5.1 Air Quality

This section presents the assessment of potential impacts on air quality as a result of the construction and operation of the Mariposa Energy Project (MEP). The section includes a discussion of the existing air quality setting and the applicable laws, ordinances, regulations, and standards (LORS); the emission estimates for the facility; and the methodology used to determine the potential air quality impacts related to the construction, commissioning, and operation of the proposed facility. A discussion of the mitigation measures and a protocol for cumulative impacts are also included. Potential public health risks posed by emissions of toxic air contaminants, including ammonia, are addressed in Section 5.9, Public Health.

5.1.1 Existing Site Conditions

MEP will be located on approximately 10 acres of a 158-acre parcel known as the Lee Property in the northeastern corner of unincorporated Alameda County (Section 1, Township 2 South, Range 3 East). The Lee Property is south of Kelso Road and east of Bruns Road. I-580 is approximately 3.5 miles to the south and the closest segment of the Byron Highway is approximately 2 miles to the northwest.

5.1.1.1 Geography and Topography

The Lee Property is relatively flat with rolling hills and gullies. The property is currently used as grazing land, hosts the 6.5-megawatt Byron Power Cogen Plant, is a former site of wind generation equipment, and includes major energy infrastructure easements (a natural gas pipeline and two electrical transmission lines). The project site is at an elevation of approximately 125 feet above sea level. The project site is near the base of the Diablo Mountain Range, which is oriented from the northwest to the southeast. The elevation in the Diablo Mountain Range rises to approximately 1,200 feet within 5 miles west of the MEP site. The Diablo Mountain range includes Mount Diablo, which is approximately 18 miles northwest of the project site and has a peak height of approximately 3,850 feet above sea level. The area to the north and east of the MEP site is flat agricultural land that drops to approximately sea level within 5 miles of the proposed project site. The nearest Class I areas are the Point Reyes National Seashore (approximately 60 miles to the northwest), Yosemite National Park (approximately 95 miles to the east), and Pinnacles National Monument (approximately 96 miles to the south).

5.1.1.2 Climate and Meteorology

The MEP site is near the base of the Diablo Mountain Range and the western edge of the San Joaquin Valley. The climate to the east of the Diablo Mountain Range is similar to the climate of the San Joaquin Valley, while the climate to the west of the Diablo Mountain Range is similar to the climate of the Livermore Valley.

In general, the climate of the region, along with much of the West Coast of the country, is controlled by a semi-permanent high-pressure system that is centered over the northeastern Pacific Ocean. In the summer, this strong high-pressure system results in clear skies inland and coastal fog. Very little precipitation occurs during the summer months because storms are blocked by the high-pressure system. Beginning in the fall and continuing through the winter, the high pressure weakens and moves south, allowing storm systems to move through the area. Temperature, winds, and rainfall are more variable during these months.

Long-term average temperature and precipitation data have been collected from the nearest surface climatological stations in the San Joaquin and Livermore valleys (the Tracy Pumping Plant Station and the Livermore Station). The data indicate that July is usually the warmest month of the year, with a normal daily maximum temperature ranging from 89 to 90 degrees Fahrenheit (°F), and a normal daily minimum of 52 to 53°F (WRCC, 2009). In the fall and spring, the afternoon temperatures are mild, in the 60s and 70s, while nights are cooler, in the 40s and 50s (WRCC, 2009). In the winter, temperatures are cool in the afternoon and crisp at night. The coldest month is usually January, with a range of normal daily maximums of 55 to 57°F, and a normal daily minimum of approximately 37°F (WRCC, 2009). The Tracy Pumping Plant Station receives an average of 12.2 inches of rain annually and the Livermore Station receives an average of 14.3 inches (WRCC, 2009).

Atmospheric stability and mixing heights are important parameters in the determination of pollutant dispersion. Atmospheric stability reflects the amount of atmospheric turbulence and mixing. In general, the less stable an atmosphere, the greater the turbulence, which results in more mixing and better dispersion. The mixing height, measured from the ground upward, is the height of the atmospheric layer in which convection and mechanical turbulence promote mixing. Good ventilation results from a high mixing height and at least moderate wind speeds within the mixing layer.

Airflow in the San Joaquin Valley can be characterized by up-valley and down-valley winds. The down-valley winds are generally caused by airflows into the valley from the Carquinez Strait that then flow south. However, the predominant wind patterns measured at the Patterson Pass monitoring station are oriented from the southwest to the northeast. The quarterly wind roses and frequency distribution tables are provided in Appendix 5.1C.

On the eastern side of the Livermore Valley, the prevailing wind direction spans the north-northeast through east-northeast sectors, caused by drainage off the hills and flow out of the Altamont Pass. Flow is light during the late night and early morning hours, about 40 percent of the winds are less than 3 miles per hour (mph). A secondary, prevailing wind direction group, east-southeast through south-southwest, accounting for about 25 percent of the observations, is probably associated to daytime flow through the Altamont Pass on its way to the San Joaquin Valley and associated to winter storm passages (Bay Area Air Quality Management District [BAAQMD], 2009a).

5.1.2 Overview of Air Quality Standards

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for the following seven pollutants, termed criteria pollutants: ozone, nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. The federal Clean Air Act (CAA) requires EPA to designate areas (counties) as attainment or non-attainment with respect to each criteria pollutant, depending on whether the areas meet the NAAQS. An area that is designated non-attainment means the area is not meeting the NAAQS and is subject to planning requirements to attain the standard.

In addition to the seven pollutants listed above, the California Air Resources Board (ARB) has established state standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. Similar to EPA, ARB designates counties in California as attainment or non-attainment with respect to the California ambient air quality standards (CAAQS). The state standards were designed to protect the most sensitive members of the population, such as children, the elderly, and people who suffer from lung or heart diseases.

Both state and federal air quality standards are based on two variables: maximum concentration and an averaging time over which the concentration would be measured. Maximum concentrations were based on levels that may have an adverse effect to human health. The averaging times were based on whether the damage caused by the pollutant would occur during exposures to a high concentration for a short time (e.g., 1 hour), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants, there is more than one air quality standard, reflecting both short-term and long-term effects. Table 5.1-1 presents the NAAQS and CAAQS.

TABLE 5.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Ozone	1 hour 8 hours	0.09 ppm (180 μg/m^3) 0.07 ppm (137 μg/m^3)	— 0.075 ppm (147 μg/m^3)
CO	1 hour 8 hours	20 ppm (23 mg/m^3) 9.0 ppm (10 mg/m^3)	35 ppm (40 mg/m^3) 9 ppm (10 mg/m^3)
NO_2	1 hour Annual arithmetic mean	0.18 ppm (339 μg/m^3) [a] 0.030 (57 μg/m^3)	— 0.053 ppm (100 μg/m^3)
SO_2	1 hour	0.25 ppm (655 μg/m^3)	—
	3 hours	—	0.5 ppm [b] (1,300 μg/m^3) (Secondary standard)
	24 hours	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)
	Annual arithmetic mean	—	0.03 ppm (80 μg/m^3)
PM_{10}	24 hours Annual arithmetic mean	50 μg/m^3 20 μg/m^3	150 μg/m^3 —
$PM_{2.5}$	24 hours Annual arithmetic mean	— 12 μg/m^3	35 μg/m^3 [d] 15 μg/m^3 [c]
Sulfates	24 hours	25 μg/m^3	—
Lead	30-day average Calendar quarter	1.5 μg/m^3 —	— 1.5 μg/m^3
Hydrogen sulfide (H_2S)	1 hour	0.03 ppm (42 μg/m^3)	—
Vinyl chloride	24 hours	0.010 ppm (26 μg/m^3)	—

TABLE 5.1-1
Ambient Air Quality Standards

Pollutant	Averaging Time	California	National
Visibility-reducing particles	8 hours (10 a.m. to 6 p.m. PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	—

[a]On February 23, 2007, ARB approved a lower 1-hour NO_2 standard and a new annual-average NO_2 standard. These changes became effective on March 20, 2008.

[b]This is a national secondary standard, which is designed to protect public welfare.

[c]3-year average of the weighted annual mean concentrations.

[d]3-year average of 98th percentile of 24-hour concentrations.

$\mu g/m^3$ = micrograms per cubic meter
ppm = parts per million

Source: ARB, 2008a

5.1.3 Existing Air Quality

The federal CAA requires EPA to classify areas in the country as attainment or non-attainment, with respect to each criteria pollutant, depending on whether they meet the national standards. In addition, ARB makes area designations within California for state ambient air quality standards (AAQS). The attainment status for both the NAAQS and CAAQS are listed in Table 5.1-2.

TABLE 5.1-2
State and Federal Air Quality Designations for the Project Area

Pollutant	State Designation	Federal Designation
Ozone	1-Hour: Non-attainment 8-Hour: Non-attainment	1-Hour: Not Applicable 8-Hour: Non-attainment [a]
CO	1-Hour: Attainment 8-Hour: Attainment	1-Hour: Attainment 8-Hour: Attainment
NO_2	1-Hour: Attainment	Annual: Attainment
SO_2	1-Hour: Attainment 24-Hour: Attainment	24-Hour: Attainment Annual: Attainment
PM_{10}	24-Hour: Non-attainment Annual: Non-attainment	24-Hour: Unclassified
$PM_{2.5}$	Annual: Non-attainment	24-Hour: Non-attainment [b] Annual: Attainment
Lead, H_2S, and Sulfates	Attainment, Unclassified, Attainment	Attainment, No federal standard, No federal standard

[a] In June 2004, the Bay Area was designated as a marginal non-attainment area of the national 8-hour ozone standard. EPA lowered the national 8-hour ozone standard from 0.80 to 0.75 ppm effective May 27, 2008. EPA will issue final designations based on the new 0.75 ppm ozone standard by March 2010.

[b] EPA has designated the Bay Area as non-attainment for the 35 $\mu g/m^3$ $PM_{2.5}$ standard, effective April 2009.

Source: BAAQMD, 2009b

According to Appendix B (g)(8)(G) of the California Energy Commission (CEC) data adequacy checklist, the ambient concentrations of all criteria pollutants for the previous 3 years as measured at the three ARB-certified monitoring stations closest to the project site, along with an analysis of whether this data is representative of conditions at the project site, is required. The applicant may also substitute an explanation as to why information from one, two, or all stations is either not available or unnecessary.

The three closest ARB-certified monitoring sites are located approximately 12 miles southeast of the project site in Tracy, California (San Joaquin County), approximately 9 miles southwest of the project site in Livermore, California (Alameda County), and approximately 16 miles northwest of the project site at the Bethel Island monitoring station (Contra Costa County). The Stockton-Hazelton Avenue monitoring station is also located near the project site, approximately 18 miles to the northeast, in San Joaquin County. Based on comments received from BAAQMD, the Stockton–Hazelton Avenue station would be considered more representative than the Livermore monitoring site even though the Livermore Station is closer. Therefore, the ambient background monitoring data included in this analysis include the Stockton-Hazelton Avenue station along with the data for the Tracy Airport and Bethel Island. A discussion of the representativeness of each individual station is included in Section 5.1.4.3.

All ambient air quality data are based on data published by ARB (ADAM Web site), BAAQMD (BAAQMD Web site) and EPA (AIRS Web site). The ARB and BAAQMD data summaries were used as the primary source of data and the EPA AIRS database summaries were used when data were unavailable on the ARB and BAAQMD Web sites. The maximum ambient background concentrations will be combined with the modeled concentrations and used for comparison to the AAQS.

5.1.3.1 Nitrogen Dioxide

NO_2 is a byproduct of combustion sources such as on-road and off-road motor vehicles or stationary fuel-combustion sources. The principle form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts quickly to form NO_2, creating a mixture of NO and NO_2 commonly called NO_x. Exposures to NO_2, along with pollutants from vehicle exhaust, are associated with respiratory symptoms, episodes of respiratory illness, and impaired lung function (ARB, 2009a). The Bay Area Air Basin is currently designated attainment status for NO_2 by both EPA and ARB.

As shown in Table 5.1-3, NO_2 concentrations measured at the three nearest stations have not exceeded either the state or federal standards for the previous three years.

TABLE 5.1-3
Background NO_2 Concentrations ($\mu g/m^3$)

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Tracy Airport	1-hour	339 / —	105	85	88
	Annual	57 / 100	18.8	16.9	15.1
Stockton – Hazelton Avenue	1-hour	339 / —	135	132	143
	Annual	57 / 100	33.9	30.1	30.1

TABLE 5.1-3
Background NO_2 Concentrations (μg/m³)

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Bethel Island	1-hour	339 / —	83	90	56.4
	Annual	57 / 100	18.8	15.1	11.3

Source: BAAQMD, 2009c; ARB, 2009b; and EPA, 2009.

5.1.3.2 Ozone

Ozone is a photochemical oxidant that is formed when volatile organic compounds (VOCs) and NO_x react in the presence of ultraviolet sunlight. The principal sources of NO_x and VOC, often termed ozone precursors, are combustion processes (including motor vehicle engines) and evaporation of solvents, paints, and fuels. Motor vehicles are the single largest source of ozone precursor emissions in the Bay Area. Exposure to ozone can cause eye irritation, aggravate respiratory diseases and damage lung tissue, as well as damage vegetation and reduce visibility (BAAQMD, 1999). Elevated ozone levels can also reduce crop and timber yields, as well as damage native plants and materials such as rubber, fabrics, and plastics (ARB, 2009a). In 2006, the NAAQS for 1-hour ozone concentrations was revoked. The Bay Area Air Basin is designated as a non-attainment area for ozone by both EPA and ARB.

