CCAA; and for implementing much of the CAA within California. CARB's primary responsibilities include establishing CAAQS, approving local air plans, submitting the SIP to the EPA, regulating mobile emission sources, and overseeing and providing technical support to California's 35 air districts, which are organized at the county or regional level. State law makes CARB the lead agency for all purposes related to the SIP. Local air districts and other agencies, such as the Bureau of Automotive Repair, prepare SIP elements and submit them to CARB for review and approval.

San Joaquin Valley Air Pollution Control District (SJVAPCD)

Air districts have the primary responsibility for control of air pollution from all sources other than motor vehicle emissions, which are the responsibility of CARB and EPA. Air districts adopt and enforce rules and regulations to achieve State and Federal ambient air quality standards and enforce applicable State and Federal law. Both the Madera and North Fork sites are located within the SJVAPCD. The SJVAPCD has jurisdiction over air quality matters in the San Joaquin Valley Air Basin (SJVAB). Its headquarters are located in Fresno with regional offices located in Bakersfield in the Southern Region and Modesto in the Northern Region. Its jurisdiction includes the entire Counties of Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare and the central and western portion of Kern County.

Until the passage of the CCAA and 1990 CAA amendments, the primary role of air districts was controlling stationary sources of pollution, such as industrial processes and equipment. Air districts are now required to implement transportation control measures and are encouraged to adopt indirect source control programs to reduce mobile source emissions. These mandates created the necessity for air districts to work closely with cities, counties, and regional transportation planning agencies to develop new programs.

The SJVAPCD entered into a memorandum of understanding with the transportation planning agencies of the eight counties in the SJVAB in 1992. This memorandum of understanding ensures a coordinated approach in the development and implementation of transportation plans throughout the valley. This action has helped the regional transportation planning agencies comply with pertinent provisions of the CAA and CCAA, as well as related transportation legislation (such as the Intermodal Surface Transportation Efficiency Act).

AIR QUALITY STANDARDS, RULES, AND REGULATIONS

Federal and State Ambient Air Quality Standards

NAAQS and CAAQS have been established for certain "criteria pollutants" to protect public health and welfare. NAAQS have been established for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM), and lead. For some of the pollutants, the EPA and States have identified air quality standards expressed in more than one averaging time in order to address the typical exposures found in the environment. For example, CO is expressed as a one-hour averaging time and an eight-hour averaging time. Regulation of air pollution is achieved holding an area accountable to both national and state ambient air quality standards, as shown in **Table 3.4-1,** and setting emission limits for individual sources of air pollutants.

The EPA has classified air basins or portions thereof as "unclassifiable[2]/attainment[3]" or "non-attainment[4]", based on whether or not the NAAQS have been achieved or whether a determination is possible with available data. The EPA has also classified the non-attainment areas according to the severity of pollution in each with each level requiring a different projected attainment date. There are five classes of non-attainment areas, ranging from marginal (relatively easy to clean up quickly) to extreme (will take a lot of work and a long time to clean up). The CAA uses the classification system to design cleanup requirements appropriate for the severity of the pollution and set realistic deadlines for reaching cleanup goals. Unclassified areas are those for which air monitoring has not been conducted but which are assumed to be in attainment.

As shown in **Table 3.4-2**, Madera County is part of the SJVAB, which was designated non-attainment under the Federal 8-hour ozone standard under subpart 2[5] and classified as "serious" with an attainment deadline of June 2013. The entire County of Madera is also classified serious non-attainment for PM_{10} and non-attainment for $PM_{2.5}$. Madera County meets the Federal standards or is unclassifiable for all other pollutants.

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2 Unclassifiable – any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

3 Attainment – any area that meets the national primary or secondary ambient air quality standard for the pollutant.

4 Non-attainment – any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for a pollutant.

5 Under subpart 2, areas are classified based on each area's ozone design value. Control requirements depend on an area's subpart 2 classification. Areas with more serious ozone pollution are subject to more prescribed requirements and are given longer to attain the standard. The requirements are designed to bring areas into attainment by their specified attainment dates.

TABLE 3.4-1
AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	Standard		Violation Criteria	
		CAAQS	NAAQS	CAAQS	NAAQS
Ozone	1 hour	0.09 ppm	0.12ppm[a]	If exceeded	Revoked June 15, 2005
	8 hour	0.070 ppm	0.08 ppm	N/A	Average of the annual fourth highest daily maximum is greater than standard
Carbon monoxide	1 hour	20 ppm	35 ppm	If exceeded	If exceeded on more than 1 day per year
	8 hour	9 ppm	9 ppm	If exceeded	If exceeded on more than 1 day per year
Nitrogen dioxide	Annual average	N/A	0.053 ppm	N/A	If exceeded
	1 hour	0.25 ppm	N/A	If exceeded	N/A
Sulfur dioxide	Annual arithmetic mean	N/A	0.03 ppm	N/A	If exceeded
	24 hours	0.04 ppm	0.14 ppm	If exceeded	If exceeded on more than 1 day per year
	1 hour	0.25 ppm	N/A	If exceeded	N/A
Hydrogen sulfide	1 hour	0.03 ppm	N/A	If equaled or exceeded	N/A
Vinyl chloride	24 hours	0.01 ppm	N/A	If equaled or exceeded	N/A
Respirable particulate matter	Annual arithmetic mean	20 μg/m^3	50 μg/m^3	If exceeded	If exceeded
	24 hours	50 μg/m^3	150 μg/m^3	If exceeded	If expected number of days is < 1
Fine particulate matter	Annual arithmetic mean	12 μg/m^3	15 μg/m^3	If exceeded	If exceeded
	24 hours	N/A	65 μg/m^3	N/A	If 98% of daily averages, averaged over 3 years, greater than standard
Sulfate particles	24 hours	25 μg/m^3	N/A	If equaled or exceeded	N/A
Lead particles	Calendar quarter	N/A	1.5 μg/m^3	N/A	If exceeded no more than 1 day per year
	30-day average	1.5 μg/m^3	N/A	If equaled or exceeded	N/A

NOTES: National standards shown are the primary (health effects) standards.
N/A = not applicable.
[a] This Standard was revoked June 15, 2005.
ppm = parts per million.
μg/m^3 = micrograms per cubic meter.
SOURCE: CARB, 2005; AES, 2005.

TABLE 3.4-2
MADERA COUNTY NAAQS ATTAINMENT STATUS

Pollutant	Federal Attainment Status Designation – Classification
Ozone (8-hour)	Non-attainment[10] -- Serious
Respirable Particulate Matter (PM_{10})	Non-attainment -- Serious
Fine Particulate Matter ($PM_{2.5}$)	Non-attainment[11]
Carbon Monoxide	Unclassifiable/Attainment
Nitrogen Dioxide	Unclassifiable/Attainment
Sulfur Dioxide	Unclassifiable
Lead	Unclassifiable/Attainment

SOURCE: CARB 2005; AES, 2005.

CARB has classified air basins, or portions thereof, as unclassified[12], transitional, attainment[13], or non-attainment[14], based on whether or not the CAAQS have been achieved or whether a determination is possible with available data. A non-attainment designation indicates a violation of the State standard. A non-attainment-transitional designation indicates improving air quality, with occasional violations or exceedances of the State standard. In contrast, an attainment designation indicates no violation of the State standard. Finally, an unclassified designation indicates either no or incomplete air quality data. CAAQS have been established for ozone (O_3), carbon monoxide (CO), particulate matter (PM), nitrogen dioxide, sulfur dioxide, sulfates, lead, hydrogen sulfide, and visibility-reducing particles.

In June 2002, CARB adopted a new State standard for fine particulate matter or $PM_{2.5}$. The State $PM_{2.5}$ standard is 12 micrograms per cubic meter ($\mu g/m^3$), measured as an annual arithmetic

[10] Ozone 8-hour non-attainment areas are those that have violated, or have contributed to violations of, the national 8-hour ozone standard over a three-year period.

[11] $PM_{2.5}$ non-attainment areas are those areas with air quality levels exceeding the standards, plus nearby areas contributing to such violations.

[12] Unclassified – a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or non-attainment.

[13] Attainment – a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a three-year period.

