9.0 AIR QUALITY

This chapter describes air quality in the San Francisco Bay area in general and in the project area specifically. It includes regulatory, regional, and project settings to provide a context for analyzing the effects of the project. The information presented in this section was compiled largely from information provided by the Bay Area Air Quality Management District (BAAQMD). References to other documents are provided as appropriate.

9.1 Affected Environment

9.1.1 Topography and Meteorology

The project areas are located in the San Francisco Bay Area Air Basin (SFBAAB). The SFBAAB is composed of the counties of Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, and Santa Clara, along with the southeast portion of Sonoma County and the southwest portion of Solano County. The SFBAAB covers an area of approximately 5,540 square miles.

Atmospheric conditions such as wind speed and direction, air temperature gradients, and local and regional topography influence air quality. The SFBAAB is affected by a Mediterranean climate of warm, dry summers and cool, damp winters. During the summer, maximum temperatures are about 64°F along the coast, and about 88°F farther inland. In winter, average minimum temperatures are in the low to mid-40s along the coast and in the low to mid-30s inland.

Topographical features, the location of the Pacific high-pressure system, and varying circulation patterns resulting from temperature gradients affect the speed and direction of local winds. The winds play a major role in the dispersion of pollutants. Strong winds can carry pollutants far from their source; a lack of wind will allow pollutants to concentrate in an area.

Air dispersion also affects pollutant concentrations. As altitude increases, air temperature normally decreases. Inversions occur when colder air becomes trapped below warmer air, restricting the air masses' ability to mix. Pollutants also become trapped, which promotes the production of secondary pollutants. Subsidence inversions, which can occur during the summer in the SFBAAB, result from high-pressure cells that cause the local air mass to sink, compress, and become warmer than the air closer to the earth. Pollutants accumulate as this stagnating air mass remains in place for 1 or more days.

9.1.2 Regulatory Setting

The project area is subject to major air quality planning programs required by both the federal Clean Air Act (CAA), which was last amended in 1990, and the California Clean Air Act of 1988. Both the federal and state statutes provide for ambient air quality standards (AAQS) o protect public health, timetables for progressing toward achieving and maintaining ambient standards, and the development of plans to guide the air quality improvement efforts of state and local agencies.

AAQS specify the concentration of pollutants to which the public can be exposed without adverse health effects. Individuals vary widely in their sensitivity to air pollutants, so standards are set to protect more sensitive populations (e.g., children and the elderly). The NAAQS and CAAQS are reviewed and updated periodically based on new health

studies. CAAQS tend to be at least as protective as NAAQS and are often more stringent. The NAAQS and CAAQS for criteria pollutants that are a potential concern for the proposed project (ozone [O_3], carbon monoxide [CO], nitrogen oxides [NO_x], sulfur oxides [SO_x], and particulate matter less than 10 micrometers in diameter [PM_{10}]) are listed in Table 9-1.

The U.S. Environmental Protection Agency (USEPA) oversees state and local implementation of CAA requirements. It sets NAAQS for criteria air pollutants. USEPA also sets emission standards for mobile sources, which include on-road motor vehicles, off-road vehicles, and marine engines. Finally, USEPA sets nationwide fuel standards.

The CAA requires states to submit a State Implementation Plan (SIP) for review and approval by USEPA. The SIP must contain control strategies that demonstrate attainment with national ambient air quality standards (NAAQS) by deadlines established in the CAA. States that fail to submit a plan or to secure approval may be denied federal funding and/or be required to increase emission offsets for industrial expansion. In California, the state plan is called the Clean Air Plan (CAP) (BAAQMD 1997a). The CAP must show satisfactory progress in attaining state ambient air quality standards.

Under California law, the responsibility to carry out air pollution control programs is split between the California Air Resources Board (CARB), USEPA, and BAAQMD.

