TABLE OF CONTENTS

LIST OF TABLES

4.12 AIR QUALITY

This section discusses the Project's potential to generate emissions that exceed threshold levels, screening trigger levels, and risk assessment thresholds. The potential for creation of odors and violations of air quality permits for the geysers operation is also discussed. Background information on air quality regulations and ambient air quality standards is presented to provide a context for a discussion of existing air quality in the Project area. Topography and meteorology are discussed because they affect local air quality. Existing emissions at the Laguna Plant and at the geysers are summarized.

IMPACTS EVALUATED IN OTHER SECTIONS

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

AFFECTED ENVIRONMENT (SETTING)

Regulatory Context

Pursuant to the Federal Clean Air Act of 1970 and subsequent revisions, the U.S. Environmental Protection Agency (EPA) established ambient air pollutant concentration standards and maximum allowable emission rates for certain individual sources of air pollutants. Air quality is controlled through the attainment of ambient standards and enforcement of emission limits. A system also was set up in which EPA made each state responsible for attaining air quality standards within its borders. Under the state programs, individual facilities generally are required to obtain permits to construct new or modified facilities and to operate such facilities. Specific emission limits for various equipment and facility types need to be met.

National Ambient Air Quality Standards have been established for six air pollutants: ozone, carbon monoxide, particulate matter less than ten microns in diameter (also referred to as PM_{10}), nitrogen oxides, lead, and sulfur dioxide. These six air pollutants are termed “criteria” pollutants because the standards established for them were based upon documented human health criteria. Primary standards for air pollutants were established to protect public health, while secondary standards were established to protect the public welfare by preventing impairment of visibility and damage to vegetation and property. Annual average standards are never to be exceeded. Short-term standards (e.g., 1-hour and 24-hour averages) are not to be exceeded more than once a year. The 1977 Amendments to the Clean Air Act required that each state identify areas within its borders that did not meet the national ambient air quality standards and develop and obtain EPA approval of a State Implementation Plan that demonstrates how the state will attain national ambient air quality standards.

Major amendments to the Clean Air Act were signed into law on November 15, 1990. These amendments prescribe new planning requirements and attainment deadlines for

areas that do not attain national ambient air quality standards. Procedures and guidelines for conforming with the 1990 Clean Air Act Amendments are continually being prepared and updated by the EPA. The 1990 amendments also directed the EPA to set standards for air toxins and require certain industries to significantly reduce emissions of controlled toxic pollutants. This information is presented in Title 40 of the Code of Federal Regulations.

The California Air Resources Board (the Air Board) coordinates and oversees the activities of California's many single-county and multi-county unified Air Pollution Control Districts and Air Quality Management Districts. The Air Board and the various Air Quality Districts operate numerous air quality monitoring stations throughout the state. Data collected at those stations are used to classify areas and air basins as "attainment" or "nonattainment" for each criteria air pollutant based on whether the ambient air quality standards have been achieved. The Air Board is responsible for incorporating local nonattainment plans into the State Implementation Plan. The Air Board also regulates the amount of pollutants that can be emitted by new motor vehicles sold in California.

The Air Board also has established state ambient air quality standards, many of which are more stringent than the corresponding national ambient air quality standards. In addition to the six criteria pollutants regulated by the Federal Clean Air Act, the Air Board has also established state standards for hydrogen sulfide, sulfates, and vinyl chloride.

An area is designated to be in nonattainment for a certain pollutant if violations of the applicable standard have occurred in each of the last three years. One violation per year contributes to state designation as nonattainment; federal designation occurs with two or more violations per year.

The California Clean Air Act, which became effective on January 1, 1989, provides a planning framework for attainment of state ambient air quality standards. Local Air Quality Districts in violation of state ambient air quality standards are required to prepare plans for attaining the state standards. The California Clean Air Act provides for the classification of nonattainment air basins into three classes: moderate, serious, and severe. For each class, the California Clean Air Act specifies attainment strategies that must be adopted. For all classes, attainment plans are required to demonstrate a five percent per year reduction in the emissions of nonattainment pollutants or their precursors, unless the Air Board determines that all feasible measures are being employed. Typically, the Air Board makes modifications to these strategies as appropriate to also meet federal requirements.

The California legislature, when it passed the California Clean Air Act, recognized that particulate matter (PM_{10}) attainment was not easily obtained and set requirements that were less strict than for other pollutants. The California Clean Air Act did require the Air Board to produce a report regarding the prospect of achieving the state ambient air quality standard for particulate matter (PM_{10}). The Air Board recommended that certain actions be taken, but did not impose a planning process to require attainment by a certain date.

The Project area includes most of the southern portion of Sonoma County, from the geysers in the north to Sears Point in the south and a small part of northern Marin County. Most of the Project lies in southern Sonoma County, which is part of the San Francisco Bay Area Air Basin. The San Francisco Bay Area Air Basin includes the counties of Napa, Sonoma, Solano, Marin, Contra Costa, San Francisco, Alameda, Santa Clara, and San Mateo and is under the jurisdiction of the Bay Area Air Quality Management District. The northern portion of Sonoma County (primarily north of Healdsburg) lies within the North Coast Air Basin. The geysers steamfield, and a portion of the pipeline leading to it, are the only Project components within the North Coast Air Basin. This portion of Sonoma County is under the jurisdiction of the Northern Sonoma County Air Pollution Control District. Table 4.12-1 shows the attainment/nonattainment status of Sonoma County for the various criteria pollutants. The majority of the Project area has been designated as nonattainment for ozone and particulate matter (PM_{10}) on the state level. The San Francisco Bay Area Air Basin is currently in nonattainment for carbon monoxide on the federal level; however, no violations of the 8-hour average standard have occurred since 1991. The Bay Area Air Quality Management District has applied to EPA for redesignation to attainment status for carbon monoxide.

Table 4.12-1

Sonoma County Designations

Pollutant	San Francisco Bay Area Air Basin		North Coast Air Basin	
	State	Federal	State	Federal
Ozone	N	A	A	A
Carbon Monoxide	A	N	A	A
Nitrogen Dioxide	A	A	A	A
Sulfur Dioxide	A	A	A	A
Particulate Matter (PM_{10})	N	U	N	U
Sulfates	A	NA	A	NA
Lead	A	NA	A	NA
Hydrogen Sulfide	U	NA	A/U[1]	NA
Visibility Reducing Particles	U	NA	U	NA

Source: Bay Area Air Quality Management District, Improving Air Quality Through Local Plans and Programs, October, 1994 and telephone conversation with Shawn Connelly with the Northern Sonoma Air Pollution Control District, July 18, 1995

Notes:
A - attainment
N - nonattainment
U - unclassified
NA - not applicable (no standard for this pollutant)
1 Geyser Geothermal Area - A, Remainder of northern Sonoma County - Unclassified

Effects of Non-Attainment Constituents

Ozone is considered to be the main constituent of smog. Complex photochemical reactions between reactive organic gases and nitrogen oxides in the presence of sunlight produce ozone. Major sources of reactive organic gases and nitrogen oxides in the Project air basins are motor vehicles and stationary source combustion processes. Direct effects of ozone include aggravation of respiratory diseases, eye irritation, visibility reduction and vegetation damage.

Particulate matter (PM_{10})of all sizes may be made up of several types of particles, including dust, smoke, ash, mist, and fumes. Sources of particulate matter include combustion of fuels, agricultural practices, construction activities, road dust, industrial processes, along with natural sources such as wind-blown dust. The majority of particulate matter generated in the Project area is caused by kicking up of road dust by tires and wind blown dust. Extended exposure to particulates can cause and aggravate respiratory diseases and severely limit visibility.