[14] Non-attainment – a pollutant is designated non-attainment if there was at least one violation of a State standard for that pollutant in the area.

mean. When CARB adopted the State $PM_{2.5}$ standard, it also made modifications to the existing State PM_{10} and sulfates standards. CARB lowered the existing State annual PM_{10} standard from 30 $\mu g/m^3$ to 20 $\mu g/m^3$ and revised the averaging method (from an annual geometric mean to an annual arithmetic mean). In addition, CARB changed the measurement method for the State sulfates standard, but left the level of the standard unchanged at 25 $\mu g/m^3$ for a 24-hour averaging time. The old method for sulfates was based on total suspended particulate matter or TSP measurements, while the new method is based on PM_{10} measurements. All of these changes became effective on July 5, 2003. In addition, on April 28, 2005, CARB approved an 8-hour ozone standard of 0.070 ppm that became effective in May 17, 2006.

According to CARB and as presented in **Table 3.4-3**, the entire County of Madera has been designated non-attainment and classified severe under the 1-hour ozone designation, and is non-attainment for the State PM_{10} 24-hour and annual average standards and the $PM_{2.5}$ annual average standard. Madera County is either in attainment or unclassified for all other State standards.

TABLE 3.4-3
MADERA COUNTY CAAQS ATTAINMENT STATUS

Pollutant	State Attainment Status Designation – Classification
Ozone – 1-hour	Non-attainment – Severe
Respirable Particulate Matter (PM_{10}) – 24-hour and annual average	Non-attainment
Fine Particulate Matter ($PM_{2.5}$) – annual average	Non-attainment
Carbon Monoxide – 8-hour and 1-hour	Unclassified
Nitrogen Dioxide – annual average and 1-hour	Attainment
Sulfur Dioxide – 24-hour and 1-hour	Attainment
Lead – 30-day average	Attainment
Particulate Sulfate – 24-hour	Attainment
Hydrogen Sulfide – 1-hour	Unclassified
Visibility Reducing Particles – 8-hour	Unclassified

SOURCE: CARB, 2005; AES, 2005.

A district with an area designated as non-attainment for any of the remaining pollutants is not subject to any specific statutory planning requirements. However, such districts must adopt and enforce rules and regulations to expeditiously attain the State standards for these pollutants (H&SC §§ 40001 and 40913). Furthermore, a non-attainment district has the option of developing and implementing an attainment plan or adopting regulations to control the emissions that contribute to these pollutants (H&SC § 40926).

State law does not impose any specific planning requirements upon districts with areas designated as attainment or unclassified. However, State law does require that the State standards not only be attained but also maintained. State law requires the districts and the Board to make a coordinated effort to protect and enhance the ambient air quality (H&SC §§39001 through 39003). As part of this effort, the districts must adopt rules and regulations sufficiently effective to achieve and maintain the State standards (H&SC §§40001 and 41500).

Health and Safety Code Section 39614

In 2003, the Legislature enacted Senate Bill 656, codified as Health and Safety Code (H&SC) Section 39614, to reduce public exposure to PM_{10} and $PM_{2.5}$. Under H&SC Section 39614, CARB was required to develop, by January 1, 2005, a list of the most readily available, feasible, and cost-effective PM control measures available as of January 1, 2004 based on consultation with local air districts throughout the state of California. The resultant list is a collection of 103 rules that have been adopted by various air districts to reduce directly emitted PM or PM precursors (including oxides of nitrogen (NO_x), oxides of sulfur (SO_x), volatile organic compounds (VOCs)), carbon monoxide (CO), air toxic emissions, and ammonia. By July 31, 2005, Section 39614 required CARB and air districts to adopt implementation schedules for appropriate CARB and air district measures. Finally, no later than January 1, 2009, CARB must prepare a report describing actions taken to fulfill the requirements of the legislation as well as recommendations for further actions to assist in achieving the State PM standards. The bill requirements would sunset on January 1, 2011, unless extended.

SJVAPCD analyzed CARB measures and concluded that all but one of the measures that apply to District sources have been implemented or are in one of the District's attainment plans for adoption within the next two years. The exception was District Rule 4621 (Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants), which was to be amended in the third quarter of 2007. This rule is a control measure in the District's Extreme Ozone Attainment Demonstration Plan, but not within the two-year schedule window required by the State law. As a control measure in a Federal attainment plan, the rule did not represent a new commitment on the part of the District in order to meet the provisions of H&SC Section 39614. The District was already planning to adopt this control measure as part of the District's ozone control strategy.

Air Toxics Rules

Provisions in Title I of the CAA that address the control of hazardous air pollutant (HAP) emissions, or air toxics, are found in Section 112 of the CAA. Section 112 of the CAA includes provisions for the promulgation of National Emissions Standards for Hazardous Air Pollutants (NESHAP), or maximum achievable control technology (MACT) standards, as well as several related programs to enhance and support the program. The EPA has identified 188 hazardous air pollutants. These pollutants are addressed by the NESHAP. The NESHAP are additional Federal emission limitations established for less widely emitted, but highly dangerous or toxic air pollutants that are not covered by the NAAQS. The 1990 Clean Air Act Amendments direct the EPA to set standards for all major sources of air toxics (and some area sources that are of particular concern). The activities and responsibilities required under Section 112 directly affect not only the EPA, but State and local regulatory agencies as well. The complexity and number of these requirements necessitate a high degree of coordination and cooperation between the regulators to ensure that these programs are carried out effectively.

The SJVAPCD has regulations that require compliance with the asbestos demolition and renovation requirements developed by the EPA in the NESHAP regulation, 40 CFR, Part 61, Subpart M. Regulated facilities subject to the NESHAP include all commercial buildings, residential buildings with more than four dwelling units, other structures, and non-portable equipment. A single-family dwelling or residential building with four or fewer dwelling units may be exempt, depending on its past use and future use of the property. The EPA has extensive policy on NESHAP applicability to these structures.

The California Air Toxics Program establishes the process for the identification and control of toxic air contaminants and includes provisions to make the public aware of significant toxic exposures and for reducing risk. CARB's statewide comprehensive air toxics program was established in the early 1980's. California regulates air toxics through AB 1807, the Toxic Air Contaminant Identification and Control Act of 1983 and AB 2588, the Air Toxics "Hot Spots" Information and Assessment Act of 1987. Under AB 1807, CARB and the Office of Environmental Health Hazard Assessment (OEHHA) are required to list TACs based on a risk assessment process that evaluates the potential for human exposure and the health effects of a substance. AB 2588 supplements the AB 1807 program by requiring a Statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks. Individual emitters of toxic air contaminants (TAC) are required by AB 2588 to prepare Toxic Emission Inventory Plans and Reports, allowing the local air quality management district to identify and inventory toxic emissions. In 1993, the California Legislature passed AB 2728, requiring that the listed Federal hazardous air pollutants be identified as State TACs.

SJVAPCD Rules and Plans

SJVAPCD exercises permit authority through its rules and regulations. California Health and Safety Code Section 40702 specifies the SJVAPCD's rule-making authority. In addition, the District's rules and regulations are based on other Federal and State air quality requirements. Air quality rules and regulations are developed by District staff and adopted by the District's Board of Directors with specific requirements for public notification and public comment periods during the rule development process. Details of SJVAPCD rules and plans can be seen at http://www.arb.ca.gov/drdb/sju/cur.htm.

These plans include a 2003 PM_{10} Plan, which met an annual 5 percent reduction requirement and provides for the implementation of best available control measures (BACM). The SJVAPCD is in the process of implementing the BACM contained in that plan and is also working on a 2006 PM_{10} Plan as specified in EPA's approval notice. On May 19, 2005, the Board adopted the 2005 Amendments to the 2003 PM_{10} Plan, primarily to revise the contingency measure discussion and to update schedules for rule adoption.

Air districts continuously monitor their progress in implementing attainment plans and must periodically report on progress to CARB and the EPA. They also periodically revise attainment plans to reflect new conditions and requirements in compliance with schedules mandated by the CCAA and the Federal CAA amendments. The California Health and Safety Code (CH&SC) requires non-attainment districts to prepare reports every three years summarizing progress in meeting the schedules for developing, adopting, and implementing the air pollution control measures contained in each district's plan for attaining the California standards. The CH&SC also requires districts to review and revise their State air quality attainment plans once every three years, beginning in 1994, to correct for deficiencies in meeting the interim measures of progress and to incorporate new data into the plan. To meet federal CAA requirements, the SJVAPCD submitted all required "Rate of Progress" and "Reasonable Further Progress" plans to show that programs adopted by the District would reduce air pollutant emissions.

