5 AIR QUALITY

5.1 INTRODUCTION

This chapter describes the existing air quality within Pacific Gas and Electric Company's (PGandE) Delta Distribution Planning Area Capacity Increase Substation Project (project) area and evaluates the potential incremental air quality impacts associated with project construction and operation. Although some temporary impacts will result during construction activities, the potential air quality impacts are less than significant for construction and operation of the project facilities. The project will not cause any objectionable odors, expose sensitive receptors to increased pollutant concentrations, including toxics, or otherwise significantly affect air quality.

5.2 METHODOLOGY

Data supplied by the U.S. Environmental Protection Agency (EPA) was used to develop construction emission estimates for the project. The sulfur dioxide (SO_2) emissions are especially conservative, because emission factors used from EPA reference documents do not reflect the use of reformulated diesel fuel, which is now mandated in California.

The potential impact of project construction activity on air quality is based on a worst-case scenario using projections of the numbers and types of equipment that will be used during project construction. Additionally, because this scenario is based on a daily-emissions impact, the duration of the job and the dimensions of the project do not affect these projections.

The following worst-case assumptions were made:

- A fleet vehicle age of 10 years
- An average travel distance of 50 miles a day during construction
- A substation and access roads footprint of 8.0 acres
- All vehicles and equipment in operation daily and simultaneously

5.3 EXISTING CONDITIONS

5.3.1 Regulatory Background

5.3.1.1 Federal Programs

5.3.1.1.1 Clean Air Act (CAA)

National ambient air quality standards were established in 1970 for six pollutants: carbon monoxide (CO), ozone (O_3), particulate matter (PM_{10}), nitrogen dioxide (NO_2), SO_2, and lead (Pb). These pollutants are commonly referred to as criteria pollutants, because they are considered the most prevalent air pollutants known to be hazardous to human health. The CAA required states exceeding the standards to prepare air quality plans showing how the standards were to be met by December 1987. The CAA Amendments of 1990 directed the EPA to set standards for toxic air contaminants and required facilities to sharply reduce emissions.

5.3.1.2 State Programs

5.3.1.2.1 The California Clean Air Act

The California CAA requires regions to develop and implement strategies to attain California's Ambient Air Quality Standards (AAQS). For some pollutants, the California standards are more stringent than the national standards. Regional air quality management districts, including the Bay Area Air Quality Management District (BAAQMD), must prepare an air quality plan specifying how federal and state standards will be met.

5.3.1.2.2 The Air Toxic "Hot Spots" Information and Assessment Act

The Air Toxic "Hot Spots" Information and Assessment Act identifies toxic air contaminant hot spots where emissions from specific sources may expose individuals to an elevated risk of adverse health effects. It requires that a business or other establishment identified as a significant source of toxic emissions provide the affected population with information about heath risks posed by the emissions.

5.3.1.3 Local Plans

5.3.1.3.1 The Bay Area Air Quality Plan

This regional plan addresses how the San Francisco Bay Area will attain the federal and state air quality standards. The plan states that emission control devices should be installed on major sources of emissions and that air quality permits are required.

5.3.2 Climatology

The project area is on the south side of the San Joaquin River Delta, east of the Carquinez Strait, and near the eastern boundary of the nine-county San Francisco Bay Area Air Basin (Basin). The site's location between the Greater Bay Area and the Central Valley, east of the coastal hills, has a great influence on the climate and air quality in the project area.

Several factors combine to give the San Francisco Bay Area a unique and varied climate. California's location in the middle latitudes, uneven topography in the Bay Area, the pronounced influence of the maritime surroundings, and the semi-permanent Eastern Pacific high-pressure system combine to produce a Mediterranean climate, characterized by moist, mild winters and dry summers. Average monthly summer (June, July, August) temperatures in the project area range from 70 to 75 degrees (^{o}) Fahrenheit (F). Average daily maximum temperatures during the summer months range from 85 to 90^{o}F. Winter temperatures are considered moderate. Daily high temperatures range from 45 to 55^{o}F. Average daily low temperatures range from 35 to 45^{o}F. The extreme maximum temperature recorded in the local area is 117^{o}F on June 17, 1961; the extreme minimum temperature is 18^{o}F on December 11, 1972.

