

4.11 AIR QUALITY

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4.11 AIR QUALITY

This section describes ambient air quality conditions and regulatory standards and provides information regarding potential air quality impacts resulting from the IRWP, including criteria pollutants, air toxics, and odors.

IMPACTS EVALUATED IN OTHER SECTIONS

All impacts relating to air quality are discussed in this section.

SETTING

Motor vehicles are the primary source of ambient air pollution in the study area. Other local sources of air pollution include industry, residential heating by burning wood and natural gas, and agricultural practices. Small miscellaneous sources such as lawn mowers, coffee roasters, char broilers, dry cleaners, gasoline stations, and many other small business operations also contribute air pollutants. Air pollutant concentrations are affected by both emissions and meteorology. While meteorology tends to create short-term variations in pollutant concentrations, changes in emissions create long-term variations. Topographical and meteorological conditions are important factors in affecting local air pollutant concentrations. Meteorological effects such as wind speed, wind direction and air temperature gradients interact with topographical features to direct the movement and dispersal of air pollutants.

Meteorology

The Pacific Ocean dominates the climate of the Santa Rosa Plain and surrounding areas. Local wind patterns are strongly influenced by the Petaluma Gap. As marine air travels through the Petaluma Gap, it splits into northward and southward paths. In the Santa Rosa area, prevailing winds flow generally from the south about 60 percent of the time. Moderate to strong northwesterly winds blow over 50 percent of the time in summer, and about 30 percent of the time annually. Calm conditions occur about 14 percent of the time in winter, and eight percent of the time annually. In Santa Rosa, the average annual wind speed is five miles per hour. At Cloverdale Peak, (elevation 2,923 feet) average annual wind speed is 7.5 miles per hour, and calm conditions almost never occur. At the Geysers Steamfield, at an elevation of 3,000 feet, the average wind speed is 11.9 miles per hour and calm conditions occur zero percent of the time.

Sonoma County is a sub-region of the San Francisco Bay Area Air Basin. The climate of the Bay Area is determined largely by a high-pressure system that is almost always present over the eastern Pacific Ocean. High-pressure systems are characterized by an upper layer of dry air that warms as it descends, restricting the mobility of cooler marine-influenced air near the ground surface, resulting in subsidence inversions. During summer and fall, locally generated emissions can, under the restraining influences of topography and subsidence inversions, create ozone and secondary particulates, such as nitrates and sulfates. In the winter, the Pacific high pressure system shifts southward, allowing storms to pass through

the area. Between storm cycles, inversions often develop, and pollution levels can build up to unhealthful concentrations.

Strong sunlight provides a catalyst for ozone precursor pollutants to react in the atmosphere and form high levels of ground level ozone smog. Thus, highest annual ambient ozone-smog levels typically occur from May to October. In winter, periods of stagnant air (calm or very low wind speeds) can occur, especially between storms. This stagnation can allow respirable particulate levels to build up to unhealthful levels, especially when fireplaces are being heavily used (as at year-end holidays). The PM₁₀ data for Santa Rosa show that the highest PM₁₀ levels occurred on December 25, 1998, December 26, 1999, and December 20, 2000.

Temperatures in Sonoma County and Lake County range from the mid-20s on winter mornings to the low-100s in late summer afternoons. Typically, temperatures range from the 40's in the winter months to the 80's in summer. Coldest weather is typically in January and February, while warmest temperatures generally occur in September and October. Rainfall at lower elevations averages about 30 inches per year and is confined primarily to the wet season from late October to early May. In some mountain areas, rainfall can be over 60 inches per year. Except for occasional light drizzles from thick marine stratus clouds, summers are almost completely dry.

Criteria Air Pollutants

Criteria air pollutants are the selected air contaminants for which State and federal ambient air quality standards have been established to protect public health and welfare: Ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter. The California Air Resources Board and local air quality agencies operate air pollutant monitoring stations and report results. These stations measure the ambient concentrations of criteria air pollutants as well as several additional pollutants regulated by the State. Monitored ambient air pollutant concentrations reflect the number and strength of emission sources and the influence of topographical and meteorological factors.

Table 4.14-1 describes the standards, effects, and sources of criteria air pollutants. The ambient air quality standards incorporate a margin of safety and are designed to protect those segments of the public most susceptible to respiratory distress. Sensitive receptors include asthmatics, the very young, the elderly, persons weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels somewhat above the ambient air quality standards before adverse health effects are observed.

Table 4.11-1

Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
Ozone (O ₃)	1 hour	0.09 ppm	0.12 ppm	Irritation and possibly permanent lung damage.	Motor vehicles, including refining and gasoline delivery.
	8 hours	---	0.08 ppm*		
Carbon Monoxide (CO)	1 hour	20 ppm	35 ppm	Deprives body of oxygen in the blood. Causes headaches and worsens respiratory problems.	Primarily gasoline-powered internal combustion engines.
	8 hours	9 ppm	9.0 ppm		
Nitrogen Dioxide (NO ₂)	Annual Average	---	0.05 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown.	Motor vehicles, petroleum-refining, power plants, aircraft, ships, and railroads.
	1 hour	0.25 ppm	---		
Sulfur Dioxide (SO ₂)	Annual Average	---	0.03 ppm	Irritates and may permanently injure respiratory tract and lungs. Can damage plants, destructive to marble, iron, and steel. Limits visibility and reduces sunlight.	Fuel combustion, chemical plants, sulfur recovery plants, and metal processing.
	1 hour	0.25 ppm	---		
	24 hours	0.04 ppm	0.14 ppm		
Suspended Particulate Matter (PM ₁₀ , PM _{2.5})	Annual Geometric Mean	20 µg/m ³ (PM ₁₀)	15 µg/m ³ (PM _{2.5})	May irritate eyes and respiratory tract, decreases in lung capacity, cancer, and increased mortality. Produces haze and limits visibility.	Industrial and agricultural operations, combustion, atmospheric photochemical reactions, and natural activities (e.g. ocean sprays).
	Annual Geometric Mean	12 µg/m ³ (PM _{2.5})	---		
	Annual Arithmetic Mean	---	50 µg/m ³ (PM ₁₀)		
	24 hours	50 µg/m ³ (PM ₁₀)	150 µg/m ³ (PM ₁₀) 65 µg/m ³ (PM _{2.5})		
Lead (Pb)	Monthly	1.5 µg/m ³	---	Disturbs gastrointestinal system, and causes anemia, kidney disease, and neuromuscular and neurologic	Present source: lead smelters, battery manufacturing and recycling facilities. Past source: combustion of leaded gasoline.
	Quarterly	---	1.5 µg/m ³		

Table 4.11-1

Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	California Standard	Federal Primary Standard	Pollutant Health and Atmospheric Effects	Major Pollutant Sources
				dysfunction (in severe cases.)	
Sulfates (SO ₄)	24 hours	25 µg/m ³	---	Similar to sulfur dioxide.	Industrial processes refineries.
Hydrogen Sulfide (H ₂ S)	1 hour	0.03 ppm (1.5 µg/m ³)		Very pungent odor similar to rotten eggs. Annoying and irritating – high concentrations fatal.	Sources include industrial processes, oil production, and geothermal wells.

Note: ppm = parts per million; µg/m³ = micrograms per cubic meter.

Ozone

Ground-level ozone smog is usually not emitted directly into the atmosphere, but is a secondary air pollutant produced through chemical reactions involving reactive organic gases (ROG) and oxides of nitrogen (NO_x). Sunlight is the energy source for this reaction, thus, ozone is formed primarily on sunny days and is not formed at night. Since ROG and NO_x are known ozone precursor compounds, control efforts focus on reducing these emissions. Ozone plumes may persist for several days and travel hundreds of miles, impacting air quality far down-wind. Ground level ozone can do significant damage to crops, materials (such as rubber) and human health, especially to those with chronic conditions such as asthma. Ozone concentrations tend to be higher in the late spring, summer, and fall, when warm temperatures and long sunny days create conditions conducive to its formation.

Carbon Monoxide

Carbon monoxide is a non-reactive pollutant that is a product of incomplete combustion of fossil fuels and is mostly associated with motor vehicle traffic and fuel combustion. High carbon monoxide concentrations develop primarily during winter when periods of light wind combine with ground level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle and heating emissions. Motor vehicles also exhibit increased carbon monoxide emission rates at low air temperatures. Carbon monoxide combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease or anemia.

Nitrogen Dioxide (NO₂)

Oxides of nitrogen (NO_x) are a group of chemicals created directly by burning and also through the atmospheric reaction that creates ozone. Fuel combustion usually creates oxides of nitrogen, typically nitrogen oxide (NO). While NO is mildly toxic by itself, nitrogen dioxide (NO₂) is about 200 times more potent. NO is an ozone precursor, but ozone production also converts some NO to NO₂. Atmospheric reactions also create N₂O₅, N₂O, and peracylacetylnitrates (PAN). Because of the complex chemistry involved, the criteria pollutant measured is NO₂. Elevated NO_x concentrations are associated with increased acute and chronic respiratory disease, eye irritation, and damage to plant leaves. Motor vehicles, residential heating, and power plants are major NO_x sources. NO_x also can agglomerate with water vapor to form fine particulate matter (PM_{2.5}), or acid fog and rain.

Sulfur Dioxide (SO₂)

Sulfur dioxide is formed through the oxidation (e.g., combustion) of sulfur containing compounds. Suspended sulfates are the product of further oxidation of sulfur dioxide. In some parts of the State, elevated levels can also be due to natural causes, such as geologic vents and hot springs. SO₂ often combines with water vapor to form sulfuric acid or related acids, resulting in acid rain or fog. SO₂ also can agglomerate with other compounds to form PM_{2.5}.

Particulate Matter (PM₁₀ and PM_{2.5})

Particulate matter that is 10 microns or less in diameter (PM₁₀) is generally considered to penetrate the lungs (a micron is one millionth of a meter). A subset of PM₁₀ is particulate matter 2.5 microns or less in diameter (PM_{2.5}). Both PM₁₀ and PM_{2.5} can be inhaled into the air passages and the lungs causing adverse health effects. Combustion, dust from industrial activities and unpaved roads, open burning, secondary formation from NO_x and SO₂, and agricultural operations (i.e., feed lot ammonia emissions), are all significant sources of PM₁₀ and PM_{2.5}. Residential wood burning can also be a significant source in colder months. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional impact.

Lead

Gasoline-powered automobile engines used to be the major source of airborne lead in urban areas. Excessive exposure to lead concentrations can result in gastrointestinal disturbances, anemia, kidney disease, and in severe cases of neuromuscular and neurologic dysfunction. The use of lead additives in motor vehicle fuel has been eliminated in California, and lead concentrations have declined substantially as a result.

Sulfates SO_x

Sulfates are a type of transformed pollutant. Originating as a gas such as sulfur dioxide (SO₂), sulfates are a salt of sulfuric acid. They are often found as a fine

particulate. Suspended sulfates contribute to overall particulate concentrations in ambient air. Sulfates tend to be acidic, and are known to contribute to premature death in individuals with pre-existing respiratory disease. They can also deposit on material surfaces and damage crops, forests, cause rust, decay marble, or mar painted surfaces. A primary local source of sulfates is industrial activities, such as a refinery or coke calciner. A wider-spread source is combustion of diesel fuel containing sulfur. The California Air Resources Board (CARB) has regulated sulfur content in diesel fuel to reduce this problem.

Hydrogen Sulfide (H₂S)

Hydrogen sulfide is found in nature around some hot springs, geothermal sources, and oil fields (sour gas). It is also produced by anaerobic decomposition, and is sometimes called swamp gas. The human nose can detect H₂S at concentrations well below toxic levels. Heavier than air, this gas is considered obnoxious and unpleasant. At higher levels it de-sensitizes the nose, and can be fatal because it blocks oxygen uptake by the blood. Mainly a health threat to industrial workers, hydrogen sulfide is usually regulated to eliminate nuisance for nearby residents or property owners.

Toxic Air Contaminants

Toxic Air Contaminants (TAC) are a large group of compounds known to cause cancer or acute health effects. They are generally less pervasive in the urban atmosphere than the criteria pollutants, but they are linked to short-term (acute) or long-term (chronic) adverse health effects. A few, such as diesel exhaust, are common in urban areas and near major highways. The current list of toxic air contaminants includes approximately 200 compounds. According to the Bay Area Air Quality Management District (BAAQMD), diesel combustion emissions are the TAC responsible for most excess cancer deaths in the Bay Area. TAC sources include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and some agricultural activities. Unlike regulations concerning criteria air pollutants, there are no ambient air quality standards for evaluation of TACs based on the amount of emissions. Instead, TAC emissions are evaluated based on the degree of health risk that could result from exposure to these pollutants.

The State requires the local air districts to quantify and prioritize emissions from individual facilities. High priority facilities must then perform a health risk assessment, and if specific thresholds are violated, they are required to communicate the results to the public in the form of notices and public meetings. Depending on the risk level, emitting facilities can be required to implement varying levels of risk reduction measures. Mobile sources, such as diesel truck and locomotive engines, are not required to perform risk assessments, but are coming under increasing scrutiny as they contribute twice as much to the toxic burden as all other stationary sources combined (BAAQMD 2000 TAC Control Program Report). Consequently, CARB has issued regulations for cleaner diesel fuels and catalytic oxidizer technology.