The 1994 Ozone Attainment Demonstration Plan outlined the SJVAPCD's control strategy for meeting the Federal one-hour NAAQS by November 15, 1999. However, the SJVAB did not attain the Federal 1-hour ozone standard by November 15, 1999, which led to a series of EPA actions requesting additional rulemaking and plan development activities. In response to SJVAPCD and CARB requests, the EPA eventually classified the SJVAB as extreme non-attainment for the Federal 1-hour ozone standard (effective May 17, 2004), which requires attainment of the standard by November 15, 2010.

In December 2002, the SJVAPCD's Governing Board adopted the Amended 2002/2005 Rate of Progress (ROP) Plan for San Joaquin Valley Ozone. This plan demonstrated that the SJVAPCD's VOC and NO_x emissions reductions met Federal requirements for 2002 and 2005. This plan satisfied all of the EPA's requirements except demonstration of attainment of the Federal 1-hour ozone standard. In July 2003, EPA found the motor vehicle emissions budget in this plan to be adequate for transportation conformity purposes. In September 2003, EPA found the 2002/2005 ROP Plan to be complete.

In 2003 and 2004, the SJVAPCD prepared the Extreme Ozone Attainment Demonstration Plan (OADP). The Extreme OADP demonstrates attainment of the Federal 1-hour ozone standard by November 15, 2010, demonstrates that VOC and NO_x emission reductions in the SJVAB meet Federal rate of progress requirements for 2008 and 2010, and fulfills State of California requirements for a triennial progress report on and revision of the District's 1991 Air Quality Attainment Plan, which is directed at attainment of the California ozone air quality standard.

The CARB submitted the 2004 Extreme OADP to EPA on schedule on November 15, 2004. The Plan has been deemed complete and is currently in review at EPA. The Extreme OADP sets forth the emission reductions and timeline for attaining the Federal 1-hour ozone ambient air quality standards in the SJVAB by November 15, 2010. The SJVAPCD, in conjunction with CARB, the EPA, and the eight regional Transportation Planning Agencies (TPAs) in the valley, developed the plan to provide healthy air for all of the valley's people and to meet Federal and State requirements for ozone planning documents.

On April 30, 2004 EPA issued a final rule revoking the Federal 1-hour ozone standard, effective June 15, 2005 (69 FR 23858). Therefore, effective June 15, 2005, the SJVAB was no longer non-attainment for the Federal 1-hour standard, and the November 15, 2010 date for attainment was eliminated. While the Federal 1-hour ozone standard was officially revoked on June 15, 2005, the new 8-hour rule also addresses anti-backsliding provisions in the Clean Air Act; so 8-hour ozone non-attainment areas remain subject to control measure commitments that applied under the 1-hour ozone standard. SJVAPCD focus has now shifted to the attainment of the 8-hour standard, and SJVAPCD and State emission control measures committed to in the Extreme OADP will be implemented for their contribution toward reducing 8-hour ozone levels.

Climate Change

Federal

In 1997 the Council on Environmental Quality (CEQ) circulated an internal draft memorandum (CEQ, 1997a) on how global climate change should be treated for the purposes of the National Environmental Policy Act (NEPA). The CEQ draft memorandum advised federal lead agencies to consider how proposed actions subject to NEPA would affect sources and sinks of GHGs. During the same year, CEQ released guidance on the assessment of cumulative effects in NEPA documents (CEQ, 1997b). Consistent with the CEQ draft memorandum, GHGs were offered as one example of a cumulative effect.

State

California has been a leader among the states in outlining and aggressively implementing a comprehensive climate change strategy that is designed to result in a substantial reduction in total statewide GHG emissions in the future. California's climate change strategy is multifaceted and involves a number of state agencies implementing a variety of state laws and policies. We have attempted to briefly summarize these laws and policies below.

Assembly Bill 1493 (AB 1493)

Signed by the Governor in 2002, AB 1493 requires that the California Air Resources Board (CARB) adopt regulations requiring a reduction in GHG emissions emitted by cars in the state. AB 1493 is intended to apply to 2009 and later vehicles, however recently the USEPA has denied a Clean Air Act waiver, which the state needs in order to implement AB 1493. Although the state is apparently planning to appeal this decision, at this time it is unclear whether AB 1493 will be implemented (Bee, 2007).

Executive Order S-3-05 (EO S-3-05)

EO S-3-05 was signed by the Governor on June 1, 2005. EO S-3-05 established the following statewide emission reduction targets:

- Reduce GHG emissions to 2000 levels by 2010,
- Reduce GHG emissions to 1990 levels by 2020, and
- Reduce GHG emissions to 80 percent below 1990 levels by 2050.

EO S-3-05 created a “Climate Action Team” or “CAT” headed by the California Environmental Protection Agency and including several other state agencies. The CAT is tasked by EO S-3-05 with outlining the effects of climate change on California and recommending an adaptation plan. The CAT is also tasked with creating a strategy to meet the emission reduction target required by the EO. In April 2006 the CAT published an initial report that accomplished these two tasks (**Appendix W**).

Assembly Bill 32 (AB 32)

Signed by the Governor on September 27, 2006, AB 32 codifies a key requirement of EO S-3-05, specifically the requirement to reduce statewide GHG emissions to 1990 levels by 2020. AB 32 tasks CARB with monitoring state sources of GHGs and designing emission reduction measures to comply with the law’s emission reduction requirements. However, AB 32 also continues the CAT’s efforts to meet the requirements of EO S-3-05 and states that the CAT should coordinate overall state climate policy.

In order to accelerate the implementation of emission reduction strategies, AB 32 requires that CARB identify a list of discrete early action measures that can be implemented relatively quickly. In October 2007, CARB published a list of early action measures that it estimated could be implemented and would serve to meet about a quarter of the required 2020 emissions reductions (CARB, 2007a; **Appendix W**). In order to assist CARB in identifying early action measures, the CAT published a report in April 2007 that updated their 2006 report and identified strategies for reducing GHG emissions (CAT, 2007; **Appendix W**). In its October 2007 report, CARB cited the CAT strategies and other existing strategies that may be utilized in achieving the remainder of the emissions reductions. AB 32 requires that CARB prepare a comprehensive “scoping plan” that identifies all strategies necessary to fully achieve the required 2020 emissions reductions.

According to AB 32 this scoping plan must be in place no later than January 1, 2009. CARB has initiated preparation of the scoping plan and plans on adopting a final plan in late 2008 (CARB, 2007b).

Executive Order S-01-07 (EO S-01-07)

EO S-01-07 was signed by the Governor on January 18, 2007. It mandates a statewide goal to reduce the carbon intensity of transportation fuels by at least 10 percent by 2020. This target reduction was identified by CARB as one of the AB 32 early action measures identified in their October 2007 report.

Western Regional Climate Initiative

The Western Regional Climate Initiative creates a coalition of western states (California, Washington, Oregon, Arizona, New Mexico) and British Columbia, Canada that have agreed to collaborate on identifying, evaluating, and implementing regional mechanisms for reducing GHG emissions. In light of this goal, the Initiative creates a regional emissions registry and plans the creation of a regional market-based multi-sector emissions reduction mechanism by August 2008.

Senate Bill 97 (SB 97)

Signed by the governor on August 24, 2007, SB 97 requires that no later than July 1, 2009, the state Office of Planning and Research (OPR) prepare California Environmental Quality Act (CEQA) guidelines for evaluating the effects of GHG emissions and for mitigating such effects. The Resources Agency is required to certify and adopt these guidelines by January 1, 2010. It is anticipated that this guidance would establish standardized significance criteria for the purposes of assessing project impacts pursuant to CEQA. In the absence of current guidelines, OPR has referred CEQA document authors to existing guidelines, examples of impact analysis in existing CEQA documents (which OPR acknowledges ranges greatly from little analysis due to the speculative nature of climate change impact analysis to the calculation of GHG emissions and the inclusion of mitigation), and to a variety of white papers on the subject of GHG impact analysis, including one prepared by the Association of Environmental Professionals (OPR, 2007).

3.4.3 POLLUTANTS OF CONCERN

Air pollution comes from many different sources. Sources are subdivided into four major emission categories: stationary sources, area-wide sources, mobile sources, and natural sources. Stationary source emissions are based on estimates made by facility operators and local air districts. Emissions from specific facilities can be identified by name and location. CARB and local air districts estimate area-wide emissions. Emissions from area-wide sources may be either from small individual sources, such as residential fireplaces, or from widely distributed sources that cannot be tied to a single location, such as consumer products and dust from unpaved roads. CARB staff estimates mobile source emissions with assistance from districts and other government agencies. Mobile sources include on-road cars, trucks, and buses and other sources such as boats, off-road recreational vehicles, aircraft, and trains. CARB staff and the air districts also estimate natural sources. These sources include biogenic hydrocarbons, geogenic hydrocarbons, natural wind-blown dust, and wildfires. These pollution sources can emit a wide variety of pollutants, which can affect air quality in many ways. Following are the pollutants of particular concern in the SJVAB.