Carbon monoxide is a product of incomplete combustion of fossil fuels. The largest source of carbon monoxide is motor vehicles. Emissions are highest when vehicles are idling or traveling at slow speeds. Other sources are utility and industrial fuel combustion, forest fires, and open burning. Exposure to high levels of carbon monoxide can cause headaches and dizziness. It can also aggravate cardiovascular disease.

Plans to Reach Attainment

In 1994, the Bay Area Air Quality Management District updated the Bay Area Clean Air Plan as required by the California Clean Air Act. The Clean Air Plan contains specific measures to reduce ozone and carbon monoxide air pollution in an attempt to reach attainment of standards for these pollutants (The area was redesignated as an attainment area for carbon monoxide in November 1994 on the state level and redesignation on the federal level is expected in 1996 or 1997). Although the Clean Air Plan does not yet directly address the problem of particulate matter (PM_{10}), the measures taken by the plan to reduce ozone and carbon monoxide will, in turn, reduce the factors contributing to particulate matter. The Clean Air Plan aims to reduce ozone and carbon monoxide emissions by implementation of control measures which will provide an overall reduction in emissions from permitted sources and by implementation of transportation control measures which will provide an overall reduction in the use of single-passenger commuter vehicles and consequent air pollution from motor vehicles on the highways. The Bay Area Air Quality Management District's goal is to obtain state ozone standard attainment by 1997. Maintenance Plans have been developed to show how the Bay Area will maintain attainment of federal ambient air quality standards.

Since the portion of the North Coast Air Basin under the jurisdiction of the Northern Sonoma Air Pollution Control District is in attainment for all air pollutants, except the state standard for particulate matter (PM_{10}), no specific planning has been required.

Factors Affecting Local Air Quality

The primary factors affecting local air quality are the location of air pollutant sources and the amount of pollutants emitted, but topographical and meteorological conditions are also important. Atmospheric conditions such as wind speed, wind direction and air temperature gradients interact with the physical features of the landscape to determine the movement and dispersal of air pollutants. Another important factor is the Pacific Ocean, which moderates temperatures and helps create consistent wind gradients.

Topography and Meteorology

Topography

From an airshed perspective, much of the Project pipelines and irrigation area lies primarily within two valleys (Santa Rosa and Petaluma). The Santa Rosa Plain covers the northern portion of the Project (from the City of Cotati to the geysers), while the southern portion of the Project (West and South County Alternatives) lies within the Petaluma Valley. These valleys are bordered on the east side by the Sonoma Mountains. On the west side, there are a series of low hills followed to the south by lowlands, called the Petaluma Gap. Many of the proposed reservoirs will be located in the low hill areas.

Temperature

Vertical temperature gradients influence the stability of the atmosphere and vertical mixing of air pollutants. A temperature inversion, which is a layer of warm air above a cooler layer of air, acts as a nearly impenetrable lid. Inversions severely limit vertical mixing of the atmosphere and thus decrease the vertical dilution of near-surface air pollutant emissions. The strongest inversions in the Project area occur during the fall, significantly contributing to high ozone and other air pollutant concentration levels.

As a result of these inversions, emissions in the Petaluma Valley are more likely to stay in the west and south county areas during the summer and fall months. The Santa Rosa Plain, which is farther inland and is less affected by the ocean, is more likely to have inversions and higher pollutant levels in the fall and winter months.

Horizontal temperature gradients create wind flows that disperse air pollutants. Horizontal temperature gradients are greater near the coast due to differential heating between land and water surfaces. This effect is diminished inland in proportion to the distance from a large body of water (e.g., the Pacific Ocean and

San Pablo Bay). The Petaluma Valley portion of the Project area can experience fairly large horizontal temperature gradients as a result of the Petaluma Gap, even though it is not a coastal location. Horizontal temperature gradients are less severe in the Project area located in the Santa Rosa Plain because of the diminishing effects of the ocean on sites farther inland. Therefore, the Santa Rosa Plain has the potential for higher pollutant levels than the Petaluma Valley.

Temperature can also play an important role in the production of pollutants. Motor vehicles and equipment run less efficiently and produce more pollutants when temperatures are lower. Ozone is produced when hydrocarbons and nitrogen oxides react in the presence of sunlight and warm temperatures. Based on temperature, the Cotati Valley portion of the Project area has a higher pollution potential than the Petaluma Valley portion because it has warmer summer and colder winter temperatures.

In general, the Project area temperatures range from 50-85 degrees Fahrenheit in the summer and 35-65 degrees Fahrenheit in the winter, depending on the time of day (Bay Area Air Quality Management District 1994).

Precipitation

When precipitation occurs, air pollutants can be washed out of the atmosphere. In the absence of precipitation, long periods of dry weather aggravate the problem of wind blown dust, resulting in generation of particulate matter (PM_{10}).

Precipitation data from the Santa Rosa and Petaluma monitoring stations show that the rainy season primarily occurs between November and March. The months with the heaviest precipitation levels are January and December. Very little rainfall is observed during the rest of the year. The annual average precipitation for the Petaluma area is approximately 24 inches. The annual average rainfall for the Santa Rosa area is approximately 30 inches. The Santa Rosa area receives more rainfall because of its proximity to the Sonoma Mountains (Bay Area Air Quality Management District 1994).

Wind

Light winds limit the dilution of air pollutants as they disperse downwind from their source. Air pollutants can accumulate, especially in sheltered valleys, when light winds combine with reversals of wind direction between daytime and nighttime air flows, or when calm conditions persist for extended periods.

Wind patterns in the Project area are strongly influenced by the topography. As marine air travels eastward through the Petaluma Gap, it splits into two directions - one northward towards Santa Rosa and one southward towards San Pablo Bay. As a result, the predominant wind direction in Petaluma is from the northwest, while the predominant wind direction in Santa Rosa is from the south or southwest.

The annual average wind speed in Petaluma is 7 mph, while the annual average is slightly lower in Santa Rosa at 5 mph (Bay Area Air Quality Management District 1994). The fastest winds generally occur during the spring and summer months when horizontal temperature gradients are the greatest between coastal and inland areas.

Existing Air Quality

The Air Board compiles ambient air quality data from monitoring stations in the state. As noted previously, the study area has some portions of its land under the jurisdiction of the Northern Sonoma Air Pollution Control District, while the majority of the area is under the jurisdiction of the Bay Area Air Quality Management District. The Bay Area Air Quality Management District operates a monitoring station in Santa Rosa that collects most gaseous and particulate pollutants. This station, however, does not monitor for particulate matter (PM_{10}). The Bay Area Air Quality Management District also operates an ozone monitoring station in Sonoma. The Northern Sonoma Air Pollution Control District only monitors for particulate matter within Sonoma County at sites located at Guerneville, Healdsburg, and Cloverdale. The Healdsburg site lies within the northern portion of the Project area.

Exceedence of the most stringent standard and the maximum concentration for monitored pollutants in the Project area are summarized in Table 4.12-2. Most of the available data come from the station located in Santa Rosa. Data from this station for regional pollutants such as ozone are representative of the whole Project area. It is likely that the levels of localized pollutants, such as carbon monoxide, in the Project area are reduced from the levels measured at the Santa Rosa station because the station is located in downtown Santa Rosa. All pollutants monitored at the Santa Rosa station were below the applicable federal and state standards. However, PM_{10} levels monitored at the Healdsburg station show exceedences of state standards. The federal standards for PM_{10} were not exceeded.

Existing Emissions at the Laguna Plant

Existing air emissions from the Laguna Plant come primarily from operation of the internal combustion engines and two of the processes (the liquid and solid process flows). Table 4.12-3 summarizes emissions from the plant.

The Laguna Plant currently has three internal combustion engines. The primary emissions from the internal combustion engines include carbon monoxide, nitrogen oxides, hydrocarbons, and various hazardous air pollutants (primarily volatile organic compounds). As a worst-case estimate, it was assumed that all three engines will operate 24 hours per day, 7 days per week, and 52 weeks per year.