- BAAQMD can require stationary sources to obtain permits, and can impose emission standards, set fuel or material specifications, and establish operational limits to reduce air emissions.
- CARB shares the regulation of mobile sources with USEPA and sets the California Ambient Air Quality Standards (CAAQS) (see below). CARB has the authority to set emission standards for on-road motor vehicles and for some classes of off-road mobile sources that are sold in California. CARB also regulates vehicle fuels; it has set emission reduction performance requirements for gasoline (referred to as *California reformulated gasoline*) and has limited the sulfur and aromatic content of diesel fuel to make it burn cleaner (this is referred to as *California diesel* or *California red-dyed diesel*).

The CAA contains conformity provisions, which are designed to ensure that federal agencies contribute to efforts to achieve the NAAQS. A conformity analysis may be required for a project if emissions of reactive organic gases (ROG) and oxides of nitrogen (NOx) are above the conformity thresholds of 50 tons of ROG and 100 tons of NOx per year. The proposed project will not exceed these emissions thresholds; therefore, no conformity analysis is required for this project.

Table 9-1

National and California Ambient Air Quality Standards

			NAAQS	
Pollutant	**Averaging Time**	**CAAQS**	**Primary**	**Secondary**
Ozone (O_3)	1-hour	0.09 ppm	0.12 ppm	Same as primary standard
Carbon Monoxide (CO)	8-hour	9 ppm	9 ppm	—
	1-hour	20 ppm	35 ppm	—
	Annual		0.053 ppm	
Nitrogen Dioxide (NO_2)	Annual		0.25 ppm	Same as primary standard
	1-hour	0.25 ppm	—	—
Sulfur Dioxide (SO_2)	Annual	—	0.03 ppm	—
	24-hour	0.04 ppm	0.14 ppm	—
	3-hour	—	—	0.5 ppm
	1-hour	0.25 ppm	—	—
Suspended particulate matter (PM_{10})	Annual. (Geometric)	30 µg/m3	50 µg/m3	—
	Annual (arithmetic)	—	15 µg/m3	Same as Primary Standard
	24-hour		65 µg/m3	Same as Primary Standard

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

1. California standards for O_3, CO, SO_2 (1-hour and 24-hour), NO_2, PM_{10}, and visibility-reducing particles are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded.
2. National standards other than 1-hour O_3 and 24-hour PM_{10} and those based on annual averages are not to be exceeded more than once a year. The 1-hour O_3 standard is attained when the expected number of days per calendar year with a maximum hourly average concentration above the standard is equal to or less than one. The 24-hour PM_{10} standard is attained when the 3-year average of the 99th percentile 24-hour concentrations is below 150 $\mu g/m^3$.
3. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects from a pollutant.

9.1.3 SFBAAB Air Quality Attainment Status

Areas with monitored pollutant concentrations that are lower than ambient air quality standards are designated as *attainment areas* on a pollutant-by-pollutant basis. When monitored concentrations exceed ambient standards, areas are designated as *non-attainment areas*. An area that recently exceeded ambient standards, but is now in attainment is designated as a *maintenance area*. Areas are often designated as *unclassified* when data are insufficient to have a basis for determining the area's attainment status. Non-attainment areas are further classified based on the severity and persistence of the air quality problem as *moderate, serious*, or *severe*. Classifications determine the minimum pollution control requirements. In general, the more serious the air quality classification, the more stringent the control requirements that must be contained in the regional air quality plans (see discussion above of the SIP and CAP).

The SFBAAB is currently in attainment of the federal standards for NO_x and SO_x, in non-attainment for O_3 and CO (urbanized areas only), and unclassified for PM_{10} (California Air Resources Board 2001a). The urbanized areas of the SFBAAB are moderate non-attainment areas for CO.

CARB designates areas of the state as either in attainment or in non-attainment of the CAAQS. An area is in non-attainment if the CAAQS have been exceeded more than once in 3 years. At the present time, the SFBAAB is in non-attainment of the CAAQS for O_3 and PM_{10} and in attainment of the CAAQS for CO, NO_2, and SO_2 (California Air Resources Board 2001a). The SFBAAB is designated as a serious state non-attainment area for O_3.