Precipitation in the area averages 12 to 15 inches a year, occurring mostly during the winter months. The rainy season is typically November to April; and the dry season is May through September. April and October are transition months between the wet and dry seasons. Off-season

precipitation is usually the result of weak early- or late-season weather fronts or surges of tropical moisture from the south.

The Antioch-Brentwood region has relatively low potential for air pollution, given the persistent and strong winds that are typical of the area. Wind records from the closest wind-measuring site (Contra Costa Power Plant) show a strong predominance of westerly and northwest wind directions. Average wind speed is relatively high, and the frequency of calm winds is quite low. The peak one-minute average wind speed (50-year return period) for this area is 70 miles an hour.

5.3.3 Air Quality

The project lies within the San Francisco Bay Area Air Basin, a region that extends from Napa County to Santa Clara County and includes Contra Costa County. Three air quality designations can be given to an area for a particular pollutant:

- **Non-attainment:** This designation applies when air quality standards have not been consistently achieved.
- **Attainment:** This designation applies when air quality standards have been achieved.
- **Unclassified:** This designation applies when there are not enough monitoring data to determine if the area is non-attainment or attainment.

According to the California Air Resources Board (CARB) State AAQS, the Basin is designated non-attainment for O_3, PM_{10}, and $PM_{2.5}$. These pollutants are discussed in more detail in the following sections. The Basin is designated attainment for NO_2, SO_2, CO, sulfate particulates, and Pb particulates. By federal standards, the Basin is designated as non-attainment for one-hour and 8-hour O_3 and attainment for all other criteria pollutants except for the PM_{10} 24-hour standard. The Basin is unclassified for the federal 24-hour PM_{10} arithmetic mean. Table 5-1 provides the California and federal air quality standards and attainment status.

5.3.3.1 Ozone

Air quality in the Basin with respect to O_3 has improved over the last decade. Although maximum hourly concentrations of O_3 have remained relatively stable, the number of exceedances of both state (0.09 parts per million (ppm) averaged over one hour) and federal (0.12 ppm averaged over one hour) standards has steadily decreased over the last three decades. However, 1995 marked the beginning of renewed exceedances of the federal and state standards. In August 1998, the Bay Area was redesignated from attainment to non-attainment/unclassified for the national one-hour O_3 standard. In April 2004, the US EPA determined that the Bay Area had an attainment record for the national 1-hour ozone standard. EPA must approve a redesignation request, currently under development, in order for the Bay Area to be redesignated to attainment status. In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard.

Table 5-1: Bay Area Air Quality Management District
Attainment Status as of November 2004

Pollutant	Averaging Time	California Standards		Federal Standards	
		Concentration	Attainment Status	Concentration	Attainment Status
Ozone	8 Hour	---	---	0.08 ppm	N[1]
	1 Hour	0.09 ppm	N	0.12 ppm	N[1]
Carbon Monoxide	8 Hour	9.0 ppm	A	9 ppm	A[2]
	1 Hour	20.0 ppm	A	35 ppm	A
Nitrogen Dioxide	Annual	---	---	0.053 ppm	A
	1 Hour	0.25 ppm	A	---	---
Particulate Matter (PM_{10})	Annual Arithmetic Mean	20.0 $\mu g/m^3$	N	50 $\mu g/m^3$	A[3]
	24 Hour	50.0 $\mu g/m^3$	N	150 $\mu g/m^3$	U
$PM_{2.5}$	Annual Arithmetic Mean	12 $\mu g/m^3$	N	15 $\mu g/m^3$	A
	24 Hour	---	---	65 $\mu g/m^3$	A

$PM_{2.5}$	Particulate matter with a diameter less than or equal to 2.5 microns
ppm	Parts per million
$\mu g/m^3$	Micrograms per cubic meter of air
N	Non-attainment
A	Attainment
U	Unclassified
---	Not applicable

[1] In June 2004, the Bay Area was designated as a marginal nonattainment area of the national 8-hour ozone standard. In April 2004, EPA determined that the Bay Area had an attainment record for the national 1-hour ozone standard. EPA must approve a redesignation request.