Emissions projections from the liquid process flow were based on quarterly sampling data taken during 1990-1993 and the Bay Area Sewage Toxics Emissions Model Version

3.0. Emissions from solid process flows were based on a December 1990 AB 2588 emission inventory report (City of Santa Rosa 1990).

In addition to air quality emissions, potential odors are an item of concern at the Laguna Plant. The Laguna Plant has an existing odor control program. Influent to the plant is prechlorinated, and ferrous chloride is also added to reduce odors. Exhaust air from the sludge treatment buildings is scrubbed prior to release to the atmosphere. The odor complaint history for the Laguna Plant was examined for the last five years (1990-1994). A total of 23 complaints were received by the Laguna Plant. The majority of the complaints were received in 1990. The odors which led to about half the complaints were found not to be caused by the Laguna Plant. In cases where the odors were caused by the Laguna Plant, corrective actions were taken to eliminate the odor.

Existing Air Quality at the Geysers

Air quality at the geysers is influenced by activities performed by several different companies. The steamfields primarily emit hydrogen sulfide, particulates, and organic gases. The Northern Sonoma Air Pollution Control District places allowable limits on each unit that emits pollutants at the geysers on a case-by-case basis. The most regulated pollutant is hydrogen sulfide. Emissions typically range from 50 to 80 percent of the allowable limits. In April 1995, there were no permit violations, and no exceedences of ambient air quality standards at the geysers based on monitoring results (Northern Sonoma Air Pollution Control District, pers. comm. July 18, 1995).

Table 4.12-2

Number of Ambient Air Quality Standard Exceedences and 1990-1993 Maximums at Monitoring Stations within the Project Area[1]

Pollutant	Units	Averaging Time	Air Quality Standards		1990		1991		1992		1993	
			State	Federal	Exceedence[2]	Max. Value[3]	Exceedence[2]	Max. Value[3]	Exceedence[2]	Max. Value[3]	Exceedence[2]	Max. Value[3]
Ozone	ppm	1-hour	0.09	0.12	0	0.07	0	0.09	0	0.08	0	0.08
Carbon Monoxide	ppm	1-hour	20	35	0	7.0	0	6.0	0	6.0	0	6.0
		8-hour	9	9	0	5.1	0	4.0	0	4.0	0	3.8
Nitrogen Dioxide	ppm	1-hour	0.25	—[4]	0	0.09	0	0.09[5]	0	0.10	0	0.09[5]
		Annual	—	0.053	NA[6]	0.014	NA	0.014[5]	NA	0.015	0	0.016[5]
Particulate matter (PM_{10})	$\mu g/m^3$	1-hour	50	150	2	57	3	72	0	42	0	43
		Annual Geometric Mean	30	—	NA	16.9	NA	19.1[5]	NA	16.9[5]	NA	16.1[5]
		Annual Arithmetic Mean	—	50	NA	20.5	NA	22.9[5]	NA	18.9[5]	NA	18.2[5]
Sulfates	$\mu g/m^3$	24-hour	25	—	0	6.0	0	6.8	0	6.3	0	10.6
Lead	$\mu g/m^3$	30-day	1.5	—	0	0.04	0	0.03	0	0.02	0	0.12
		Quarter	—	1.5	0	0.03	0	0.02	0	0.01	0	0.05

Source: California Air Resources Board, California Air Quality Data, 1990-1993

Notes:

1. Ozone, carbon monoxide, nitrogen dioxide, sulfates, and lead were monitored at the Santa Rosa - Fifth Street Station. PM_{10} was monitored at the Healdsburg-Matheson Street Station.
2. Number of exceedences of the most stringent standard.
3. Maximum concentration measured during the year.
4. — indicates that no ambient air quality standard has been established.
5. Data represented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA and/or CARB criteria for representativeness.
6. NA = Not Applicable

Table 4.12-3

Estimated Existing Air Pollutant Emissions from Operation of the Laguna Plant

Pollutant / Organic Compound	Liquid Process Flow[1]		Solid Process Flow[2]		Internal Combustion Engines[3]		Total	
	(lb / day)	(lb / yr)	(lb / day)	(lb / yr)	(lb / day)	(lb / yr)	(lb / day)	(lb / yr)
Criteria Pollutants								
Nitrogen Oxides	--	--	--	--	362.0	132130.0	362.0	132130.0
Carbon Monoxide	--	--	--	--	1125.0	410625.0	1125.0	410625.0
Hydrocarbons	--	--	--	--	144.0	52560.0	144.0	52560.0
Hazardous Air Pollutants								
Acetaldehyde	--	--	--	--	0.0013	0.5	0.0013	0.5
Acetone	0.3002	109.6	--	--	0.0000	--	0.3002	109.6
Acrolein	--	--	--	--	0.0009	0.3	0.0009	0.3
Benzene	0.0190	6.9	0.0003	0.1	0.0421	15.4	0.0614	22.4
Dichlorobenzene	0.0488	17.8	--	--	--	--	0.0488	17.8
Ethylbenzene	0.0271	9.9	--	--	--	--	0.0271	9.9
Formaldehyde	--	--	--	--	0.0187	6.8	0.0187	6.8
Perchloroethylene	0.5511	201.2	--	--	--	--	0.5511	201.2
Styrene	--	--	--	--	0.0151	5.5	0.0151	21.6
Toluene	0.1152	42.1	0.0014	0.5	0.0538	19.6	0.1704	62.2
Trichloroethene	0.0577	21.1	--	--	--	--	0.0577	21.1
Xylene	0.1937	70.7	0.0016	0.6	0.0190	6.9	0.2143	78.2
Methylene Chloride	0.3274	119.5	0.0500	18.3	0.0256	9.3	0.4030	147.1
1,1,1-Trichloroethane	0.2155	78.7	0.0003	0.1	--	--	0.2158	78.8

Source: Parsons Engineering Science, Inc., 1996

Notes
1. Source of information is Quarterly sampling from January 1990 through 1993 (CH2M Hill 1993)
2. Emissions are a total of AB 2588 report Source Test Data (City of Santa Rosa 1990)
3. Source of information is Permit Application Package to BAAQMD for Authority to Construct the Laguna Advanced Treatment Upgrade Project (CH2M Hill, 1993)
- Not tested for or detected

Air Quality Goals, Objectives, and Policies

Table 4.12-4 identifies goals, objectives, and policies which provide guidance for development in relation to air quality in the Project area. The table also indicates which criteria in the Air Quality Section are responsive to each set of policies.

Table 4.12-4

General Plan Goals, Objectives, and Policies - Air Quality

Adopted Plan Document	Document Section	Document Numeric Reference	Policy	Relevant Evaluation Criteria[1]
Sonoma County General Plan	Resource Conservation Element	Goal RC-13 Objective RC-13.1 Objective RC-13.2 Policy RC-13d	Preserve and maintain the projected county air quality and minimize air pollution	1-6
Marin Countywide Plan	Environmental Quality Element	Policy EQ-2.75 Program EQ-2.76b Program EQ-2.78a	The County shall adhere to the Federal or State air quality standards, whichever are more stringent, for management of locally generated pollutants, and shall require projects which generate high levels of pollutants to incorporate mitigation in the Project design	1-6
Santa Rosa General Plan	Open Space and Conservation Element	Goal OSC-10 Objective OSC-10a	Continue to meet federal and state standards for air quality and, where possible, maintain air quality superior to those standards	1-6
Petaluma General Plan	Community Health and Safety Element	Objective (n)	Maintain or improve Petaluma's air quality	1-6
Sebastopol General Plan	Conservation, Open Space and Parks Element	Goal 7 Policy 18 Policy 19	Protect and improve air quality by cooperating in implementation of the regional Clean Air Plan and enforcement of air quality standards	1-6
Windsor General Plan	Environmental Resources Element	Policy G.1 Policy G.1.1	Comply with state and federal ambient air quality standards	1-6

Source: Harland Bartholomew and Associates, Inc., 1995

Notes:
1. The evaluation criteria can be found on Table 4.12-5.