CARBON MONOXIDE

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Other non-road engines and vehicles (such as construction equipment and boats) contribute about 22 percent of all CO emissions nationwide. Higher levels of CO generally occur in areas with heavy traffic congestion. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are sources of CO indoors. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. Under inversion conditions warm air is unable to rise and the air pollution becomes trapped near the ground beneath a layer of warm air.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person’s ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

Motor vehicles are the dominant source of CO emissions in most areas. CO is described as having only a local influence because it dissipates quickly. High CO levels develop primarily during winter when periods of light winds combine with the formation of ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Because CO is a product of incomplete combustion, motor vehicles exhibit increased CO emission rates at low air temperatures. High CO concentrations occur in areas of limited geographic size, sometimes referred to as hot spots. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, in active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

State and Federal CO standards have been set for both 1-hour and 8-hour averaging times. The State 1-hour standard is 20 parts per million (ppm) by volume, while the Federal 1-hour standard is 35 ppm. The 8-hour standard for both is 9 ppm. Madera County is designated unclassified for the State ambient CO standards and unclassifiable/attainment for the Federal CO standards.

OZONE

Ozone is a highly reactive gas molecule composed of three oxygen atoms (O_3); it has a light blue color at very high concentrations. Ozone occurs naturally at altitudes high in the stratosphere (35,000 to 65,000 feet, depending on latitude and season) where it shields life on earth from harmful ultraviolet radiation. Depletion of stratospheric ozone by chemical reactions involving anthropogenic chemicals (principally chlorofluorocarbons) allows this radiation to reach the earth's surface, thereby endangering the biosphere. Ozone is also present in the first few hundred feet of elevation above ground level (in the troposphere) due to chemical reactions between hydrocarbons and nitrogen oxides from natural and anthropogenic sources in the presence of sunlight. Because of its reactivity, tropospheric ozone present in high enough concentrations as an air pollutant adversely affects human health and damages crops and materials. All references to "ozone" in this document refer to tropospheric ozone.

Ozone is not emitted directly into the air, but is formed by a photochemical reaction in the atmosphere. Ozone is the product of a series of chemical reactions involving sunlight, reactive organic gases (ROG)[15], and nitrogen oxides (NO_x). ROG and NO_x are "ozone precursors" and are considered primary pollutants because they are emitted directly into the atmosphere. ROG is composed of hydrocarbon compounds that contribute to the formation of smog by its involvement in atmospheric chemical reactions. Ozone is considered a secondary pollutant because it is formed in the atmosphere from primary pollutants via photochemical reactions. Because photochemical reaction rates depend on the intensity of ultraviolet light and air temperature, ozone is primarily a summer air pollution problem and often the effects of the emitted ROG and NO_x are felt a distance downwind of the emission sources.

Generally, the higher the temperature, the more ozone is formed within the valley, since reaction rates increase with temperature. However, extremely hot temperatures can "lift" or "break" the inversion layer. Typically, if the inversion layer doesn't lift to allow the build-up of contaminants to be dispersed into the Southeast Desert, the ozone levels will peak in the late afternoon,

[15] Reactive organic gases are also sometimes called volatile organic compounds (VOCs). CARB originally expressed hydrocarbon emissions data as reactive organic gases rather than volatile organic compounds. However; CARB now considers the terms to be synonymous. VOC emissions are a subset of ROG emissions.

sometimes as late as 3 to 7 p.m. If the inversion layer breaks and the resultant afternoon winds occur, the ozone will peak in the early afternoon and decrease in the late afternoon as the contaminants are transported to the Southeast Desert.

Because sunlight is required to form ozone and the chemical reactions are not instantaneous, the greatest concentrations of ozone are usually downwind of urban centers and usually occur on summer afternoons when sunlight is most intense. Occasionally during the summer months ozone levels are built up in the valley floor and get transported with the upslope (mountain) flow during the day, creating exacerbated air quality conditions in the foothills and lower mountains of the Sierras. In fact, Sequoia/Kings Canyon and Yosemite National Parks periodically experience some of the worst air quality in the National Park Service.

In summer, as weather systems move through the area, a cycle of stable and less-stable air masses over the valley results in alternating periods of higher and lower ozone concentrations. During the winter months, a number of factors contribute to reduced ozone concentrations: clouds and fog block the required solar radiation at ground level, the sun angle is lower, the days are shorter, wintertime storms produce good dispersion conditions that inhibit the buildup of pollutants, and temperatures are not high enough to produce ozone in great quantities.

Ozone can irritate lung airways and cause inflammation much like a sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high. Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors in the summer is at risk, particularly children and other people who are active outdoors. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like chronic obstructive pulmonary disease, pneumonia, and bronchitis.

In setting the 8-hour ozone standard, EPA concluded that replacing the existing 1-hour standard with an 8-hour standard was appropriate to provide adequate and more uniform protection of public health from both short-term (1 to 3 hours) and prolonged (6 to 8 hours) exposures to ozone. In addition, the State adopted an 8-hour standard for ozone on April 28, 2005 of 0.070 ppm but the standard is not expected to become effective until early 2006.

Due to the fact that ozone is created over a period of time and sometimes miles downwind of the pollutant sources, ozone is considered a regional pollutant, i.e. entire regions are classified non-attainment. Ozone precursors can be transported well away from the source area before ozone concentrations peak. The SJVAB, which includes both valley and mountainous areas, has been designated as a "serious" non-attainment area for the Federal 8-hour ozone standard with an attainment deadline of June 2013. The region is also designated non-attainment for the State 1-hour ozone standard.

PARTICULATE MATTER

Particle matter (PM) is a mixture of microscopic solids and liquid droplets suspended in air. Like ozone, PM is considered a regional pollutant in part because of its tendency to remain suspended in the air over long periods of time. PM is made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, soil or dust particles, and allergens (such as fragments of pollen or mold spores). The size of particles is directly linked to their potential for causing health problems. Small particles less than 10 micrometers in diameter pose the greatest problems because they can get deep into the lungs, and some may even get into the bloodstream. Exposure to such particles can affect both the lungs and the heart. Larger particles are of less concern, although they can irritate the eyes, nose, and throat. Particulate matter may be divided into many size fractions, measured in microns (a micron is one-millionth of a meter). CARB regulates two size classes of particles: particles up to 10 microns (PM_{10}) and particles up to 2.5 microns in size ($PM_{2.5}$). $PM_{2.5}$ particles are a subset of PM_{10}. **Figure 3.4-1** shows the relative sizes of particulate matter.

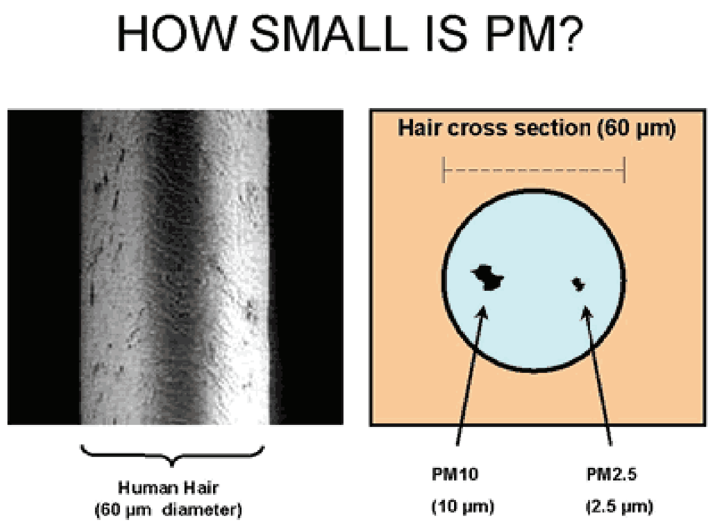

Figure 3.4-1 – Relative sizes of particulate matter pollution
Source: CARB, 2005.