The current state regulatory 1-hour ozone concentration standards were exceeded at each of the three monitoring stations (Table 5.1-4). The measured 8-hour ozone concentrations also exceeded the federal and state standards.

TABLE 5.1-4
Background Ozone Concentrations (μg/m³)

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Tracy Airport	1-hour	180 / —	238	190	242
	8-hour	137 / 147	202	163	202
Stockton – Hazelton	1-hour	180 / —	214	183	206
Avenue	8-hour	137 / 147	181	161	179
Bethel Island	1-hour	180 / —	228	183	214
	8-hour	137 / 147	177	153	177

Source: BAAQMD, 2009c; ARB, 2009b; and EPA, 2009.

5.1.3.3 Sulfur Dioxide

Sulfur dioxide is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Effects from SO_2 exposures at levels near the 1-hour standard include broncho-constriction accompanied by symptoms, which may include wheezing, shortness of breath, and chest tightness, especially during exercise or physical activity (ARB, 2009a). The Bay Area Air Basin is designated attainment status for SO_2 by both EPA and ARB.

As shown in Table 5.1-5, SO_2 concentrations measured at the Bethel Island station have not exceeded either the state or federal standards in the past 3 years.

TABLE 5.1-5
Background SO_2 Concentrations (μg/m^3)[a, b]

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Bethel Island	1-hour	655 / —	44.5	47.1	31.4
	3-hour	— / 1300	28.8	34.0	23.6
	24-hour	105 / 365	18.3	13.1	10.5
	Annual	— / 80	5.50	3.93	5.24

[a]Source: BAAQMD, 2009c and EPA, 2009.
[b]SO_2 was not measured at the Tracy Airport or Stockton-Hazelton Monitoring Stations between 2006 and 2008.

5.1.3.4 Carbon Monoxide

CO is a colorless, odorless gas formed by incomplete combustion of fossil fuels. Motor vehicles are by far the single largest source of CO in the Bay Area (BAAQMD, 1999). Exposure to CO near the levels of the AAQS can lead to fatigue, headaches, confusion, and dizziness (ARB, 2009a). The Bay Area Air Basin is designated attainment status for the state CO standards by both EPA and ARB.

As shown in Table 5.1-6, CO concentrations measured at the Stockton-Hazelton Avenue and Bethel Island monitoring stations have not exceeded either the state or federal standards in the past 3 years.

TABLE 5.1-6
Background CO Concentrations (μg/m^3)

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Stockton – Hazelton Avenue	1-hour	23,000 / 40,000	5,039	4,123	2,978
	8-hour	10,000 / 10,000	2,577	2,645	2,130
Bethel Island	1-hour	23,000 / 40,000	1,489	1,260	1,145
	8-hour	10,000 / 10,000	1,145	916	916

Source: BAAQMD, 2009c; ARB, 2009b; and EPA, 2009

5.1.3.5 Fine Particulates (PM_{10} and $PM_{2.5}$)

Fine particulate matter (PM_{10} and $PM_{2.5}$) includes a wide range of solid or liquid particles, including smoke, dust, aerosols, and metallic oxides. There are many sources of fine particulate emissions, including combustion, industrial processes, grading and construction, and motor vehicles (BAAQMD, 1999).

Extensive research indicates that exposures to ambient PM_{10} and $PM_{2.5}$ concentrations that exceed current air quality standards are associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma. PM exposure is also associated with increased risk of premature death, especially in the elderly and people with pre-existing cardiopulmonary disease. In children, studies have shown associations between PM exposure and reduced lung function and increased respiratory symptoms and illnesses (ARB, 2009a). The Bay Area Air Basin is designated as non-attainment by ARB for the annual PM_{10}, 24-hour PM_{10}, and annual $PM_{2.5}$ state standards. The Bay Area Air Basin is designated by EPA as "unclassified" for the federal PM_{10} standard, non-attainment for the 24-hour $PM_{2.5}$ standard, and attainment for the annual $PM_{2.5}$ standard.

As shown in Table 5.1-7, PM_{10} concentrations measured at the Stockton-Hazelton, Tracy Airport, and Bethel Island monitoring stations did not exceed the 24-hour PM_{10} NAAQS. However, the 24-hour CAAQS PM_{10} standards have been consistently exceeded each year during the past 3 years, with the exception of the Bethel Island monitoring station in 2007. The annual PM_{10} concentrations recorded at the Stockton monitoring station and the concentrations recorded at the Tracy Airport station in 2006 and 2008 exceeded the annual state standards.

TABLE 5.1-7
Background PM_{10} Concentrations ($\mu g/m^3$)[a]

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Tracy Airport	24-hour	50 /150	94	75	126
	Annual[b]	20 / —	20	19	27
Stockton – Hazelton Avenue	24-hour	50 /150	85	75	105
	Annual[b]	20 / —	33	27	34
Bethel Island	24-hour	50 /150	84	49	78
	Annual[b]	20 / —	19.4	18.8	24

[a]Source: BAAQMD, 2009c; ARB, 2009b; and EPA, 2009.
[b]Annual Arithmetic Mean

The 24-hour $PM_{2.5}$ concentrations measured at the Stockton-Hazelton Avenue and the Tracy Airport monitoring stations have exceeded the NAAQS in each of the past 3 years (Table 5.1-8). The annual $PM_{2.5}$ concentrations measured at the Stockton-Hazelton Avenue monitoring station did not exceed the annual NAAQS but did exceed the state standards.

TABLE 5.1-8
Background $PM_{2.5}$ Concentrations ($\mu g/m^3$)[a. b]

Station	Averaging Time	CAAQS/NAAQS	2006	2007	2008
Tracy Airport	24-hour	— / 35	NA	61.0	85.3
	Annual[c]	12 / 15	NA	NA	NA
Stockton – Hazelton Avenue	24-hour	— / 35	53.3	66.8	91.0
	Annual[c]	12 / 15	13.1	12.9	12.5

[a]Source: BAAQMD, 2009c; ARB, 2009b; and EPA, 2009.
[b]$PM_{2.5}$ was not measured at the Bethel Island Monitoring Station between 2006 and 2008.
[c]Annual Arithmetic Mean

5.1.3.6 Greenhouse Gases

ARB has promulgated new laws to address the potential effects of increasing atmospheric concentrations of carbon dioxide and other greenhouse gases. On September 20, 2006, California signed into law the California Global Warming Solutions Act of 2006 (Assembly Bill [AB] 32, codified at Section 1, Division 25.5, Section 38500 et seq. of the California Health & Safety Code). This law requires ARB to design and implement emission limits, regulations, and other measures, such that statewide greenhouse gas emissions are reduced in a technologically feasible and cost-effective manner to 1990 levels by 2020 (representing a 25 percent reduction), and further reduced by 2050 (an 80 percent reduction over 1990 levels).

AB 32 does not directly amend other environmental laws, such as the California Environmental Quality Act (CEQA). Instead, it provides for creation of a greenhouse gas emissions program that will involve identification of sources, prioritization of sources for regulation based on significance of source contribution to greenhouse gas emissions, and eventual regulation of those sources.

Greenhouse gases include the following pollutants:

- Carbon dioxide (CO_2) is a naturally occurring gas, as well as a by-product of burning fossil fuels and biomass, land-use changes, and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance.
- Methane (CH_4) is a greenhouse gas with a global warming potential (GWP) most recently estimated at 23 times that of CO_2. GWP is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming and is a relative scale that compares the mass of one greenhouse gas to that same mass of carbon dioxide. CH_4 is produced through anaerobic (without oxygen [O_2]) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion.
- Nitrous oxide (N_2O) is a greenhouse gas with a global warming potential of 296 times that of CO_2. Major sources of nitrous oxide include soil cultivation practices, especially the use of commercial and organic fertilizers, fossil fuel combustion, nitric acid production, and biomass burning.
- Hydrofluorocarbons (HFCs) are compounds containing only hydrogen, fluorine, chlorine, and carbon. HFCs have been introduced as a replacement for the chlorofluorocarbons identified as ozone-depleting substances.
- Perfluorocarbons (PFCs) are compounds containing only fluorine and carbon. Similar to HFCs, PFCs have been introduced as a replacement for chlorofluorocarbons. PFCs are also used in manufacturing and are emitted as by-products of industrial processes. PFCs are powerful greenhouse gases.
- Sulfur hexafluoride (SF_6) is a colorless gas soluble in alcohol and ether, and slightly soluble in water. It is a very powerful greenhouse gas used primarily in electrical transmission and distribution systems, as well as dielectrics in electronics.

Emissions of HFCs, PFCs, or SF_6 are not expected to be significant for the proposed project. Therefore, the project impact assessment focused on the impacts from emissions of CO_2, CH_4, and N_2O.

5.1.4 Environmental Analysis

This section describes the analysis conducted to assess the ambient air quality impacts from MEP and to demonstrate compliance with the local, state, and federal air quality requirements for criteria pollutants. Emission estimates are presented for MEP construction, commissioning, and operation. Dispersion model selection and setup are also described (i.e., emissions scenarios and release parameters, building wake effects, meteorological data, and receptor locations). Results are presented for the dispersion modeling analysis and are compared to the applicable local, state, and federal air quality regulations.

ARB is currently developing statewide CEQA significance thresholds for greenhouse gas emissions and is expected to present the recommended thresholds to the ARB Board sometime in 2009. Therefore, greenhouse gas emissions were also calculated for informational purposes at this time. However, no conclusions regarding significance will be made during the analysis.

5.1.4.1 Criteria Pollutant and Greenhouse Gas Emission Estimates

Criteria pollutant emission rates were calculated for three discrete phases of the project. The first phase is the construction of the new electrical generating components, the second phase is the commissioning activities, and the final phase is operation. Hourly, daily, and annual criteria pollutant emissions were calculated based on a 14-month construction schedule and a contractual obligation for up to 4,000 hours of annual operations with up to 300 startup and 300 shutdown events (i.e., total of 300 hours of startup and shutdown activity), per turbine. The criteria pollutants evaluated include NO_x, oxides of sulfur (SO_x), VOCs, CO, PM_{10}, and $PM_{2.5}$.

5.1.4.1.1 Construction Phase

Short-term emissions will be generated from the installation of the four new combustion turbines, the new auxiliary equipment, and the administration buildings. The construction area is expected to be approximately 15 acres, which includes approximately 5 acres for laydown and parking. Most of the construction activities are expected to be completed within 10 months of the 14-month construction phase. The remaining construction period will be used for contractor mobilization, turbine commissioning activities, and contractor demobilization. Emissions were calculated for construction equipment exhaust, on- and offsite motor vehicle exhaust, re-entrained road dust, and fugitive dust emissions from soil disturbance.

Onsite project emissions were divided into two categories: onsite exhaust and fugitive dust from vehicle and construction equipment. The following criteria pollutant emissions were calculated: NO_x, SO_x, VOC, CO, PM_{10}, and $PM_{2.5}$. Fugitive dust from grading and construction equipment exhaust emissions were estimated using URBEMIS2007 (version 9.2.4) emission factors. Fugitive dust emissions from unpaved roads were estimated using EPA-approved emission factors published in AP-42 (EPA, 2006). On-road exhaust emissions were estimated using EMFAC2007 (version 2.3) emission factors. It is not expected that large stockpiles of earthen materials would be present during the construction of the project, therefore, wind-blown fugitive dust emissions from earthen stockpiles were assumed to be negligible.

Construction emissions will also be generated during the installation of offsite linears including an access road, a natural gas pipeline, a transmission line, and a water supply pipeline. Offsite emission sources include the exhaust emissions from construction equipment and motorized vehicles used to install the project-related linears, as well as the exhaust emissions from motor vehicles traveling to and from the proposed work site (e.g., delivery trucks and worker vehicles). Minor amounts of fugitive dust will also be generated by construction activities and vehicle travel on roadways.

Maximum annual emissions were estimated based on the number and type of construction equipment, the number of heavy-duty trucks, and the workforce projected for each month of construction. It was conservatively assumed the construction activities will occur 10 hours per day, 22 days per month. The maximum annual construction emissions will occur from month 1 through month 12.

The maximum annual construction emissions are presented in Table 5.1-9. The detailed emission calculations for construction are provided in Appendix 5.1A.

TABLE 5.1-9
Maximum Annual Construction Emissions

	Emissions (tons/yr)					
Construction Emission Source	**NOx**	**CO**	**VOC**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Onsite Construction Emissions	5.0	4.0	0.6	0.006	1.02	0.3
Offsite Vehicle Emissions	3.7	1.0	0.2	0.005	1.8	0.2
Offsite Construction Emissions	0.7	0.5	0.09	0.0009	0.03	0.009
Maximum Total (tons/yr)	**9.5**	**5.5**	**0.9**	**0.012**	**2.9**	**0.5**

Greenhouse gas emissions from construction activities are presented in Table 5.1-10. Construction equipment emissions were estimated using emission factors from the California Climate Action Registry (CCAR) General Reporting Protocol (GRP) (version 3.1) and fuel consumption rates from the OFFROAD2007 model. Vehicle emissions (trucks and worker commutes) were estimated using emission factors from the CCAR GRP (version 3.1) and EPA fuel economy values.

Estimated total fuel use during construction would be 122,059 gallons of diesel and 30,195 gallons of gasoline. Construction equipment fuel consumption rates were obtained from the OFFROAD2007 model. Vehicle fuel use was estimated using the EPA fuel economy values. Detailed greenhouse gas emission and fuel use calculations are included in Appendix 5.1B.