EVALUATION CRITERIA WITH POINT OF SIGNIFICANCE

The criteria identified in Table 4.12-5 are used to determine whether the impact of the Project on air quality will be significant. These criteria are based on local rules and regulations and are more stringent, when converted to an annual basis, than de minimis threshold levels specified in the Final Clean Air Act Conformity Rule dated November 30, 1993 (EPA 1993).

Table 4.12-5

Evaluation Criteria with Point of Significance - Air Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
1. Will construction of the Project generate emissions that exceed threshold levels?	Emissions of Hydrocarbons, Nitrogen Oxides, Sulfur Dioxide, and Particulates Carbon Monoxide Particulates	Greater than 150 pounds/day for each pollutant Greater than 550 pounds/day Greater than 15 tons/year	Bay Area Air Quality Management District Guidelines for Assessing Impacts of Projects and Plans Northern Sonoma Air Pollution Control District Rules and Regulations
2. Will Project emissions cumulatively exceed allowable limits?	Emissions of Organic Compounds, Nitrogen Oxides, Sulfur Dioxide, Carbon Monoxide, and Particulates	Greater than 10 pounds/day for each pollutant	Bay Area Air Quality Management District Regulation 2 Rule 2 Section 301.2
3. Will Project toxic emissions exceed screening trigger levels?	Emissions of Carcinogens Benzene Dichlorobenzene Perchloroethylene Methylene Chloride Non Carcinogens Ethylbenzene Toluene Xylene 1,1,1-Trichloroethane	 Greater than 6.7 lbs/yr Greater than 68 lbs/yr Greater than 33 lbs/yr Greater than 190 lbs/yr Greater than 193,000 lbs/yr Greater than 38,600 lbs/yr Greater than 57,900 lbs/yr Greater than 61,800 lbs/yr	Bay Area Air Quality Management District Risk Management Policy
4. Will Project toxic emissions exceed risk assessment thresholds?	Cancer risk	Greater than one in a million	Bay Area Air Quality Management District Risk Management Policy

Table 4.12-5

Evaluation Criteria with Point of Significance - Air Quality

Evaluation Criteria	As Measured by	Point of Significance	Justification
5. Will the Project cause potential odors?	Complaints	Greater than ten odor complaints in a 90 day period	Bay Area Air Quality Management District Regulation 7
6. Will the Project cause permit/monitoring violations at the geysers?	Violations	Greater than 0 violations	Northern Sonoma Air Pollution Control District Rules and Regulations

Source: Parsons Engineering Science, Inc. 1996

METHODOLOGY

Headworks Expansion

Expansion of the headworks will increase capacity at the Laguna Plant, allowing the Laguna Plant to operate at an average dry weather flow of 21 mgd, an increase from the existing capacity of 18 mgd. Increases in air quality related emissions will result from the higher liquid and solid process flows. The buildout flow rate without water conservation is 27 mgd. Water conservation reduces the flow rate to 21 mgd, but the same quantity of solids will be treated at the plant as without conservation, i.e., 27 mgd (CH2M Hill 1995). Thus, emissions from liquid process flow were based on 21 mgd, and emissions from solid process flow were based on 27 mgd. Emissions from the liquid process flow were estimated by the Bay Area Sewage Toxics Emissions Model Version 3.0. The model estimates pathway losses through volatilization, sorption, and biodegradation. The solid process flow emissions for 21 mgd are presented in the Permit Application Package to the Bay Area Air Quality Management District for Authority to Construct the Laguna Advanced Treatment Upgrade Project (CH2M Hill 1993). A factor of 27/21 or 1.29 was applied to the results presented in those reports to account for water conservation.

Currently the internal combustion engines operate blowers, which supply air to the aeration basins. After the Advanced Treatment Upgrade Project, the internal combustion engines will be used to run the generator in the Cogeneration Building, which will be used to power the Laguna Plant. Emissions from the internal combustion engines for the Advanced Treatment Upgrade Project were calculated as part of the Permit Application Package to the Bay Area Air Quality Management District for authority to construct (CH2M Hill 1993). There will be some additional air quality emissions generated by the internal combustion engines in order to power the larger capacity pumps that will be installed at the headworks as part of the Long-Term Wastewater Project. However, the

engines will not operate under the Project at levels above the permitted levels specified for the Upgrade Project.

Construction Activities

Air quality related emissions were estimated for several construction related components. These items included dust emissions from wind erosion of exposed soil surfaces, material handling, grading, and entrained and re-entrained dust due to vehicle travel over paved and unpaved roadways, as well as combustion engine emissions from construction equipment and vehicles used to transport material and employees. Typical construction scenarios were developed including the amount of area worked per day, amount of materials handled, number of miles traveled by trucks, and equipment usage.

Emission factors for dust generating activities were calculated using various equations presented in the *Control of Open Fugitive Dust Sources* (EPA 1992) and *Compilation of Air Pollutant Emission Factor, Volume I: Stationary Point and Area Sources* (EPA 1995). The emissions factors are applied to usage units such as vehicle miles traveled, area cleared or exposed, and tons of material handled.

Construction equipment exhaust emissions from fuel combustion were estimated using emission factors presented in EPA's *Nonroad Engine and Vehicle Emission Study* (EPA 1991). These emission factors require information on type of equipment, equipment horsepower and operational hours. Exhaust emission factors for heavy-duty trucks and passenger vehicles used to transport materials and workers to the site were calculated using the California Air Resources Board EMFAC7F mobile source emission factor model. These emission factors are on a per mile basis, are based on travel speed, and were applied to round trip travel distances to the Project site.

Details of the assumptions used, emission factor calculations, and emissions calculations related to construction operations are provided in Appendix O-1.

Odors

The discussion of possible odor complaints in the future due to expanded Laguna Plant operations was based on an evaluation of the history of past odor complaints and the potential of the Project to have additional complaints, measured by the number and type of controls incorporated into the Project to limit emission of odorous compounds.

ENVIRONMENTAL CONSEQUENCES (IMPACTS) AND RECOMMENDED MITIGATION

No Action (No Project) Alternative

Impact: **12.1.1-6. Will the No Action Alternative impact air quality based on evaluation criteria 1 through 6?**

Analysis: *No Impact; Alternative 1.*

The no action alternative will have no air quality impacts.

Mitigation: No mitigation is needed.

Headworks Expansion Component

Table 4.12-6 provides a summary of air quality impacts associated with the headworks expansion.

The expansion of the Laguna Plant headworks will result in the increase of air quality emissions from liquid and solid process flows only. There will be no change in the operation or emissions of the internal combustion engines, because the engines are part of the Advanced Treatment Upgrade Project, not the Long-Term Project (see Initial Study for Laguna Subregional Wastewater Treatment Plant - Advanced Treatment Upgrade [City of Santa Rosa, 1994]). A table showing the compounds that have an increase in emissions compared to existing conditions including the upgrade Project is provided in Appendix 0-6. Most of the increases are due to increased throughput at the aeration basins.