[2] In April 1998, the Bay Area was redesignated to attainment of the national eight-hour carbon monoxide standard.

[3] Annual arithmetic mean.

These exceedances are generally attributed to unique meteorological patterns, combined with increases in emissions during the summer months. Urban vehicular emissions, industrial complex emissions, and high ambient temperatures in the Basin contribute to summertime O_3 generation and subsequent air standard violations.

In Contra Costa County, state AAQS for O_3 has been exceeded each year since 1999, as shown in Table 5-2. Peak hourly average O_3 concentrations ranged from 0.094 to 0.118 ppm in the urban Pittsburg area during this time. Table 5-3 presents data from the BAAQMD air monitoring station located on 10th Street in Pittsburg. This station, one of three monitoring stations within Contra Costa County, provides data that is most representative of the project area. The Pittsburg station is the nearest air-monitoring site with the most complete data set. However, the nearest air monitoring station where toxic air contaminants are routinely collected is the BAAQMD Concord-Treat Boulevard station located approximately 15 miles due west of the project area.

5.3.3.2 Particulate Matter

PM_{10} is generated within the project area largely as a result of wind during dry conditions (resulting in fugitive dust) and combustion sources. Between 1999 and 2002, the maximum 24-hour PM_{10} concentration within Contra Costa County was 104 micrograms per cubic meter of air ($\mu g/m^3$), which was reached in 2001. The number of violations of the PM_{10} state air quality standards (over 50 $\mu g/m^3$) between 1999 and 2003 ranged from 6 out of 60 sampling days in 1999 to 1 out of 61 sampling days in 2003. PM_{10} levels are elevated during the winter because of wood smoke, vehicle exhaust, and dry, windy conditions.

5.3.3.3 Air Toxics

Table 5-4 contains the mean concentrations of selected toxic pollutants, which are monitored on a nominal 10-day cycle at the BAAQMD Concord-Treat Boulevard and Pittsburg air-monitoring stations.

This monitoring program was designed to determine the concentrations in air of various gaseous toxic pollutants, which the EPA has defined as those that may reasonably be anticipated to result in increased deaths or serious illness and which are not already regulated. The CARB identifies the most important toxic pollutants by considering risk of harm to public health.

If the emissions from a source are less than trigger levels, it is assumed that the source will pass a risk screen. If the emissions are equal to or greater than one or more of the trigger levels, a risk screen is completed to determine the source's status.

Table 5-2: Contra Costa County Exceedances of the State Ambient Air Quality Standards Between 1999 and 2003

Year	Ozone[1]		Carbon Monoxide[2]		PM_{10}[3]	
	Number of Exceedance Days	Maximum Hour Concentration (ppm)	Number of Exceedance Days	Maximum Hour Concentration (ppm)	Number of Exceedance Days	Maximum 24-Hour Concentration ($\mu g/m^3$)
1999	8	0.156	0	7.8	6	104
2000	2	0.138	0	4.9	2	65
2001	7	0.134	0	5.2	4	112
2002	10	0.111	0	6.2	3	77
2003	5	0.101	0	3.4	1	59

Source: California Air Resources Board, 1980 to 2003.

[1] The sampling frequency of ozone is continuous (hourly). The state Ambient Air Quality Standard (AAQS) for ozone is 0.9 parts per million (ppm).

[2] The sampling frequency of carbon monoxide (CO) is continuous (hourly). The state one-hour AAQS for CO is 20 ppm.

[3] Sampling of particulate matter (PM_{10}) is scheduled throughout California once every sixth day (a 24-hour sample). Therefore, each station has a nominal 60 to 61 sampling days per year. All stations have the same schedule; that is, they all attempt to sample for PM_{10} on the same days. The number of station-sampling days per county is dependent the number of PM_{10} stations in the county. The state AAQS for PM_{10} is 50 micrograms per meter of air ($\mu g/m$).