According to the BAAQMD, control programs have significantly reduced many types of TACs by 60 percent or more. The BAAQMD's 1999 Annual TAC Control Report presents a population-based estimate of excess cancer deaths. This estimate is stated as excess cancer

deaths per 1 million people. For stationary sources, the estimate is 186 excess deaths per 1 million Bay Area residents. For diesel exhaust, the risk is approximately 450 deaths per 1 million residents.

The ARB Air Toxics Section has conducted modeling of excess cancer deaths due to inhaled TACs for most urban areas of the State. Much of Lake County and Northern Sonoma County has not been modeled (<http://www.arb.ca.gov/toxics/cti/hlthrisk/hlthrisk.htm>). For the areas that have been modeled, combined risk from all sources is estimated at less than 250 excess annual cancer deaths per million people. The Lake and Northern Sonoma County air pollution control agencies implement all CARB-recommended control measures to reduce TACs.

Existing Pollution Levels

Air quality in Sonoma and Lake Counties is generally very good due to the rural nature of the region and the almost persistent flow of maritime air across the region. There are infrequent exceedances of health-based air quality standards for ozone and fine particulate matter.

Measured Pollutant Concentrations

Santa Rosa currently hosts one automated monitoring station that operates 24 hours per day, every day. This station measures ozone, carbon monoxide, nitrogen dioxide, lead, sulfates, and PM₁₀. PM₁₀ is sampled on a special filter according to a national schedule every sixth day. PM₁₀ is also monitored on the same schedule in Guerneville, Healdsburg, and Cloverdale. The Healdsburg station also monitors ozone smog. Hydrogen sulfide is monitored in Lake County at three sites near the Geysers, at Anderson, Glenbrook, and Hobergs (on Pine Summit Road).

Table 4.11-2 shows that ozone air quality is a moderate problem in Sonoma County, with 1999 being generally worse than subsequent years.

Table 4.11-2

Highest 4 Daily Maximum Ozone Measurements at Sonoma County

Location	Average Time	National Ambient Air Quality Standard	California Ambient Air Quality Standard	Measured Levels ¹ (ppm)		
				1999	2000	2001
Santa Rosa	1-Hour	0.12 ppm	0.09 ppm	0.10	0.08	0.09
	8-Hour	0.08 ppm	---	0.08	0.06	0.06
Healdsburg	1-Hour	0.12 ppm	0.09 ppm	0.10	0.09	0.09
	8-Hour	0.08 ppm	---	0.09	0.08	0.07

Notes:1. Values exceeding a State or federal standard are shown in bold.

Detailed air quality data are shown in the following four tables. Table 4.11-3 presents the highest PM₁₀ levels measured in Sonoma County. Table 4.11-4 shows the highest PM_{2.5} levels measured in Santa Rosa, which is the only station in the County that measures this pollutant. The State PM₁₀ standard is exceeded on about 42 to 72 days per year in the Bay Area; however, the national standard has not been exceeded in at least the last 10 years. Elevated PM₁₀ levels are somewhat problematic in Sonoma County as well as most of California. Exceedances of the State 24-hour PM₁₀ standard were measured; however there were no exceedances of the national standards. The 1-hour federal PM_{2.5} standard was also exceeded in 2001.

Exceedances of any other air quality standards were not measured in the region during 1999-2001. For example, Table 4.11-5 shows that the highest carbon monoxide concentrations were less than 50 percent of the standards. Hydrogen sulfide, which is a pollutant of concern near the Geysers Steamfield, is monitored near the geysers in Lake County. Table 4.11-6 shows that levels are well below standards at the three monitoring stations closest to the Geysers Steamfield.

Table 4.11-3

Maximum PM₁₀ Measurements in Sonoma County

Location	Average Time	National Ambient Air Quality Standard	California Ambient Air Quality Standard	Measured Levels ¹ (µg/m ³)		
				1999	2000	2001
Santa Rosa	24-Hour	150 µg/m ³	50 µg/m ³	54	46	74
	Annual	50 µg/m ³	20 µg/m ³	19	15	18
Cloverdale	24-Hour	150 µg/m ³	50 µg/m ³	71	44	58
	Annual	50 µg/m ³	20 µg/m ³	14	9	12
Guerneville	24-Hour	150 µg/m ³	50 µg/m ³	61	33	59
	Annual	50 µg/m ³	20 µg/m ³	16	13	14
Healdsburg	24-Hour	150 µg/m ³	50 µg/m ³	69	41	57
	Annual	50 µg/m ³	20 µg/m ³	12	12	13

Notes: 1. Values exceeding a State or federal standard are shown in bold.

Table 4.11-4

Maximum PM_{2.5} Measurements in Sonoma County

Pollutant	Average Time	National Ambient Air Quality Standard	California Ambient Air Quality Standard	Measured Levels ¹ (µg/m ³)		
				1999	2000	2001
Respirable Particulate Matter (PM _{2.5}) - Measured at Santa Rosa	24-Hour	65 µg/m ³	--	55	40	76
	Annual	15 µg/m ³	12 µg/m ³	12	10	11

Notes: 1. Values exceeding a State or federal standard are shown in bold.

Table 4.11-5

Maximum Carbon Monoxide Measurements in Sonoma County

Pollutant	Average Time	National Ambient Air Quality Standard	California Ambient Air Quality Standard	Measured Levels ¹ (ppm)		
				1999	2000	2001
Carbon Monoxide	8-Hour	9 ppm	9.0 ppm	3.4	3.1	2.4

Notes: 1. Values exceeding a State or federal standard are shown in bold.

Table 4.11-6

Maximum Hydrogen Sulfide Measurements in Lake County

Location	Average Time	National Ambient Air Quality Standard	California Ambient Air Quality Standard	Measured Levels ¹ (ppm)		
				1999	2000	2001
Anderson Springs	1-Hour	none	0.03 ppm	0.011	0.007	0.008
Glenbrook - High Valley Road				0.010	0.016	0.008
Hobergs - Pine Mountain Summit				0.009	0.011	0.014

Notes: 1. Values exceeding a State or federal standard are shown in bold.

Existing Emissions at the Laguna Plant

Air pollutant emissions at the Laguna Plant are shown in Table 4.11-7. These emissions are primarily from the operation of the internal combustion engines and liquid and solid process flows.

In addition to air pollutant emissions, odorous substances are emitted from the plant. The Laguna Plant has an ongoing odor control program. Incoming sewage is treated with chlorine, and then ferrous chloride is added to reduce odors. During late spring, as septage flow diminishes to summer levels, odors (typically hydrogen sulfide or the rotten egg smell) created by sulfide bacteria usually increase in the Headworks area. Plant operators treat the Headworks with sodium hypochlorite to kill the bacteria and eliminate most of the hydrogen sulfide formation. Fans and blowers also help to ventilate certain areas where gases can concentrate, thus diluting potential odor sources.

Table 4.11-7

Estimated Laguna Plant Emissions

Pollutant/Compound	Emission Rate
Total Organic Gases	16 tons/year ^a
Carbon Monoxide	11 tons/year ^a
Reactive Organic Gases	5.7 tons/year ^a
Nitrogen Oxides	2.6 tons/year ^a
Sulfur Oxides	0.3 tons/year ^a
Particulate Matter	0.1 tons/year ^a
Particulate Matter < 10 microns	0.1 tons/year ^a
1,1,1-Trichlorethane	262.4 lbs/yr ^b
Benzene	102.1 lbs/yr ^b
Chloroform	787.2 lbs/yr ^b
Formaldehyde	132 lbs/yr ^b
Methylene chloride	874.7 lbs/yr ^b
Perchloroethylene	612.3 lbs/y ^b r
Trichloroethylene	87.5 lbs/yr ^b
Xylenes	437.3 lbs/yr ^b

Source: California Air Resources Board, 1999

Notes:

a: Compounds 1 through 7 data are from 1999.

b: According to published CARB reports, data for compounds 8-15 are from various years (the years are not specified, assumed to be in the mid to late 1990's).

In the six years from 1997 through 2002, the Laguna Plant received 14 odor complaints. A review of records from these complaints indicated that six complaints were attributable to the Laguna Plant. The remaining complaints were due to other sources, mostly agricultural activities, such as farmers spreading manure nearby. Of the six complaints about odors coming from the plant, all were rectified through chemical means or by mechanical air movement. Most validated complaints from the existing plant come from the Llano Road metering station and indicate the presence of strong odors. The Laguna Plant odor complaint performance is improving, as shown by the record for the five-year period 1990 through 1994, when 23 complaints were received.

Existing Air Quality at the Geysers Steamfield

Air quality at the Geysers Steamfield is influenced by activities performed by several different companies. The steamfields primarily emit hydrogen sulfide (an odorous compound), organic gases, and particulates. The North Sonoma and Lake County air pollution control agencies place allowable limits on each unit at the Geysers that emits

pollutants. The most regulated pollutant is hydrogen sulfide. In the past, there have been two minor violations of North Sonoma APCD rules: one was the brief exceedance of an hourly particulate emission limit and the other was an exceedance in the number of construction hours for a well (Sessions, 2003). Otherwise, air emissions have been well below allowable limits. The State standards for hydrogen sulfide have not been exceeded at any of the monitoring stations. Lake County, which is typically downwind of the Geysers, has hydrogen sulfide monitors located near the Geysers geothermal plants. The highest monitored levels were less than 50 percent of the State standard. There are no government-operated hydrogen sulfide monitoring stations in Sonoma or Mendocino counties.

Carbon Dioxide/Greenhouse Gases

On December 4, 2001 the Santa Rosa City Council adopted a resolution to become a member of Cities for Climate Protection (CCP), a project of the International Council on Local Environmental Initiatives. Since that time all eight Sonoma-county cities and Sonoma County also have become members. By becoming a member, local governments commit to completing five milestones: 1) conduct a greenhouse gas (GHG) emissions analysis; 2) set a target for emissions reduction; 3) draft a local action plan for meeting the target; 4) implement the action plan; and 5) monitor and report on the progress (Cities for Climate Protection Report, 2002). The City of Santa Rosa completed the greenhouse gas emissions analysis in October 2002. The report recommended setting a target reduction of 20 percent from 2000-2001 emissions by the year 2012. No action has yet been taken on the recommendation.

Emissions for the Laguna Treatment Plant and its associated facilities in 2000-2001 were 20,492 tons of GHG. Therefore, to meet the recommended target reduction, emissions in 2012 would need to be less than 16,394 tons.

GOALS, OBJECTIVES, AND POLICIES

Regulatory Context

The federal and California Clean Air Acts have established ambient air quality standards for different pollutants. National ambient air quality standards (NAAQS) were established by the federal Clean Air Act of 1970 (amended in 1977 and 1990) for six "criteria" pollutants (see Table 4.11-1. In 1997, EPA established an 8-Hour standard for ozone and annual and 24-hour standards for very fine particulate matter (PM_{2.5}).

California established ambient air quality standards as early as 1969 through the Mulford-Carrell Act. Pollutants regulated under the California Clean Air Act are similar to those regulated under the federal Clean Air Act and includes California ambient air quality standards (CAAQS).

Federal Air Quality Regulations

The EPA is responsible for implementing programs established under the federal Clean Air Act. Responsibilities include establishing and reviewing the national ambient air quality standards and judging the adequacy of State Implementation Plans. EPA has delegated the

authority to implement many of the federal programs to the states while retaining an oversight role to ensure that the programs continue to be implemented.

If an area does not meet the NAAQS over a period of 3 years, the EPA designates it as a “nonattainment” area for that particular pollutant. The EPA requires states with areas not in compliance with the national standards to prepare and submit air quality plans showing how they will come into compliance. If the states cannot show how the standards would be met immediately, then they must show progress toward meeting the standards. Such a plan is referred to as the State Implementation Plan (SIP). Under severe cases, the EPA may impose a federal plan to show progress in meeting the federal standards.

Under the NAAQS, the Bay Area is classified a “moderate nonattainment” area for the 1-hour ozone standard. Exceedances of the standard are usually experienced in the far eastern and southern portions of the Bay Area. The region is considered unclassified under the 8-hour ozone standard. The region has until 2006 to meet the NAAQS for 1-hour ozone concentrations under the attainment plan submitted by the region and approved by EPA. The northern portion of Sonoma County and all of Lake County are considered unclassified or attainment for the standard ozone NAAQS, because monitoring data show no exceedances in these areas.

Prior to 1998, the Bay Area was a “moderate nonattainment” area for carbon monoxide due to localized exceedances of the national carbon monoxide standards in downtown San Jose and Vallejo. The carbon monoxide standards have not been exceeded since 1991. Since the region had not experienced exceedances of the carbon monoxide standards, the San Francisco Bay Area Redesignation Request and Maintenance Plan for the National Carbon Monoxide Standard was submitted to EPA in 1994. In 1998, EPA approved the plan and reclassified the area as a carbon monoxide “maintenance” area. Northern Sonoma County and Lake County are considered unclassified since exceedances of the carbon monoxide standard have not been measured, and violations of the standard are unlikely.

For all pollutants other than ozone, the IRWP area, including the entire San Francisco Bay Area, is in attainment of the NAAQS. The counties in the study area have not measured ambient air pollutant concentrations in excess of those allowed by the NAAQS.