Table 4.12-6

Air Quality Impacts by Component - Headworks Expansion

Evaluation Criteria	Point of Significance		Impact	Type of Impact[1]	Level of Significance[2]
12.2.1. Will construction of the headworks expansion component generate emissions that exceed threshold levels?	Daily Particulates	Greater than 150 lbs/day	0 lbs	C	==
	Annual Particulates	Greater than 15 tons/year	0 tons	C	==
	Daily Hydrocarbons	Greater than 150 lbs/day	0 lbs	C	==
	Daily Nitrogen Oxides	Greater than 150 lbs/day	0 lbs	C	==
	Daily Sulfur Dioxides	Greater than 150 lbs/day	0 lbs	C	==
	Daily Carbon Monoxides	Greater than 550 lbs/day	0 lbs	C	==
12.2.2. Will headworks expansion component emissions cumulatively exceed allowable limits?	Organic Compounds	Greater than 10 lbs/day	1.2 pounds	O&M	❍

Table 4.12-6

Air Quality Impacts by Component - Headworks Expansion

Evaluation Criteria	Point of Significance		Impact	Type of Impact[1]	Level of Significance[2]
	Nitrogen Oxides	Greater than 10 lbs/day	0 pounds	O&M	❍
	Sulfur Monoxide	Greater than 10 lbs/day	0 pounds	O&M	❍
	Carbon Monoxide	Greater than 10 lbs/day	0 pounds	O&M	❍
	Particulates (PM_{10})	Greater than 10 lbs/day	0 pounds	O&M	❍
12.2.3. Will headworks expansion component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels				
	Benzene	Greater than 6.7 lbs/yr	3 pounds		❍
	Dichlorobenzene	Greater than 68 lbs/yr	5 pounds		❍
	Perchloroethylene	Greater than 33 lbs/yr	105 pounds		⊙[3]
	Methylene chloride	Greater than 190 lbs/yr	182		❍
	Ethylbenzene	Greater than 193,000 lbs/yr	3 pounds		❍
	Toluene	Greater than 38,600 lb/yr	14		❍
	Xylene	Greater than 57,900 lbs/yr	20		❍
	1,1,1 - Trichloroethane	Greater than 61,800	40		❍
12.2.4. Will headworks expansion component toxic emissions exceed risk assessment thresholds?	Cancer risk	Greater than 1/million	0.37/ million	O&M	❍

Table 4.12-6

Air Quality Impacts by Component - Headworks Expansion

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
12.2.5. Will the headworks expansion component cause potential odors?	Greater than 10 complaints/ 90-day period	Possible odors from sludge	O&M	●
12.2.6. Will the headworks expansion component cause permit/monitoring violations at the geysers?	Greater than 0 violations	--	--	--

Source: Parsons Engineering Science, Inc., 1996

Notes: 1. Type of Impact:
C Construction
O&M Operation and Maintenance
-- Not Applicable

2. Level of Significance:
❍ Less than significant impact; no mitigation proposed
● Significant impact before and after mitigation
⊙ Significant impact before mitigation; less than significant impact after mitigation
== No impact)

3. If a compound exceeds trigger levels significance is determined by an evaluation of cancer risk (criterion 4).

Impact: 12.2.1. Will the headworks expansion component exceed emissions threshold levels?

Analysis: *No Impact; All Alternatives.*

Because no grading or other soil and material handling is required for this component, no construction-related emissions are expected. Therefore, the construction phase has no emissions.

Alternative 1 does not have a headworks expansion component.

Mitigation: No mitigation is needed.

Impact: 12.2.2. Will the headworks expansion component cumulatively exceed allowable emission limits?

Analysis: *Less than Significant; Alternatives 2, 3, 4, and 5.*

The Project will not exceed the significance criteria of 10 pounds/day of volatile organic compounds, nitrogen oxides, carbon monoxide, sulfur dioxide, or particulate matter. This impact is less than significant.

No Impact; Alternative 1.

Alternative 1 does not have a headworks expansion component.

Mitigation: No mitigation is proposed.

Impact: 12.2.3. Will the headworks expansion component exceed/trigger toxic emissions levels?

Analysis: *Significant; Alternatives 2, 3, 4, and 5.*

The increase in perchloroethylene, a toxic compound, exceeds its screening trigger level for carcinogenic effects. A screening level health risk assessment was performed to determine if this increase will lead to a cancer risk of greater than one in a million (refer to impact 12.2.4). The results show that it does not lead to cancer risk of greater than one in a million and is therefore not a significant impact (CH2M Hill 1995).

No Impact; Alternative 1.

Alternative 1 does not have a headworks expansion component.

Mitigation: No mitigation is proposed.

Impact: 12.2.4. Will the headworks expansion component exceed the cancer risk toxic emissions threshold?

Analysis: *Less than Significant; Alternatives 2, 3, 4, and 5.*

The risk screening analysis shows that toxic emissions from the Project will not exceed a cancer risk of greater than one in one million.

No Impact; Alternative 1.

Alternative 1 does not have a headworks expansion component.

Mitigation: No mitigation is proposed.

Impact: 12.2.5. Will the headworks expansion component cause odors?

Analysis: *Significant; Alternatives 2, 3, 4, and 5.*

This expansion will lead to more throughput and consequently the potential for an increase in the amount of odorous emissions. The current odor control program at the plant appears to be adequate. There have been relatively few complaints over the last five years. Once an odor complaint is received by the plant, the complaint is investigated by plant personnel. If the odor causing substance is found to be related to plant operation, corrective measures are taken. It is not expected that an increase in plant capacity will create a significant increase in off-site odors based on the odor history of the plant.

Expansion of the headworks will 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). The EIR concluded that potential odors were the only unavoidable adverse impact associated with the sludge Project. Despite the inclusion of mitigation measures it was concluded that there was a potential for odors associated with both composting and land application. Although it is uncertain whether odor impacts will exceed the points of significance established in the criteria for this environmental document, because the previous EIR found this impact to be significant, even with mitigation, it is reported here as significant. Measures to minimize odors are included in Chapter 2, Measure 2.2.26, Odor Control for Sludge Handling.

No Impact; Alternative 1.

Alternative 1 does not have a headworks expansion component.

Mitigation: No feasible mitigation has been identified.

After Mitigation: *Significant after Mitigation; Alternatives 2, 3, 4, and 5.*

The previous EIR concluded that mitigation will reduce the potential for odors but that a significant potential for odor will still exist.

Impact: 12.2.6. Will the headworks expansion component cause permit/monitoring violations at the geysers?

Analysis: Does not apply.

Mitigation: Does not apply.

Urban Irrigation Component

Impact: 12.3.1-6. Will the urban irrigation component impact air quality based on evaluation criteria 1 through 6?

Analysis: *No Impact; All Alternatives.*

The urban irrigation component consists of existing irrigation systems where existing water supplies will be replaced with reclaimed water. No construction is proposed. Inorganic and organic chemicals in the reclaimed water have been measured between 1988 and 1995 by the City of Santa Rosa. The potential impacts to people from these chemicals have been covered both in the Public Health and Safety section of this document and in the human health risk assessment prepared for this Project (Human Health Risks from Chemical and Biological Components of Reclaimed Water). It was concluded that some inhalation from spray irrigation is possible, but this route will be orders of magnitude lower than exposure to domestic water via the same route because of decreased exposure duration and because volatile organic chemicals will dissipate outdoors. In

addition, some types of irrigation, such as drip, present essentially no exposure.

Based on experience with existing operations, minor odors associated with the start of irrigation each spring will not be expected to result in more than 10 odor complaints in a 90-day period. This component will have minimal or no impacts on air quality.

Alternative 1, 4, and 5 do not have an urban irrigation component.

Mitigation: No mitigation is needed.