Table 9-2 displays the estimated annual average air emissions for the SFBAAB in the year 2000 (CARB, 2001b). Mobile sources are one of the largest contributors to air pollutants in the SFBAAB. Mobile sources account for approximately 60% of the reactive organic gases (ROG), 93% of the CO, 81% of the NO_x, 39% of the SO_2, and 12% of the PM_{10} emitted in the SFBAAB.

Table 9-2
Year 2000 Estimated Annual Average Emissions for SFBAAB (tons/day)

Source Type/Category	ROG	CO	NO_x	SO_2	PM_{10}
Stationary Sources					
Fuel Combustion	2.8	33.4	77.4	10.7	3.9
Waste Disposal	7.1	0.1	0.1	0.0	0.0
Cleaning and Surface Coating	71.0	0.0	0.0	--	0.0
Petroleum Production and Marketing	33.3	1.2	8.7	36.5	1.2
Industrial Processes	11.0	0.7	3.0	7.5	12.2
Subtotal	125.2	35.4	89.2	54.7	17.3
Area wide Sources					
Solvent Evaporation	74.6	--	--	--	--
Miscellaneous Processes	15.6	169.0	17.1	1.4	130.1
Subtotal	90.2	169.0	17.1	1.4	130.1
Mobile Sources					
On-Road Motor Vehicles	255.1	2,149.6	273.6	4.9	8.5
Other Mobile Sources	63.7	513.3	178.1	31.4	12.4
Subtotal	318.8	2,662.9	451.7	36.3	20.9
Total for the Air Basin	534.2	2,867.3	558.0	92.4	168.3

9.1.4 Ambient Air Quality in the Project Area

The three nearest air quality monitoring stations to the project areas are Central San Jose, Fremont, and Redwood City. Table 9-3 shows ambient air quality data from the years 1997 to 2002 for the criteria pollutants, O_3, CO, and PM_{10}.

Table 9-3

Summary of Ambient Air Quality in the Vicinity of Redwood City and Mountain View, 1997 – 2002

			Days above standard					
Pollutant	**Time Standard**	**Monitoring Station**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**
0_3	Federal 1-hour	Fremont	0	0	0	0	0	0
		San Jose Central	0	1	0	0	0	0
		Redwood City	0	0	0	0	0	0
	State 1-hour	Fremont	2	7	3	2	0	3
		San Jose Central	0	4	3	0	2	-
		Redwood City	0	0	0	0	1	0
	Federal 8-hour	Fremont	0	0	1	0	0	0
		San Jose Central	0	0	0	0	0	-
		Redwood City	0	0	0	0	0	0
CO	Federal 8-hour	Redwood City	0	0	0	0	0	0
		Fremont	0	0	0	0	0	0
		San Jose Central	0	0	0	0	0	0
PM_{10}	State 24-hour	Redwood City	2	0	3	1	4	1
		Fremont	1	1	2		3	1
		San Jose Central	2	3	5	7	4	2
	Federal 24-hour	Redwood City	0	0	0	0	0	0
		Fremont	0	0	0	0	0	0
		San Jose Central	0	0	0	0	0	0

Source: BAAQMD 1998, 1999, 2000 Internet Air Quality Data Summaries

Notes to Table 9-3:

ppm = parts per million;
pphm = parts per hundred million,
ppb = parts per billion

PM_{10} = particulate matter under 10 micrometers in diameter Pollutant standards listed as follows (state, federal): Ozone 1 hour peak (9pphm, 12 pphm); CO 8 hour (20 ppm, 35 ppm); NO_2 1 hour (25 pphm, na) annual (na, 5.3 pphm); SO_2 24 hour (40 ppb, 140 ppb); PM_{10} annual geometric mean (30 ppm, na) 24 hour (50 ppm, 150 ppm).

9.2 Criteria for Determining Significance of Effects

Criteria based on the *CEQA Guidelines* and federal, state, and local air pollution standards and regulations, as well as professional judgment, were used to determine the significance of air quality impacts. The project would have a significant impact on air quality if it would:

- Conflict with or obstruct implementation of applicable air quality plans;
- Increase ambient pollutant levels from below to above the NAAQS or CAAQS;
- Substantially contribute to an existing or projected air quality standard violation;
- Exceed the following thresholds that BAAQMD defines as significant under CEQA for project operation activities: total emissions greater than 80 pounds per day or 15 tons per year of ROG, NO_x, PM_{10}, or PM_{10} precursors, such as SO_x (BAAQMD 1996);
- Expose sensitive receptors to substantial pollutant concentrations; or
- Create objectionable odors affecting a substantial number of people.