Table 5-3: Pittsburg Air-Monitoring Station Annual Air Quality Measurements Between 1999 and 2003

Year	Ozone		Carbon Monoxide		Particulate Matter	
	Maximum 8-Hour Overlap Concentration (ppm)	Maximum 1-Hour Concentration (ppm)	Maximum 8-Hour Concentration (ppm)	Maximum 1-Hour Concentration (ppm)	Annual Arithmetic Mean ($\mu g/m^3$)	Maximum 24-Hour Concentration ($\mu g/m^3$)
1999	0.087	0.098	3.3	7.8	----[1]	72.0
2000	0.080	0.107	2.7	4.9	16.3	55.5
2001	0.092	0.118	2.4	5.2	20.7	97.7
2002	0.096	0.111	2.5	6.2	23.8	73.2
2003	0.080	0.094	4.6	3	20.2	58.3

Source: Bay Area Air Quality Management District, 2004.

ppm Parts per million
$\mu g/m^3$ Micrograms per cubic meter of air

[1] Poor data recovery (only 25 samples in 1999) resulted in no calculation of an Annual Arithmetic Mean for the Pittsburg Station in 1999.

Table 5-4: Bay Area Air Quality Management District Concord-Treat Boulevard and Pittsburg Stations Toxic Air Pollutant Measurements

Parameter	Mean Concentration per Year (parts per billion)			
	1999[1]	2000[1]	2001[2]	2002[2]
Acetaldehyde	0.87	0.72	---	---
Benzene	0.58	0.68	0.50	0.40
1,3-Butadiene	0.16	0.19	---	---
Carbon Tetrachloride	0.082	0.074	0.10	0.01
Chloroform	0.03	0.02	0.03	0.02
Formaldehyde	2.64	1.86	---	---
Ortho-Xylene	0.20	0.25	---	---
Ortho-Dichlorobenzene	---	0.05	---	---
Ethyl Benzene	0.3	0.3	---	---
Methyl Chloroform	0.06	0.05	0.05	0.03
Methyl Ethyl Ketone	0.11	0.15	---	---
Dichloromethane	---	---	0.46	0.55
Perchloroethylene	0.03	0.05	0.06	0.06
Styrene	0.08	0.05	---	---
Toluene	1.03	1.44	1.19	1.09
Trichloroethylene	0.01	0.01	0.08	0.04
Methyl tertiary-Butyl Ether	0.85	0.75	0.94	0.77
Ethylene Dibromide	---	---	0.02	0.01
Ethylene Dichloride	---	---	0.10	0.05
Vinyl Chloride	---	0.30	0.30	0.15

[1] Concord-Treat Boulevard air-monitoring station
[2] Pittsburg air-monitoring station

5.4 IMPACTS

5.4.1 Significance Criteria

Standards of significance were derived from Appendix G of the California Environmental Quality Act (CEQA) Guidelines. Impacts to air quality would be considered significant if they:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state AAQS,
- expose sensitive receptors to substantial pollutant concentration, or
- create objectionable odors affecting a substantial number of people.

The CEQA Guidelines do not specifically describe what thresholds of significance should be or how they may be used. Appendix G of the CEQA Guidelines lists a variety of potentially significant effects, but does not provide a means of judging whether they are indeed significant. The lead agency governing air quality standards in the project area, in this case the BAAQMD, is charged with the task of determining whether the effects of a project are indeed below the levels of significance to the environment. However, during construction of a project, the pollutant of concern is generally PM_{10}.

5.4.2 Construction

PM_{10} is the primary air pollutant source from construction activities. In addition to PM_{10}, there are pollutants associated with equipment usage and with vehicular emissions from transporting workers, equipment, and supplies.

The cumulative impact of the construction emissions presented in Table 5-5 was compared to the BAAQMD CEQA Guidelines "Thresholds of Significance for Construction Impacts," and the cumulative impact was determined to be less than significant.