TABLE 5.1-10
Greenhouse Gas Emissions Estimates for MEP Construction Activities

	Greenhouse Gas Emissions (metric tons)			
	CO_2	**CH_4**	**N_2O**	**CO_2 Equivalent**
Total (metric tons)	1,835	0.08	0.038	1,848

5.1.4.1.2 Commissioning Phase

During the commissioning phase, the turbine will be initially operated at various load rates without the benefit of the emission control systems to ensure proper operation of the equipment. The duration of the commissioning phase for MEP is expected to be up to 180 days. During this period, MEP will ensure that emissions are reduced to the extent feasible by limiting equipment operation consistent with the equipment manufacturers recommended intervals. However, several scenarios are possible during commissioning that are expected to result in NO_x, VOC, and CO emissions that are greater than during normal operations. During commissioning, $PM_{10/2.5}$ and SO_2 emissions are expected to be no greater than full load operations. The scenarios include the following:

- **Initial load testing and checkout of an engine (typical for all turbines)**—This phase consists of approximately 1 day of unsynchronized operation, for approximately 2 to 4 hours per day, followed by approximately 1 day per engine of low-load checkout (low-load checkout also is estimated at approximately 2 to 4 hours per day). The average operating load for this initial load testing is expected to be 5 to 10 percent, based on a range of 0 percent and 10 percent load.
- **Initial tuning**—This phase consists of approximately 9 days of testing and tuning at various loads and up to full load per turbine for not more than an average of 8 operating hours per day. The average operating load is expected to be 75 percent, based on a typical commissioning range between 50 percent and 100 percent load. Upon completion of initial tuning phase, the selective catalytic reduction (SCR) equipment and CO oxidation catalyst will be loaded. The second tuning phase will be done with the SCR and CO oxidation catalyst operation and may include up to 120 hours of operation per turbine.
- **Final tuning**—This phase consists of approximately 15 days of SCR and oxidation catalyst tuning and pre-witness testing performance verification at an average of not more than 12 to 16 hours per day. The average operating load is expected to be 75 percent, based on a range of 50 percent and 100 percent load.

Short-term NO_2, VOC, and CO emissions during the commissioning phase were estimated based on correspondence with the turbine vendor. The emission estimates are based on the estimated duration of each commissioning event, emission control efficiencies expected for each event, and turbine operating rates. The maximum hourly and event commissioning emission rates are presented in Table 5.1-11. The annual impacts for the commissioning phase were not evaluated because the commissioning phase is expected to be completed within 180 days. As previously stated, maximum hourly emission rates for SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates due to reduced loads during commissioning. The detailed emission calculations for commissioning are provided in Appendix 5.1A.

TABLE 5.1-11
MEP Turbine Commissioning Emission Rate

	NO_x	CO	VOC	SO_2*	PM_{10}*	$PM_{2.5}$*
Maximum Hourly, lb/hr (per turbine)	51	45	4.48	0.91	3.0	3.0
Total Commissioning Period, tons (all turbines)	18.3	11.7	1.58	0.80	2.64	2.64

*Not emitted in amounts greater than normal operating rates.

lb/hr = pound(s) per hour

5.1.4.1.3 Turbine Emissions—Operational Phase

Operational emission estimates were prepared for the turbine startup and shutdown modes and the steady-state operating mode. Emission estimates for these operating modes are based on vendor data and engineering estimates. Natural gas will be the only fuel burned in the turbines. The turbines will use advanced combustion controls, combined with SCR, to limit emissions of NO_x to 2.5 parts per million by volume, corrected to 15% O_2 (ppmvdc). Advanced combustion controls, combined with the use of an oxidation catalyst, will be used to limit CO and VOC emissions to 6 and 2 ppmvdc, respectively. PM_{10} and SO_2 emissions will be kept to a minimum through the exclusive use of natural gas, inlet air filtration (for particulate matter control), and the oxidation catalyst system.

Startup and Shutdown Emissions

During the startup and shutdown operating modes, the emission control systems are not fully functional, which may result in higher air emission rates relative to the steady-state operating mode. The GE LM6000 has the ability to reach full power from start-up within 10 minutes. However, an additional 20-minute period is required for the SCR and oxidation catalyst system to reach design effectiveness. Therefore, the duration of a complete startup event is assumed to be 30 minutes. The shutdown duration for the GE LM6000 is approximately 8 minutes plus an additional 22 minutes of emissions required for purging ductwork of exhaust gases. Therefore, the duration of a complete shutdown event is assumed to be 30 minutes.

The maximum facility startup and shutdown emission rates are presented in Table 5.1-12, on a pound per event (lb/event) and a pound per hour (lb/hr) basis. The maximum facility hourly startup and shutdown emission rates are based on the turbines operating at an ambient air temperature of 59°F, with the remainder of the hour consisting of steady-state operations at base load with air inlet chiller, unless otherwise noted. The detailed estimates of the facility startup and shutdown emissions are provided in Appendix 5.1B.

TABLE 5.1-12
Facility Startup/Shutdown Emission Rates[a]

	NO_x	CO	VOC	SO_2[b]	PM_{10}	$PM_{2.5}$
Startup (lb/event/turbine)	18.2	25.3	2.2	—	—	—
Startup (lb/hr/turbine)	20.3	28.5	2.8	<0.91	<3.0	<3.0
Shutdown (lb/event/turbine)	4.3	4.8	0.5	—	—	—
Shutdown (lb/hr/turbine)	6.5	8.0	1.1	<0.91	<3.0	<3.0

[a]See Appendix 5.1B.
[b]Maximum SO_2 hourly emission rate based on the 0.66 grains of sulfur per 100 dry standard cubic feet (dscf) of natural gas.

Steady-state Operating Emissions

The turbine operational emission rates for steady-state operations have been estimated based on the combined maximum heat input rating and conservative estimates of annual operation. The emission rates for the GE LM6000 unit are shown in Table 5.1-13. Emission estimates are provided in Appendix 5.1B.

TABLE 5.1-13
Maximum Pollutant Emission Rates for the GE LM6000 Turbine[a]

Pollutant	ppmvd @ 15% O_2	Emission Rate (lb/hr)[b]
NO_x	2.5	4.4
CO	6.0	6.4
VOC	2.0	1.2
PM_{10} /$PM_{2.5}$ [c]	NA[d]	3.0
SO_2 [e]	NA[d]	0.91
Ammonia	5	3.3

[a]Maximum values are for each turbine and excludes startups and shutdowns.

[b]Based on the base load with air inlet chiller operating scenario.

[c]100 percent of particulate matter emissions assumed to be emitted as PM_{10} and $PM_{2.5}$.

[d]Not available.

[e] Estimated using a maximum of 0.66 grains of sulfur per 100 dscf of natural gas.

5.1.4.1.4 Facility Emissions

Emission sources at MEP would include the four natural gas LM 6000 turbines and up to a 200-horsepower, diesel-fired, emergency fire pump. Natural gas will be the only fuel used during plant operation with the exception of the diesel fire pump. The typical natural gas composition is shown in Table 5.1-14. Natural gas combustion results in the formation of NO_x, CO, unburned hydrocarbons (VOCs), SO_2, PM_{10}, and $PM_{2.5}$. Because natural gas is a clean-burning fuel, there will be minimal formation of combustion PM_{10}, $PM_{2.5}$, and SO_2.

TABLE 5.1-14
Typical Natural Gas Specifications

Component Analysis		Chemical Analysis	
Component	Average Concentration, Volume	Molecular Weight	Weighted Average
CH_4	96.19	16.04	15.43
C_2H_6	1.67	30.07	0.50
C_3H_8	0.27	44.00	0.12
C_4H_{10}	0.098	58.12	0.057
C_5H_{12}	0.0072	72.15	0.0052
C_6H_{14}	0.022	86.18	0.019
N_2	0.41	28.01	0.11
CO_2	1.34	44.01	0.59
		Average	**16.83**

Note: Analysis assumes an average fuel sulfur content of 0.25 grains per 100 dscf of natural gas and a maximum fuel sulfur content of 0.66 grains per 100 dscf of natural gas.

Table 5.1-15 presents the maximum natural gas use expected for each of the turbines and the facility total. The maximum hourly fuel use for the gas turbines was estimated based on one hour of turbine firing at full capacity with air inlet chillers operating. The daily fuel use for the gas turbines was estimated based on 24 hours of turbine firing at full capacity with air inlet chillers operating. The annual fuel use for the gas turbines was estimated based on 4,000 hours of turbine operation at full capacity with air inlet chillers per year and 300 hours of startup and shutdown activity.

TABLE 5.1-15
Maximum Facility Fuel Use (MMBtu)

Period	Gas Turbine (each)	Total Fuel Use (all units)
Per Hour	481	1,925
Per Day	11,551	46,205
Per Year	2,069,590	8,278,360

Maximum hourly turbine emissions are based on a simultaneous startup event for all four turbines plus 30 minutes of steady-state operation at full capacity with air inlet chillers operating.

Maximum daily turbine emissions are based on 12 startup and 12 shutdown events per turbine and approximately 12 hours of turbine operation at 100 percent load with air inlet chillers operating. The annual natural gas sulfur content is expected to average 0.25 grains per 100 dscf. However, on rare occasions, the natural gas fuel sulfur content can deviate up to 0.66 grains of sulfur per 100 dscf. Therefore, hourly and daily SO_2 emissions have been estimated assuming a natural gas sulfur content of 0.66 grains per 100 dscf.

Maximum annual emissions were based on up to 4,000 hours of normal operating conditions at full capacity with air inlet chillers operating, plus 300 hours of startup and shutdown events. Annual SO_2 emissions are based on an expected annual fuel sulfur level of 0.25 grains per 100 dscf of natural gas.

The hourly emergency fire pump emissions were estimated based on 20 minutes of continuous operation. The daily and annual emission rates were based on non-emergency use of 20 minutes per day and 4 hours per year of operation, respectively (Table 5.1-16).

TABLE 5.1-16
MEP Facility Emissions

	NO_x	SO_2	VOC	CO	$PM_{10}/PM_{2.5}$
Maximum Hourly Emissions, lb/hr					
Turbine (per turbine)[a]	20.4	0.91	2.78	28.5	3.0
Emergency Fire Pump	0.37	0.00080	0.0091	0.18	0.016
Total Project (lb/hr)	**20.7**	**0.91**	**2.79**	**28.7**	**3.02**

TABLE 5.1-16
MEP Facility Emissions

	NO_x	SO_2	VOC	CO	$PM_{10}/PM_{2.5}$
Maximum Facility Daily Emissions, lb/day					
Turbines[b]	1289	21.8	185.1	1750	12
Emergency Fire Pump	0.37	0.00080	0.0091	0.18	0.016
Total Project (lb/day)	**1289**	**21.8**	**185**	**1750**	**12.0**
Maximum Annual Emissions, lbs/year[c]					
Turbines	97,274	6,483	22,259	138,913	51,600
Emergency Fire Pump	4.5	0.010	0.11	2.1	0.20
Total Project (lb/yr)	**97,278**	**6,483**	**22,259**	**138,915**	**51,600**
Total Project (tpy)	**48.6**	**3.2**	**11.1**	**69.5**	**25.8**

[a]Worst-case hourly emissions were based on turbine start-up and 30 minutes of steady-state operation at full capacity with air inlet chillers operating.

[b]Daily NO_x, CO, and VOC emissions include 12 startup events and 12 shutdown events and 12 hours of steady-state operation at full capacity with air inlet chillers operating. Daily SO_2, and $PM_{10/2.5}$ emissions are based on 24 hours of steady-state operation at full capacity with air inlet chillers operating.

[c]Annual emissions are based on each turbine operating with 300 startups and shutdowns per year and 4,000 hours of steady-state operation at full capacity with air inlet chillers operating. See Appendix 5.1B.

tpy = ton(s) per year

Criteria pollutant emissions from worker commutes and material deliveries were also calculated. The emissions are presented in Table 5.1-17. Emissions were estimated using emission factors from EMFAC2007 (version 2.3). Detailed calculations are included in Appendix 5.1B.

TABLE 5.1-17
Criteria Pollutant Emissions from Worker Commute and Deliveries During Operation

	Emissions (lb/yr)					
Emission Source	**VOC**	**CO**	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Worker Commute	21	737	78	1.2	11	5
Material Deliveries	8	50	174	0.2	6	5
Total	**29**	**787**	**252**	**1**	**17**	**11**

As discussed in Section 2.0, peaking units in California have typically operated at relatively low capacity factors, averaging less than 600 hours per year. Therefore an operational scenario of 600 hours per year and 200 start up and shutdown events was used to determine expected emission levels. Table 5.1-18 presents a comparison of the estimated and maximum permitted annual MEP emissions to the estimated 2008 annual emission totals for San Joaquin County. As presented in Table 5.1-18, MEP emissions would contribute less than one and a half percent to the San Joaquin County emission inventory. Furthermore, the daily San Joaquin County air emissions are significantly higher than the project's annual emissions, which are based on maximum contractual operating hour limits.