BAAQMD has not identified thresholds of significance for emissions from construction activities. Construction-related emissions are generally short-term in duration, but still may cause adverse air quality impacts. PM_{10} is generally the pollutant of greatest concern with respect to construction activities that disturb the ground surface (e.g., during installation of water conveyance features or levee repairs). Construction equipment emits CO and O_3 precursors; however, these emissions are included in the emission inventory that is the basis for regional air quality plans. These pollutants are therefore not expected to impede attainment or maintenance of the O_3 and CO standards in the Bay Area (BAAQMD 1996).

9.3 Impacts and Mitigation Measures

The baseline for comparison of air quality impacts is current conditions, which is the operation of the salt pond system for brine concentration. Current conditions involve movement of brine through the salt ponds, with infrequent drying of some of the salt ponds. Periodic levee maintenance is conducted by topping levees with mud from within the salt ponds, and disking and grading the levees once the mud has dried. Employees drive on the unpaved levee roads to maintain and monitor the salt pond system.

While current conditions are used as a baseline for comparison purposes, it is important to note that Cargill Salt no longer owns the property, and operation of the ponds to concentrate brine for salt production will not continue into the future. If the project is not approved, future conditions will more closely resemble the No Project alternative.

Impacts due to the salt ponds in their current condition can be broken down into three categories:

- Dust generation: Dust is generated as a result of driving on unpaved levee roads and from maintenance of levee roads.
- Combustion emissions: Combustion emissions are generated from routine vehicle use and from construction and maintenance related equipment.
- Odor emissions: Odor complaints have occasionally been received as a result of ongoing salt pond operations due to hydrogen sulfide from dredging pond mud, due to algae decomposition in ponds containing brine, or due to decomposition of organic material in mud at the bottom of ponds that have dried out.

9.3.1 No Project/ No Action Alternative

Under the No Action alternative the majority of pond waters/brines would be moved to the Cargill plant site and the remainder of the waters would be allowed to evaporate in the ponds. The ponds would then fill seasonally with rainwater in winter and dry through the evaporation process in summer. No new public access would be available. No action would be conducted by the agencies, including levee maintenance, and some levees would likely fail during this period.

> *Air Quality Impact 1:* Increased dust generation due to exposed dry pond bottoms in seasonal ponds.

Under this alternative, all of the ponds would be seasonal ponds. The majority of the pond bottom areas would be dry during summer and fall. Fine materials and sediments on the dry pond bottoms may become airborne during windy periods.

Significance: Potentially significant

> *Air Quality Benefit 1:* Decreased dust generation due to driving and levee maintenance.

Under this alternative, the amount of driving on unpaved levees would be decreased. The amount of levee maintenance conducted would be less than current levels.

Significance: Beneficial

> *Air Quality Benefit 2:* Decrease in combustion emissions due to vehicles and equipment

Under this alternative, the amount of vehicle use for levee inspection and maintenance would be less than current levels.

Significance: Beneficial

> *Air Quality Impact 2:* Generation of odors

Decomposition of algae, brine shrimp, and other biomass that grows and accumulates in the ponds can degrade and produce odors. There are two ways that odor can occur in the ponds. First, algae and other biomass that naturally grow in the ponds can accumulate in certain areas of the ponds. As the algae naturally decompose, hydrogen sulfide gas can be produced. Warm weather and very little wind, similar to the Bay Area Indian summer condition, can accelerate the decomposition in the ponds and aggravate the odor condition. Second, odors can develop as the ponds dry and the mud bottoms are exposed to air, especially in hot weather. These odors are caused by the exposure of algae or brine shrimp.

The occurrence of the odor depends to a large part on the number of degree-cooling days that occur in summer months. The potential for odor impacts is also dependant on prevailing winds and the proximity and location of downwind receptors.