Particle exposure can lead to a variety of health effects. For example, numerous studies link particle levels to increased hospital admissions and emergency room visits, and even to death from heart or lung diseases. Both long- and short-term particle exposures have been linked to health problems. Long-term exposures, such as those experienced by people living for many years in areas with high particle levels, have been associated with problems such as reduced lung function and the development of chronic bronchitis, and even premature death. Short-term exposures to particles (hours or days) can aggravate lung disease, causing asthma attacks and acute bronchitis, and may also increase susceptibility to respiratory infections. In people with heart disease, short-term exposures have been linked to heart attacks and arrhythmias. Healthy children and adults have not been reported to suffer serious effects from short-term exposures, although they may experience temporary minor irritation when particle levels are elevated.

EPA first established NAAQS for PM in 1971. The primary standards (measured by the indicator total suspended particulates or TSP) were 260 micrograms per cubic meter ($\mu g/m^3$), 24-hour average, and 75 $\mu g/m^3$, annual geometric mean. In 1987, EPA changed the indicator for particles from TSP to PM_{10}, the latter including particles with a mean aerodynamic diameter less than or equal to 10 µm, which delineates that subset of inhalable particles small enough to penetrate to the thoracic region of the respiratory tract. The standards were changed to 150 $\mu g/m^3$ for 24-hours and 50 $\mu g/m^3$ for annual geometric mean. In July 1997, while it was determined that the PM NAAQS should continue to focus on particles less than or equal to 10 µm in diameter, it was also determined that the fine and coarse fractions of PM_{10} should be considered separately. EPA recently promulgated a new standard for $PM_{2.5}$, or fine particulate matter. The new NAAQS were 65 $\mu g/m^3$ for a 24-hour sample, and 15 $\mu g/m^3$ for an annual arithmetic mean. Due to the fact that specific monitoring data did not exist at the time, official designations did not occur until December 17, 2004. Now that non-attainment designations have taken effect, the State and local governments have three years to develop implementation plans for reducing air pollutant emissions contributing to fine particle concentrations, in order to lower PM levels.

In 1982, CARB adopted California standards for PM_{10}, i.e. 50 $\mu g/m^3$ as a 24-hour average and 30 $\mu g/m^3$ as an annual geometric mean. On July 5, 2003 the State modified the PM CAAQS with a new $PM_{2.5}$ standard of 12 $\mu g/m^3$ as an annual arithmetic mean, lowered the annual average PM_{10} to 20 $\mu g/m^3$, and retained the 24-hour PM_{10}.

The SJVAB has an extensive network of $PM_{10}/PM_{2.5}$ monitors; however, there are no PM_{10} or $PM_{2.5}$ monitors within 20 miles of the Madera site and none within 30 miles of the North Fork site. The closest $PM_{10}/PM_{2.5}$ monitor to the Madera site is in Fresno on 1st Street, which is about 25 miles southeast, but since Fresno is a larger metropolitan area than Madera, the $PM_{10}/PM_{2.5}$ monitor in Merced, which is 29 miles northwest of the Madera site, would probably be more representative. The closest $PM_{10}/PM_{2.5}$ monitor to the North Fork site is in Clovis on Villa Avenue, approximately 31 miles south southwest.

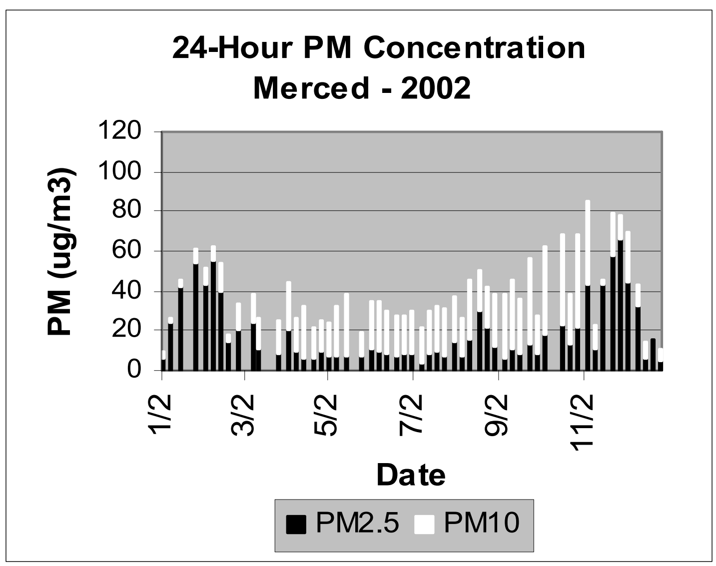

Figure 3.4-2 – Particulate matter concentrations in Merced in 2002
Source: CARB, 2005.

However, since the Clovis monitor is in the valley at only 86 feet elevation, it is not considered representative for the North Fork site area.

Figure 3.4-2 illustrates the variation in PM_{10} and $PM_{2.5}$ levels throughout 2002 in Merced. The total height of each bar represents the PM_{10} concentration, while the height of the black portion of each bar represents the $PM_{2.5}$ fraction. In Merced, the highest PM_{10} and $PM_{2.5}$ concentrations occurred during the winter. The colder, more stagnant conditions during this time of the year are conducive to the buildup of $PM_{2.5}$, including the formation of secondary ammonium nitrate. In addition, increased activity from residential wood combustion may also occur.

In contrast, the coarse fraction (particles between $PM_{2.5}$ and PM_{10} in size) was highest during the spring through the early fall. The coarse fraction is primarily due to activities that resuspend dust, such as emissions from paved and unpaved roads and construction. Based on 2000-2003 monitoring data, CARB estimates that throughout the entire valley portion of the SJVAB, $PM_{2.5}$ makes up approximately 70 percent of ambient PM_{10} during the winter (November through February). $PM_{2.5}$ makes up approximately 30 percent of ambient PM_{10} during the rest of the year. On an annual average basis, $PM_{2.5}$ makes up approximately 50 percent of ambient PM_{10}. Data does not exist to give a clear picture of the component make-up for the mountainous North Fork site area.

The County of Madera is designated non-attainment for the Federal PM_{10} standard and unclassifiable/attainment for the Federal $PM_{2.5}$ standard. It is classified non-attainment for both the State PM_{10} and $PM_{2.5}$ standards.

TOXIC AIR CONTAMINANTS

In addition to the above-listed criteria pollutants, Toxic Air Contaminants (TACs) are another group of pollutants of concern. Sources of TACs include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to TACs can result from emissions from normal operations, as well as accidental releases. Health effects of TACs include cancer, birth defects, neurological damage, and death.

OTHER CRITERIA POLLUTANTS

The standards for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), sulfates, hydrogen sulfide, vinyl chloride, lead, and visibility-reducing particles are being met or are unclassifiable in the Madera County area, and the latest pollutant trends suggest that these standards will not be exceeded in the foreseeable future. Madera County is designated attainment or unclassified for all other State and Federal standards.

INDOOR AIR QUALITY

The total quantity of air pollutants emitted indoors is less than that emitted by outdoor sources. However, once emitted, indoor air pollutants are diluted much more slowly, due to the partial trapping effect of the building shell. Additionally, indoor emissions occur in closer proximity to people; Californians, like others from industrialized nations, spend most of their time indoors. California adults spend an average of 87 percent of their time indoors, and children under 12 years of age spend about 86 percent of their time indoors. Most of the time spent indoors is spent in the home; however, working adults spend about 25 percent of their time at other indoor locations such as office buildings, stores, and restaurants, primarily for work, while children spend about 21 percent of their time in school on a school day. Because of these time budgets, the trapping effect of buildings, and people's proximity to indoor emissions, there is a much higher likelihood that people will be exposed to indoor pollutants than outdoor pollutants. Investigators have calculated that pollutants emitted indoors are 1,000 times more likely to be inhaled than those emitted outdoors (CARB, 2005b).

Chemicals found in indoor air pollution can cause a variety of impacts on human health, from irritant effects to respiratory disease, cancer, and premature death. Indoor air pollutants can be elevated to levels that may result in adverse health effects. The major indoor pollutants that can have a substantial impact on Californians' health are listed in **Table 3.4-4**, along with their sources and associated health impacts. The health impacts of greatest significance include asthma, cancer, premature death, respiratory disease and symptoms, and irritant effects.