An emissions inventory of the Basin by source category is presented in Table 5-6. Table 5-7 provides the net percent (unabated) contribution of the project. Even when assuming worst-case conditions, these contributions are small when compared to the total daily emissions in Contra Costa County. As a result, air quality impacts from project construction will be less than significant.

Table 5-5: Typical Construction Emissions Estimates During Construction

Activity and Equipment	Emissions (pounds per day)				
	ROG	CO	NO_x as NO_2	SO_2	PM_{10}
General Construction					
Rigging Truck (2)	0.59	9.24	1.08	0.00	0.00
Mechanic Truck (1)	0.14	1.69	0.17	0.00	0.00
Structure Foundation Excavation					
3/4-Ton Pick-up Truck (2)	0.59	9.24	1.08	0.00	0.00
One-Ton Truck (1)	1.20	5.78	13.52	1.15	1.11
Truck Mounted Digger (2)	2.40	10.56	27.04	2.29	2.22
Crawler Backhoe (2)	3.04	57.44	20.32	5.57	2.50
Concrete Truck (2)	2.40	11.56	27.04	2.30	2.22
Structure Delivery and Setup					
3/4-Ton Pick-up Truck (2)	0.59	9.24	1.08	0.00	0.00
Boom Truck (2)	8.96	272.00	6.74	0.37	0.90
Mobile Crane (2)	8.96	272.00	6.74	0.21	0.90
Wire Installation					
One-Ton Truck (2)	2.40	11.56	27.04	2.22	4.10
3/4-Ton Pick-up Truck (2)	0.59	9.24	1.08	0.00	0.00

Activity and Equipment	Emissions (pounds per day)				
	ROG	**CO**	**NO_x as NO_2**	**SO_2**	**PM_{10}**
Cleanup and Landscaping					
Two-Ton Flat Bed Truck (2)	3.04	28.64	66.72	7.26	4.10
3/4-Ton Pick-up Truck (2)	0.59	9.24	1.08	0.00	0.00
One-Ton Truck (2)	3.04	28.64	66.72	7.26	4.10
D-3 Bulldozer	1.52	14.32	33.36	2.78	1.32
Concrete Truck (2)	2.40	11.56	27.04	2.30	2.22
Tensioner	0.3	4.62	0.54	0.00	0.00
Cable Puller	0.3	4.62	0.54	0.00	0.00
Fugitive Dust					
Grading and Backfill	0.00	0.00	0.00	0.00	309.57
Substation Construction Total (pounds/day)	**43.05**	**790.19**	**328.85**	**34.32**	**332.27**
Substation Construction Total (tons/day)	**0.022**	**0.395**	**0.164**	**0.017**	**0.166**

ROG	Reactive organic gas
CO	Carbon monoxide
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
PM_{10}	Fugitive dust
SO_2	Sulfur dioxide

Table 5-6: 2004 Contra Costa County Estimated Annual Average Emissions by Source Category

Source Category	Daily Emissions (tons per day)				
	ROG	**CO**	**NO_2**	**SO_2**	**PM_{10}**
Industrial Processes	2.95	1.09	2.43	7.45	1.92
Organic Compound Evaporation	10.56	0.0	0.0	0.0	0.0
Combustion	1.39	16.46	29.65	8.20	3.05
Mobile Sources	33.99	309.63	68.76	2.87	3.29
Miscellaneous	24.56	25.79	6.58	20.49	22.02
Area Totals	**73.45**	**352.97**	**107.42**	**39.01**	**30.28**

Source: California Air Resources Board, 2005.

ROG Reactive organic gas
CO Carbon monoxide
NO_2 Nitrogen dioxide
SO_2 Sulfur dioxide
PM_{10} Fugitive dust

Table 5-7: Percent of Contra Costa County Emissions for Substation Construction

Pollutant	Percent Emissions
Reactive organic gas	0.03
Carbon monoxide	0.11
Nitrogen dioxide	0.15
Sulfur dioxide	0.04
Particulate matter	0.55

Furthermore, Section 2.3 of the BAAQMD CEQA Guidelines states that "if all the control measures indicated in Table 2 of the Guidelines, as appropriate (depending on the size of the project area), will be implemented, then air pollutant emissions from construction activities would be deemed a less than significant impact."