California Air Quality Regulations

The California Clean Air Act of 1988, amended in 1992, outlines a program for areas in the State to attain the CAAQS by the earliest practical date. The CARB is the State air pollution control agency. The California Clean Air Act sets more stringent air quality standards for all of the pollutants covered under national standards (i.e., NAAQS), and additionally regulates levels of vinyl chloride, hydrogen sulfide, sulfates, and visibility-reducing particulates. If an area does not meet the CAAQS, the CARB designates the area as a nonattainment area.

The CARB establishes and periodically reviews the State ambient air quality standards, prepares the California SIP, secures approval of that plan from EPA, and identifies toxic air contaminants. CARB also oversees the activities of air quality management districts, which are organized at the county or regional level. As a general matter, EPA and CARB regulate emissions from mobile sources and consumer products, and the local air districts regulate

stationary emission sources. Unlike stationary sources, mobile sources of air pollutants are not regulated through individual permits but rather through vehicle emissions standards, fuel specifications, and vehicle inspection and maintenance programs.

The CARB requires regions that do not meet the CAAQS for ozone to submit clean air plans that describe plans to attain the standard. Based on the California standards, the Bay Area is a serious nonattainment area for ozone (since the area cannot forecast attainment of the State ozone standard in the near future). Northern Sonoma APCD is classified as non-attainment for the State ozone and PM₁₀ standards. The State recognizes that high ozone levels measured in Healdsburg are a result of pollutant transport from the Bay Area (Woodward 2003). Lake County is considered to be in attainment of the CAAQS ozone standard.

The Bay Area and northern Sonoma County are considered nonattainment areas for PM₁₀ under the CAAQS. Lake County is the only attainment area in the State for PM¹⁰ under the CAAQS.

The study area has met the CAAQS for all other air pollutants.

Regional Air Quality Regulations and Planning

The Bay Area Air Quality Management District (BAAQMD) was created by the California Legislature in 1955. The BAAQMD oversees development of air quality plans, regulations, and permitting for air pollution emissions in the southern portion of Sonoma County. As described in the above section, the BAAQMD operates a regional monitoring network that measures the ambient concentrations of criteria air pollutants. The BAAQMD also regulates stationary sources through its permitting program. Clean Air Plans are prepared by the BAAQMD in conjunction with the Metropolitan Transportation Commission (MTC) and the Association of Bay Area Governments (ABAG).

The Northern Sonoma County APCD regulates emission sources in the northern portion of Sonoma County. Sonoma is one of a few counties in California divided into two air districts. The Northern Sonoma APCD comprises the more rural portion of Sonoma County.

The Lake County AQMD regulates stationary sources throughout Lake County. The Geysers geothermal field has produced high levels of hydrogen sulfide in the past, and this air district cooperates with the Northern Sonoma APCD to monitor and regulate emissions from the Geysers.

Bay Area Ozone Attainment Plan

To fulfill Federal Clean Air Act requirements for the San Francisco Bay Area Air Basin, ABAG, the MTC and BAAQMD jointly prepared a Bay Area Air Quality Plan in 1982. This plan predicted attainment of all national clean air standards within the basin by 1987. This forecast was somewhat optimistic in that attainment of federal clean air standards was only briefly achieved in the early 1990's.

Violations of the NAAQS in the mid to late 1990's resulted in the necessity to update the plan. The EPA indicated its intention to reject portions of the 1999 Ozone Attainment Plan. As a result, the 2001 Ozone Attainment Plan was prepared and

submitted to EPA. Portions of this latest plan have been approved by EPA. This plan forecasts attainment of the 1-hour ozone NAAQS by 2006. To ensure continued attainment of the national carbon monoxide standard, the Carbon Monoxide Maintenance Plan was adopted by ABAG in 1994.

Bay Area Clean Air Plan

As required under the California Clean Air Act, the Bay Area Clean Air Plan (CAP) was prepared in 1991. Triennial assessments and revisions to the CAP have subsequently been prepared in 1994, 1997 and 2000. The 2000 Bay Area CAP contains specific measures intended to improve air quality through tighter industry controls, cleaner cars and trucks, and cleaner fuels. The plan encourages cities and counties to adopt measures to support this clean air goal. Any project that attracts automobile traffic may be found to have a significant air quality impact, according to BAAQMD, if the project's traffic generation has not been properly anticipated in the regional air quality plan. No air quality plans are required for areas violating the State PM₁₀ standard.

Table 4.11-8 identifies air quality related goals, objectives, and policies. The table also indicates which criteria in the Air Quality Section are responsive to each set of policies.

Table 4.11-8

Goals, Objectives and Policies – Air Quality

Adopted Plan Document	Document Section	Document Numeric Reference	Goal, Objective or Policy	Relevant Evaluation Criteria¹
Sonoma County General Plan	Resources Conservation Element	Goal RC-13 Objective RC-13.1 Policy RC-13d Policy RC-13f	Preserve and maintain the projected county air quality and minimize air pollution	1-4
Lake County General Plan	Resource Management and Conservation Plan	Policy Air Quality 1.2 Policy Air Quality 1.2	Require Best Available Control Technology Reduce dust impacts from roads	1-4, 6
Petaluma General Plan	Community Health and Safety Element	Objective (n)	Maintain or improve Petaluma's air quality	1-4
Rohnert Park General Plan	Resource Conservation Element	Goal EC-K Policy EC-24	Work to improve air quality by reducing emissions from mobile and stationary sources Adopt dust abatement measures per BAAQMD	1-4

Table 4.11-8

Goals, Objectives and Policies – Air Quality

Adopted Plan Document	Document Section	Document Numeric Reference	Goal, Objective or Policy	Relevant Evaluation Criteria¹
Santa Rosa General Plan	Open Space Conservation Element	OSC-G OSC-G-2 OSC-I	Help maintain good air quality Use low-emitting diesel fuel (biodiesel and lo-NO _x additives) Encourage development of non-traditional and distributed sources of electricity generation	1-4
Cotati General Plan	Community Development Element	Objective 3.1	Improve air quality in Cotati and reduce air quality impacts from future development.	1-4
Sebastopol General Plan	Conservation, Parks, and Open Space Element	Goal 7	Protect and improve air quality	1-4
Windsor General Plan	Environmental Resources Element	Policy G.1	Comply with air standards and participate in regional efforts to improve air quality	1-4

Source: Petaluma 1987; Rohnert Park 2000; Santa Rosa 2002a; Sebastopol 1998, Windsor 1996; Sonoma County 1989

Notes: 1. The evaluation criteria are identified in Table 4.11.9.

EVALUATION CRITERIA WITH SIGNIFICANCE THRESHOLDS

Table 4.11-9

Evaluation Criteria with Significance Thresholds – Air Quality

Evaluation Criteria	As Measured by	Significance Thresholds	Source of Criteria
1. Will construction of the IRWP generate emissions that expose people to high levels of dust and equipment exhaust?	Size of construction area, duration of construction, amount and size of large equipment, and proximity of receptors.	Non-compliance with measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD.	CEQA Guidelines Appendix G, Checklist Item III (d). Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans

Table 4.11-9

Evaluation Criteria with Significance Thresholds – Air Quality

Evaluation Criteria	As Measured by	Significance Thresholds	Source of Criteria
2. Will IRWP emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Emissions of Reactive Organic Compounds, Nitrogen Oxides, Sulfur Dioxide, Carbon Monoxide and Particulates	<p>- In the jurisdiction of the BAAQMD: greater than 80 pounds/day for ozone precursor pollutants (nitrogen oxides and reactive organic gases) and PM₁₀; and 550 pounds/day of carbon monoxide.</p> <p>- In the jurisdiction of the Northern Sonoma County APCD: greater than 40 tons per year of ozone precursor pollutants, 15 tons per year of PM₁₀;</p> <p>- In jurisdiction of the Lake County AQMD greater than 150 pounds/day of a criteria air contaminant.</p>	<p>CEQA Guidelines Appendix G, Checklist Item III (a) and Item III (c)</p> <p>Bay Area Ozone Attainment Plan</p> <p>Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans,</p> <p>Northern Sonoma County APCD Rules and Regulations, and</p> <p>Lake County AQMD Rules and Regulations</p>
3. Will the IRWP expose people to substantial levels of toxic air contaminants?	Risk associated with emissions of toxic air contaminants.	Probability of contracting cancer for maximally exposed individual (MEI) exceeds ten in one million or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans
4. Will the IRWP violate or contribute to violation of ambient an air quality standard?	Emissions of carbon monoxide. ¹	Greater than 550 pounds per day of CO.	<p>CEQA Guidelines Appendix G, Checklist Item III (b).</p> <p>Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans.</p>
5. Will the IRWP cause odor impacts?	Complaints	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints per year averaged over 3 years.	<p>CEQA Guidelines Appendix G, Checklist Item III (e).</p> <p>Bay Area Air Quality Management District CEQA Guidelines for Assessing Impacts of Projects and Plans.</p>

Table 4.11-9

Evaluation Criteria with Significance Thresholds – Air Quality

Evaluation Criteria	As Measured by	Significance Thresholds	Source of Criteria
6. Will the IRWP cause permit/monitoring violations at the Geysers Steamfield?	Violations	Greater than 0 violations.	Northern Sonoma Air Pollution Control District Rules and Regulations. Lake County AQMD Rules and Regulations
7. Will the IRWP increase greenhouse gas emissions?	Percent increase of equivalent carbon dioxide (eCO ₂) emissions over 2000-2001 levels	Any increase.	City of Santa Rosa, City of Cotati, City of Rohnert Park, and City of Sebastopol as members of Cities for Climate Protection

1. CO is the only criteria air contaminant that is normally modeled for its ambient concentration impacts (such as CO “hotspots” at congested intersections). Impacts for the other criteria air contaminants are assessed against criterion number 2 according to their mass emissions.

METHODOLOGY

Construction

Building the treatment plant upgrade facilities, pipelines, and reservoirs could involve excavation, grading, and paving. All of these activities can generate dust (soil particles). Wind erosion and disturbance to exposed areas would also be sources of dust emissions. PM₁₀ is a component of dust. Construction activities would also create exhaust emissions from construction equipment, construction worker vehicles, and transport trucks.

Within the jurisdiction of the BAAQMD, the significance of air quality impacts from construction dust is typically determined by the control measures that would be implemented. Projects that would move substantial amounts of earth or take place close to sensitive receptors require the greatest level of mitigation. Therefore, emissions from construction were not calculated. Instead, a significant construction phase impact was assumed and construction phase mitigation measures are recommended for all construction phase activities.

Laguna Plant Upgrade

There are three sources of air pollution from the Laguna Plant: motor vehicles, TACs from the Headworks, and from power plants generating electricity for the operation’s pumps and other electric energy needs. Motor vehicle and Headworks emissions primarily affect air quality in the IRWP area. Electricity generation emissions can be generated at any generation facility, or mix of facilities, both fossil fueled and non-fossil fueled, connected to

the system. Thus, power plant emissions may not affect local air quality, but could impact air quality at other locations. The emissions factors and guidance provided by the CARB take these factors into account and are recommended for use in environmental impacts reports as their assumed average proportional contribution to local air quality impacts.

Motor vehicle criteria air contaminant emissions were calculated using the emissions factors for a typical vehicle fleet mix provided by the BAAQMD, and are presented in Appendix K. The calculations are based on an assumed increase in the number of trips per day caused by the operation of the upgraded facilities.

Carbon monoxide emissions were calculated based on BAAQMD criteria and compared to the threshold criterion to determine if carbon monoxide "hotspot" modeling was needed to determine if concentrations at congested intersections would exceed the ambient standard. The assumed incremental number of additional vehicle trips and carbon monoxide emissions would not substantially increase traffic at congested intersections. Current carbon monoxide concentrations in Santa Rosa are less than 50 percent of the standard and levels outside the city would be less than that. Thus, no carbon monoxide modeling was deemed necessary, and impact was based on daily emissions.

For TACs, the risk assessment for the Headworks expansion included in the previous Long-Term EIR/EIS (Santa Rosa 1996) was utilized. That screening assessment determined that the cancer risk was well below the screening criteria, and therefore, the impact would be less than significant. The plant upgrade could increase throughput by 22 percent over the levels evaluated in the Long-Term EIR/EIS, increasing TAC emissions by a similar rate. This increase was compared to the screening criteria to determine significance of impact.

Additional pumps would require more electricity, with resulting regional air pollutant emissions from generation plants. Ultraviolet disinfection uses about 30 percent of the total power demand at the plan. Currently, the plant uses about 17 megawatts of electricity annually, and the new ultraviolet system may use up to 5 megawatts of energy annually (Small, pers. comm. 2003). Power plant emissions are normally calculated for projects using significant amounts of electricity (BAAQMD 1999) even though it is not anticipated that a project itself would require the construction of any new generating facilities. Instead, existing facilities would increase the level of their operations by a relatively small degree to accommodate the added project demand. Emissions from electric energy generation were calculated using CARB per-megawatt emissions factors (CARB, 2001) and forecast electric energy demand, as shown in Appendix K. Power plant emissions controls are the responsibility of the plant operator and the air quality management jurisdiction within which they are located.