TABLE 3.4-4
SOURCES AND POTENTIAL HEALTH EFFECTS OF MAJOR INDOOR AIR POLLUTANTS

Pollutant	Major Indoor Sources	Potential Health Effects Associated with One or More of The Pollutants Listed*
Asbestos	Building materials in older homes disturbed during renovation. Naturally occurring in some soils.	Lung cancer, asbestosis, mesothelioma.
Biological Agents (bacteria, fungi, viruses, house dust mites, animal dander, cockroaches, microbial VOCs)	House and floor dust; bedding; poorly maintained air conditioners, humidifiers, dehumidifiers; moist structures; insect infestation; building occupants; pets.	Allergic reactions; asthma; eye, nose, and throat irritation; humidifier fever, influenza, other infectious diseases.
Carbon Monoxide	Unvented/malfunctioning gas and propane appliances, woodstoves, fireplaces, tobacco smoke, vehicles in garages.	Headache; nausea; angina; impaired vision and mental functioning; fatal at high concentrations.
Endocrine Disruptors (PBDEs, some phthalates, some pesticides)	Flame retardants, plastics, pesticides.	Mimic or block natural effects of hormones (estrogen and others); developmental abnormalities.
Environmental Tobacco Smoke (ETS)	Cigarettes, cigars, and pipes.	Respiratory irritation, bronchitis and pneumonia in children; asthma in preschool children; lung cancer; heart disease; aggravated asthma; decreased lung function.

Pollutant	Major Indoor Sources	Potential Health Effects Associated with One or More of The Pollutants Listed*
Formaldehyde, Other Aldehydes	Composite wood products such as plywood and particleboard, furnishings, wallpaper, durable press fabrics, paints, combustion appliances, tobacco smoke.	Cancer; eye, nose, and throat irritation; headache; allergic reactions; aggravated asthma, decreased lung function.
Lead	Lead paint chips, contaminated soil.	Learning impairment.
Nitrogen Dioxide	Unvented or malfunctioning gas appliances, other combustion appliances.	Aggravated asthma; decreased lung function; eye, nose, and throat irritation; increased respiratory disease in children.
Organic Chemicals (benzene, chloroform, paradichlorobenzene, methylene chloride, perchloroethylene, others)	Solvents, glues, cleaning agents, pesticides, building materials, paints, treated water; moth repellents, dry-cleaned clothing, air fresheners.	Cancer; eye, nose, throat irritation; aggravated asthma; decreased lung function; at high levels: loss of coordination, damage to liver, kidney, brain.
Ozone	Infiltration of outdoor air, some air “purifiers”, office machines.	Lung inflammation, aggravated asthma, cough, wheeze, chest pain.
Particulate Matter	Cigarettes, wood stoves, fireplaces, cooking, candles, aerosol sprays, house dust.	Increased mortality and hospital admissions; lung cancer; irritation; susceptibility to sinus and respiratory infections; bronchitis; aggravated asthma; decreased lung function.
Pesticides	Insecticides, herbicides, sanitizers or disinfectants used indoors or tracked in or blown in from outdoors.	Neurological impairment; nausea, headache, dizziness; skin and eye irritation; hormone disruption.
Polycyclic Aromatic Hydrocarbons (PAH)	Cigarette smoke, cooking, wood burning.	Cancer, gene mutation.
Radon	Uranium-bearing soil under buildings, groundwater, construction materials.	Lung cancer (especially in smokers).

NOTE: *When multiple pollutants are listed in a group, each pollutant may not cause all of the health effects listed in the third column.
SOURCE: CARB, 2005b.

GREENHOUSE GASES

Introduction

The Fourth Assessment Report, issued by the International Panel on Climate Change (IPCC) in 2001, anticipates that the average global temperature between the years 2000 and 2100 could rise from 0.6 (33.0) to 4.0 ^{o}C (39.2 ^{o}F) (IPCC, 2007). The extent to which human activities affect global client change is a subject of considerable scientific debate. While many in the scientific community contend that global climate variation is a normal cyclical process that is not necessarily related to human activities, the IPCC report identifies anthropogenic greenhouse gases (GHGs) as a contributing factor to changes in the Earth’s climate (Michaels, 2004; IPCC, 2007).

Preferring to error on the side of caution, the analysis in this Environmental Impact Statement (EIS) assumes anthropogenic GHGs are in fact contributing to global climate changes.

The U.S. Supreme Court has affirmed the authority of the U.S. Environmental Protection Agency (USEPA) to list GHGs as pollutants under the Federal Clean Air Act (CAA). To date, however, regulatory action at the federal level has not occurred. The State of California, on the other hand, recently passed the Global Warming Solutions Act of 2006 (Assembly Bill 32 [AB 32]), legislation designed to result in substantial reductions GHG emissions generated by human activities in California.

The Greenhouse Effect and Climate Change

The Earth's temperature is regulated by a system known as the "greenhouse effect." GHGs are primarily water vapor (H_2O), carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) that trap the heat of the sun, preventing radiation from dissipating into space. Water vapor is the most abundant GHG and CO_2 is a distant second. Without the effect of these GHGs, which are both naturally occurring and anthropogenic, the average temperature on the Earth would be approximately –18 °C (-64.4 ^{o}F), instead of the current average of 15 °C (59 ^{o}F).

IPCC modeling estimates that anthropogenic CO_2 in the lower atmosphere has increased by approximately 31 percent since 1750. At the same time, average temperature in the lower atmosphere has increased approximately 0.6 (33.0) to 0.8 ^{o}C (33.4 ^{o}F). Due to the challenges inherent in modeling the complexities of the Earth's climate, the proportional importance of anthropogenic activities as opposed to natural feedback systems is exceptionally difficult to establish. Nonetheless, the IPCC concludes that "Most of the observed increase in globally-averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." As noted above, this EIS assumes that an increase in anthropogenic GHG concentration is in fact contributing to global warming.

IPCC theorizes that a continuation of this warming trend could have profound implications, including flooding, erratic weather patterns, increased sea levels, and reduced arctic ice. The IPCC projects a number of future GHG emissions scenarios leading to a varying severity of impacts on the environment and the global economy. According to the 2007 IPCC report if anthropogenic GHG continue to increase in the atmosphere there will be a point at which the above impacts would become irreversible, this point is commonly referred to as the "tipping point." Although the 2007 IPCC Report states the tipping point may be as far off as 20 years, some experts contend the tipping point has already been reached.

Table 3.4-5 illustrates the state contribution to the global increase in GHG emissions. The 2020 estimates assume "business as usual." As shown, without modifications in human activities or the introduction of new technologies, GHG emissions are anticipated to increase.

TABLE 3.4-5
GLOBAL GREENHOUSE GAS EMISSIONS

Regions	Estimated GHG Emissions
	Million metric tons per year of CO_2e[1]
	1990
Global Emissions	626,395
California Emissions	427
	2020
Global Emissions	882,246
California Emissions	600

[1]Carbon Dioxide Equivalent (see methodology in Section 4.12)
Source: CARB, 2007; IPCC. 2007

3.4.4 EXISTING AIR QUALITY DATA

The following is a description of existing air quality conditions in the Madera County area.

Madera County Emissions Summary

Table 3.4-6 summarizes estimated 2004 emissions in tons per year and tons per day of key criteria air pollutants from major categories of air pollutant sources. For each pollutant, estimated emissions are presented for Madera County as a whole and no further spatial refinement is available (CARB, 2005).

Since ozone is a reaction between reactive organic gases (ROGs) and nitrous oxides (NO_x), to get a clearer picture of the relative contribution to ozone, you have to evaluate emissions of both. NO_x is primarily a product of complete combustion of fossil fuels, and on-road vehicular influence on Madera County emissions is apparent. On-road motor vehicles contribute 31.3% of the total NO_x. However, industrial processes contribute an additional 26.9%, and other mobile sources contribute an additional 22.1%. For the on-road motor vehicles component, the vast majority of NO_x comes from heavy-duty diesel trucks, while the industrial processes component is primarily made up of food and agricultural operations. The other mobile sources component's primary contributors are farm equipment and trains. ROG is largely an evaporative emission, albeit also from combustion sources; therefore major contributors are less definitive. The largest single category of ROG emissions is also from on-road motor vehicles, but with only 26.6% of the total. Miscellaneous processes add another 23.8% and other mobile sources add another 19.7%. The primary on-road motor vehicles component is light-duty autos and trucks; the