Pipeline Component

Table 4.12-7

Air Quality Impacts by Component - Pipelines

Evaluation Criteria	Point of Significance		Impact		Type of Impact[1]	Level of Significance[2]
12.4.1. Will construction of the pipeline component generate emissions that exceed threshold levels?	Daily Particulates	Greater than 150 lbs/day	Alternatives 2 & 3	208 lbs	C	⊙
			Alternative 4	132 lbs	C	❍
			Alternative 5A	44 lbs	C	❍
	Annual Particulates	Greater than 15 tons/year	Alternative 2	25 tons	C	●
			Alternative 3	18 tons	C	⊙
			Alternative 4	17 tons	C	⊙
			Alternative 5A	9 tons	C	❍
	Daily Hydrocarbons	Greater than 150 lbs/day	Alternatives 2 & 3	15 lbs	C	❍
			Alternative 4	12 lbs	C	❍
			Alternative 5A	4 lbs	C	❍
	Daily Nitrogen Oxides	Greater than 150 lbs/day	Alternatives 2 & 3	164 lbs	C	⊙
			Alternative 4	124 lbs	C	❍
			Alternative 5A	42 lbs	C	❍
	Daily Sulfur Dioxides	Greater than 150 lbs/day	Alternatives 2 & 3	15 lbs	C	❍
			Alternative 4	11 lbs	C	❍
			Alternative 5A	4 lbs	C	❍

Table 4.12-7

Air Quality Impacts by Component - Pipelines

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
	Daily Carbon Monoxide Greater than 550 lbs/day	Alternatives 2 & 3 92 lbs	C	❍
		Alternative 4 70 lbs	C	❍
		Alternative 5A 23 lbs	C	❍
12.4.2. Will the pipeline component emissions cumulatively exceed allowable limits?	All Criteria Pollutants	0 lbs	O&M	==
12.4.3. Will pipeline component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels	0 lbs/yr	O&M	==
12.4.4. Will pipeline component toxic emissions exceed risk assessment thresholds?	Cancer risk Greater than 1/million	No Risk	O&M	==
12.4.5. Will the pipeline component cause odors?	Greater than 10 complaints/ 90-day period	Less than 10	O&M	==
12.4.6. Will the pipeline component cause permit/monitoring violations at the geysers?	Greater than 0 violations	--	--	--

Source: Parsons Engineering Science, Inc., 1996

Notes:
1. Type of Impact:
C Construction
O&M Operation and Maintenance
-- Not Applicable

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: 12.4.1. Will the pipeline component exceed emission threshold levels?

Analysis: *Significant; Alternatives 2, 3, and 4.*

The installation of pipelines will generate air pollutants in two ways: fugitive dust and combustion emissions. Fugitive dust is emitted during such construction activities as grading, trenching, material handling, and truck travel over unpaved and paved roadways, as well as wind erosion over construction areas. Combustion emissions will be generated by heavy-duty construction equipment and from trucks transporting materials to and from the site. Emissions were calculated using the emission factors described in the methodology as well as assumptions related to a typical construction day. Comparing pipeline construction emissions to significance criteria indicates that generation of particulate matter will be a significant air quality impact on a daily and annual basis for Alternatives 2 and 3 and on an annual basis for Alternative 4. Alternatives 2 and 3 also have significant nitrogen oxides impacts.

Less than Significant; Alternative 5A.

Emissions of all constituents are below threshold levels.

No Impact; Alternatives 1 and 5B.

Alternative 1 and 5B do not have a pipeline component.

Mitigation: *Alternatives 2, 3, and 4.*

2.4.10 Vehicle and Equipment Exhaust Control Program.

2.4.11 Dust Control Program.

Alternatives 1 and 5. No mitigation is proposed.

After Mitigation: *Less than Significant after Mitigation; Alternatives 3 and 4.*

Significant after Mitigation; Alternative 2.

The impacts regarding daily particulates and nitrogen oxides will be reduced to a level below significance. Impacts for Alternative 3 and 4 regarding annual particulates will be reduced to a level below significance. Annual particulate impacts for Alternative 2 will remain significant.

Impact: 12.4.2-6. Will the pipeline component degrade air quality based on evaluation criteria 2, 3, 4, 5, and 6?

Analysis: *No Impact; All Alternatives.*

The pipelines are underground, and their operation does not produce measurable air emissions or odors. Emissions from occasional releases at valves along the pipeline will be inconsequential. Therefore, there are no air quality impacts from operation of the pipelines.

Alternatives 1 and 5B do not have a pipeline component.

Mitigation: No mitigation is needed.

Storage Reservoir Component

Table 4.12-8

Air Quality Impacts by Component - Storage Reservoirs

Evaluation Criteria	Point of Significance		Impact		Type of Impact[1]	Level of Significance[2]
12.5.1. Will the construction of the storage reservoir component generate emissions that exceed threshold levels?	Daily Particulates	Greater than 150 lbs/day	Tolay Extended	2,340 lbs	C	●
			Adobe/Lakeville	1,314 lbs	C	●
			Tolay Confined	1,256 lbs	C	●
			Lakeville/Sears Point	1,544 lbs	C	●
			Two Rock	863 lbs	C	●
			Bloomfield	790 lbs	C	●
			Carroll Road	899 lbs	C	●
			Valley Ford	899 lbs	C	●
			Huntley	732 lbs	C	●
	Annual Particulates	Greater than 15 tons/year	Tolay Extended	268 tons		●
			Adobe/Lakeville	144 tons	C	●
			Tolay Confined	145 tons	C	●
			Lakeville/Sears Point	171 tons	C	●
			Two Rock	107 tons	C	●
			Bloomfield	85 tons	C	●
			Carroll Road	96 tons	C	●
			Valley Ford	97 tons	C	●
			Huntley	79 tons	C	●

Table 4.12-8

Air Quality Impacts by Component - Storage Reservoirs

Evaluation Criteria	Point of Significance		Impact		Type of Impact[1]	Level of Significance[2]
	Daily Hydrocarbons	Greater than 150 lbs/day	105 lbs		C	❍
	Daily Nitrogen Oxides	Greater than 150 lbs/day	Tolay Extended and Confined	1,413 lbs	C	●
			Adobe/Lakeville and Lakeville/Sears Point	1,958 lbs	C	●
			Alternative 3	1,069 lbs	C	●
	Daily Sulfur Dioxides	Greater than 150 lbs/day	Tolay Extended and Confined	134 lbs	C	❍
			Adobe/Lakeville and Lakeville/Sears Point	175 lbs	C	⊙
			Alternative 3	87 lbs	C	❍
	Daily Carbon Monoxide	Greater than 550 lbs/day	Tolay Extended and Confined	521 lbs	C	❍
			Adobe/Lakeville and Lakeville/Sears Point	791 lbs	C	●
			Alternative 3	467 lbs	C	❍
12.5.2. Will the storage reservoir component emissions cumulatively exceed allowable limits?	All Criteria Pollutants		0 lbs		O&M	==

Table 4.12-8

Air Quality Impacts by Component - Storage Reservoirs

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
12.5.3. Will storage reservoir component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels	0 lbs/day	O&M	==
12.5.4. Will storage reservoir component toxic emissions exceed risk assessment thresholds?	Cancer risk Greater than 1/million	No Risk	O&M	==
12.5.5. Will the storage reservoir component cause odors?	Greater than 10 complaints/ 90-day period	Less than 0	O&M	❍
12.5.6. Will the storage reservoir component cause permit/monitoring violations at the geysers?	Greater than 0 violations	--	--	--

Source: Parsons Engineering Science, Inc., 1996

Notes:

1. Type of Impact:
   - C — Construction
   - O&M — Operation and Maintenance
   - -- — Not Applicable
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: **12.5.1. Will the storage reservoir component exceed threshold emissions levels?**

Analysis: *Significant; Alternatives 2 and 3.*

As with construction of transmission pipelines, construction of the storage reservoirs will generate dust and combustion-related emissions from heavy-duty equipment and vehicles entering and leaving the Project site. For several criteria pollutants all Alternative 3 reservoirs had similar impacts and the highest value among them was presented in Table 4.12-8. Comparing the emissions estimates to the daily significance criteria, the results of the analysis show that construction of each of the reservoirs will have significant impacts from dust generation and nitrogen oxide emissions from construction equipment and vehicle trips related to the Project. In addition, subalternatives that have two reservoirs proposed (Alternatives 2B and 2D) will have significant sulfur dioxide and carbon monoxide impacts. Mitigation measures will reduce sulfur dioxide emissions to less than significant levels.