Odors

The odor analysis methodology evaluates the history of past odor complaints and from that assesses the potential for the IRWP to create new ones. The potential for new complaints is based on the number and type of control measures incorporated into the IRWP.

Carbon Dioxide/Greenhouse Gases

The greenhouse gas emissions for operation of each component were determined using the Cities for Climate Protection Greenhouse Gas Emissions Software version 5. The software converts fuel types (gas, electricity, etc.) and fuel units (therms, MWh, etc.) into equivalent carbon dioxide (eCO₂) emissions. This is the same software used by the City of Santa Rosa for their greenhouse gas emissions analysis.

Emissions during construction would primarily come from construction vehicles. Due to the intermittent and temporary nature of these emissions, construction impacts are not evaluated for eCO₂ emissions.

IMPACTS AND RECOMMENDED MITIGATION MEASURES

Laguna Plant Upgrade Component

Table 4.11-10

Air Quality Impacts by Component – Laguna Plant Upgrade

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.1.1. Will construction of the Laguna Plant Upgrade component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD.	Dust (PM ₁₀) and Diesel Exhaust from construction on 18 acres.	C	○
11.1.2. Will the Laguna Plant Upgrade component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	Traffic & Energy consumption: NO _x = 25 to 59 lbs/day ROG = 0.2 lbs/day PM ₁₀ = 0.2 lbs/day	O&M/P	○
11.1.3. Will the Laguna Plant Upgrade component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		Up to 22% increase in emissions but < 10 in 1 million risk	O&M/P	○

Table 4.11-10

Air Quality Impacts by Component – Laguna Plant Upgrade

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.1.4. Will the Laguna Plant Upgrade component violate or contribute to violation of an ambient air quality standard?	Greater than 9.0 ppm CO for 8-hour averaging periods.	None	O&M/P	==
11.1.5. Will the Laguna Plant upgrade component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annually (three year average).	Greater than ten odor complaints in a 90-day period, or 1 confirmed or 3 unconfirmed complaints annually (three year average)	O&M/P	●
11.1.6. Will the Laguna Plant Upgrade component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	None	O&M/P	==
11.1.7. Will the Laguna Plant Upgrade component increase greenhouse gas emissions?	Any increase over 2000-2001 eCO ₂ emissions	30% increase	O&M/P	●

- Notes:
- | | | |
|-------------------------------|---|--|
| 1. Type of Impact: | 2. Level of Significance: | |
| C Construction | ● Significant impact before and after mitigation | |
| O&M Operation and Maintenance | ⊙ Significant impact before mitigation; less than significant impact after mitigation | |
| P Permanent | ○ Less than significant impact; no mitigation proposed | |
| | == No impact | |

Impact: 11.1.1 Will construction of the Laguna Plant Upgrade component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 1 through 6*

Upgrading of the Laguna Plant would involve utilization of heavy construction equipment, earthworks, and construction personnel.

Construction would also expose soil to wind erosion and allow soil track-out onto paved roads where vehicle traffic can entrain dust into the atmosphere. Construction might occur near homes, and construction-related emissions could impact people and property. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of the local air management districts.

Alternative 7 does not have a Laguna Plant Upgrade component.

Mitigation: No mitigation is needed.

Impact: 11.1.2. Will the Laguna Plant Upgrade component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *Less than Significant: Alternatives 1 through 6*

The Laguna Plant upgrade would result in increases of emissions of criteria air pollutants due to an increase in the number of employee and delivery trips and from the demand for additional energy. Both of these impacts to air quality are indirect. Emissions from increased vehicle activity during operation and maintenance would be less than one pound per day of each criteria pollutant (see emission calculations in Appendix K). Electricity demand at the plant would increase by approximately 5 megawatt hours annually. NO_x and PM are the emissions of greatest concern from operation of power plants (CARB 2001). Based on energy generation emission factors developed by the CARB, NO_x emissions would be approximately in a range of 25-50 pounds per day (depending upon the exact generation mix). This NO_x would be generated off-site by power plants connected to the grid. Emissions of other IRWP-related air contaminants from power plants would be less than 1 pound per day, as emissions factors for PM, CO, ROG and SO_x are normally much lower than for NO_x (CARB 2001 and SCAQMD 1993). Thus, the emissions of PM, CO, ROG and SO_x would also be lower than the significance thresholds, resulting in an impact that is less than significant.

Alternative 7 does not have a Laguna Plant Upgrade component.

Mitigation: No mitigation is needed.

Impact: 11.1.3. Will the Laguna Plant Upgrade component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 1 through 6*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operational phase toxic air contaminant emissions estimates were developed for the Subregional Long-Term Waste Water Treatment Plant EIR/EIS (Santa Rosa 1996). These estimates are shown in the following table. Additionally, Laguna Plant upgrade emissions are shown in the table, based on an assumed 22 percent throughput increase from the amount shown in that EIR/EIS, which would increase TAC emissions by a similar rate. Estimated IRWP emissions what would exceed the points of significance are shown in bold type.

Table 4.11-11

Toxic Air Contaminant Emissions – Laguna Plant Upgrade

TAC	Point of Significance	Total Emissions (from 1996 EIR/EIS)	Total Estimated IRWP Emissions
Benzene	Greater than 6.7 pounds/year	3 pounds/year	4 pounds/year
Dichlorobenzene	Greater than 68 pounds/year	5 pounds/year	6 pounds/year
Perchloroethylene	Greater than 33 pounds/year	105 pounds/year	128 pounds/year
Methylene chloride	Greater than 190 pounds/year	182 pounds/year	222 pounds/year
Ethylbenzene	Greater than 193,000 pounds/year	3 pounds/year	4 pounds/year
Toluene	Greater than 38,600 pounds/year	14 pounds/year	17 pounds/year
Xylene	Greater than 57,900 pounds/year	20 pounds/year	24 pounds/year
1,1,1 Trichloroethane	Greater than 61,800 pounds/year	40 pounds/year	49 pounds/year

A risk assessment for the headworks expansion was prepared and included in the Long-Term EIR/EIS for perchlorethylene (which exceeded the screening trigger level) which found an increased cancer risk of 0.37/million, well below the one per one million significance criterion in use at that time. Since 1996 BAAQMD policy and CEQA guidance have changed to set the cancer risk significance threshold at 10 in 1 million – an order of magnitude greater than the standard in use before. As stated above, the proposed plant upgrade could increase throughput by 22 percent, increasing toxic air contaminants and cancer risk by roughly a similar amount. With that increase, cancer risk would still be well below the significance criterion including the risk from perchloroethylene and methylene chloride. Additionally, the TAC emissions increase would not result in a non-carcinogenic TAC Hazard Index greater than 1 for the maximally exposed individual. Further details on the analysis are provided in a memo from Illingworth and Rodkin (February 3, 2003)

contained in Appendix K. Furthermore, the plant upgrades would be required to obtain the appropriate BAAQMD Authority to Construct and Authority to Operate permits. These permits would require the plant to continue meeting the BAAQMD's Risk Management Policy. The BAAQMD considers that any source that obtains the appropriate permits and complies with all appropriate rules and regulations would not have a significant impact. This impact is considered to be less than significant.

Alternative 7 does not have a Laguna Plant upgrade component.

Mitigation: No mitigation is needed.

Impact: 11.1.4. Will the Laguna Plant Upgrade component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternatives 1 through 6*

Operational traffic generated by the Laguna Plant Upgrade would emit CO, which can lead to localized air quality impacts. The IRWP would emit less than 550 pounds per day of CO (see Appendix K) and not substantially add traffic to congested intersections where elevated CO concentrations may occur. Therefore, the Laguna Plant Upgrade would not cause or contribute to a violation of CO air quality standards, resulting in no impact.

Alternative 7 does not have a Laguna Plant upgrade component.

Mitigation: No mitigation is needed.

Impact: 11.1.5. Will the Laguna Plant upgrade component cause odor impacts?

Analysis: *Significant: Alternatives 1 through 6*

The Laguna Plant upgrade would enable greater throughput and consequently increase the potential for impacts both in terms of odor strength and frequency. Verified odor complaints have been traced to bacterial sulfide gas production in the headworks. The Laguna Plant has an ongoing odor control program that appears to be adequate. There were three unconfirmed odor complaints to the BAAQMD, one in 1997, one in 1998, and one in 2002. None of these odor complaints resulted in Violations Notices from the BAAQMD.

Proposed modifications to the plant would increase odors infrequently. The population of sulfide-forming bacteria builds up in late spring, when sewage water flows diminish. The Plant's odor reduction strategy for waste treatment entails adding chlorine to the headworks in the event of a complaint, or if conditions exist that may cause an odor impact. This action kills some of the bacteria eliminating most of the sulfide gas production. However, the odor treatment may occur after the fact, that is, after an odor complaint has been received. Therefore, the impact is considered potentially significant.

Expansion of the headworks would lead to an increase in production of sludge at the Laguna Plant. Impacts of expanded sludge handling facilities

were evaluated in the Santa Rosa Subregional Sludge Beneficial Use Project EIR (LSA Associates, Inc. 1991; State Clearinghouse #88092911). The Beneficial Use EIR concluded that potential odors were the only unavoidable adverse impact associated with the Sludge Project. The Mitigation Measure to minimize odors recommended by the EIR is incorporated into the IRWP as Measure 3.2.11, Odor Control for Sludge Handling. Despite the inclusion of this Measure, it was concluded that there was a potential for odors associated with both composting and land application would exceed the significance threshold and therefore the impact could be significant.

Alternative 7 does not have a Laguna Plant Upgrade component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternatives 1 through 6*

The potential for odor impacts would continue, even with continued implementation of the facility's current odor control program. The program is effective, but there are residences nearby and, with the increased treatment capacity provided by the IRWP, the potential for odor impacts would continue to exist and may increase.

Impact: 11.1.6. Will the Laguna Plant upgrade component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternatives 1 through 6*

Upgrading the Laguna Plant would not affect emissions at the Geysers Steamfield.

Alternative 7 does not have a Laguna Plant upgrade component.

Mitigation: No mitigation is needed.

Impact: 11.1.7. Will the Laguna Plant Upgrade component increase eCO₂ emissions?

Analysis: *Significant: Alternatives 1 through 6*

The Laguna Plant Upgrade component would use approximately 11 million kWh annually, creating an additional 6,172 tons of eCO₂ emissions. This would be a 30 percent increase over 2000-2001 emissions. This impact would be considered significant.

Alternative 7 does not have a Laguna Plan Upgrade component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternatives 1 through 6*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures such as process or

equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

Indoor Water Conservation Component

Table 4.11-12

Air Quality Impacts by Component – Indoor Water Conservation

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.2.1. Will construction of the Indoor Water Conservation component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	None	C	==
11.2.2. Will Indoor Water Conservation component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.2.3. Will the Indoor Water Conservation component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	None	O&M/P	==
11.2.4. Will the Indoor Water Conservation component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.2.5. Will the Indoor Water Conservation component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.2.6. Will the Indoor Water Conservation component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==

Table 4.11-12

Air Quality Impacts by Component – Indoor Water Conservation

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.2.7. Will the Indoor Water Conservation increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	4% reduction	O&M/P	+

Notes:	1. Type of Impact:		2. Level of Significance:
C	Construction	●	Significant impact before and after mitigation
O&M	Operation and Maintenance	⊙	Significant impact before mitigation; less than significant impact after mitigation
P	Permanent	○	Less than significant impact; no mitigation proposed
		==	No impact
		+	Beneficial impact

Impact: 11.2.1 through 11.2.6. Will the Indoor Water Conservation component cause air quality impacts based on evaluation criteria 1 through 6?

Analysis: *No Impact: Alternative 1*

No construction would occur and no air contaminant emissions are associated with indoor water conservation activities. Therefore the Indoor Water Conservation component would have no impact.

Mitigation: No mitigation is needed.

Impact: 11.2.7. Will the Indoor Water Conservation component cause an increase in greenhouse gas emissions?

Analysis: *Beneficial: Alternative 1*

The Indoor Water Conservation component would not require additional energy and therefore would not increase eCO₂ emissions. There could, however, be a reduction in energy use as a result of less water to treat, as this component would reduce flow to the Laguna Plant by as much as 285 million gallons annually. This would equate to a 1.475 million kWh annual energy savings or 4 percent reduction of eCO₂ emissions over 2000-2001 levels. Therefore the Indoor Water Conservation Component would have no impact.

Alternatives 2 through 7 do not have an indoor water conservation component.

I&I Reduction Component

Table 4.11-12

Air Quality Impacts by Component – I&I Reduction

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.3.1. Will construction of the I&I Reduction component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 3,191 acres	C	○
11.3.2. Will I&I Reduction component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.3.3. Will the I&I Reduction component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
11.3.4. Will the I&I Reduction component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.3.5. Will the I&I Reduction component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.3.6. Will the I&I Reduction component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==

Table 4.11-12

Air Quality Impacts by Component – I&I Reduction

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.3.7. Will the I&I component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	28% reduction	O&M/P	==

- Notes:
- | | |
|-------------------------------|---|
| 1. Type of Impact: | 2. Level of Significance: |
| C Construction | ● Significant impact before and after mitigation |
| O&M Operation and Maintenance | ⊙ Significant impact before mitigation; less than significant impact after mitigation |
| P Permanent | ○ Less than significant impact; no mitigation proposed |
| | == No impact |

Impact: 11.3.1. Will construction of the I&I Reduction component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternative 2*

Replacing leaking sewage lines and laterals requires extensive use of diesel-powered equipment and requires construction worker commuting. It would also expose soil to wind erosion and allow soil track-out onto paved roads. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Impact: 11.3.2. Will the I&I Reduction component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternative 2*

No air contaminant emissions are associated with I&I reduction operational phase activities because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Impact: 11.3.3. Will the I&I Reduction component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternative 2*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

No TAC emissions are associated with I&I Reduction operation phase activities because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Impact: 11.3.4. Will the I&I Reduction component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternative 2*

No air contaminant emissions are associated with I&I reduction operational phase activities because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Impact: 11.3.5. Will the I&I Reduction component potentially cause odors?