TABLE 3.4-6
MADERA COUNTY 2004 ANNUAL EMISSIONS IN TONS PER DAY *(tpd)* AND TONS PER YEAR (*tpy)*

Emission Category	ROG		CO		NO_x		PM_{10}		$PM_{2.5}$	
	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy
Fuel Combustion										
Electrical Utilities	0.0	2	0.2	64	0.3	101	0.2	69	0.2	65
Cogeneration	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Oil and Gas Production (Combustion)	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Manufacturing and Industrial	0.0	3	0.1	27	0.6	225	0.0	10	0.0	10
Food and Agricultural Processing	0.1	48	0.6	208	1.5	555	0.1	38	0.1	37
Service and Commercial	0.0	4	0.1	22	0.5	168	0.0	7	0.0	7
Other (Fuel Combustion)	0.0	13	0.0	18	0.1	36	0.0	1	0.0	1
Waste Disposal										
Other (Waste Disposal)	0.0	4	0.0	0	0.0	0	0.0	0	0.0	0
Cleaning and Surface Coatings										
Laundering	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Degreasing	0.0	16	0.0	0	0.0	0	0.0	0	0.0	0
Coatings and Related Process Solvents	0.4	151	0.0	0	0.0	0	0.0	0	0.0	0
Printing	0.1	28	0.0	0	0.0	0	0.0	0	0.0	0
Adhesives and Sealants	0.0	10	0.0	0	0.0	0	0.0	0	0.0	0
Other (Cleaning and Surface Coatings)	0.1	53	0.0	0	0.0	0	0.0	1	0.0	1
Petroleum Production and Marketing										
Oil and Gas Production	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0
Petroleum Marketing	0.3	120	0.0	0	0.0	0	0.0	0	0.0	0
Industrial Processes										
Chemical	0.1	19	0.0	0	0.0	0	0.0	1	0.0	1
Food and Agriculture	1.6	600	1.5	553	6.1	2,210	0.4	155	0.2	79
Mineral Processes	0.2	58	0.0	1	1.3	486	0.5	182	0.4	138
Metal Processes	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Wood and Paper	0.0	0	0.0	0	0.0	0	0.0	17	0.0	10
Glass and Related Product	0.0	3	0.1	54	1.4	518	0.1	54	0.1	51
Other (Industrial Processes)	0.0	1	0.0	0	0.0	0	0.0	13	0.0	9

Emission Category	ROG		CO		NO_x		PM_{10}		$PM_{2.5}$	
	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy
Solvent Evaporation										
Consumer Products	1.0	363	0.0	0	0.0	0	0.0	0	0.0	0
Architectural Coatings and Related Process Solvents	0.4	151	0.0	0	0.0	0	0.0	0	0.0	0
Pesticides/Fertilizers	0.9	316	0.0	0	0.0	0	0.0	0	0.0	0
Asphalt Paving/Roofing	0.0	15	0.0	0	0.0	0	0.0	0	0.0	0
Miscellaneous Processes										
Residential Fuel Combustion	0.6	227	7.3	2,647	0.3	101	1.0	383	1.0	369
Farming Operations	2.7	990	0.0	0	0.0	0	5.6	2,027	1.4	517
Construction and Demolition	0.0	0	0.0	0	0.0	0	0.5	174	0.1	36
Paved Road Dust	0.0	0	0.0	0	0.0	0	4.2	1,520	1.8	667
Unpaved Road Dust	0.0	0	0.0	0	0.0	0	3.3	1,195	0.6	231
Fugitive Windblown Dust	0.0	0	0.0	0	0.0	0	2.2	803	0.5	177
Fires	0.0	2	0.1	20	0.0	1	0.0	3	0.0	3
Waste Burning and Disposal	1.1	391	10.1	3,672	0.5	190	1.3	466	1.2	440
Cooking	0.0	5	0.0	0	0.0	0	0.0	15	0.0	9
On-Road Motor Vehicles										
Light-Duty Passenger	1.6	579	16.6	6,041	1.6	585	0.1	25	0.0	15
Light-Duty Trucks	1.8	675	22.9	8,364	2.4	896	0.1	27	0.1	18
Medium-Duty Trucks	0.3	120	4.1	1,489	0.6	212	0.0	6	0.0	4
Light Heavy-Duty Gas Trucks	0.2	77	1.4	520	0.1	58	0.0	1	0.0	1
Medium Heavy-Duty Gas Trucks	0.2	85	1.8	643	0.1	41	0.0	0	0	0.0
Heavy Heavy-Duty Gas Trucks	0.2	67	3.2	1,172	0.2	86	0.0	0	0.0	0
Light Heavy-Duty Diesel Trucks	0.0	8	0.1	24	0.3	115	0.0	1	0.0	1
Medium Heavy-Duty Diesel Trucks	0.0	9	0.2	61	0.7	272	0.0	9	0.0	8
Heavy Heavy-Duty Diesel Trucks	0.2	71	0.8	303	3.6	1,300	0.1	32	0.1	27
Motorcycles	0. 1	38	0.8	306	0.0	8	0.0	0	0.0	0
Heavy Duty Urban Buses	0.1	46	1.2	443	0.2	89	0.0	1	0.0	1
School Buses	0.0	6	0.2	63	0.1	48	0.0	1	0.0	1
Motor Homes	0.1	23	1. 7	610	0.2	60	0.0	0	0.0	0
Other Mobile Sources										
Aircraft	0.1	20	1.7	631	0.0	2	0.0	3	0.0	2
Trains	0.1	29	0.3	106	1.9	694	0.1	19	0.0	18

Emission Category	ROG		CO		NO_x		PM_{10}		$PM_{2.5}$	
	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy	tpd	tpy
Recreational Boats	1.5	540	9.0	3,285	0.4	147	0.1	41	0.1	31
Off-Road Recreational Vehicles	0.9	334	3.4	1,256	0.1	23	0.0	0	0.0	0
Off-Road Equipment	0.4	159	4.2	1,522	1.2	422	0.1	31	0.1	28
Farm Equipment	0.5	194	3.5	1,284	3.7	1,351	0.2	90	0.2	83
Fuel Storage and Handling	0.1	55	0.0	0	0.0	0	0.0	0	0.0	0
TOTAL	**18.4**	**6,727**	**97.0**	**35,408**	**30.1**	**10,971**	**20.3**	**7,424**	**8.5**	**3,095**

SOURCE: CARB, 2005.

primary miscellaneous processes components are farming operations, and waste burning and disposal; and the other mobile sources primary contributors are recreational boats and off-road recreational vehicles.

On road motor vehicles are the primarily contributor of CO in Madera County, with 56.2% of the total CO. Other mobile sources contribute an additional 22.7%. Again, light-duty vehicles and recreational boats are the major contributors.

Both PM_{10} and $PM_{2.5}$ are almost completely the result of miscellaneous processes (88.2% of PM_{10} and 77.8% of $PM_{2.5}$ emissions). The major contributors of PM_{10} emissions from miscellaneous processes are farming operations and paved road dust. Since $PM_{2.5}$ is more likely from combustion sources, the major contributors of $PM_{2.5}$ emissions from miscellaneous processes are farming operations, paved road dust, waste burning and disposal, and residential fuel combustion.

AIR QUALITY MONITORING

CARB and local air districts operate a regional monitoring network that measures the ambient concentrations of the six criteria pollutants. The major pollutants of concern in the project area are ozone, CO, and particulate matter. Existing and probable future levels of air quality in the project area can generally be inferred from ambient air quality measurements conducted by the SJVAPCD and CARB at their monitoring stations. There is only one monitoring site in the County of Madera. It is the Madera Pump Yard site, located at Avenue 8 and Road 29½ in Madera, about 11 miles south southeast of the Madera site but 38 miles southwest of the North Fork site. The Madera Pump Yard site measures ozone, nitrogen oxides (NO_2), and total non-methane hydrocarbons. Other stations affecting the Madera site are in the more metropolitan areas north and south of Madera. The nearest monitoring station that measures CO is the Fresno Skypark Site, which is located about 18 miles southeast of the Madera site on Chennault Avenue in Fresno. The Fresno Skypark Site monitors NO_2 and ozone as well as CO. The nearest particulate samplers are about 25 miles southeast of the Madera site in Fresno on North First Street and about 29 miles northwest of the Madera site in Merced on M Street.

The North Fork site is in a more rural mountainous setting. Monitoring is predominantly limited to the urbanized areas. In the SJVAB, the monitoring sites are almost exclusively on the valley floor. In fact, the nearest monitor of any kind to the North Fork site is in Clovis at an elevation of 85 feet. All the other sites mentioned with regards to the Madera site are between 35 and 55 miles from the North Fork site and, again, represent more urbanized conditions at elevations of less than 100 feet. The most representative monitoring station for the North Fork site would probably be the Turtleback Dome site in Yosemite. It is about 36 miles north northwest of the North Fork site and is at 1,746 feet elevation.