No Impact; Alternatives 1, 4 and 5.

These alternatives do not have a storage reservoir component.

Mitigation: *Alternatives 2 and 3.*

2.4.10 Vehicle and Equipment Exhaust Control Program

2.4.11 Dust Control Program.

Alternatives 1, 4 and 5. No mitigation is needed.

After Mitigation: *Significant after Mitigation; Alternatives 2 and 3.*

The above mitigation measures, which are described in Chapter 2, will reduce impacts regarding sulfur dioxide to less than significant levels. Other impacts remain significant even with mitigation.

Impact: **12.5.2-4, 6. Will the storage reservoir component degrade air quality based on evaluation criteria 2, 3, 4, and 6?**

Analysis: *No Impact; All Alternatives.*

Operation of the storage reservoirs does not produce air emissions. Therefore, there are no air quality impacts associated with operation of the reservoirs.

Alternatives 1, 4 and 5 do not have a storage reservoir component.

Mitigation: No mitigation is needed.

Impact: 12.5.5. Will the storage reservoir component cause odors?

Analysis: *Less than Significant; Alternatives 2 and 3.*

Draining of the reservoirs may lead to possible odors. However, similar activities have been performed at the Delta and Meadowlane ponds with relatively few complaints in the past. It is thus highly unlikely that these activities will lead to 10 complaints in a 90-day period.

No Impact; Alternatives 1, 4, and 5.

These alternatives do not have a storage reservoir component.

Mitigation: No mitigation is proposed.

Pump Station Component

Table 4.12-9

Air Quality Impacts by Component - Pump Stations

Evaluation Criteria	Point of Significance		Impact	Type of Impact[1]	Level of Significance[2]
12.6.1. Will construction of the pump station component generate emissions that exceed threshold levels?	Daily Particulates	Greater than 150 lbs/day	22 lbs	C	❍
	Annual Particulates	Greater than 15 tons/year	0.2 tons	C	❍
	Daily Hydrocarbons	Greater than 150 lbs/day	7 lbs	C	❍
	Daily Nitrogen Oxides	Greater than 150 lbs/day	95 lbs	C	❍
	Daily Sulfur Dioxides	Greater than 150 lbs/day	10 lbs	C	❍
	Daily Carbon Monoxide	Greater than 550 lbs/day	32 lbs	C	❍

Table 4.12-9

Air Quality Impacts by Component - Pump Stations

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
12.6.2. Will pump station component emissions cumulatively exceed allowable limits?	All Criteria Pollutants	0 lbs	O&M	==
12.6.3. Will pump station component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels	0 lbs	O&M	==
12.6.4. Will pump station component toxic emissions exceed risk assessment thresholds?	Cancer risk Greater than 1/million	No Risk	O&M	==
12.6.5. Will the pump station component cause potential odors?	Greater than 10 complaints/ 90-day period	0	O&M	==
12.6.6. Will the pump station component cause permit/monitoring violations at the geysers?	Greater than 0 violations	--	--	--

Source: Parsons Engineering Science, Inc., 1996

Notes: 1. Type of Impact:
C Construction
O&M Operation and Maintenance
-- Not Applicable

2. Level of Significance codes:
❍ Less than significant impact; no mitigation proposed
== No impact

Impact: **12.6.1. Will the pump station component exceed emissions threshold levels?**

Analysis: *Less than Significant; Alternatives 2, 3, and 4.*

Construction of the pump stations will require some grading of the area and will create some additional vehicle trips bringing materials and workmen to the site. These activities are not expected to have a significant impact on air quality. The values in the table represent the highest amount of emissions calculated for any of the subalternatives.

No Impact; Alternatives 1 and 5.

These alternatives do not have a pump station component.

Mitigation: No mitigation is proposed.

Impact: **12.6.2-6. Will the pump station component degrade air quality based on evaluation criteria 2, 3, 4, 5, and 6?**

Analysis: *No Impact; All Alternatives*

Because pumps are operated by electricity (not internal combustion engines), operation of the pump stations does not produce air emissions. Therefore, there are no air quality impacts from operation of pumps.

Alternatives 1 and 5 do not have a pump station component.

Mitigation: No mitigation is needed.

Agricultural Irrigation Component

Impact: **12.7.1-6. Will the agricultural irrigation component impact air quality based on evaluation criteria 1 through 6?**

Analysis: *No Impact; All Alternatives.*

The agricultural irrigation component includes the irrigation system on individual properties and operation as defined in the Irrigation Management Guidelines. Some construction will occur on private property as individuals hook themselves up to the public pipelines. Since specific details are not available regarding level of effort and schedule, emissions from these activities were not calculated. It is expected that activities will be at a much lower effort and less frequent than for Project pipeline construction. As a result, emissions are expected to be well below significance criteria. Inorganic and organic chemicals in the reclaimed water have been measured between 1988 and 1995 by the City of Santa Rosa. The potential impacts to people from these chemicals are addressed both in the Public Health and Safety section of this document and in the human health risk assessment prepared for this Project (*Human*

Health Risks from Chemical and Biological Components of Reclaimed Water). It was concluded that some inhalation from spray irrigation is possible, but this exposure will be orders of magnitude lower than exposure to domestic water via the same route because of decreased exposure duration and because volatile organic chemicals (and also odors) will dissipate quickly outdoors. In addition, some types of irrigation, such as drip, present essentially no exposure. Therefore, operation of the agricultural irrigation component will have no impacts on air quality. Operation of winter irrigation for the implementation of the contingency plan will have the same impacts as summer irrigation.

Alternatives 1, 4, and 5 do not have an agricultural irrigation component.

Mitigation: No mitigation is needed.

Geysers Steamfield Component

Table 4.12-10

Air Quality Impacts by Component - Geysers Steamfield

Evaluation Criteria	Point of Significance		Impact	Type of Impact[1]	Level of Significance[2]
12.8.1. Will construction of the geysers steamfield component generate emissions that exceed threshold levels?	Daily Particulates	Greater than 150 lbs/day	111 lbs	C	❍
	Annual Particulates	Greater than 15 tons/year	4 tons	C	❍
	Daily Hydrocarbons	Greater than 150 lbs/day	27 lbs	C	❍
	Daily Nitrogen Oxides	Greater than 150 lbs/day	224 lbs	C	●
	Daily Sulfur Dioxides	Greater than 150 lbs/day	15 lbs	C	❍
	Daily Carbon Monoxides	Greater than 550 lbs/day	120 lbs	C	❍
12.8.2. Will geysers steamfield component emissions cumulatively exceed allowable limits?	All Criteria Pollutants		0 lbs	O&M	==
12.8.3. Will geysers steamfield component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels		0 lbs	O&M	==
12.8.4. Will geysers steamfield component toxic emissions exceed risk assessment thresholds?	Cancer risk	Greater than 1/million	No risk	O&M	==

Table 4.12-10

Air Quality Impacts by Component - Geysers Steamfield

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
12.8.5. Will the geysers steamfield component cause potential odors?	Greater than 10 complaints/ 90-day period	0	O&M	==
12.8.6. Will the geysers steamfield component cause permit/monitoring violations at the geysers?	Greater than 0 violations	0	O&M	==

Source: Parsons Engineering Science, Inc., 1996

Notes: 1. Type of Impact:
C Construction
O&M Operation and Maintenance

2. Level of Significance codes:
● Significant impact before and after mitigation
◯ Less than significant impact; no mitigation proposed
== No impact

Impact: 12.8.1. Will the geysers steamfield component exceed emissions threshold levels?