Analysis: *No Impact: Alternative 2*

After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, no odor complaints are anticipated and there would thus be no impact.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Impact: 11.3.6. Will the I&I Reduction component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternative 2*

The I&I reduction component would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation measures are needed.

Impact: 11.3.7. Will the I&I Reduction component increase eCO₂ emissions?

Analysis: *Beneficial: Alternative 2*

The I&I Reduction component does not include additional energy use and therefore would not increase eCO₂ emissions. There could, however, be a reduction in energy use as a result of less water to treat. The I&I Reduction component would reduce flow to the Laguna Plant up to 2,000 million gallons annually. This would be an annual energy savings of up to 10.2 million kWh, or a 28 percent reduction of eCO₂ emissions over 2000-2001 levels.

Alternatives 1, 3, 4, 5, 6 and 7 do not have an I&I Reduction component.

Mitigation: No mitigation is needed.

Urban Irrigation Component

Table 4.11-13

Air Quality Impacts by Component – Urban Irrigation

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.4.1. Will construction of the Urban Irrigation component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 17 acres	C	○
11.4.2. Will Urban Irrigation component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.4.3. Will the Urban Irrigation component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust None	C O&M/P	○ ==

Table 4.11-13

Air Quality Impacts by Component – Urban Irrigation

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.4.4. Will the Urban Irrigation component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.4.5. Will the Urban Irrigation component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	Fewer than the threshold level of complaints from graywater systems	O&M/P	○
11.4.6. Will the Urban Irrigation component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.4.7. Will the Urban Irrigation increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P	+

-
- Notes:
- | | | |
|-------------------------------|----|---|
| 1. Type of Impact: | | 2. Level of Significance: |
| C Construction | ● | Significant impact before and after mitigation |
| O&M Operation and Maintenance | ⊙ | Significant impact before mitigation; less than significant impact after mitigation |
| P Permanent | ○ | Less than significant impact; no mitigation proposed |
| | == | No impact |
| | + | Beneficial impact |

Impact: 11.4.1. Will construction of the Urban Irrigation component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant Alternative 3*

Replacement of existing sources of water with recycled water for urban irrigation systems would not require use of any construction equipment that would generate emissions. However, the installation of graywater systems would involve use of diesel-powered equipment and requires construction worker commuting. It could also expose soil to wind erosion and allow soil track-out onto paved roads. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust

impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.2. Will the Urban Irrigation component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternative 3*

No air contaminant emissions are associated with operational phase activities of the Urban Irrigation component because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.3. Will the Urban Irrigation component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternative 3*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

No TAC emissions are associated with operational phase activities for the Urban Irrigation component because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.4. Will the Urban Irrigation component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternative 3*

No air contaminant emissions are associated with operational phase activities of the Urban Irrigation component because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.5. Will the Urban Irrigation component potentially cause odors?

Analysis: *Less than Significant: Alternative 3*

After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system.

Graywater systems may be an odor source at a local scale, but this would not be expected to result in odor complaints in excess of the threshold criteria because any odors sources would be relatively small and highly localized.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.6. Will the Urban Irrigation component cause air permitting/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternative 3*

The Urban Irrigation component would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.4.7. Will the Urban Irrigation component increase eCO₂ emissions?

Analysis: *No Impact: Alternative 3*

The Urban Irrigation component does not include energy use and therefore would not contribute to the increase of eCO₂ emissions.

Alternatives 1, 2, 4, 5, 6 and 7 do not have an Urban Irrigation component.

Mitigation: No mitigation is needed.

Agricultural Irrigation Component

Table 4.11-14

Air Quality Impacts by Component – Agricultural Irrigation

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.5.1. Will construction of the Agricultural Irrigation component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to xx acres	C	○

Impact: 11.5.1. Will construction of the Agricultural Irrigation component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternative 4*

For areas without existing irrigation systems, agricultural irrigation with recycled water would require the construction of local distribution systems. This requires use of diesel-powered equipment and construction employee commuting, which would emit air pollutants. Construction would also expose soil to wind erosion and allow soil track-out onto paved roads where vehicle traffic can entrain dust into the atmosphere. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.5.2. Will Agricultural Irrigation component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *Significant: Alternative 4*

Implementation of the Agricultural Irrigation component could allow expanded agricultural production in the North County and East of Rohnert Park areas. Altogether, about 24,900 acres could be brought into production by utilizing the increased availability of recycled water for irrigation.

While the exact amount of acreage or the crops to be cultivated is not known at this time, it is possible to develop a rough order-of-magnitude emissions estimate for mobile source emissions from agricultural activities based upon previous environmental documents and assumptions on future agricultural activities. For purposes of this analysis, the Draft EIR for the Gallo of Sonoma Winery Expansion (Sonoma County 2002) was utilized to develop a future operations scenario. Additionally, for analytical purposes it is assumed that the future agricultural land would be planted in vineyards. The Gallo of Sonoma DEIR provides estimates of future air pollutant emissions resulting from operation of a 2,000 acre winery. These estimated emissions were scaled up to develop a ROM emissions estimate for the operational phase of the Agricultural Irrigation component. Table 4.11-15 below presents these future emissions data for the typical day (44-46 weeks per year) and during the harvest/crush season (6-8 weeks per year) as a worst case scenario. Note that the Gallo EIR only reported emissions in terms of tons per year for comparison with North Sonoma APCD thresholds. The IRWP estimates have been

converted into harvest/crush worst case day, and the days that exceed the allowable limits are shown in bold font.

Table 4.11-15

Estimated Operational Emissions – Agricultural Irrigation

Operation Case	VOC	NO _x	CO	PM ₁₀
Gallo Typical Operation (tons/year) ¹	3	11	26	2
Gallo Harvest/Crush Operation (tons/year) ¹	6	50	49	5
IRWP Alt. 4 Typical Operation (tons/year)	10	40	97	7
IRWP Alt. 4 Harvest/Crush (tons/year)	24	189	186	19
IRWP Alt 4 Worst Case Day (lbs/day)	130	1037²	1017	105

Notes:

1. Source: Sonoma County 2002
2. Exceeds allowable limits

The data in the table show that emissions of NO_x would exceed the allowable limits, resulting in a significant impact. Other emissions would not exceed the allowable limits and the impact for these emissions would be less than significant.

Alternatives 1, 2, 3, 5, 6, and 7 do not have an Agricultural Irrigation component.

Mitigation: No further feasible mitigation measures have been identified.

After

Mitigation: *Significant: Alternative 4*

Measures 3.2.16 and 3.2.17 recommended above for the construction phase are also applicable to operational phase mobile sources. Implementation would reduce NO_x emissions by about 20 percent to 40 percent, which would not be sufficient to reduce the impact to a level of less than significant. No other mitigation measures are available to control mobile sources.

Impact: **11.5.3. Will the Agricultural Irrigation component expose people to substantial levels of toxic air contaminants ?**

Analysis: *Less than Significant: Alternative 4*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and

3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.5.4. Will the Agricultural Irrigation component violate or contribute to violation of an ambient air quality standard?

Analysis: *Less than Significant: Alternative 4*

As stated above in the discussion of Impact 11.5.2, both construction and operation activities would create CO emissions. However, as shown in Table 4.11-15, CO emissions would not exceed allowable limits, and therefore would be a less than significant impact.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.5.5. Will the Agricultural Irrigation component potentially cause odors?

Analysis: *Significant: Alternative 4*

During the operational phase, recycled water after treatment has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, there would be no impact from that source.

Implementation of the Agricultural Irrigation component could cause odor impacts from grape process-water treatment ponds and other operations such as grape-water treatment ponds and other operations such as grape-waste (pomace) storage from the crushing process and odors from fermentation. The greatest odor potential would be from anaerobic decomposition of grape waste and from burning of grape waste for disposal. This could result in odor complaints and a significant odor impact.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: **3.5.6 Odor Control from Grape Harvesting and Crushing Operations**

After

Mitigation: *Less than Significant: Alternative 4*

The recommended mitigation measures would reduce the impact potential from anaerobic decomposition and from burning. However, in the event that an odor complaint is received and verified, the pomace can be required to be removed sooner than the two days specified.

Impact: 11.5.6. Will the Agricultural Irrigation component cause air permitting monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternative 4*

The Agricultural Irrigation component would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: No mitigation is needed.

Impact: 11.5.7. Will the Agricultural Irrigation component increase eCO₂ emissions?

Analysis: *Significant: Alternative 4*

The Agricultural Irrigation component does not include energy use and therefore would not contribute to the increase of eCO₂ emissions. For land converted to agriculture because of the availability of recycled water, energy will be required to grow livestock or harvest crops or trees.

Alternatives 1, 2, 3, 5, 6 and 7 do not have an Agricultural Irrigation component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternative 4*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures, such as process or equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

Pipelines Component

Table 4.11-16

Air Quality Impacts by Component – Pipelines

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.6.1. Will construction of the pipelines component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 3,323 acres	C	○
11.6.2. Will pipelines component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.6.3. Will the Pipelines component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
11.6.4. Will the Pipelines component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.8.5. Will the Pipelines component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.6.6. Will the Pipelines component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	C	==

Table 4.11-16

Air Quality Impacts by Component – Pipelines

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.6.7. Will the Pipelines component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P	==

Notes:

1. Type of Impact:

C Construction

O&M Operation and Maintenance

P Permanent

2. Level of Significance codes:

● Significant impact before and after mitigation

⊙ Significant impact before mitigation; less than significant impact after mitigation

○ Less than significant impact; no mitigation proposed

== No impact

Impact: 11.6.1 Will construction of the Pipelines component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 3 through 6*

Pipeline construction requires both construction workers and heavy equipment travel. Major construction activities consist of mobilizing construction equipment, excavated materials disposal, delivering gravel, asphalt, and water for pipeline trenches, pavement restoration, soil compaction and dust control, pipe deliveries, and construction employee commuting. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2 and 7 do not have a pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.2. Will Pipelines component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternatives 3 through 6*

Operation of the Pipelines component would not involve the use of emissions-producing equipment or demand for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.3. Will the Pipelines component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 3 through 6*

As stated above in the discussion of Impact 11.6.1, construction activities would create emissions of criteria air contaminants, including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operation of the Pipelines component would not involve the use of emissions-producing equipment of demand for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.4. Will the Pipelines component violate or contribute to the violation of an air quality standard?

Analysis: *No Impact: Alternatives 3 through 6*

The pipelines are underground, and their operation do not produce measurable air emissions. Therefore, there would be no operational phase impact.

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.5. Will the Pipelines component increase potentially cause odors?

Analysis: *No Impact: Alternatives 3 through 6*

After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, no odor complaints are anticipated and there would thus be no impact..

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.6. Will the Pipelines component cause air permitting/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternatives 3 through 5 and 6B through 6E.*

The Pipelines component would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Impact: 11.6.7. Will the Pipelines component increase eCO₂ emissions?

Analysis: *No Impact: Alternatives 3 through 6.*

The Pipelines component does not include energy use and therefore would not contribute to the increase of eCO₂ emissions.

Alternatives 1, 2 and 7 do not have a Pipelines component.

Mitigation: No mitigation is needed.

Storage Component

Table 4.11-17

Air Quality Impacts by Component –Storage

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.7.1. Will construction of the Storage component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 580 acres	C	○
11.7.2. Will Storage component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.7.3. Will the Storage component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
11.7.4. Will the Storage component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==

Impact: 11.7.2. Will Storage component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternatives 3 through 6*

Operation of storage facilities does not involve any energy use or use of equipment that would emit air contaminants. Therefore, there would be no impacts from emissions.

Alternatives 1, 2 and 7 do not include a Storage component.

Impact: 11.7.3. Will the Storage component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 3 through 6*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

No emissions are associated with Storage component operational phase activities because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2 and 7 do not include a Storage component.

Mitigation: No mitigation is needed.

Impact: 11.7.4. Will the Storage component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternative 2*

No air contaminant emissions are associated with Storage component operational phase activities because there are no requirements for the operation of emissions-producing equipment or need for energy. Therefore, there would be no operational phase impact.

Alternatives 1, 2 and 7 do not include a Storage component.

Mitigation: No mitigation is needed.

Impact: 11.7.5. Will the Storage component potentially cause odors?

Analysis: *Less than Significant: Alternatives 3 through 6*

After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, there would be no impact from placing the water in storage facilities.