The project will not cause any objectionable odors, expose sensitive receptors to increased pollutant concentration, conflict with any air quality plans or standards, or otherwise significantly affect air quality. Project construction will not produce any pollutants on the BAAQMD toxic air contaminant list.

5.4.3 Operations

The BAAQMD has published thresholds of significance for project environmental impacts. For air quality impacts, it states that concentrations of air emissions are significant if they:

- violate any AAQS, contribute substantially to an existing or projected air quality violation, or expose sensitive receptors to substantial pollutant concentrations, or
- emit more than 80 pounds a day of a criteria pollutant (nitrogen oxides, SO_2, CO, PM_{10}).

Operation of the substation will not result in any pollutants being emitted into the air. Since the substation is unmanned, there will be no vehicular emissions associated with regular commuting to and from the substation. Vehicular emissions associated with maintenance and repair of the substation and powerlines will be the only sources of emissions during substation operation. As shown in Table 5-8, using an estimated total of 250 vehicle miles a month (both light-duty and heavy-duty trucks) for substation maintenance and repairs, the total emissions during operations will be considerably less than the 80 pounds/day maximum for reactive organic gas, CO, NO_2, SO_2, and PM_{10}.

Table 5-8: Operations Emissions Estimates

Activity and Equipment	Emissions (pounds per day)				
	ROG	**CO**	**NO_2**	**SO_2**	**PM_{10}**
Light-Duty Truck (200 miles per month)	0.04	0.82	0.21	0.00	0.00
Heavy-Duty Truck (50 miles per month)	0.02	0.31	0.04	0.148	0.166
Substation Operations Total (Pounds/Day)	**0.06**	**1.13**	**0.25**	**0.14**	**0.166**

ROG Reactive organic gas
CO Carbon monoxide
NO_2 Nitrogen dioxide
PM_{10} Fugitive dust
SO_2 Sulfur dioxide

5.5 MITIGATION MEASURES

5.5.1 Construction

While impacts associated with construction of the substation and tower modifications will be less than significant and, therefore, no mitigation is required, PGandE will take the following measures to further reduce impacts to air quality:

- Implement applicable standard best management practices (BMPs) identified in Table 2 of the BAAQMD CEQA Guidelines to reduce air quality impacts associated with PM_{10} as follows:

  - Streets will be cleaned daily with water sweepers if visible soil material is carried onto adjacent public streets.
  - All paved access roads, parking areas, and staging areas at construction sites will be swept daily (with water sweepers).
  - Soil stabilizers will be applied to inactive construction areas on an as-needed basis.
  - Exposed stockpiles of soil and other excavated materials will be enclosed, covered, watered twice daily, or applied with soil binders.
  - Vegetation will be replanted in disturbed areas as quickly as possible following construction completion.
  - All active construction areas will be watered at least twice daily.
  - All trucks hauling soil, sand, and other loose materials will be covered or will maintain at least two feet of freeboard.
  - All unpaved access roads, parking areas, and staging areas at construction sites will be paved, watered three times daily, or receive a daily application of a non-toxic soil stabilizer.
  - Exposed stockpiles (dirt, sand, etc.) will be enclosed, covered, watered twice daily, or receive a daily application of a non-toxic soil binder.
  - Traffic speeds will be limited to 15 miles an hour on unpaved roads.

- Encourage carpooling among construction workers through contractor bid specifications and project orientation training for workers.

- Tune vehicles used in construction activities according to the manufacturer's recommended maintenance schedule, or at least annually thereafter.

- Minimize vehicle idling time when feasible.

5.5.2 Operations and Maintenance

There will be no significant impacts to air quality due to the operations and maintenance of the substation; consequently, no mitigation measures are proposed. However, PGandE will employ standard BMPs during operations, such as minimizing vehicle trips and keeping vehicles and equipment well maintained.

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