TABLE 5.1-18
Comparison of Estimated MEP Emission Totals to the Estimated Emission Totals for San Joaquin County

Emission Source	Emissions (tons/day)					
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Estimated 2008 San Joaquin County Emission Totals [a]	47.07	222.7	90.95	4.98	32.84	11.29
Estimated Annual MEP Emission – Expected Totals [b, c]	0.015	0.12	0.086	0.0046	0.029	0.029
Estimated MEP Emission – Maximum Permitted Totals [c]	0.067	0.42	0.29	0.019	0.15	0.15
Percent of San Joaquin County Totals (Expected)	**0.032%**	**0.053%**	**0.094%**	**0.093%**	**0.088%**	**0.23%**
Percent of San Joaquin County Totals (Maximum Permitted)	**0.14%**	**0.19%**	**0.32%**	**0.39%**	**0.47%**	**1.37%**

[a] Source: ARB, 2009c
[b] Estimated based on 600 hours per year of steady-state operation and 200 start up and shutdown events.
[c] Values were calculated assuming 4,000 hours of operation and 300 start up and shutdown events per year distributed evenly throughout the year.

5.1.4.2 Greenhouse Gas Emission Estimates

Combustion of natural gas in the gas turbines and diesel fuel in the emergency fire pump engine would result in emissions of CO_2, CH_4 and N_2O. Greenhouse gas emissions for normal facility operations were calculated based on the maximum fuel use predicted for MEP and emission factors contained in the CCAR General Reporting Protocol (CCAR, 2008). The emission factors used to estimate the greenhouse gas emissions are summarized in Appendix 5.1B. Emissions of CO_2, N_2O, and CH_4 resulting from operation of the proposed project are presented in Table 5.1-19.

TABLE 5.1-19
Estimated Annual Greenhouse Gas Emissions from MEP

	Estimated Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2e
Turbine	439,250	49	0.8	440,532
Emergency Fire Pump	0.46	0.000014	0.0000045	0.46
Total Emissions	**439,250**	**49**	**0.8**	**440,533**

Greenhouse gas emissions from worker commutes and material deliveries were also calculated as part of the analysis. The greenhouse gas emissions are presented in Table 5.1-20. Emissions were estimated using emission factors from the CCAR GRP (version 3.1). Detailed calculations are included in Appendix 5.1B.

TABLE 5.1-20
Greenhouse Gas Emissions from Worker Commute and Deliveries During Operation

Emission Source	Greenhouse Gas Emissions (metric tons/year)			
	CO_2	CH_4	N_2O	CO_2 Equivalent
Worker Commute	86	0.003	0.001	86
Material Deliveries	10	0.0003	0.0003	10
Total	**96**	**0.0029**	**0.0017**	**96**

5.1.4.3 Air Quality Impact Analysis

An ambient air quality impact analysis was conducted to compare worse-case ground-level impacts resulting from the operation of MEP with established state and federal AAQS and applicable BAAQMD significance criteria. The analysis was conducted in accordance with the air quality impact analysis guidelines presented in the EPA's 40 CFR Part 51, Appendix W: *Guideline on Air Quality Models* (EPA, 2005) and BAAQMD's *Permit Modeling Guidance* (BAAQMD, 2005).

The analysis includes an evaluation of the possible effects of simple, intermediate, and complex terrain, and aerodynamic effects (downwash) due to nearby building(s) and structures on plume dispersion and ground-level concentrations. A basic Gaussian plume model was used in this analysis. The model assumes that the concentrations of emissions within a plume can be characterized by a Gaussian distribution of gaseous concentrations about the plume centerline. Gaussian dispersion models are approved by EPA and BAAQMD for regulatory use and are based on conservative assumptions (i.e., the models tend to overpredict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions, etc.).

The following subsections present the:

- Modeling methodology for evaluating the impacts on ambient air quality
- Modeling scenarios and source data used to evaluate the impacts on ambient air quality
- Modeling results compared to the AAQS

5.1.4.3.1 Modeling Methodology for Evaluating Impacts on Ambient Air Quality

The air dispersion modeling was conducted based on guidance presented in the *Guideline on Air Quality Models* (EPA, 2005) and the EPA-approved dispersion model, AERMOD (version 07026).

Model Selection

The AERMOD model is a steady-state, multiple-source, dispersion model that incorporates hourly meteorological data inputs and local surface characteristics. The AERMOD model is well suited for this assessment based on the ability of the model to handle the various physical characteristics of project emission sources, including point, area, and volume source types. The required emission source data inputs to AERMOD include source locations, source elevations, stack heights, stack diameters, stack exit temperatures, stack exit velocities, and pollutant emission rates. The source locations are specified for a Cartesian (x,y) coordinate system where x and y are distances east and north in meters, respectively. The Cartesian coordinate system used for these analyses is the Universal Transverse Mercator Projection (UTM), 1927 North American Datum (NAD 27).

The NO_2 1-hour modeling was performed using the AERMOD ozone limiting method (OLM) model selection. OLM offers a more realistic method of calculating concentrations of NO_2. During the combustion of natural gas, approximately 10 percent of the stack emissions are NO_2. The remaining stack gas is released as nitrogen oxide. In the atmosphere, nitrogen oxide chemically reacts with ambient concentrations of ozone to form NO_2. The OLM model calculates NO_2 concentrations based on the ambient ozone concentrations using this principle.

The hourly ozone data used for the MEP OLM modeling was collected at the Patterson Pass monitoring station. The 2003 hourly OLM data were preprocessed and formatted for use with OLM by the San Joaquin Valley Air Pollution Control District (SJVAPCD). However, the 1997 through 1999 hourly ozone data was obtained from SJVAPCD prior to preprocessing. Although each of the 3 years of data were greater than 90 percent complete, there were missing data in each year. Therefore, missing data were filled using the following approach. For missing periods that were two sequential hours or less, the maximum concentration for the hour before or the hour after the missing period were used to fill the missing data. For missing periods that were more than two sequential hours, the maximum ozone concentration for the respective month with missing data was used to the fill the missing data.

Model Options

The technical options selected for the AERMOD model include:

- Regulatory default control options
- Rural dispersion mode or the "no-urban" mode in AERMOD (land use within 3 kilometers of the facility is primarily classified as rural based on the Auer Method, therefore, AERMOD will be run in the "no-urban" dispersion mode)
- Receptor elevations and controlling hill heights were obtained from AERMAP (Version 09040) output.

Meteorological Data

The CEC requires a minimum of 1 year of meteorological data approved by ARB or the local air pollution control district to be used in the air dispersion modeling analysis. After consultation with BAAQMD, it was determined that the use of 4 years of meteorological data would be appropriate for this analysis. Therefore, 4 years of meteorological data from the SJVAPCD Patterson Pass monitoring station, the Stockton Airport, and the Oakland, California upper air sounding station were used for the dispersion modeling analysis (Cordova, 2008).

The surface data collected at the Patterson Pass monitoring station for calendar years 1997 through 1999 were obtained from BAAQMD and the 2003 data were obtained from SJVAPCD. The Patterson Pass data contain hourly wind speed, wind direction, and ambient temperature data at 10 meters above ground level. Corresponding hourly cloud cover data from the Stockton Airport, California were also obtained along with the Patterson Pass wind and temperature data in order to determine stability and boundary layer conditions.

Upper air sounding data collected at Oakland, California were obtained from the National Climatic Data Center. The twice-daily sounding data were provided in forecast systems laboratory format for midnight and noon Greenwich Mean Time.

The EPA AERMET (version 06341) pre-processor was used to combine the upper air and surface data. BAAQMD recommended using the MODIFY keyword in the AERMET processing step for upper air data (Cordova, 2009). By specifying this keyword, the following actions occur:

- Some mandatory levels are deleted from the sounding (e.g., if a mandatory sounding level is within one percent of a significant level).
- A nonzero wind direction is set to zero if the corresponding wind speed is zero.
- Missing ambient and dew point temperatures are replaced with interpolated values.

The AERSURFACE program (Version 08009) was used to determine the surface characteristics surrounding the Patterson Pass monitoring site. AERSURFACE was developed by EPA to assist in determining surface characteristics by using U.S. Geological Survey (USGS) land use maps and converting the land use type to values described in the *AERMET User's Guide* (EPA, 2004).

AERSURFACE was used to determine the surface roughness values for each sector within a 1-kilometer radius of the monitoring site, and the daytime wet, dry, and average Bowen Ratio and the mid-day albedo for a 10 by 10 kilometer area.

Prior to using the meteorological data collected at an offsite monitoring station, EPA recommends an analysis to determine if the meteorological data collected is representative of the project site. BAAQMD also recommends a similar comparison of surface characteristic between the meteorological station and the proposed project site. An analysis was completed and it was determined the Patterson Pass meteorological data set is expected to be representative of the proposed project site.

A complete discussion of the AERMET data file preparation and the representativeness evaluation are included in the modeling protocol (Appendix 5.1D). The annual and quarterly wind rose plots for the Patterson Pass meteorological station are presented in Appendix 5.1C.

Background Data

The background data need not be collected on site, as long as the data are representative of the air quality in the subject area (40 CFR 51, Appendix W, Section 9.2). The following three criteria were used for determining whether the background data would be representative: (1) location, (2) data quality, and (3) data currentness. These criteria are defined as follows:

- **Location:** The measured data must be representative of the areas where the maximum concentration occurs for the proposed stationary source, existing sources, and a combination of the proposed and existing sources.
- **Data quality:** Data must be collected and equipment must be operated in accordance with the requirements of 40 CFR Part 58, Appendixes A and B, and Prevention of Significant Deterioration monitoring guidance.

- **Data currentness:** The data are current if they have been collected within the preceding 3 years and are representative of existing conditions.

The nearest monitoring station was previously located approximately 5 miles from the project site at the Tracy 24371 Patterson Road monitoring station. However, on January 11, 2005, the site was relocated to the Tracy Airport (ARB, 2008b) approximately 11 miles from the project site. Based on a review of meteorological data collected at the Patterson Pass monitoring station, the San Joaquin County monitoring stations would be downwind of the MEP site for most meteorological conditions. Therefore, it is expected that the maximum short- and long-term concentrations would occur in proximity to the Tracy monitoring stations.

As a result, the three most recent years of background NO_2 and ozone data from the Tracy Airport monitoring station (Table 5.1-21) were used to estimate the background concentrations in the vicinity of the project.

Annual and 24-hour PM_{10} and 24-hour $PM_{2.5}$ monitors were also installed at the Tracy Airport monitoring station in 2006. Therefore, the 2006–2008 annual and 24 hour background PM_{10} and 24-hour background $PM_{2.5}$ data from the Tracy Airport monitoring station were included in Table 5.1-21. Because the Tracy Airport monitoring station does not include annual $PM_{2.5}$ monitoring equipment, the annual $PM_{2.5}$ data collected at the Stockton–Hazelton Avenue station were used to estimate the background concentrations.

CO data were not recorded at the Tracy monitoring station. Therefore, the three most recent years of CO data recorded at the Stockton–Hazelton Avenue monitoring station (Table 5.1-21) were used. The data collected at the Stockton–Hazelton Avenue station represents a conservative estimate of the background CO concentrations in the project area because the area surrounding the Stockton–Hazelton Avenue station is more densely populated than the MEP site.

SO_2 concentrations were not measured in Alameda County or San Joaquin County between 2006 and 2008. Therefore, measurements from Bethel Island (Contra Costa County), which is approximately 16 miles north of the proposed site, were used to estimate the existing SO_2 background concentrations in the vicinity of the project.

Based on the previous discussion, the background data in Table 5.1-21 would meet the three criteria for determining whether the data would be representative for the project.

TABLE 5.1-21
Background Air Concentrations (2006–2008)[a]

Pollutant	Averaging Time	2006		2007		2008		Maximum
		ppm	µg/m³	ppm	µg/m³	ppm	µg/m³	µg/m³
NO_2 [b]	1-hour	0.056	105	0.045	84.7	0.047	88.4	**105**
	Annual	0.010	18.8	0.009	16.9	0.008	15.1	**18.8**
SO_2 [c]	1-hour	0.017	44.5	0.018	47.1	0.012	31.4	**47.1**
	3-hour	0.011	28.8	0.013	34.0	0.009	23.6	**34.0**
	24-hour	0.007	18.3	0.005	13.1	0.004	10.5	**18.3**
	Annual	0.002	5.5	0.002	3.9	0.002	5.2	**5.5**

TABLE 5.1-21
Background Air Concentrations (2006–2008)[a]

Pollutant	Averaging Time	2006		2007		2008		Maximum
		ppm	μg/m³	ppm	μg/m³	ppm	μg/m³	μg/m³
CO [d]	1-hour	4.4	5039	3.6	4123	2.6	2978	**5039**
	8-hour	2.3	2577	2.3	2645	1.9	2130	**2645**
PM_{10} [b]	24-hour	—	94	—	75	—	126	**126**
	Annual	—	20	—	19	—	27	**27**
$PM_{2.5}$ [e]	24-hour	—	NA	—	61	—	85.3	**85.3**
	Annual	—	13.1	—	12.9	—	12.5	**13.1**

[a]Data reported for the three most recent years of data available. The annual ARB and BAAQMD ambient air quality data summaries were used as the primary reference. The EPA AIRS database was used when ARB or BAAQMD data were not available. Conversion from ppm to μg/m³ at 25° Celsius and 760 torr.

[b]Data from the Tracy Airport monitoring station.

[c]Data from the Bethel Island monitoring station.

[d]Data from the Stockton monitoring station.

[e]Data from the Tracy Airport monitoring station, with the exception of annual $PM_{2.5}$. Annual $PM_{2.5}$ data from the Stockton monitoring station

NA = Data not available.

Receptor Grid Spacing

Receptor and source base elevations were determined from USGS Digital Elevation Model (DEM) data using the 7½-minute format (i.e., 30-meter spacing between grid nodes). All coordinates were referenced to UTM NAD27, Zone 10.