Draining reservoirs or other water storage areas could lead to odors as vegetation dies and decays. This could cause an odor impact if sensitive

receptors are located in the vicinity of the storage facility. However, similar activities have been performed at Delta and Meadowland ponds with relatively few complaints in the past. It is thus highly unlikely that these activities would lead to 10 complaints in a 90-day period, or one confirmed complaint in 3 years or 3 unconfirmed complaints annually. Therefore the impact would be less than significant.

Alternatives 1, 2 and 7 do not include a Storage component.

Mitigation: No mitigation is needed.

Impact: 11.7.6. Will the Storage component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis *No Impact: Alternatives 3 through 6*

No storage facilities would be located in the Geysers Steamfield.

Mitigation: No mitigation is needed.

Alternatives 1, 2 and 7 do not include a storage component.

Impact: 11.7.7. Will the Storage component increase eCO₂ emissions?

Analysis: *Significant: Alternatives 3 through 6*

The Storage component requires a small amount of energy use from a single light and a dam gate that would be located at each reservoir. Operation of both of these would require energy a few times a year for a short period of time. The use would be approximately 5,000 kWh annually, which would emit 3 tons of eCO₂, a .01percent increase over 2000-2001 emissions. The increase would be considered significant.

Alternatives 1, 2 and 7 do not have a Storage component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternatives 3 through 6*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures such as process or equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

Created Wetlands Component

Table 4.11-18

Air Quality Impacts by Component – Created Wetlands

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.8.1. Will construction of the Created Wetlands component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 35 acres.	C	○
11.8.2. Will the Created Wetlands component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.8.3. Will the Created Wetlands component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
11.8.4. Will the Created Wetlands component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.8.5. Will the Created Wetlands component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	Fewer than the threshold level of complaints	O&M/P	○
11.8.6. Will the Created Wetlands component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.8.7. Will the Created Wetlands component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P	==

Notes:	1. Type of Impact:	2. Level of Significance:
C	Construction	● Significant impact before and after mitigation
O&M	Operation and Maintenance	⊙ Significant impact before mitigation; less than significant impact after mitigation
P	Permanent	○ Less than significant impact; no mitigation proposed
		= No impact
		+ Beneficial impact

Impact: 11.8.1. Will construction of the Created Wetlands component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 3 through 6*

Individual created wetland areas may be up to 30 acres in area. Typically, the impacts from building these wetlands would be similar to constructing reservoirs on flat ground. This would involve excavating earth and building perimeter berms. Earth moving must be done during the dry season, and this activity would generate dust and diesel exhaust emissions. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.2. Will the Created Wetlands component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternatives 3 through 6*

Operation of created wetlands does not involve any energy use or use of equipment that would emit air contaminants. Therefore, there would be no impacts from emissions that would cumulatively exceed allowable limits.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.3. Will the Created Wetlands component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 3 through 6*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and

3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operation of created wetlands does not involve any energy use or use of equipment that would emit air contaminants. Therefore, there would be no operation phase impacts.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.4. Will the Created Wetlands component violate or contribute to violation of an ambient air quality standard?

Analysis: *No Impact: Alternatives 3 through 6*

Operation of created wetlands does not involve any energy use or use of equipment that would emit air contaminants. Therefore, there would be no impacts.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.5. Will the Created Wetlands component potentially cause odors?

Analysis: *Less than Significant: Alternatives 3 through 6*

After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, there would be no impact from placing the water in created wetlands.

Draining wetlands could lead to odors as vegetation dies and decays. This could cause an odor impact if sensitive receptors are located in the vicinity of the wetlands. However, similar activities have been performed at Delta and Meadowland ponds with relatively few complaints in the past. It is thus highly unlikely that these activities would lead to 10 complaints in a 90-day period, or one confirmed complaint in 3 years or 3 unconfirmed complaints annually. Therefore the impact would be less than significant.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.6. Will the Created Wetlands component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternatives 3 through 6*

No Created Wetlands would be located in the Geysers Steamfield or affect its operations. Therefore, there would be no impacts from air permit or monitoring violations there.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Impact: 11.8.7. Will the Created Wetlands component increase eCO₂ emissions?

Analysis: *No Impact: Alternatives 3 through 6*

The Created Wetlands component does not include energy use and therefore would not contribute to the increase of eCO₂ emissions.

Alternatives 1, 2 and 7 do not have a Created Wetlands component.

Mitigation: No mitigation is needed.

Pump Stations and Tanks Component

Table 4.11-19

Air Quality Impacts by Component – Pump Stations and Tanks

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.9.1. Will construction of the Pump Stations and Tanks component generate emissions that expose people to high levels of dust and equipment exhaust?	Application of appropriate mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 10.7 acres	C	○
11.9.2. Will the Pump Stations and Tanks component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	Power plant emissions	C, O&M/P	○
11.9.3. Will the Pump Stations and Tanks component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		Power plant emissions	O&M/P	○
11.9.4. Will the Pump Stations and Tanks component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	Power plant emissions	O&M/P	○

Table 4.11-19

Air Quality Impacts by Component – Pump Stations and Tanks

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.9.5. Will the Pump Stations and Tanks component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.9.6. Will the Pump Stations and Tanks component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.9.7. Will the Pump Stations and Tanks component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	0	O&M/P-	●

- Notes:
- | | |
|-------------------------------|---|
| 1. Type of Impact: | 2. Level of Significance: |
| C Construction | ● Significant impact before and after mitigation |
| O&M Operation and Maintenance | ⊙ Significant impact before mitigation; less than significant impact after mitigation |
| P Permanent | ○ Less than significant impact; no mitigation proposed |
| | = No impact |
| | + Beneficial impact |

Impact: 11.9.1. Will construction of the Pump Stations and Tanks component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 3 through 6*

Construction of pump stations and tanks would require both construction workers and heavy equipment travel. Major construction activities include mobilizing construction equipment, grading pads, building access roads, soil compaction and dust control, equipment deliveries, and driving by construction employees. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.2. Will the Pump Stations and Tanks component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis *Less than Significant: Alternatives 3 through 6*

Pump station and tank operation would not directly emit air contaminants. Indirect emissions would result from the generation of electricity to power the pumps from fossil-fueled power plants. These emissions could occur at any of the power plants connected to the PG&E electric grid. The grid is also energized by a mix of non-emitting generators, such as hydroelectric facilities and wind generation. Air pollutant emissions from power plants are regulated by a number of local, State and federal requirements, depending upon location. While there may be some incremental increase in air pollution in the IRWP area resulting from increased generation, existing and future power plant emissions controls and energy conservation activities would maintain an impact of less than significant from this source.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.3. Will the Pump Stations and Tanks component expose people to substantial levels of toxic air contaminants?

Analysis *Less than Significant: Alternatives 3 through 6*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Pump station and tank operation would not directly emit air contaminants. Indirect emissions would result from the generation of electricity to power the pumps from fossil-fueled power plants connected to the PG&E system, but this minor incremental emissions increase would not result in a substantial exposure of people to TAC emissions.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.4. Will the Pump Stations and Tanks component violate or contribute to violation of an ambient air quality standard?

Analysis *Less than Significant: Alternatives 3 through 6*

Operation of pump stations and tanks does not involve the use of equipment that would emit air contaminants. CO emissions from fossil-fueled power plants generating electricity to operate pumps would be regulated by local air quality standards and permit requirements, and thus would not result in localized CO concentrations in excess of the ambient standard.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.5. Will the Pump Stations and Tanks component potentially cause odors?

Analysis *No Impact: Alternatives 3 through 6*

Since the pumps would be powered by electricity, operation of the pump stations would not cause any emissions affecting odors. Recycled water would be completely enclosed in the surge tanks. After treatment, recycled water has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, there would be no impact.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.6. Will the Pump Stations and Tanks component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis *No Impact: Alternatives 3 through 6*

Electric-powered pumps do not emit air contaminants and are not subject to air permitting regulations. They would not emit air contaminants that could affect air ambient air quality and thus would not cause monitoring violations. Therefore, there would be no impact at the Geysers Steamfield.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Mitigation: No mitigation is needed.

Impact: 11.9.7. Will the Pump Stations and Tanks component increase eCO₂ emissions?

Analysis: *Significant: Alternatives 3 through 6*

The additional energy required for the pump stations varies among the alternatives. Table 4.12-20, below, lists the energy use of each alternative that includes a pump station component and the eCO₂ emissions associated with each. The pump station component would increase emissions by up to 72 percent. This would be considered a significant impact.

Alternatives 1, 2 and 7 do not have a Pump Stations and Tanks component.

Table 4.11-20

Energy Use of Pump Stations by Alternative

Alternative	kWh Usage (net)	eCO ₂ emissions (tons)	Percent increase over 2000-2001 emissions
3 - Urban Reuse	2,542,000	1,431	7
Agricultural Reuse			
4A - North County	6,584,582	3,707	18%
4B - East of Rohnert Park	809,000	455	2%
5 - Geysers Expansion	26,331,077	14,822	72%
Discharge			
6A and 6B - Direct	20,890,240	11,759	57%
6C, 6D and 6E - Indirect	7,955,240	4,478	22%

Note: Calculations for Geysers Expansion does not include the three mountain pumps which are supplied with electricity by the Geysers Steamfield.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternatives 3 through 6*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures, such as process or equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

Geysers Steamfield Expansion Component

Table 4.11-21

Air Quality Impacts by Component – Geysers Steamfield Expansion

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.10.1. Will construction of the Geysers Steamfield Expansion component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 62.5 acres	C	○
11.10.2. Will Geysers Steamfield Expansion component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	PM ₁₀ emissions from cooling towers	O&M/P	○
11.10.3. Will the Geysers Steamfield Expansion component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust None	C O&M/P	○ ==
11.10.4. Will the Geysers Steamfield Expansion component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.10.5. Will the Geysers Steamfield Expansion component potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.10.6. Will the Geysers Steamfield Expansion component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==

Table 4.11-21

Air Quality Impacts by Component – Geysers Steamfield Expansion

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.10.7. Will the Geysers Steamfield Expansion component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P	==

Notes:	1. Type of Impact:		2. Level of Significance:
C	Construction	●	Significant impact before and after mitigation
O&M	Operation and Maintenance	⊙	Significant impact before mitigation; less than significant impact after mitigation
P	Permanent	○	Less than significant impact; no mitigation proposed
		==	No impact
		+	Beneficial impact

Impact: 11.10.1. Will construction of the Geysers Steamfield Expansion component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 5 and 6*

Construction activities generate dust and diesel exhaust emissions. Construction could entail drilling new wells or re-working existing wells. Existing plumbing may also need replacement or upgrading. This activity would require travel by both construction workers and heavy equipment on within the Steamfield area and outside on access roads. Well drilling equipment often uses multiple large (over 500 horsepower) diesel engines. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts. Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield Expansion component.

Mitigation: No mitigation is needed.

Impact: 11.10.2. Will the Geysers Steamfield Expansion component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *Less than Significant: Alternatives 5 and 6*

The only source of emissions during the operational phase would be PM₁₀ emissions from cooling tower drift at the Steamfield. The component does not involve the use of emissions producing equipment other than cooling towers, nor would it use energy from fossil-fueled power plants. Both the Lake County and Northern Sonoma air pollution control agencies monitor

the Geysers area closely. Stationary source air permit conditions have been developed to bring the area into compliance with hydrogen sulfide and particulate emission standards. These emission controls include requiring drift eliminators with a removal efficiency of about 99.9 percent for water and particulates. The Geysers Steamfield Expansion component would not hamper continued compliance with air permit conditions.

Additionally, the quality of water coming to the Geysers Steamfield as a result of implementation of the IRWP would be better than that currently being utilized at the Geysers Steamfield. For example, “new” recycled water from the IRWP to be conveyed to the Geysers Steamfield would average between 432 mg/l total dissolved solids (TDS) and 600 mg/l TDS depending upon whether a portion of the brine from a possible multi-filtration reverse osmosis treatment plant would be included in the flow. Current TDS data for water going to the cooling towers at the Geysers vary widely – from 120 mg/l to 13,280 mg/l. The average of the current water quality data (without utilizing the highest reading, which is clearly an outlier) yields a current average TDS of 1,072 mg/l. Thus, future recycled water routed to the Geysers Steamfield would be of somewhat better quality than the current flow, and no new significant emission impacts would be expected to occur from operation and maintenance activities.

If brine is sent to the Geysers Steamfield at TDS concentrations of 600 mg/l or more, the recycled water would not be used in the cooling towers.

Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield Expansion component.

Mitigation: No mitigation is needed.

Impact 11.10.3. Will the Geysers Steamfield Expansion component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 5 and 6*

Construction activities would create emissions of criteria air contaminants, including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operation of the Geysers Steamfield Expansion component would not involve the use of internal combustion equipment – thus there would be no impacts on toxic air contaminants from these sources.

Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield Expansion component.

Mitigation: No mitigation is needed.

Impact: 11.10.4. Will the Geysers Steamfield Expansion component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternatives 5 and 6*

Operation of the Geysers Steamfield Expansion component would not involve the use of internal combustion equipment – thus there would be no impacts on CO air quality from these sources.

Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield component.

Mitigation: No mitigation is needed.

Impact: 11.10.5 and 11.10.6. Will the Geysers Steamfield Expansion component impact air quality based on criteria 5 and 6?