The Baumberg ponds may have the greatest potential for odor impacts, due to proximity and downwind location of residences.

Transferring the ponds in a dry condition would lead to unmanaged wetting and drying cycles as the ponds accumulate rainwater and dry through natural evaporation. Any biomass produced while the pond contains water would be exposed as the pond dried.

This could potentially expose more areas to unmanaged drying, potentially during the warmest periods of the year. It could also potentially lead to ponds drying out that are either in close proximity to neighboring populations or have not dried out in the past, exposing neighboring residents to odors they have not experienced before.

Significance: Potentially significant

9.3.2 Alternative 1 – Seasonal Ponds

In Alternative 1, the majority of pond waters/brines would be moved to the Cargill plant site and the remainder of the waters would be allowed to evaporate in the ponds. The ponds would then fill seasonally with rainwater in winter and dry through the evaporation process in summer. The only action taken by the agencies would be to maintain the levees at their current standard of maintenance (i.e., salt pond maintenance, not for flood control).

> *Air Quality Impact 1:* Increased dust generation due to exposed dry pond bottoms in seasonal ponds.

Under this alternative, all of the ponds would be seasonal ponds. The majority of the pond bottom areas would be dry during summer and fall. Fine materials and sediments on the dry pond bottoms may become airborne during windy periods.

Significance: Potentially significant

> *Air Quality Benefit 1:* Decreased dust generation due to driving and levee maintenance.

Under this alternative, the amount of driving on unpaved levees would be decreased. The amount of levee maintenance conducted would be similar to current levels. However, current weekly pond visits for inspection and operation adjustments would not be required.

Significance: Benefit

> *Air Quality Benefit 2:* Decrease in combustion emissions due to vehicles and equipment

Under this alternative, the amount of driving on unpaved levees would be decreased. The amount of levee maintenance conducted would be similar to current levels. However, current weekly pond visits for inspection and operation adjustments would not be required.

Significance: Benefit

> *Air Quality Impact 2:* Generation of odors

For Alternative 1, the seasonal pond conditions would be same as for the No Action alternative.

Significance: Potentially significant

9.3.3 Alternative 2 – Simultaneous Marsh/April Initial Release

In Alternative 2, the contents of most of the Alviso and Baumberg Ponds would be released simultaneously in March and April. The ponds would then be managed as a mix of continuous circulation ponds, seasonal ponds and batch ponds, though management of some ponds could be altered through adaptive management during the continuous

circulation period. Higher salinity ponds in Alviso and in the West Bay would be discharged in March and April in a later year when salinities in the ponds have been reduced to appropriate levels. The Island Ponds (A-19, 20, and 21) would be breached and open to tidal waters.

Air Quality Impact 1: Dust generation

Pond management alternative 1 will require the construction and installation of several structures for water management. Construction activities will temporarily result in an increase in traffic on unpaved levee roads, resulting in a temporary increase in dust generation.

Construction activities may also require the stockpiling of dirt, either from excavations or for use in construction. There may be some blowing of dirt from stockpiles.

Under pond management alternative 1, some ponds will be managed as seasonal ponds, and as a result they will be dry for part of the year. As discussed under the No Action Alternative, there is potential for dust generation due to dry ponds. The number of acres of dry ponds under this management alternative will be significantly less than under the No Action Alternative.

Significance: Less than significant

Air Quality Impact 2: Generation of odors

In Alternative 2, some ponds would be managed as seasonal ponds and the remaining ponds would intake, circulate and discharge brine. The potential odor impacts associated with the seasonal ponds under this alternative would be the same as those listed under the No Action Alternative, except that a significantly fewer number of ponds would be dry at any time.

Odor impacts associated with the ponds containing brine would be similar to impacts under the baseline scenario of current pond management. Algae and other biomass grows in the ponds and can accumulate in certain areas of the ponds and decompose, particularly in ponds that have remained stagnant for a long period of time and during hot weather.