Cartesian coordinate receptor grids were used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. In order to minimize model run times and control file size, a coarse- and fine-grid approach was used for the impact analysis. The following coarse grid was used to identify the areas of maximum concentration:

- 25-meter spacing at the fence line
- 100-meter spacing from property boundary to 1 kilometer from the origin
- 500-meter spacing from beyond 1 to 10 kilometers from the origin
- No receptors within the facility fence line.

The selection of the refined receptor grid was then developed based on the location of the maximum impacts for each pollutant, averaging period, and year for all scenarios. The following refined receptor grid spacing was used to estimate the predicted maximum impacts:

- 25-meter spacing surrounding areas of maximum impact within 1 kilometer of the facility extending 100 meters from the maximum location.
- 50-meter spacing surrounding areas of maximum impact beyond 1 kilometer of the facility extending 500 meters from the maximum location.

The coarse and refined receptor grids are presented in Appendix 5.1C.

Building Downwash and Good Engineering Practice Assessment

For the analysis of the potential turbine impacts during operation, EPA's BPIP-Prime (Building Profile Input Program – Plume Rise Model Enhancement, dated 04274), was used to calculate the projected building dimensions required for AERMOD evaluation of impacts from building downwash.

Good engineering practice (GEP), as used in the modeling analyses, is the maximum allowed stack height to ensure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction ensures that any required regulatory control measure is not compromised by the effect of that portion of the stack that exceeds the GEP.

EPA's guidance for determining GEP stack height (H_g) (EPA, 1985) is based on the height of a nearby structure(s) measured from the ground-level elevation at the base of the stack (H) and the lesser dimension, height or projected width, of the nearby structure(s) (L) as follows:

$$H_g = H + 1.5L$$

The GEP modeling restriction is the greater of the calculated GEP stack height or 65 meters. Therefore, based on the onsite and offsite building dimensions as input into BPIP-Prime, the calculated GEP height for the facility stack is the greater of 65 meters or the calculated height of 25.3 meters. The proposed turbine stack height of 24.2 meters does not exceed GEP stack height.

5.1.4.3.2 Modeling Scenarios and Source Data Used to Evaluate Impacts on Ambient Air Quality

In evaluating the potential impacts of MEP on ambient air quality, modeling of the worst-case ambient impacts for the project were added to representative background concentrations, and the results were compared to the state and federal AAQS.

Thresholds of Significance

For attainment pollutants, the predicted impacts from the construction or operation of the project would be considered significant if the impacts for the project combined with the representative background concentrations exceed the state and federal AAQS.

For non-attainment pollutants, the predicted impacts from the construction or operation of the project would be considered significant if the impacts for the project contribute to an existing violation of the state or federal AAQS.

Construction Impacts Analysis

The short-term construction emissions were not compared to daily or annual thresholds because BAAQMD has not published quantitative thresholds of significance for construction emissions. According to the BAAQMD *CEQA Guidelines*, implementation of the basic control measures would reduce fugitive PM_{10} emissions during construction to less-than-significant levels (BAAQMD, 1999). Although these control measures would not directly address exhaust emissions generated during construction, construction equipment exhaust emissions (CO, NO_x, and VOC) are included in the emissions inventory, which is the basis for the regional air quality plans (BAAQMD, 1999). Therefore, construction emissions are not expected to impede attainment or maintenance of the ozone standards in the Bay Area (BAAQMD, 1999).

To meet CEC requirements, modeled concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from construction activities related to the project were combined with the ambient background concentrations and compared to the AAQS. The exhaust emissions were modeled as a volume source with a plume centerline height of 4.6 meters (15 feet), and the wind-blown and fugitive dust emissions were modeled as an area source assuming an average release height of 1 meter.

The results of the construction modeling analysis are presented in Section 5.1.4.3.3.
A detailed summary of the assumptions and emission factors used to estimate the emission rates are presented in Appendix 5.1A.

Commissioning Impacts Analysis

During the commissioning period, it is anticipated that only one turbine will be undergoing commissioning activities at a time. However, one turbine may be commissioned while another turbine is in normal (non-commissioning) operation. Though precise emission values during the phases of commissioning cannot be provided, given the consideration for contingencies during shakedown, the maximum emission rates for each operating load and turbine configuration were estimated. For the dispersion modeling analysis, it was assumed that the maximum impact would occur if up to three turbines were simultaneously undergoing the initial load testing and engine checkout commissioning or post-catalyst initial tuning activities. Therefore, the AERMOD coarse and refined grid dispersion analyses were conducted using the parameters and emission rates presented in Table 5.1-22.

The short-term concentrations of NO_2 and CO (the 1-hour and 8-hour impacts) from the commissioning phase of the project were combined with the ambient background concentrations and compared to the short-term AAQSs. Emission rates of PM_{10}, $PM_{2.5}$, and SO_x are expected to be equal to or lower than normal operating rates due to reduced loads during commissioning. The results of the commissioning modeling analysis are presented in Section 5.1.4.3.3.

Because the commissioning phase is expected to be completed within 180 days, annual impacts were not evaluated for the commissioning phase of the project. The emissions from the diesel fire pump were not included as part of the turbine commissioning analysis. Additional details used to determine the maximum commissioning emission details are presented in Appendix 5.1B. A summary of the dispersion modeling input files are presented in Appendix 5.1C.

TABLE 5.1-22
MEP Commissioning Dispersion Modeling Scenarios

Scenarios	No. of Turbines/ Modeling Load[a]	Exit Velocity (m/s)	Exhaust Temp (K)	Emission Rates[b] (lb/hr)		
				1-Hr NO_x	1-Hr CO	8-Hr CO
Initial Load Testing and Engine Checkout	Three / 50%	32.98	689.3	51	45	45
Post-Catalyst Initial Tuning	Three / 100%	41.45	733.7	51	45	45

[a]The modeled exhaust parameters were based on the 50% load case, 93°F turbine exhaust parameters and the 100% load case, 93°F turbine exhaust parameters.
[b]Emission rate given per turbine.

m/s = meter(s) per second
K = degrees Kelvin

Operation Impacts Analysis

Exhaust parameters for the GE LM6000 stacks and the diesel-fired internal combustion engine (ICE) were based on information provided by the vendor. Turbine emissions and stack parameters, such as flow rate and exit temperature, would exhibit some variation with ambient temperature and operating load. Therefore, to evaluate the worst-case air quality impacts, dispersion modeling was conducted at 50 percent load at 59°F and 93°F; 100 percent load at 17°F, 59°F, 93°F, 112°F; and one inlet air chiller scenario at 100 percent load. Emission rates modeled for the startup and shutdown events and the normal operation of the MEP turbines were calculated based on vendor data and additional conservative assumptions of turbine performance. Emission rates modeled for the ICE were based on the hourly and annual emission rates presented in Section 5.1.4.1.

The maximum 1-hour NO_x and CO emission rates were based on the conservative assumption that all four GE LM6000 units would start up and shut down within the same hour. The maximum 1-hour SO_2 concentration was estimated based on a fuel sulfur concentration of 0.66 grains of sulfur per 100 dscf of natural gas. The maximum 1-hour emission rates are presented in Table 5.1-23.

The hourly emission rate for the 3-hour and 24-hour SO_2 averaging period were also estimated based on the maximum 1-hour emission rate. The hourly emission rate for 8-hour CO averaging period was based on the conservative assumption that all four GE LM6000 units would start up and shut down three times within 8 hours, and the emission rate for the remaining 5 hours were calculated based on the maximum emission rate at base load with air inlet chiller operating. The hourly emission rate for the 24-hour PM_{10} and $PM_{2.5}$ were based on the base load with air inlet chiller operating. The maximum 3-, 8-, and 24-hour emission rates are presented in Table 5.1-23.

The annualized hourly NO_x, SO_x, PM_{10}, and $PM_{2.5}$ emission rates for the annual impact assessment were based on 4,000 hours of operation at full turbine capacity with air inlet chiller operating and 300 hours of startup and shutdown events per turbine. The annual SO_2 emission rate was based on an average fuel sulfur content of 0.25 grains/per 100 dscf of natural gas. The maximum annual emission rates are presented in Table 5.1-23.

Source emission rates for the dispersion modeling are presented in Table 5.1-23. A summary of the source parameters and the UTM locations of each source are shown in Appendix 5.1C. The results of the modeling analysis are presented in the following section and Appendix 5.1C.

TABLE 5.1-23
Maximum Emission Rates Used for the AERMOD Model Runs

	Turbine 1 (lb/hr)	Turbine 2 (lb/hr)	Turbine 3 (lb/hr)	Turbine 4 (lb/hr)	Fire Pump (lb/hr)
NO_2					
1-Hour	22.46	22.46	22.46	22.46	0.37
Annual	2.628	2.628	2.628	2.628	0.00051
CO					
1-Hour	30.02	30.02	30.02	30.02	0.18
8-Hour	15.278	15.278	15.278	15.278	0.022
SO_2					
1-hour	0.910	0.910	0.910	0.910	0.00080
3-hour	0.910	0.910	0.910	0.910	0.00027
24-hour	0.910	0.910	0.910	0.910	0.00003
Annual	0.165	0.165	0.165	0.165	0.0000011
PM_{10}					
24-hour	3.000	3.000	3.000	3.000	0.00068
Annual	1.473	1.473	1.473	1.473	0.000022
$PM_{2.5}$					
24-hour	3.000	3.000	3.000	3.000	0.00068
Annual	1.473	1.473	1.473	1.473	0.000022

Emission rates are based on the following assumptions:

- The maximum 1-hour NO_x and CO turbine emission rates are based on one startup and one shutdown event within 60 minutes.
- 1-, 3-, and 24-hour SO_2 emission rate based on the worst-case fuel sulfur content of 0.66 grains per 100 dscf of natural gas.
- 8-hour CO emission rate estimate based on three startups, three shutdowns, and the remaining hours operating at full capacity with air inlet chiller operating.
- 24-hour PM_{10}/$PM_{2.5}$ emission rate estimate based on the worst-case 1-hour emission rate (full capacity with air inlet chiller operating).
- Annual emission rate for NO_x, SO_x, PM_{10}, and $PM_{2.5}$ were conservatively based on 4,000 hours of turbine operation at full capacity with air inlet chiller operating, plus 300 startup and shutdown events. The annual SO_2 emission rate based on the average fuel sulfur content of 0.25 grains per 100 dscf of natural gas

5.1.4.3.3 Modeling Results Compared to the Ambient Air Quality Standards

Construction Impacts Analysis

The results of the analysis (Table 5.1-24) indicate that the maximum construction impacts combined with the background concentrations will be below the AAQS for each of the criteria pollutants and averaging periods, with the exception of the PM_{10} and $PM_{2.5}$ concentrations.

TABLE 5.1-24
Maximum Modeled Impacts from Construction and the Ambient Air Quality Standards

Pollutant	Averaging Period	Maximum Modeled Concentration (μg/m³)	Background Concentration[a] (μg/m³)	Total Predicted Concentration (μg/m³)	State Standard (μg/m³)	Federal Standard (μg/m³)
NO_2	1-hour[b]	226	105	331	339	—
	Annual	19.5	18.8	38.3	57	100
SO_2	1-hour	1.2	47.1	48.3	655	—
	3-hour	1.1	34.0	35.1	—	1,300
	24-hour	0.19	18.3	18.5	105	365
	Annual	0.025	5.5	5.5	—	80
CO	1-hour	957	5,039	5,996	23,000	40,000
	8-hour	416	2,645	3,061	10,000	10,000
PM_{10}	24-hour	112	126	238	50	150
	Annual	6	27	33	20	—
$PM_{2.5}$	24-hour	17.9	85.3	103.2	—	35
	Annual	1.2	13.1	14.3	12	15

[a]Background concentrations were the highest concentrations monitored during 2006 through 2008.
[b]The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

For particulate matter (PM_{10} and $PM_{2.5}$), the annual and 24-hour background concentrations exceed several of the AAQS without adding the modeled concentrations. As a result, the predicted impacts would also be greater than the AAQS. However, the construction activity would be finite and best available fugitive dust emission control techniques would be used throughout the 14-month construction activity period, as required by BAAQMD (fugitive dust emissions contribute to approximately 97 percent of the predicted PM_{10} impact). Construction impacts would be further reduced with the implementation of the additional construction mitigation measures presented in Section 5.1.6. Therefore, with the implementation of best available fugitive dust emission control techniques and other proposed mitigation measures, the impacts from construction are expected to be less than significant.

Commissioning Impacts Analysis

The potential impacts on ambient air quality associated with commissioning activities were assessed based on vendor estimates of schedule and emissions. As previously discussed, it was assumed that the maximum impact would occur if up to three turbines were simultaneously undergoing the initial load testing and engine checkout commissioning or post-catalyst initial tuning activities. Table 5.1-25 presents a comparison of the maximum modeled project commissioning impacts to the AAQS. As presented in Table 5.1-25, the maximum impacts for SO_2, PM_{10}, and $PM_{2.5}$ are expected to be equal to or lower than normal operating rates due to reduced loads during commissioning. The analysis excluded a comparison to the annual averaging period standards or thresholds because commissioning will only occur once during the project lifetime, and is expected to be completed within 180 days. The maximum facility NO_2 and CO impacts combined with the background concentration are less than the AAQS. Therefore, impacts from commissioning will be less than significant.