Analysis: *No Impact: Alternatives 5 and 6*

The Northern Sonoma APCD and Lake County AQMD regulate emissions at the Geysers Steamfield through a cooperative agreement. Thus, they monitor air quality and prepare/enforce stationary source equipment air permits. Any Geysers expansion activity must meet agency permit and regulatory requirements. The two air pollution control agencies also cooperate to control odors and conduct monitoring. Continued compliance with permit conditions would ensure that there would be no odor impacts or violations of permit conditions. Thus, there would be no impacts.

Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield Expansion component.

Mitigation: No mitigation is needed.

Impact: 11.10.7. Will the Geysers Steamfield Expansion component increase eCO₂ emissions?

Analysis: *No Impact: Alternatives 5 and 6*

For Alternative 5, the energy required for the Geysers Steamfield Expansion component would be provided directly by the Geysers Steamfield which produces “green” energy that does not create any greenhouse gas emissions.

Alternatives 1, 2, 3, 4 and 7 do not have a Geysers Steamfield Expansion component.

Mitigation: No mitigation needed.

Direct Discharge Component

Table 4.11-22

Air Quality Impacts by Component – Direct Discharge

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.11.1. Will construction of Direct Discharge component facilities generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 10.1 acres	C	○
11.11.2. Will emissions from Direct Discharge component facilities cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	None	O&M/P	==
11.11.3. Will Direct Discharge component facilities expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
11.11.4. Will Direct Discharge component facilities violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	None	O&M/P	==
11.11.5. Will Direct Discharge component facilities potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==

Table 4.11-22

Air Quality Impacts by Component – Direct Discharge

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.11.6. Will Direct Discharge component facilities cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.11.7. Will the Direct Discharge component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P-	==

- Notes:
- | | | |
|-------------------------------|----|---|
| 1. Type of Impact: | | 2. Level of Significance: |
| C Construction | ● | Significant impact before and after mitigation |
| O&M Operation and Maintenance | ⊙ | Significant impact before mitigation; less than significant impact after mitigation |
| P Permanent | ○ | Less than significant impact; no mitigation proposed |
| | == | No impact |
| | + | Beneficial impact |

Impact: 11.11.1. Will construction of Direct Discharge component facilities generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 6A and 6B*

The Direct Discharge component would involve improvements to Delta Pond and/or discharge to the Russian River via a new outfall. Thus, new facilities and pipelines would be needed to implement the direct discharge component. Construction of these facilities would produce fugitive dust and diesel exhaust emissions. Construction could entail grading, pouring concrete, building access roads, soil compaction and dust control, equipment deliveries, and commuting by construction employees. In some cases dirt can be tracked out onto paved roads where it is entrained into the atmosphere by passing cars. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.2 Will emissions from Direct Discharge component facilities cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternatives 6A and 6B*

Direct discharge facility operation would not directly emit air contaminants because there would be no emissions-producing equipment or energy use involved in its operation. Thus there would be no emissions impact.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.3. Will the Direct Discharge component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 6A and 6B*

Construction activities would create emissions of criteria air contaminants, including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operation of the Direct Discharge component would not involve the use of internal combustion equipment – thus there would be no impacts on toxic air contaminants from these sources.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.4. Will the Direct Discharge component violate or contribute to the violation of an ambient air quality standard?

Analysis: *No Impact: Alternatives 6A and 6B*

Operation of the Direct Discharge component would not involve the use of internal combustion equipment – thus there would be no impacts on CO air quality from these sources.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.5. Will the Direct Discharge component potentially cause odors?

Analysis: *No Impact: Alternatives 6A and 6B.*

During the operational phase, recycled water after treatment has essentially no odor, as has been demonstrated with the operation of the existing system. Therefore, there would be no impact.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.6. Will the Direct Discharge component cause air permitting/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternatives 6A and 6B*

Outfall construction and operation would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.11.7. Will the Direct Discharge component increase eCO₂ emissions?

Analysis: *No Impact: Alternatives 6A and 6B*

The Direct Discharge component does not include energy use and therefore would not contribute to the increase of eCO₂ emissions.

Alternatives 1, 2, 3, 4, 5, 6C, 6D, 6E and 7 do not have a Direct Discharge component.

Mitigation: No mitigation is needed.

Indirect Discharge Component

Table 4.11-23

Air Quality Impacts by Component – Indirect Discharge

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.12.1. Will construction of the Indirect Discharge component facilities generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with mitigation measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 1,400 acres	C	○

Table 4.11-23

Air Quality Impacts by Component – Indirect Discharge

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.12.2. Will emissions from the Indirect Discharge component facilities cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan? <ul style="list-style-type: none"> • Alts 6C and 6D 	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM10; or exceeds 550 pounds per day of carbon monoxide.	–		
		–		
<ul style="list-style-type: none"> • Alt 6E 		Power Plant Emissions	O&M/P	○
11.12.3. Will the Indirect Discharge component facilities expose people to substantial levels of toxic air contaminants? <ul style="list-style-type: none"> • Alts 6C, 6D, and 6E 	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel exhaust	C	○
		None	O&M/P	==
<ul style="list-style-type: none"> • Alt 6E 		Power Plant Emissions	O&M/P	○
11.12.4. Will the Indirect Discharge component facilities violate or contribute to violation of an ambient air quality standard? <ul style="list-style-type: none"> • Alts 6C and 6D 	Greater than 550 pounds per day of CO.	None	O&M/P	==
		None	O&M/P	==
<ul style="list-style-type: none"> • Alt 6E 		Power Plant Emissions	O&M/P	○
11.12.5. Will the Indirect Discharge component facilities potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	Fewer than the threshold level of complaints	O&M/P	○

Table 4.11-23

Air Quality Impacts by Component – Indirect Discharge

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.12.6. Will the Indirect Discharge component facilities cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.12.7. Will the Indirect Discharge component increase eCO ₂ emissions? <ul style="list-style-type: none"> • Alts 6C and 6D 	Any increase over 2000-2001 eCO ₂ emissions	None	O&M/P	==
<ul style="list-style-type: none"> • Alt 6E 		14% Increase	O&M/P	●

Notes:

1. Type of Impact:	2. Level of Significance:
C Construction	● Significant impact before and after mitigation
O&M Operation and Maintenance	⊙ Significant impact before mitigation; less than significant impact after mitigation
P Permanent	○ Less than significant impact; no mitigation proposed
	== No impact
	+ Beneficial impact

Impact: 11.12.1. Will construction of Indirect Discharge component facilities generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternatives 6C, 6D and 6E*

Construction of Indirect Discharge component facilities produces fugitive dust and diesel exhaust emissions. Construction could entail grading, pouring concrete, building access roads, soil compaction and dust control, equipment deliveries, and commuting by construction employees. In some cases dirt can be tracked out onto paved roads where it is entrained into the atmosphere by passing cars. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed

Impact: 11.12.2 Will emissions from Indirect Discharge component facilities cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *No Impact: Alternatives 6C and 6D; Less than Significant: Alternative 6E*

Operation of percolation ponds or infiltration basins would not directly emit air contaminants because there would be no emissions-producing equipment involved or energy requirements. Thus, there would be no emissions impact for these facilities.

Injection well fields would not directly emit air contaminants. However, indirect emissions would result from the generation of electricity at fossil-fueled power plants to power the pumps at the injection wells. These emissions could occur at any of the power plants connected to the PG&E electric grid. The grid is also energized by a mix of non-emitting generators, such as hydroelectric facilities and wind generation. Air pollutant emissions from power plants are regulated by a number of local, State and federal requirements, depending upon location. While there may be some incremental increase in air pollution in the IRWP area resulting from increased generation, existing and future power plant emissions controls and energy conservation activities would maintain an impact of less than significant from this source.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.12.3. Will the Indirect Discharge component expose people to substantial levels of toxic air contaminants?

Analysis: *Less than Significant: Alternatives 6C, 6D and 6E*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Operation of the indirect discharge facilities would not directly emit air contaminants. For injection well fields, indirect emissions would result from the generation of electricity to power the pumps at the wells from fossil-fueled power plants connected to the PG&E system, but this minor incremental emissions increase would not result in a substantial exposure of people to TAC emissions.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.12.4. Will the Indirect Discharge component violate or contribute to violation of an ambient air quality standard?

Analysis: *No Impact: Alternatives 6C and 6D; Less than Significant: Alternative 6E*

Operation of indirect discharge facilities does not involve the use of equipment that would emit air contaminants. CO emissions from fossil-fueled power plants generating electricity to operate pumps for the injection well fields would be regulated by local air quality standards and permit requirements, and thus would not result in localized CO concentrations in excess of the ambient standard.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.12.5. Will the Indirect Discharge component potentially cause odors?

Analysis: *Less than Significant: Alternatives 6C through 6E*

During the operational phase, recycled water after treatment has essentially no odor, as has been demonstrated with the operation of the existing system. Thus, there would be no impact from placing water in percolation ponds or infiltration basins, or injecting the water.

Draining percolation ponds or infiltration basins could lead to odors as vegetation dies and decays. This could cause an odor impact if sensitive receptors are located in the vicinity of the storage facility. However, similar activities have been performed at Delta and Meadowland ponds with relatively few complaints in the past. It is thus highly unlikely that these activities would lead to 10 complaints in a 90-day period, or one confirmed complaint in 3 years or 3 unconfirmed complaints annually. Therefore the impact would be less than significant.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.12.6. Will the Indirect Discharge component cause air permitting/monitoring violations at the Geysers Steamfield?

Analysis: *No Impact: Alternatives 6C through 6E*

Indirect discharge facilities would not affect operations at the Geysers Steamfield, and would therefore not cause air permit or monitoring violations there. Therefore, there would be no impact from this component.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No mitigation is needed.

Impact: 11.12.7. Will the Indirect Discharge component increase eCO₂ emissions?

Analysis: *No Impact: Alternatives 6C and 6D; Significant: Alternative 6E*

The percolation ponds and infiltration basins do not include energy use and therefore would not contribute to the increase of eCO₂ emissions.

The additional energy required for the pumps at the well heads in the injection well fields would be 5,056,090 kWh, and would generate 2,846 tons of eCO₂ emissions, which would be an increase of 14 percent. This would be considered a significant impact.

Alternatives 1, 2, 3, 4, 5, 6A, 6B and 7 do not have an Indirect Discharge component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternative 6E*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures, such as process or equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

Advanced Membrane Treatment Component

Table 4.11-24

Air Quality Impacts by Component – Advanced Membrane Treatment

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact ¹	Level of Significance ²
11.13.1. Will construction of the Advanced Membrane Treatment component generate emissions that expose people to high levels of dust and equipment exhaust?	Non-compliance with measures recommended by BAAQMD, Northern Sonoma County APCD, and Lake County AQMD	Dust (PM ₁₀) and Diesel Exhaust from construction of up to 15 acres.	C	○
11.13.2. Will Advanced Membrane Treatment emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?	Activity exceeds 80 pounds per day of nitrogen oxides, reactive organic gases, or PM ₁₀ ; or exceeds 550 pounds per day of carbon monoxide.	Mobile source exhaust and Power Plant Emissions	O&M/P	○

Table 4.11-24

Air Quality Impacts by Component – Advanced Membrane Treatment

Evaluation Criteria	Significance Thresholds	Impact	Type of Impact¹	Level of Significance²
11.13.3. Will the Advanced Membrane Treatment component expose people to substantial levels of toxic air contaminants?	Probability of developing cancer for maximally exposed individual (MEI) exceeds ten in one million, or exposure to non-carcinogenic toxic air contaminants would result in a Hazard Index greater than 1 for the MEI.	Diesel Exhaust Mobile source exhaust and Power Plant Emissions	C, O&M/P	○ ○
11.13.4. Will the Advanced Membrane Treatment component violate or contribute to violation of an ambient air quality standard?	Greater than 550 pounds per day of CO.	Mobile Source Exhaust	O&M/P	○
11.13.5. Will the Advanced Membrane Treatment potentially cause odors?	Potential for greater than ten odor complaints in a 90 day period or greater than 1 confirmed or 3 unconfirmed complaints annual complaints (three year average).	None	O&M/P	==
11.13.6. Will the Advanced Membrane Treatment component cause air permit/monitoring violations at the Geysers Steamfield?	Greater than 0 violations.	0 violations	O&M/P	==
11.13.7. Will the Advanced Membrane Treatment component increase eCO ₂ emissions?	Any increase over 2000-2001 eCO ₂ emissions	348% increase	O&M/P	●

Notes:

1. Type of Impact:	2. Level of Significance:	
C Construction	● Significant impact before and after mitigation	
O&M Operation and Maintenance	⊙ Significant impact before mitigation; less than significant impact after mitigation	
P Permanent	○ Less than significant impact; no mitigation proposed	
	== No impact	
	+ Beneficial impact	

Impact: 11.13.1. Will construction of the Advanced Membrane Treatment component generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant: Alternative 6*

Construction of the Advanced Membrane Treatment component facilities would require both construction workers and heavy equipment travel. Major construction activities include mobilizing construction equipment, grading pads, building access roads, soil compaction and dust control, equipment deliveries, and driving by construction employees. However, the City has adopted project description measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, designed to reduce dust and exhaust impacts to less than significant levels according to the recommendation of local air quality management districts.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.13.2. Will Advanced Membrane Treatment component emissions cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *Less than Significant: Alternative 6*

Advanced Membrane Treatment component mobile sources would generate emissions from employee commuting trips (a total of 20 future employees is assumed for purposes of this analysis) and trips by three trucks hauling brine crystals for disposal and two delivery trucks daily. Total estimated emissions from these mobile sources are shown in the following table. Calculation details are presented in Appendix K.