Table 3.4-7 provides the latest three-year summary of monitoring data for ozone, CO, PM_{10}, and $PM_{2.5}$ from these monitors.

When interpreting the data presented below, it is essential to understand the difference between an exceedance and a violation. An exceedance is any concentration that is higher than the level of the standard. In contrast, violations are a subset of the exceedances. A violation is any exceedance that is not affected by a highly irregular or infrequent event, and therefore cannot be excluded from the area designation process. An area is designated as non-attainment for a pollutant if air quality data show that a standard for the pollutant was violated at least once during the previous three calendar years. As explained above, exceedances that are affected by highly irregular or infrequent events are not considered violations of a standard and are not used as a basis for designating an area as non-attainment.

TABLE 3.4-7
AIR MONITORING RESULTS

Pollutant (Location)	CAAQS	NAAQS	2002	2003	2004
Ozone (Madera Pump Yard)					
Highest 1-Hour Average (ppm)	0.09	0.12	0.141	0.120	0.097
Highest 8-Hour Average (ppm)	0.070	0.08	0.110	0.102	0.084
Days > State 1-Hour Standard			21	15	3
Days > Federal 1-Hour Standard			2	0	0
Days > Federal 8-Hour Standard			18	14	0
Ozone (Fresno Skypark)					
Highest 1-Hour Average (ppm)	0.09	0.12	0.157	0.130	0.111
Highest 8-Hour Average (ppm)	0.070	0.08	0.132	0.112	0.095
Days > State 1-Hour Standard			66	35	16
Days > Federal 1-Hour Standard			15	1	0
Days > Federal 8-Hour Standard			78	32	12
Ozone (Yosemite Turtleback Dome)					
Highest 1-Hour Average (ppm)	0.09	0.12	0.106	0.135	0.137
Highest 8-Hour Average (ppm)	0.070	0.08	0.095	0.102	0.124
Days > State 1-Hour Standard			15	6	6
Days > Federal 1-Hour Standard			0	1	1
Days > Federal 8-Hour Standard			24	10	8
Carbon Monoxide (Fresno Skypark)					
Highest 8-Hour Average (ppm)	9.0	9	1.91	1.68	2.19
Days > State 8-Hour Standard			0	0	0
Days > Federal 8-Hour Standard			0	0	0
PM_{10} (Merced M Street)					
Highest State 24-Hour Average ($\mu g/m^3$)	50		88	75	57
Highest Federal 24-Hour Average ($\mu g/m^3$)		150	85	74	56
Calculated Days > State Standard			84.8	44.4	12.3
Calculated Days > Federal Standard			0	0	0
State Annual Average	20		39.6	32.7	28.7
National Annual Average		50	38.8	32.1	27.9
PM_{10} (Fresno First Street)					
Highest State 24-Hour Average ($\mu g/m^3$)	50		100	74	58
Highest Federal 24-Hour Average ($\mu g/m^3$)		150	96	74	54
Calculated Days > State Standard			90.4	79.6	30.2
Calculated Days > Federal Standard			0	0	0
State Annual Average	20		28.0	35.0	31.3
National Annual Average		50	38.9	34.7	30.9

$PM_{2.5}$ (Merced M Street)					
Highest Federal 24-Hour Average (μg/m^3)		65	66	46.7	53.1
Days > Federal Standard			1	0	0
State Annual Average	12		18.7	15.7	15.2
National Annual Average		15	18.8	15.7	15.2
$PM_{2.5}$ (Fresno First Street)					
Highest Federal 24-Hour Average (μg/m^3)		65	84	63	71
Days > Federal Standard			13	0	2
State Annual Average	12		N/A	17.7	16.8
National Annual Average		15	21.6	17.7	16.4

NOTES: The number of days that at least one measurement was greater than the level of the State or national standard is not necessarily the number of violations of the standard for the year, since the 1-hour and 8-hour standards can be violated more than once per day.
The 1-hour Federal ozone standard was in effect for these three monitoring years, even though it is now inapplicable.
ppm = parts per million; μg/m^3 = micrograms per cubic meter.
Calculated days = days above the standard if measurements were made on a daily basis (PM is normally only measured once every six days).
SOURCE: CARB, 2005.

Based on the data shown in **Table 3.4-7**, the following interpretations can be made:

- **Ozone Ambient Data**
  - While the Fresno station also showed 15 exceedances of the 1-hour ozone NAAQS in 2002, only 1 in 2003, and none in 2004, the Madera station only had 2 exceedances in 2002 and none in either 2003 or 2004.
  - The Yosemite station showed no exceedances of the Federal 1-hour standard in 2002 and only one per year in 2003 and 2004.
  - The Federal 8-hour ozone standard was exceeded many times at the Fresno station (from 78 times in 2002 to 12 times in 2004), but even though the Madera station also showed multiple exceedances of the standard in 2002 and 2003 (18 and 14 respectively), the site had no exceedances in 2004.
  - The Yosemite station had multiple exceedances of the Federal 8-hour standard in the three monitoring years (from 24 in 2002 to only 8 in 2004).

- **CO Ambient Data**
  - There were no exceedances of the CAAQS or NAAQS for CO at either monitoring station during the last three years.

- **PM_{10} Ambient Data**
  - The 24-hour Federal PM_{10} standard was not exceeded at either the Merced M Street monitoring station or the Fresno First Street station in 2002, 2003, or 2004.
  - The State 24-hour PM_{10} standard was exceeded at both stations in all three years. In fact, it was calculated that the State standard was exceeded on over 90 days per year in 2002 at the Fresno station and on almost 85 days per year at the Merced station in

2002. By 2004 those calculated exceedances were down to over 30 days per year at Fresno and to just over a dozen days per year at Merced.
  - The State annual average for PM_{10} was exceeded in each year for which data were available.
  - The Federal annual average PM_{10} was not exceeded at either site during 2002, 2003, or 2004.

- **$PM_{2.5}$ Ambient Data**
  - The Federal $PM_{2.5}$ 24-hour standard was exceeded at both the Fresno and Merced stations in 2002. Neither station exceeded the standard in 2003. In 2004 the Fresno station exceeded the standard while the Merced did not exceed it.
  - The annual averages for both the State and Federal standards were exceeded at both stations in all three years.

ODORS

Existing odor sources in the area of the Madera site are primarily limited to those associated with various agricultural activities, including fertilization and scattered cattle grazing activities. There is one potential odor source in the area of the Madera site. An existing facility that uses fiberglass in its product is located about a mile southeast. That facility is discussed in more detail below. During site visits, AES observed no detectable odors from the Madera site area.

Existing odor sources in the area of the North Fork site are limited. During site visits, AES observed no detectable odors from the North Fork site area.

TOXIC AIR CONTAMINANTS

A major source of toxics is defined as a source that emits 10 tons per year of any listed toxic air pollutant or 25 tons per year of a mixture of air toxics. An area source is defined as a source that emits less than these levels of air toxics and which is a concern because there are a large number of these small emitters within a single area. A search of the EPA Toxic Release Inventory shows a major source of toxic emissions located about a mile southeast of the Madera site. Florestone Products Company, located on Falcon Drive, is a manufacturing plant producing products like molded shower receptors, gel-coated fiberglass reinforced bathtubs, showers, tub/showers and whirlpools. The company also produces acrylic bathtubs, whirlpools, shower receptors and utility sinks and shower doors. Florestone was reported to have emitted over 50 tons of styrene in 2002 (EPA, 2005). The SJVAPCD (McVeigh, 2005) stated that the Florestone facility is not considered a “Hot Spot” at this time; styrene is exempt unless emitted in copious quantities.

No major source of toxics has been identified in the area surrounding the North Fork site.

SENSITIVE RECEPTORS

Current land uses in the vicinity of the Madera site are largely agricultural. There are some rural residential land uses near the northwest corner of the Madera site. Just southwest of the Madera site is another collection of rural residential land uses, near the northern entrance to the Madera Airport. Whereas there are mostly commercial operations immediately adjacent to State Highway 99 (SR-99) on the northeastern side, there is a collection of residential units west of the Madera site.

Several private and public school facilities are within a 3-mile radius of the Madera site. Two private schools are located about 2 miles east of the Madera site on Road 26 (Crossroads Christian and Madera Christian School); a private day care center is located about 3 miles southeast on Schnoor Street (Kiddie Kountry Club); and a Merced County Office of Education facility is located about 3 miles east on Road 26.

Current land uses in the vicinity of the North Fork site are largely open space and unused. There are few rural residential land uses in the area of the North Fork site.