TABLE 5.1-25
Turbine Commissioning Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards
Impacts Associated with Commissioning Three Turbines Simultaneously

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour[b]	216	105	321	339	—
SO_2	1-hour	4.2	47.1	51.3	23,000	40,000
	3-hour	2.4	34.0	36.4	10,000	10,000
	24-hour	0.56	18.3	18.9		
CO	1-hour	205	5,039	5,244	23,000	40,000
	8-hour	69	2,645	2,714	10,000	10,000
PM_{10}	24-hour	1.9	126	128	50	150
$PM_{2.5}$	24-hour	1.9	85.3	87.2	—	35

[a]Background concentrations were the highest concentrations monitored during 2006–2008
[b]The maximum 1-hour NO_2 concentration is based on AERMOD OLM output.

Operation Impacts Analysis

The highest modeled concentrations were used to demonstrate compliance with the AAQS. Table 5.1-26 presents a comparison of the maximum MEP operational impacts to the AAQS. The NO_2, SO_2, and CO concentrations combined with the background concentrations do not exceed the AAQS. Therefore, MEP will not cause or contribute to the violation of a standard, and the NO_2, SO_2, and CO impacts from operation will be less than significant.

For PM_{10} and $PM_{2.5}$, the background concentrations exceed the AAQS without the proposed project, with the exception of the federal 24-hour standard. As a result, the predicted project impact plus background also exceeds the AAQS and the operation of the proposed project would further contribute to an existing violation of the standard absent mitigation. As discussed in Section 5.1.6, MEP is proposing to offset project emissions as required by BAAQMD. Therefore, the PM_{10} and $PM_{2.5}$ impacts from operation will be less than significant.

A complete list of off-property impacts for the multiple turbine operating scenarios is presented in Appendix 5.1C.

TABLE 5.1-26
MEP Operation Impacts Analysis—Maximum Modeled Impacts Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	Maximum Modeled Concentration ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)[a]	Total Predicted Concentration ($\mu g/m^3$)	State Standard ($\mu g/m^3$)	Federal Standard ($\mu g/m^3$)
NO_2	1-hour [b]	130	105	235	339	—
	annual	0.10	18.8	18.9	57	100
SO_2	1-hour	5.4	47.1	52.5	655	—
	3-hour	3.1	34.0	37.1	—	1,300
	24-hour	0.74	18.3	19.0	105	365
	annual	0.0060	5.5	5.5	—	80
CO	1-hour	178	5,039	5,217	23,000	40,000
	8-hour	30	2,645	2,675	10,000	10,000
PM_{10}	24-hour	2.4	126	128	50	150
	annual	0.053	27	27	20	—
$PM_{2.5}$	24-hour	2.4	85.3	87.7	—	35
	annual	0.053	13.1	13.2	12	15

[a]Background concentrations were the highest concentrations monitored during 2006 through 2008.

[b]The 1-hour NO_2 concentrations are based on the AERMOD OLM output.

Fumigation Impacts Analysis

A meteorological condition that can produce high concentrations of ground-level pollutants is referred to as inversion breakup fumigation. Inversion breakup fumigation occurs when a plume is emitted into a stable layer of air and that layer is then mixed to the ground in a short period of time through convective heating and microscale turbulence. Under these conditions, an exhaust plume may be drawn to the ground with little diffusion, causing high ground-level pollutant concentrations, although typically for periods less than 1 hour. In some cases, the fumigation impacts can be greater than impacts predicted with the AERMOD model. To verify that fumigation impacts do not result in higher ambient air quality impacts, fumigation modeling is performed.

The effects of fumigation on the maximum modeled impacts were evaluated using the EPA SCREEN3 model (Version 96043). For this evaluation, only impacts from the turbine stack were evaluated. The results of the fumigation modeling were based on the 50 percent load, 93°F operating scenario, which was identified in the operational ambient air quality impact analysis as the worse-case 1-hour turbine impact scenario. Regulatory default mixing heights were selected. The predicted 1-hour concentrations were converted to 3-, 8-, and 24-hour average concentrations based on the Screening Procedures for Air Quality Impact of Stationary Sources guidance (EPA, 1992).

The maximum inversion breakup fumigation concentration predicted by SCREEN3 occurs over 10 kilometers downwind of the combustion turbine location. Table 5.1-27 presents a comparison of the potential MEP operational fumigation impacts to the AAQS. The NO_2, SO_2, and CO concentrations combined with the background concentrations do not exceed the AAQS, nor result in the worst-case impacts compared to the AERMOD dispersion modeling results. Therefore, fumigation impacts of NO_2, SO_2, and CO would be less than significant.

TABLE 5.1-27
MEP Operation Impacts Analysis—Fumigation Impacts Analysis Results Compared to the Ambient Air Quality Standards

Pollutant	Averaging Time	SCREEN3 Fumigation Result (μg/m^3)	Background Concentration* (μg/m^3)	Total Predicted Concentration (μg/m^3)	State Standard (μg/m^3)	Federal Standard (μg/m^3)
NO_2	1-hour	10	105	115	339	—
SO_2	1-hour	0.41	47.1	47.5	655	—
	3-hour	0.37	34.0	34.4	—	1,300
	24-hour	0.17	18.3	18.5	105	365
CO	1-hour	14	5,039	5,053	23,000	40,000
	8-hour	4.9	2,645	2,650	10,000	10,000

*Background concentrations were the highest concentrations monitored during 2006 through 2008.

5.1.5 Cumulative Effects

Mariposa Energy requested a list of projects that are within a 6-mile radius of MEP and are either currently in the permitting process, undergoing CEQA review, or recently receiving an Authority to Construct (ATC) permit from either BAAQMD or SJVAPCD. Both districts were also provided the coordinates for the MEP turbine exhaust stacks. Once the source lists are received, the sources will be provided to the CEC for review and comment on the appropriateness of excluding specific sources (sources with negligible emissions, administrative permit amendments with no increase in air emissions, and VOC sources) and a cumulative air quality impact analysis will be prepared using the methodology presented in the Air Dispersion Modeling Protocol within 60 days of receipt of the necessary data from the air districts.

BAAQMD has responded that three applicants have proposed projects within 6 miles of MEP. These projects would include the East Altamont Energy Center and the Midway Power, LLC Project, as well as several projects proposed by Waste Management of Alameda County. These projects will be evaluated for incorporation into the cumulative air quality impact assessment. Mariposa Energy will continue to work with SJVAPCD to identify applicable sources.

5.1.6 Mitigation Measures

5.1.6.1 Construction Mitigation

Construction impacts will be further reduced with the implementation of a construction fugitive dust and diesel-fueled engine control plan. This plan will focus on reducing construction air quality impacts and will include the following construction mitigation measures:

- Watering unpaved roads and disturbed areas
- Limiting onsite vehicle speeds to 10 mph and post the speed limit
- Frequent watering during period of high winds when excavation/grading is occurring
- Sweeping onsite paved roads and entrance roads on an as-needed basis
- Replacing ground cover in disturbed areas as soon as practical

- Covering truck loads when hauling material that could be entrained during transit
- Applying dust suppressants or covers to soil stockpiles and disturbed areas when inactive for more than 2 weeks
- Using ultra-low sulfur diesel fuel (15 ppm sulfur) in all diesel-fueled equipment
- Maintaining all diesel-fueled equipment per manufacturer's recommendations to reduce tailpipe emissions
- Limiting diesel heavy equipment idling to less than 5 minutes, to the extent practical
- Using electric motors for construction equipment to the extent feasible

5.1.6.2 Operational Mitigation

During operations, the appropriate mitigation measure is to reduce potential air emissions before they are emitted. This is accomplished by the careful design of the project, including the installation of the best available control technology (BACT) to minimize air emissions. Air quality impacts will be further mitigated by providing emission offsets in excess of the quantity expected to be emitted. The remainder of this section describes the BACT analysis and the emission offset mitigation.

5.1.6.2.1 Emission Offsets

Table 5.1-28 presents a summary of the BAAQMD emission offset applicability requirements for MEP. The estimated annual emissions are compared with BAAQMD Regulation 2, Rule 3 emission offset thresholds. Because annual emissions of NO_x and VOC are expected to exceed the BAAQMD Regulation 2, Rule 3 emission offset thresholds, Mariposa Energy is required to provide BAAQMD with emission offsets for the amount of project emissions calculated for each of the pollutants in Table 5.1-28. Because PM_{10}, $PM_{2.5}$, and SO_2 emissions do not exceed BAAQMD offset thresholds, there is no BAAQMD requirement that the project emissions for these pollutants be offset. The project area is in attainment of CO, therefore, no mitigation is required by BAAQMD.

TABLE 5.1-28
MEP Emission Offset Applicability Analysis

Pollutant	Annual Emission Estimate (tpy)	BAAQMD ERC Threshold (tpy)	ERCs Required (yes/no)	Quantity of ERCs Required
NO_x	48.6	10	yes	55.9
VOC	11.1	10	yes	11.1
SO_2	3.2	100	no	—
$PM_{10/2.5}$	25.8	100	no	—

[a] Per BAAQMD Rule 2-2-303, a facility is not required to offset PM_{10} or SO_2 emissions unless the source is a Major Facility. Per BAAQMD Rule 2-6-212, a major facility is defined as a facility with the potential to emit 100 tpy or more of any regulated air pollutant except total suspended particulate.

[b] Per BAAQMD Rule 2-2-302, a facility permitted to emit more than 10 tpy but less than 35 tpy, on a pollutant-specific basis, of precursor organic compounds or nitrogen dioxides shall offset emissions at a ratio of 1.0 to 1.0.

[c] Per BAAQMD Rule 2-2-302, a facility permitted to emit more than 35 tpy, on a pollutant-specific basis, of precursor organic compounds or nitrogen dioxides shall offset emissions at a ratio of 1.1.5 to 1.0.

ERC = Emission Reduction Credit

5.1.6.2.2 BACT Analysis

Applicable BAAQMD BACT levels are presented in Table 5.1-28. BAAQMD Rule 2-2-301 requires the project to apply BACT for emission increases of precursor organic compounds (POC), NO_x, SO_2, PM_{10}, and CO that are greater than 10 lb/day per new or modified emissions unit. As presented in Table 5.1-29, BACT is required for VOC, NO_x, PM_{10}, CO, and ammonia, depending on the particular emission unit and the potential daily emissions by pollutant. The calculation of facility emissions is discussed in Section 5.1.6.1 and a summary of the BACT analysis is presented in Appendix 5.1E.

TABLE 5.1-29
Best Available Control Technology Requirements (Ref. BAAQMD Rule 2-2-301)

Pollutant	Applicability Level	Permit Units Exceeding this Level	BACT Required?
POC*	10 lb/day/source	Turbine	Yes
NO_x	10 lb/day/source	Turbine and Emergency Fire Pump	Yes
SO_2	10 lb/day/source	—	No
PM_{10}	10 lb/day/source	Turbine	Yes
CO	10 lb/day/source	Turbine and Emergency Fire Pump	Yes
Ammonia	—	Turbine	Yes

*For this analysis, it is assumed that VOC emissions are the same as POC emissions. Therefore, VOCs have been compared to the POC threshold.

BACT for NO_x emissions from the turbine will be achieved by the use of low NO_x emitting combustion equipment and post-combustion controls. Mariposa Energy has selected a turbine equipped with water-injected NO_x combustors. The gas turbine will be designed to generate less than 25 ppmvd NO_x, corrected to 15% O_2, at the outlet of the engine. In addition, the turbine will be equipped with a post-combustion SCR system to further reduce NO_x emissions to 2.5 ppmvd NO_x, corrected to 15% O_2 on a 1-hour average basis (excluding startups and shutdowns). The current BAAQMD BACT requirement for natural gas-fired, simple-cycle gas turbines greater than 40 MW is 2.5 ppmvd, corrected to 15% O_2 over a 1-hour averaging period. Therefore, MEP will meet the BAAQMD BACT requirements for NO_x.

BACT for CO emissions from the turbine will be achieved by good combustor design and an oxidation catalyst. Good combustor design will result in low levels of combustion CO while maintaining very low NO_x formation. In addition, the project will use an oxidation catalyst system to further reduce CO emissions to 6 ppmvd, corrected to 15% O_2. The current BAAQMD CO BACT requirement for natural gas-fired, simple-cycle gas turbines greater than 40 MW is 6.0 ppmvd, corrected to 15% O_2. Therefore, MEP will meet the BAAQMD BACT requirements for CO.

BACT for VOC emissions will be achieved by good combustor design and an oxidation catalyst. BACT for VOC emissions from combustion devices has historically been the use of good combustor design. With the use of the good combustor design and the oxidation catalyst, the VOC emissions leaving the stacks will not exceed 2 ppmvd, corrected to 15% O_2 for turbine operation at full load. The current BAAQMD VOC achieved in practice BACT requirement for natural gas-fired simple-cycle gas turbines greater than 40 MW is

2.0 ppmvd, corrected to 15% O_2 over a 3-hour averaging period. Therefore, MEP will meet the BAAQMD BACT requirements for VOC.

For the turbines, BACT for PM_{10} typically includes inlet air filtration, use of natural gas, and mist eliminator filters on lubricating oil vents. The use of clean-burning gaseous fuel will result in minimal particulate emissions and the inlet air filtration will minimize combustion air is particulate matter. The lubricating oil mist eliminator filters will also reduce particulate matter emissions. The current BAAQMD PM_{10} achieved in practice BACT requirement for simple-cycle gas turbines greater than 40 MW is the use of CPUC-regulated grade natural gas. MEP will use pipeline grade natural gas with a sulfur content less than 0.66 grains per 100 dscf. Therefore, MEP will meet the BAAQMD BACT requirements for $PM_{10/2.5}$.