The greatest odor impacts will be at the Baumberg ponds, due to the proximity and downwind location of residences within 500 yards of the edge of ponds subject to seasonal drying and the number of ponds that will become seasonal ponds under the various alternatives, including the No Project/No Action Alternative. At residences near the Baumberg ponds (within 500 yards) the odor will be noticeable after a succession of degree-cooling days. Table 9-4 shows the odor risk factors associated with the Baumberg ponds.

Table 9-4.
Odor Risk Factors Associated with the Baumberg Complex Ponds

Type	Pond(s)	Odor Risk Factor
System Intake	1, 1C, 5, 6, 4C, 9,	None
System Outlet	2, 2C, 5C	None
Winter System Pond; Summer Seasonal	4, 7, 8, 6B, 6A, 12, 13, 14	Possible
Winter System Pond; Summer Seasonal	6A	Probable

System Pond	6C, 5, 3C, 2C	None
Winter System Outlet/Summer Seasonal, tidally muted in borrow ditch	8A	None
Open tidal culvert do ditch-pond is seasonal	8X	Possible
Winter system intake; Summer intake and outlet	10, 11	None

The Alviso ponds are also located upwind of residential areas, but at a greater distance than the Baumberg Ponds. Odors from the Alviso Ponds will therefore be dispersed to a high degree resulting in little significant impact to residential and other receptors. In addition, fewer of the Alviso ponds are proposed to be managed as seasonal ponds, so overall odor production will be less than at the Baumberg ponds.

The West Bay ponds are located downwind from the nearest residential areas and seasonal management is not proposed for any of the West Bay ponds. Therefore, odor impacts from these ponds will be of minor significance.

Significance: Potentially significant (Baumberg Complex ponds only)

Air Quality Mitigation 1A: Drain the seasonal ponds early enough in the dry season so that any exposure of organic material is allowed to occur before the onset of particularly warm, still weather at the end of summer.

Air Quality Mitigation 1B: If odors result from biomass accumulating and stagnating in ponds containing brine, increase circulation through the ponds.

Post Mitigation Significance: Less than Significant

Air Quality Impact 3: Increase in combustion emissions

The construction of structures required by Alternative 2, may result in a temporary increase in combustion emissions from construction equipment. Construction-related air quality impacts were analyzed by comparing anticipated construction-generated concentrations of criteria pollutants to the appropriate federal and/or state ambient air quality standard. Inventories of construction-related emissions, used to evaluate construction impacts, included:

- Combustion emissions from equipment used in the installation of water conveyance equipment and its supporting equipment and levee repairs and upgrades
- Combustion emissions from all support and transport vessels (much of the equipment would have to be brought in by barge)
- Combustion emissions from landside vehicles used for worker commute trips and material delivery trips, and fugitive dust emissions from any ground disturbance or stockpiling activities

The evaluation of construction phase emissions also considers the following factors:

- Types and sizes of mobile equipment, vessels, and vehicles used;
- Daily hours of operation;
- Load factors of the engines;
- Type(s) of fuel used;
- Vessel and vehicle miles traveled;

- Area of disturbed land surface; and
- Schedule of activities (when the various activities would occur).

To the extent possible, these data were derived from the U.S. Army Corps of Engineering (Corps) engineering estimates for the project.

Emissions for all project alternatives are assumed to be less than the emissions for Cargill's past operation and maintenance permits, and right-of-way and easement operation and maintenance permits awarded to PG&E for its transmission lines; Southern Pacific Rail Road for its rail lines, and East Bay Waste Water management for its interceptor line. All vehicle emissions are below the thresholds under existing permits.

Significance: Less than significant

9.3.4 Alternative 3 – Phased Initial Release

In Alternative 3, many of the lower salinity ponds in Alviso and Baumberg would be discharged in July, and the medium salinity ponds would be discharged the following March and April. These ponds would then be managed in the same manner as in Alternative 2 during the continuous circulation period. The higher salinity ponds would also be managed as in Alternative 2.

The construction for Alternative 3, and long-term operations for Alternative 3 would be the same as for Alternative 2.

All air quality related impacts for Alternative 3 would be the same as for Alternative 2.