Table 4.11-25

Operation Phase Mobile Source Emissions – Advanced Membrane Treatment

Air Contaminant	Emissions (lbs/day)
NO _x	1.3
ROG	0.5
CO	7.5
PM ₁₀	0.5

The above estimates show that emissions from mobile sources would be less than significant.

Advanced Membrane Treatment component stationary equipment operation would not directly emit air contaminants. Indirect emissions

would result from the generation of electricity to power facility operations from fossil-fueled power plants. These emissions could occur at any of the power plants connected to the PG&E electric grid. The grid is also energized by a mix of non-emitting generators, such as hydroelectric facilities and wind generation. Air pollutant emissions from power plants are regulated by a number of local, State and federal requirements, depending upon location. While there may be some incremental increase in air pollution in the IRWP area resulting from increased generation, existing and future power plant emissions controls and energy conservation activities would maintain an impact of less than significant from this source.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.13.3. Will the Advanced Membrane Treatment component expose people to high levels of toxic air contaminants?

Analysis *Less than Significant: Alternative 6*

Construction activities would create emissions of criteria air contaminants including TACs as a component of ROG emissions. However, the City has agreed to implement Measures 3.2.16, Dust Control Program, and 3.2.17, Equipment Exhaust Control Program, as part of the project description, thereby decreasing effects to less than significant.

Advanced Membrane Treatment plant operation would not directly emit air contaminants. Emissions from mobile sources would be far below levels of significance, and would occur during roadway travel, thus lessening their localized impacts to a level of less than significant. Indirect emissions would result from the generation of electricity to power facility operations from fossil-fueled power plants. These emissions could occur at any of the power plants connected to the PG&E electric grid and are controlled by to plant operators to meet emissions requirements at their respective locations. Thus, this source would not expose people to substantial levels of toxic air contaminants, resulting in a less than significant impact.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.13.4. Will the Advanced Membrane Treatment component violate or contribute to the violation of an air quality standard?

Analysis *No Impact: Alternative 6*

Operation of Advanced Membrane Treatment component facilities would not involve the use of stationary internal combustion equipment. There would be about 5 trucks and 20 employees traveling to and from the

facility daily, which would not significantly affect traffic movement at nearby intersections. Thus, there would be no impacts on ambient CO concentrations from these sources.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.9.5. Will the Advanced Membrane Treatment component potentially cause odors?

Analysis *No Impact: Alternative 6*

Since the plant would be powered by electricity, operation of the facilities would not cause any emissions affecting odors. Recycled water would be completely enclosed in the plant system and the recycled water would be odor free as has been demonstrated with the operation of the existing system. Thus, there would be no impact.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.9.6 Will the Advanced Membrane Treatment component cause air permit/monitoring violations at the Geysers Steamfield?

Analysis *No Impact: Alternative 6*

A portion of the “brine” from the Advanced Membrane Treatment plant could be routed to the Geysers Steamfield for use at that facility. Depending upon the actual TDS concentration in the brine, and the mixture of brine to recycled water, the net effect could be an increase in TDS levels at the Geysers Steamfield, which could impact particulate air quality from cooling tower emissions. If brine is sent to the Geysers Steamfield at TDS concentrations of 600 mg/l or more, the recycled water would not be used in the cooling towers.

As stated above, the emissions-producing equipment at The Geysers steamfield is under authority of the Lake County and Sonoma County air pollution agencies, which regulate and enforce air quality through their permit and monitoring systems. Cooling towers would be equipped with mist eliminators operating at 99.9 percent water/particulate removal efficiency. The use of emission control equipment as permitted and supervised by the air agencies would ensure that there would be no impact from air permit or monitoring violations at the Geysers Steamfield.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No mitigation is needed.

Impact: 11.13.7. Will the Advanced Membrane Treatment component increase eCO₂ emissions?

Analysis: *Significant: Alternative 6*

The Advanced Membrane Treatment component requires between 88.4 million and 126.5 million kWh of energy annually, depending on the method of brine disposal. This would increase eCO₂ emissions of the Laguna Plant by as much as 348 percent.

Alternatives 1, 2, 3, 4, 5 and 7 do not have an Advanced Membrane Treatment component.

Mitigation: No feasible mitigation has been identified.

After

Mitigation: *Significant: Alternative 6*

Increased energy use would result in an unavoidable increase in eCO₂ emissions. No additional energy conservation measures, such as process or equipment design or alternative energy sources, are available that would reduce the net increase in energy use.

No Project Component

Impact: 11.14.1 through 11.14.7. Will the No Project component impact air quality based on evaluation criteria 1 through 7?

Analysis: *No Impact: Alternative 7*

The No Project alternative would not cause any air quality impacts since it would not involve any IRWP-related construction or operation activities.

Mitigation: No mitigation is needed.

CUMULATIVE IMPACTS

All of the development anticipated in General Plans in the project area, plus all of the individual projects on the cumulative projects list that include ground-disturbing activities would have the potential to generate construction-related emissions. Transportation projects in the project area could result in additional emission of carbon monoxide along roadways, if additional vehicular traffic results from the project.

Impact: 11.1C. Will the IRWP plus cumulative projects generate emissions that expose people to high levels of dust and equipment exhaust?

Analysis: *Less than Significant; Alternatives 1 through 6, No Impact Alternative 7*

Construction activities for IRWP components would result in significant construction-period emissions of criteria air contaminants. Mitigation measures can reduce these impacts to less than significant for all emissions. Because all cumulative projects would be subject to required mitigation measures for construction, it is anticipated that construction emissions would not be cumulatively significant.

Impact: 11.2C. Will the IRWP plus cumulative projects emissions exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan?

Analysis: *Significant: Alternatives 1 through 6, No Impact: Alternative 7*

The EIRs for the General Plans for the cities of Santa Rosa and Rohnert Park both predicted significant air quality impacts associated with emissions of PM₁₀ and CO, and Rohnert Park also projected significant emissions of ozone precursors. Although the IRWP emissions of CO and PM₁₀ are projected to be less than significant, they would contribute to cumulative emissions of these pollutants, and are therefore considered significant. A portion of the IRWP emissions would be emissions associated with off-site power plants that would produce energy for the project. The project has already incorporated mitigation measures to minimize emissions, and no further measures are feasible.

Impact: 11.3C. Will the IRWP plus cumulative project expose people to high levels of toxic air contaminants?

Analysis: *Less than Significant; Alternatives 1 through 6, No Impact Alternative 7*

The Laguna Plan upgrade component would generate TAC emissions, however a risk assessment showed that the cancer risk would be less than the significance threshold. There are no other projects in the immediate area that would emit TAC that could contribute to that risk. Emissions of TACs during construction are fully mitigated, and it is expected that construction of cumulative projects would be subject to the same mitigation requirements, so cumulative TAC emissions during construction would not be significant.

Impact: the violation of an air quality standard?

Analysis: *Less than Significant; Alternatives 1 through 6, No Impact Alternative 7*

According to the BAAQMD CEQA Guidelines, projects that emit less than 550 pounds per day CO and do not substantially increase traffic at congested intersections would not cause or contribute to CO violations. The IRWP would result in only negligible emissions of CO, and traffic from operation of the IRWP is not expected to be significant. Therefore the IRWP would not contribute to a violation of CO air quality standards.

Impact: 11.5C. Will the IRWP plus cumulative projects cause potential odors?

Analysis: *Less than Significant; Alternatives 1 through 6, No Impact Alternative 7*

Increased wastewater treatment activity at the Laguna Plant was determined to be significant. No other odor sources in the vicinity of the Laguna Plant have been identified, so cumulative impacts are not expected. Mitigation is proposed to address potential impacts associated with the grape production that could result from Agricultural Irrigation

alternative. Other grape production facilities would be expected to be subject to similar mitigation, so this impact is not expected to be significant.

Impact: 11.9.6 Will the IRWP plus cumulative projects cause air permit/monitoring violations at the Geysers Steamfield?

Analysis: *Less than Significant: Alternatives 5 and 6; No Impact: Alternatives 1 through 4 and 7*

All operations at the Geysers Steamfield would be regulated by the Northern Sonoma APCD and Lake County AQMD, so no cumulative impacts associated with emissions at the Geysers would be expected.

Impact: 11.7C. Will the IRWP plus cumulative projects cause the City to exceed its goals for reducing eCO₂ emissions?

Analysis: *Significant: Alternatives 1 and 3 through 6; Beneficial Alternative 2, No Impact Alternative 7.*

There are several projects at the Laguna Plant that are being built or are under consideration, but are not part of the IRWP. These projects would impact energy use at the Plant. The first project is an upgrade to the aeration blowers that includes the installation of two air compressors that are more efficient. This upgrade is expected to be complete by mid summer 2003 and would reduce annual eCO₂ emissions by 1,172 tons (a 6 percent reduction over 2000-2001 emissions). The second project is to replace two existing pumps resulting in an annual reduction of 129 tons (<a 1 percent reduction over 2002-2001 emissions). This project is not currently funded; however the City is submitting a grant in spring 2003 to the California Energy Commission to request funding. Until funding is available, it is uncertain when this project might be completed. The third project, to begin in 2003, is to develop and build a power generation plant that uses alternative energy sources such as solar or wind. All of these projects would reduce the cumulative eCO₂ emissions associated with operation of the Subregional System, but the emissions associated with the energy requirements of alternatives 1 and 3 through 6 would outweigh these reductions. Only Alternative 2 I&I reduction would have a net benefit in terms of an overall reduction of emissions.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table 4.11-26

Summary of Significant Impacts and Mitigation Measures – Air Quality

Impact	Level of Significance	Mitigation
Laguna Plant Upgrade		
11.1.5. The Laguna Plant Upgrade component may cause odor complaints.	Alts 1 through 6 - ●	No feasible mitigation has been identified
11.1.7 The Laguna Plant Upgrade component may increase eCO ₂ emissions.	Alt 1 through 6 - ●	No feasible mitigation has been identified
Agricultural Irrigation		
11.5.2. The Agricultural Irrigation component may cumulatively exceed allowable limits or conflict with or obstruct the implementation of the Bay Area Ozone Attainment Plan.	Alt 4 - ●	No feasible mitigation has been identified
11.5.5. The Agricultural Irrigation component may cause odor impacts.	Alt 4 - ⊙	3.5.6 Odor Control from Grape Harvesting and Crushing Operations
11.5.7 The Agricultural Irrigation component may increase eCO ₂ emissions.	Alt 4 - ●	No feasible mitigation has been identified
Storage		
11.7.7 The Storage component may increase eCO ₂ emissions.	Alts 3 though 6 - ●	No feasible mitigation has been identified
Pump Stations and Tanks		
11.9.7. The Pump Stations and Tanks component may increase eCO ₂ emissions.	Alts 3 though 6 - ●	No feasible mitigation has been identified
Indirect Discharge		
11.12.7. The Indirect Discharge component may not reduce eCO ₂ emissions.	Alt 6E - ●	No feasible mitigation has been identified
Advanced Membrane Treatment		
11.13.7 The Advanced Membrane Treatment component may increase eCO ₂ emissions.	Alt 6 - ●	No feasible mitigation has been identified

Notes:

- Significant impact before and after mitigation
- ⊙ Significant impact before mitigation; less than significant impact after mitigation

SUMMARY OF IMPACTS BY ALTERNATIVE

Table 4.11-27

Summary of Impacts by Alternative – Air Quality

Component	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6A	Alt 6B	Alt 6C	Alt 6D	Alt 6E	Alt 7
Laguna Plant Upgrade	●	●	●	●	●	●	●	●	●	●	--
Indoor Water Conservation	+	--	--	--	--	--	--	--	--	--	--
I&I Reduction	--	○	--	--	--	--	--	--	--	--	--
Urban Irrigation	--	--	○	--	--	--	--	--	--	--	--
Agricultural Irrigation	--	--	--	●	--	--	--	--	--	--	--
Pipelines	--	--	○	○	○	○	○	○	○	○	--
Storage	--	--	●	●	●	●	●	●	●	●	--
Created Wetlands	--	--	○	○	○	○	○	○	○	○	--
Pump Stations and Tanks	--	--	●	●	●	●	●	●	●	●	--
Geysers Steamfield	--	--	--	--	○	○	○	○	○	○	--
Direct Discharge	--	--	--	--	--	○	○	--	--	--	--
Indirect Discharge	--	--	--	--	--	--	--	○	○	●	--
Advanced Membrane Treatment	--	--	--	--	--	●	●	●	●	●	--
No Project	--	--	--	--	--	--	--	--	--	--	==

Notes: Level of Significance Codes

- | | | | |
|---|---|----|--|
| ○ | Less than significant impact; no mitigation proposed | == | No impact |
| ⊙ | Significant impact before mitigation; less than significant impact after mitigation | -- | Not Applicable (Alternative does not include this Component) |
| ● | Significant impact before and after mitigation | + | Beneficial impact |

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