5.1.7 Laws, Ordinances, Regulations, and Standards

The CAA, implemented by EPA, requires major new and modified stationary sources of air pollution to obtain a construction permit prior to commencing construction through a program known as the federal New Source Review (NSR) program. The requirements of the NSR program are dependent on whether the air quality in the area where the new source (or modified source) is being located attains the NAAQS. The program that applies in areas that are in attainment of the NAAQS is the Prevention of Significant Deterioration (PSD). The program that applies to areas where the air does not meet the NAAQS (termed non-attainment areas) is the non-attainment NSR.

EPA implements the NSR program through regional offices. Arizona, California, Hawaii, Nevada, and specific Pacific trust territories are administrated out of the EPA Region IX office in San Francisco. EPA typically delegates its NSR, Title V, and Title IV authority to local air quality agencies that have sufficient regulatory structure to implement these programs consistent with requirements of the CAA and implementing regulations. BAAQMD has been delegated several of these programs. However, EPA currently retains authority for administering the PSD program in BAAQMD.

ARB was established by the state legislature in 1967 with the purpose of attaining and maintaining healthy air quality, conducting research into causes and solutions to air pollution, and addressing the impacts that motor vehicles have on air quality. To this end, ARB implements the following programs:

- Establish and enforce motor vehicle emission standards, including fuel standards.
- Monitor, evaluate, and set health-based air quality standards.
- Conduct research to solve air pollution problems.
- Establish toxic air contaminant (TAC) control measures.
- Oversee and assist local air quality districts.

Air pollution control districts were established shortly after ARB, based on meteorological and topographical factors. The districts were established to enforce air pollution regulations for the purpose of attaining and maintaining all state and federal AAQS. The districts regulate air emissions by issuing air permits to stationary sources of air pollution in compliance with approved regulatory programs. Each district promulgates rules and regulations specific to air quality issues within its jurisdiction. The air emissions sources regulated by each district vary. The types of air pollution sources that might be regulated include manufacturers, power plants, refineries, gasoline service stations, and auto body shops.

The applicable LORS and compliance with these requirements are discussed in more detail in the following sections. Applicable ATC permit forms have been prepared in conjunction with this AFC and are included in Appendix 5.1D.

5.1.7.1 Federal LORS

EPA promulgates and enforces federal air quality regulations, with Region IX administering the federal air programs in California. The federal CAA provides the legal authority to regulate air pollution from stationary sources. The applicable federal regulations are summarized in Table 5.1-30, along with the agency responsible for administration of the regulation.

5.1.7.2 State LORS

ARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the state's AAQS; to review the operations of the local air pollution control districts; and to review and coordinate preparation of the State Implementation Plan for achievement of the federal AAQS.

The California Health and Safety Code, Section 41700 prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, that endanger the comfort, repose, health, or safety of the public, or that damage business or property.

The state has promulgated numerous laws and regulations at the state level (i.e., Toxic Air Contaminants and Air Toxic Hot Spots) which are effectuated at the local level by the air districts. A discussion of these state and local LORS is presented in Tables 5.1-31 and 5.1-32, respectively. A discussion of the public health risks posed by emissions of toxic air contaminants, including ammonia, is presented in Section 5.9, Public Health.

In August 2006, the California legislature passed Assembly Bill (AB) 32, the California Global Warming Solutions Act of 2006. AB 32 requires California resource agencies to establish a comprehensive program of regulatory and market mechanisms to achieve reductions in greenhouse gas emissions (ARB, 2006). MEP will be subject to AB 32, and will be required to comply with all final rules, regulations, emissions limitations, emission reduction measures or market-based compliance mechanisms adopted under AB 32. However, there are currently no applicable facility-specific greenhouse gas emission limits or caps. Therefore, greenhouse gas emissions have been estimated for MEP for information purposes at this time.

TABLE 5.1-30
Applicable Federal Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR Part 50	Establishes AAQS for criteria pollutants.	EPA Region IX	MEP will conduct a dispersion modeling analysis to determine if the project will exceed the state or federal AAQS. Dispersion modeling indicates MEP will not exceed the state or federal AAQS for the attainment pollutants. Non-attainment pollutant emissions will be mitigated through the surrendering of emission reduction credits consistent with the BAAQMD's State Implementation Plan-Approved NSR program.
Title 40 CFR Parts 51, NSR (BAAQMD Reg 2 Rule 2)	Requires pre-construction review and permitting of new or modified stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of AAQS.	EPA Region IX	Requires NSR facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS. The NSR requirements are implemented at the local level with EPA oversight (BAAQMD Reg 2 Rule 2). Because MEP will exceed the 10 lb/day trigger for at least one of the regulated pollutants, an ATC and Permit to Operate (PTO) application will be obtained from BAAQMD prior to construction of the project. As a result, the compliance requirements of 40 CFR, Part 51 will be met.
Title 40 CFR Parts 52, PSD	The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified in areas classified as attainment, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I Areas (e.g., national parks and wilderness areas).	EPA Region IX	The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing major stationary source. BAAQMD classifies an unlisted source (which is not in the specified 28 source categories) that emits or has the potential to emit 250 tpy of any pollutant regulated by the Act as a major stationary source. For listed sources, the threshold is 100 tpy. NO_x or SO_x emissions from a modified major source are subject to PSD if the cumulative emission increases for either pollutant exceeds 40 tpy. In addition, a modification at a non-major source is subject to PSD if the modification itself would be considered a major source. Because MEP is a simple-cycle peaker project, it would not be considered one of the 28 source categories. Therefore, the emission rates were compared to the 250 ton per year threshold. As shown in Table 5.1-16, the emission increase in NO_x, CO, PM_{10}, SO_2, and VOC would be significantly less than 250 tpy per pollutant. Therefore, MEP would not be subject to PSD analysis requirements.

TABLE 5.1-30
Applicable Federal Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR, Part 60	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD with EPA Region IX oversight	**Turbine:** Proposed 40 CFR Part 60 Subpart KKKK – NO_x Emission Limits for New Stationary Combustion Turbines would apply to all new combustion turbines that commence construction, modification, or reconstruction after February 18, 2005. The rule requires natural gas-fired turbines greater than or equal to 30 MW to meet a NO_x emission limit of 50 nanograms per Joule (ng/J) (0.39 pounds per megawatt-hour [lb/MW-hr]), and an SO_2 limit of 73 ng/J (0.58 lb/MW-hr). Alternatively, a fuel sulfur limit of 500 parts per million by weight (ppmw) could be met. Stationary combustion turbines regulated under this subpart would be exempt from the requirements of Subpart GG. The proposed turbine will utilize low NO_x combustors along with an SCR system, pipeline-quality natural gas, and will comply with both the NO_x and SO_2 limits. The NO_x and SO_2 emissions from the turbines will be 0.086 lb/MW-hr and 0.018 lb/MW-hr, respectively. The certified NO_x Continuous Emission Monitoring System (CEMS) will ensure compliance with the standard. Records of natural gas use and fuel sulfur content will ensure compliance with the SO_2 limit.
Title 40 CFR, Part 60	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD with EPA Region IX oversight	**Emergency ICE:** 40 CFR Part 60 Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) would apply to the diesel fire pump. The NMHC+NO_x emission limit for a model year 2009 fire pump between 175 and 300 hp would be 3.0 g/bhp, the CO emission limit would be 2.6 g/bhp, and the PM_{10} emission limit would be 0.15 g/bhp. The proposed CI ICE used to operate the emergency fire pump would be a Tier III, 200 bhp ICE. Therefore, the engine would meet the NMHC+NO_x, CO, and PM_{10} emission standards.

TABLE 5.1-30
Applicable Federal Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR, Part 63	Establishes national emission standards to limit emissions of hazardous air pollutants (HAPs, or air pollutants identified by EPA as causing or contributing to the adverse health effects of air pollution but for which NAAQS have not been established) from facilities in specific categories.	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 63—National Emission Standards for Hazardous Air Pollutants for Source Categories, establishes emission standards to limit emissions of hazardous air pollutants from specific source categories for Major HAP sources. Sources subject to Part 63 requirements must either use the maximum achievable control technology (MACT), be exempted under Part 63, or comply with published emission limitations. The potential National Emissions Standards for Hazardous Air Pollutants (NESHAP) applicable to the project are Subpart YYYY, which sets a formaldehyde emission limit or an operational limit of 91 parts per billion by volume (ppbv) for the turbines and the NESHAPS for Stationary Reciprocating Internal Combustion Engines (RICE). Projects would be subject to the Title 40 CFR, Part 63 requirements if the HAP PTE is greater or equal to 25 tpy for combined HAPs and 10 tpy for individual HAPs. As shown in Section 5.9 (Public Health), MEP would not exceed the major source thresholds for HAPs (10 tpy for any one pollutant or 25 tpy for all HAPs combined). Therefore, MEP would not be subject to the NESHAP regulations. The expected formaldehyde emissions associated with MEP would be 40 ppbv. Therefore, the project is expected to comply with the Subpart YYYY control technology and formaldehyde emission limit requirement of 91 ppbv.

TABLE 5.1-30
Applicable Federal Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR Part 64 (CAM Rule)	Establishes onsite monitoring requirements for emission control systems.	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 64—Compliance Assurance Monitoring (CAM), requires facilities to monitor the operation and maintenance of emissions control systems and report any control system malfunctions to the appropriate regulatory agency. If an emission control system is not working properly, the CAM rule also requires a facility to take action to correct the control system malfunction. The CAM rule applies to emissions units with uncontrolled potential to emit levels greater than applicable major source thresholds. Emission control systems governed by Title V operating permits requiring continuous compliance determination methods are generally compliant with the CAM rule. MEP would have an emission control systems for NO_x and CO (SCR and oxidation catalyst). However, emissions of NO_x and CO would be directly measured by a continuous monitoring system. Therefore, MEP would not be subject to the CAM provisions.
Title 40 CRF part 70 (BAAQMD Reg 2, Rule 6)	CAA Title V Operating Permit Program	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 70—Operating Permits Program, requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. The requirements of 40 CFR, Part 70 apply to facilities that are subject to NSPS requirements and are implemented at the local level through BAAQMD Reg 2, Rule 6. According to Reg 2, Rule 6, a facility would be considered a Major Facility if the facility had a potential to emit greater than 100 tpy on a pollutant specific basis or the HAP PTE is greater or equal to 25 tpy for combined HAPs and 10 tpy for individual HAPs. If MEP operated 8,760 hours per year, the potential to emit would be greater than 100 tpy and the project would be required to submit a Title V application. However, enforceable permit conditions would limit the potential to emit to levels less than the 100 tpy (Table 5.1-16) and the HAP thresholds. As a result, MEP would be categorized as a Synthetic Minor Facility. Therefore, an application for a Synthetic Minor Permit will be made to BAAQMD in addition to the CEC AFC application.

TABLE 5.1-30
Applicable Federal Laws, Ordinances, Regulations, and Standards for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
Title 40 CFR part 72 (BAAQMD Reg 2, Rule 7)	CAA Acid Rain Program	BAAQMD with EPA Region IX oversight	Title 40, Code of Federal Regulations, Part 72—Acid Rain Program, establishes emission standards for SO_2 and NO_x emissions from electric generating units through the use of market incentives, requires sources to monitor and report acid gas emissions, and requires the acquisition of SO_2 allowances sufficient to offset SO_2 emissions on an annual basis. This program is implemented through BAAQMD's Reg 2, Rule 7. An acid rain facility, such as MEP, must also obtain an acid rain permit as mandated by Title IV of the Clean Air Act. A permit application must be submitted to BAAQMD at least 24 months before operation of the new units commences. The application must present all relevant sources at the facility, a compliance plan for each unit, applicable standards, and estimated commencement date of operation. The necessary Title IV applications will be included during the CEC licensing proceeding.

TABLE 5.1-31
Applicable State Laws, Ordinances, Regulations, and Standards for the Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Strategy
California Code of Regulations, Section 41700	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	BAAQMD with ARB oversight	The CEC conditions of exemption and the air quality management district ATC processes are developed to ensure no adverse public health affects or public nuisances result from operation of the Project.
California Code of Regulations Sections 93115 (Diesel ATCM)	The purpose of the airborne toxics control measure (ATCM) is to reduce diesel particulate emissions from stationary diesel fired compression engines.	BAAQMD with ARB oversight	The diesel ATCM applies to stationary compression engines with a rating of greater than 50 brake horsepower and requires the use of ARB-certified diesel fuel or equivalent, and limits emissions from the operation of compression engines. The proposed fire pump would be greater than 50 bhp. However, the fire pump would meet the Tier III emission standards and non-emergency hours of operation would be limited to four hours or less per year. Therefore, the Project would comply with the diesel ATCM.
California Assembly Bill 32 - Global Warming Solutions Act of 2006 (AB32)	The purpose is to reduce carbon emissions within the state by approximately 25% by the year 2020.	BAAQMD with ARB oversight	There are currently no applicable facility-specific greenhouse gas emission limits or caps. Therefore, greenhouse gas emissions have been estimated for MEP for informational purposes at this time.

5.1.7.3 Local LORS

When the state's air pollution statutes were reorganized in the mid-1960s, local districts were required to be established in each county of the state. There are three different types of districts: county, regional, and unified. In addition, special air quality management districts, with more comprehensive authority over non-vehicular sources as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California, including BAAQMD. Air quality management districts have principal responsibility for developing plans for meeting the NAAQS and CAAQS; for developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards; for implementing permit programs established for the construction, modification, and operation of sources of air pollution; and for enforcing air pollution statutes and regulations governing non-vehicular sources.

The BAAQMD plans define the proposed strategies, including stationary source control measures and NSR rules, whose implementation will attain the state AAQS. The relevant stationary source control measures and NSR requirements are presented in Table 5.1-32.

TABLE 5.1-32
Applicable Local Laws, Ordinances, Regulations, Standards, and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Assessment
BAAQMD Reg 1, Section 301 (Public Nuisance)	Prohibits the emissions of air contaminants or other material which create a public nuisance.	BAAQMD	The CEC conditions of exemption and the BAAQMD ATC process is designed to ensure that the operation of the Project will not cause a public nuisance.
BAAQMD Regulation 2, Rule 2 (Permits – NSR)	Purpose of this Rule is to provide for the review of new and modified sources and provide mechanisms, including the use of BACT, Best Available Control Technology for Toxics (TBACT), and emission offsets, by which authorities to construct such sources may be granted.	BAAQMD	Applicability: As part of the NSR permit approval process, an air quality dispersion analysis must be conducted using a mass emissions-based analysis contained in the rule or an approved dispersion model, to evaluate impacts of increased criteria pollutant emissions from any new or modified facility on ambient air quality. Compliance: An air quality dispersion analysis was conducted, using a mass emissions-based analysis contained in the rule and the AERMOD dispersion model. Applicability: The PSD requirements apply on a pollutant-specific basis to any project that is a new major stationary source or a major modification to an existing major stationary source. (See Title 40 CFR Part 51 and Part 52 discussion for thresholds). Compliance: The MEP emissions are below the PSD SER criteria for regulated pollutants. Therefore, MEP is not subject to the PSD analysis requirements. Applicability: BACT shall be applied to all new and modified sources with a potential to emit 10 pounds or more of any of the following: POC, NPOC, NO_x, SO_2, PM_{10} or CO. (BAAQMD 2-2-301). Compliance: Based on the BACT thresholds, a BACT analysis was conducted for the following: POC, NO_x, PM_{10} and CO. Applicability: A source shall be exempt from MACT requirements if the combined potential to emit from all related sources in a proposed modification is less than 10 tpy of any HAP and less than 25 tpy of any combination of HAPs. (BAAQMD 2-2-114). Compliance: The MEP does not exceed the major source thresholds for HAPs (10 tpy for any one pollutant or 25 tpy for all HAPs combined). Therefore, NESHAP regulations are not expected to apply. Applicability: Offsets for NO_x are required at a 1.0 to 1.15 ratio if a modification to the permit causes a cumulative increase greater than 35 tpy. Offsets for PM_{10} and SO_x are required for a Major Facility at a 1.0 to 1.0 ratio if a modification to the permit causes a cumulative increase of 100 tpy. (BAAQMD 2-2-302 and 2-2-303). Compliance: Offsets for NOx and VOC will be provided at a 1.0 to 1.15 ratio for the MEP application. SO_2 and PM_{10} emissions do not exceed the offset threshold of 100 tpy.

TABLE 5.1-32
Applicable Local Laws, Ordinances, Regulations, Standards, and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Assessment
			Applicability: A visibility, soils, and vegetation analysis is required if the proposed project is subject to PSD requirements and is within 10 kilometers of a Class I Area. (BAAQMD 2-2-417). Compliance: Per BAAQMD 2-2-417, MEP is not subject to PSD requirements and is greater than 10 kilometers from the nearest Class I area (Point Reyes National Seashore), therefore, a visibility, soils, and vegetation analysis is not required. Using the FLM screening methodology (July 8, 2008 Federal Register Volume 73, Number 131) of Q/D <= 10 [(48.7 NOx + 3.2 SO2 + 25.8 PM10)/ 98 km to Point Reyes National Seashore) = 0.8], MEP is not expected to result in significant visibility impacts.
BAAQMD Regulation 2, Rule 3 (Permits – ATC and PTO for Power Plants)	The purpose of this rule is to outline the special permitting provisions for the construction of power plants within the District.	BAAQMD	In conjunction with the submittal of the AFC to the CEC, MEP will work with BAAQMD to provide the information needed for the issuance of a ATC. As stated in this rule, the review will be conducted as outlined in Regulation 2, Rule 2.
BAAQMD Regulation 2, Rule 5 (Permits – Toxics NSR)	The purpose of this rule is to provide for the review of new and modified sources of TAC emissions in order to evaluate potential public exposure and health risk, to mitigate potentially significant health risks resulting from these exposures, and to provide net health risk benefits by improving the level of control when existing sources are modified or replaced.	BAAQMD	TBACT shall be applied to any new or modified source of TACs where the source risk is a cancer risk greater than 1.0 in a million (10^{-6}), and/or a chronic hazard index greater than 0.20. An ATC or PTO will be denied if the facility cancer risk exceeds 10 in a million, or the facility chronic hazard index exceeds 1.0, or the facility acute hazard index exceeds 1.0. The predicted MEIR and MEIW cancer risks for the project are 0.019 and 0.0023 in a million, respectively. The maximum predicted chronic and acute hazard indices are 0.00088 and 0.070, respectively. The values are less than the individual source TBACT thresholds of 1.0 in a million (10^{-6}), and/or a chronic hazard index greater than 0.20. The levels are also below the ATC or PTO facility thresholds for cancer risk of 10 in a million and the chronic and acute hazard index of 1.0.
BAAQMD Regulation 2, Rule 6 (Permits – Title V)	The purpose of this rule is to implement the operating permit requirements of Title V of the CAA as amended in 1990.	BAAQMD with EPA Oversight	See Federal, Title 40 CFR, Part 70 to review applicability and the compliance assessment.
BAAQMD Regulation 2, Rule 7 (Permits – Acid Rain)	The purpose of this rule is to incorporate by reference the provisions of 40 CFR Part 72 for purposes of implementing an acid rain program that meets the requirements of Title IV of the CAA.	BAAQMD with EPA Oversight	See Federal, Title 40 CFR, Part 72 to review applicability and the compliance assessment.

TABLE 5.1-32
Applicable Local Laws, Ordinances, Regulations, Standards, and Permits for Protection of Air Quality

LORS	Purpose	Regulating Agency	Applicability/Compliance Assessment
BAAQMD Regulation 6 (Particulate Matter and Visible Emissions)	Purpose of this Regulation is to limit the quantity of particulate matter in the atmosphere through the establishment of limitations on emission rates, concentration, visible emissions, and opacity.	BAAQMD	Exhaust emissions shall not be darker than No. 1 when compared to the Ringleman Chart for any period(s) aggregating 3 minutes in any hour, exceed the opacity standard of not greater than 20 percent for a period or periods aggregating 3 minutes in any hour, or exceed the 0.15 grains per dscf of exhaust gas volume. The GE LM6000 will emit PM at 0.0014 grains per dscf of exhaust gas volume, less than the 0.15 grains per dscf limit.
BAAQMD Regulation 7 (Odorous Substances)	The purpose of this regulation is to place general limitations on odorous substances and specific emission limitations on certain odorous compounds.	BAAQMD	Emissions of odorous substances shall not remain odorous after dilution with odor-free air at a rate of 1,000 volumes of odor-free air per volume of source sample. The maximum emissions of ammonia shall not exceed 5,000 ppm. Ammonia emissions from the SCR catalyst will be less than 5 ppmv. Therefore, maximum emissions will be below the 5,000 ppm limit, and odors from MEP are expected to be less than significant.
BAAQMD Regulation 9, Rule 1	Establishes emission limits for sulfur dioxide from all sources and limits ground-level concentrations of SO_2	BAAQMD	Dispersion modeling will be conducted to determine if off-property SO_2 ground level concentrations are less than 0.5 ppm for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Sulfur contents in the fuel will be less than 0.5% and gas stream concentrations will be less than 300 ppm (dry). Results of the dispersion modeling indicate off-property SO_2 ground-level concentrations will be below the 0.5 ppm level for 3 consecutive minutes, 0.25 ppm level averaged over 60 consecutive minutes, or the 0.05 ppm level averaged over 24 hours. The proposed turbine will burn pipeline-quality natural gas with less than 12 ppm sulfur. Therefore, sulfur content in the fuel will be less than 0.5% and gas stream concentrations will be less than 300 ppm (dry).
BAAQMD Regulation 9, Rule 9	Purpose of this rule is to limit emissions of NO_x from stationary gas turbines.	BAAQMD	For turbines with a heat input rating greater than 500 million British thermal units per hour (MMBtu/hr) (40+ MW), NO_x emission levels shall not exceed 0.72 lb/MW-hr or 25 ppmv. BACT levels of 2.5 ppmv for NO_x will be applied to the Project; therefore, the NO_x emission levels for the Project will not exceed the 25 ppmv level.
BAAQMD Regulation 10 (40 CFR Part 60)	Establishes national standards of performance for new or modified facilities in specific source categories.	BAAQMD	See Federal, Title 40 CFR, Part 60 to review applicability and the compliance assessment.

5.1.8 Agencies and Agency Contacts

Each level of government has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to MEP. The agencies having permitting authority for MEP, and their contact information, are shown in Table 5.1-33.

TABLE 5.1-33
Agency Contacts for Air Quality

Issue	Agency	Contact
Regulatory oversight	EPA Region IX	Gerardo Rios EPA Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
Regulatory oversight	ARB	Michael Tollstrup Project Assessment Branch California Air Resources Board 2020 L Street Sacramento, CA 95814 (916) 322-6026
Permit issuance, enforcement	BAAQMD	Brian Bateman Bay Area Air Quality Management District 939 Ellis Street San Francisco, CA 94109 (415) 771-6000

5.1.9 Permits Required and Permit Schedule

BAAQMD is responsible for issuing the required operating permits related to air quality. BAAQMD must issue a preliminary determination of compliance within 180 days after issuing the application completeness determination letter. If all requirements of the BAAQMD rules are met, BAAQMD will issue a determination of compliance to the CEC within 240 days after the acceptance of the application as complete. Upon approval of the project by the CEC, a determination of compliance serves as the BAAQMD ATC. A permit to operate will be issued by BAAQMD after construction and prior to commencement of operation.

Mariposa Energy will prepare a Title IV Acid Rain permit for submittal to EPA Region IX by the end of 2009.

5.1.10 References

Bay Area Air Quality Management District (BAAQMD). 1999. BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans. December.

Bay Area Air Quality Management District (BAAQMD). 2005. Permit Modeling Guidance. May.

Bay Area Air Quality Management District (BAAQMD). 2009a. Climate, Physiography, and Air Pollution Potential – Bay Area and Its Subregions. http://www.baaqmd.gov/pln/index.htm. Accessed February 16.

Bay Area Air Quality Management District (BAAQMD). 2009b. Ambient Air Quality Standards and Bay Area Attainment Designations. http://baaqmd.gov/pln/air_quality/ambient_air_quality.htm (Web site last updated December 2008). Accessed January

Bay Area Air Quality Management District (BAAQMD). 2009c. Air Quality Data Summaries. http://www.baaqmd.gov/pio/aq_summaries/index.htm. Accessed First Quarter 2009.

California Air Resources Board (ARB). 2006. *AB 32 Fact Sheet*. September 25

California Air Resources Board (ARB). 2008a. Summary of Ambient Air Quality Standards. November 17.

California Air Resources Board (ARB). 2008b. Quality Assurance Air Monitoring Site Information http://www.arb.ca.gov/qaweb. Accessed April 2008.

California Climate Action Registry (CCAR). 2008. *General Reporting Protocol*, *Version 3.0*. April.

California Air Resources Board (ARB). 2009a. Overview of Nitrogen Dioxide, Ozone, Sulfur Dioxide, Carbon Monoxide, and Particulate Matter. http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm. Accessed First Quarter 2009.

California Air Resources Board (ARB). 2009b. Air Quality Data Summaries http://www.arb.ca.gov/adam/welcome.html. Accessed First Quarter 2009.

California Air Resources Board (ARB). 2009c. Almanac Emission Projection Data. http://www.arb.ca.gov/app/emsinv/emssumcat.php. Accessed April 24, 2009.

Cordova, James/Bay Area Air Quality Management District. 2008. Personal communication with Keith McGregor/CH2M HILL. December 8.

Cordova, James/Bay Area Air Quality Management District. 2009. Personal communication with Keith McGregor/CH2M HILL. January 15.

U.S. Environmental Protection Agency (EPA). 1985. Guideline for Determination of Good Engineering Practice Stack Height. EPA-450/4-80-023R. June.

U.S. Environmental Protection Agency (EPA). 1992. Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised. EPA-454/R-92-019. October.

U.S. Environmental Protection Agency (EPA). 2004. *AERMET User's Guide*. November.

U.S. Environmental Protection Agency (EPA). 2005. Guideline on Air Quality Models, 40 CFR, Part 51, Appendix W. November.

U.S. Environmental Protection Agency (EPA). 2006. AP-42, Compilation of Air Pollutant Emission Factors. Chapter 13. Volume 1. Fifth Edition.

U.S. Environmental Protection Agency (EPA). 2009. AIRS Air Quality Data Summaries. http://www.epa.gov/air/data/monvals.html. Accessed First Quarter 2009.

Western Regional Climatic Center (WRCC). 2009. Historical Climate Data Summaries for the Tracy Pumping Station and the Livermore, CA Station. Website Accessed February.