Analysis: *Significant; Alternative 4.*

Construction of the distribution pipelines, installation of the storage tanks, and grading to create a flat surface area for the storage tanks will generate dust and equipment exhaust emissions. The amount of nitrogen oxide emissions will exceed the significance criteria and is considered a significant impact. All other air pollutants amount are below applicable significance criteria.

No Impact; Alternative 1, 2, 3, and 5.

These alternatives do not have a geysers steamfield component.

Mitigation: *Alternative 4.*

2.4.10 Vehicle and Equipment Exhaust Control Program.

Alternative 1, 2, 3, and 5. No mitigation is needed.

After Mitigation: *Significant after Mitigation; Alternative 4.*

The above mitigation measure will not reduce impacts regarding nitrogen oxide to a level below significance.

Impact: 12.8.2-6. Will the geysers steamfield component degrade air quality based on evaluation criteria 2 through 6?

Analysis: *No Impact; All Alternatives.*

Operation of the storage tanks and distribution pipelines will not produce air emissions. Therefore, there will be no air quality impacts from operation of these facilities.

Alternative 4, the Geysers Recharge, involves injecting water into wells that will feed into the geysers-Calistoga geothermal reservoir. This additional water will extend the life of the steamfields, but will not result in modification of typical operations. Therefore, it is expected that the air quality related emissions at the geysers will not increase from current levels. The Northern Sonoma Air Pollution Control District does not consider existing or potential future emissions at the geysers to be significant (i.e., violate permitting/monitoring requirements), based on existing monitoring results at various facilities at the geysers. When the Northern Sonoma Air Pollution Control District did their attainment planning for the future, they assumed that the geysers will continue to operate at current levels indefinitely into the future.

Alternatives 1, 2, 3, and 5 do not have a geyser steamfield component.

Mitigation: No mitigation is needed.

Discharge Component

Table 4.12-11

Air Quality Impacts by Component - Discharge

Evaluation Criteria	Point of Significance		Impact	Type of Impact[1]	Level of Significance[2]
12.9.1. Will construction of the discharge component generate emissions that exceed threshold levels (for Alternative 5A only)?	Daily Particulates	Greater than 150 lbs/day	22 lbs	C	❍
	Annual Particulates	Greater than 15 tons/year	0.01 tons	C	❍
	Daily Hydrocarbons	Greater than 150 lbs/day	7 lbs	C	❍
	Daily Nitrogen Oxides	Greater than 150 lbs/day	95 lbs	C	❍
	Daily Sulfur Dioxides	Greater than 150 lbs/day	10 lbs	C	❍
	Daily Carbon Monoxide	Greater than 550 lbs/day	32 lbs	C	❍

Table 4.12-11

Air Quality Impacts by Component - Discharge

Evaluation Criteria	Point of Significance	Impact	Type of Impact[1]	Level of Significance[2]
12.9.2. Will discharge component emissions cumulatively exceed allowable limits?	All Criteria Pollutants	0 lbs	O&M	==
		0 lbs	O&M-CP	==
12.9.3. Will discharge component toxic emissions exceed screening trigger levels? A risk screening analysis would then have to be performed.	Greater than screening trigger levels	0 lbs	O&M	==
		0 lbs	O&M-CP	==
12.9.4. Will discharge component toxic emissions exceed risk assessment thresholds?	Cancer risk Greater than 1/million	No risk	O&M	==
		No risk	O&M-CP	==
12.9.5. Will the discharge component cause potential odors?	Greater than 10 complaints/ 90-day period	0	O&M	==
		0	O&M-CP	==
12.9.6. Will the discharge component cause permit/monitoring violations at the geysers?	Greater than 0 violations	--	--	--

Source: Parsons Engineering Science, Inc., 1996

Notes:

1. Type of Impact:
   - C — Construction
   - O&M — Operation and Maintenance
   - O&M-CP — Operation and Maintenance - Contingency Plan
   - -- — Not Applicable
2. Level of Significance codes:
   - ❍ — Less than significant impact; no mitigation proposed
   - == — No impact

Impact: **12.9.1. Will the discharge component construction exceed emission threshold levels?**

Analysis: *Less than Significant; Alternative 5A.*

It was assumed that construction of the outfall structure will be similar to construction of a pump station. Construction activities are not expected to have a significant impact on air quality.

No Impact; Alternatives 1, 2, 3, 4, and 5B.

Alternative 5B does not include any construction activities.

Alternatives 1, 2, 3, and 4 do not have a new discharge outfall.

Mitigation: No mitigation is proposed.

Impact: **12.9.2-6. Will the discharge component degrade air quality based on evaluation criteria 2 through 6?**

Analysis: *No Impact; All Alternatives.*

Discharge does not produce emissions. Therefore there are no air quality impacts.

Mitigation: No mitigation is needed.

CUMULATIVE IMPACTS

There are three impacts -- either significant or less than significant after mitigation -- identified in the Air Quality section:

Impact: **12.1C. Will the Project plus cumulative projects generate emissions that exceed threshold levels?**

Analysis: Construction activities for pipelines (Alternatives 2, 3, and 4) and reservoirs (Alternatives 2 and 3) result in significant construction-period emissions of daily and annual particulates, nitrogen oxides, sulfur oxides, and carbon monoxide. Mitigation measures can reduce impacts to less than significant for pipeline construction for all emissions except annual particulate levels associated with the Alternative 2 pipelines and nitrogen oxide emissions associated with the geysers pipeline. Impacts for reservoir construction are less mitigable, and will be significant even with mitigation for daily and annual particulates and daily nitrogen oxides at all reservoirs, and for daily carbon monoxide for Alternatives 2B and 2D.

Impact: 12.2C. Will the Project plus cumulative projects emissions exceed allowable levels?

Analysis: Threshold levels for construction emission are established by the Bay Air Quality Management District on a per project basis, and are based on regional goals for control of emissions. Thus, other projects will need to be evaluated on an individual basis. While the threshold for construction emissions is not applicable to cumulative analysis, it is certainly possible that two or more construction projects could be occurring simultaneously in the Project area, and will contribute to the total load of construction emissions. For example, the reservoirs for a South County Alternative and the proposed Petaluma reclaimed water storage reservoir could be constructed at the same time.

Impact: 12.3 and 4C. Will the Project plus cumulative projects toxic emissions exceed screening trigger levels or risk assessment thresholds?

Analysis: The headworks expansion will generate perchloroethylene emissions that exceed the screening trigger level, however further risk assessment analysis showed that the cancer risk will be less than the threshold of one in a million.

There are no foreseeable projects in the vicinity of the Laguna Treatment Plant that will contribute additional emissions of perchloroethylene in the Project vicinity. Emissions will only be produced by industrial or commercial uses.

Impact: 12.5C. Will the Project plus cumulative projects cause potential odors?

Analysis: Increased sludge production from expansion of the headworks was previously determined to be significant in the evaluation of the Santa Rosa Subregional Sludge Beneficial Use Project EIR. No other new odor sources in the vicinity of the Laguna Treatment Plant have been identified.

SUMMARY OF SIGNIFICANT IMPACTS AND MITIGATION MEASURES

Table 4.12-12

Summary of Significant Impacts and Mitigation Measures- Air Quality

Impact	Level of Significance	Mitigation Measure
Headworks Expansion		
12.2.3. The headworks expansion component may exceed/trigger toxic emissions levels.	Alt 2 - ⊙ Alt. 3 - ⊙ Alt. 4 - ⊙ Alt. 5 - ⊙	A screening level health risk assessment determined perchloroethylene levels will be less than significant.
12.2.5. The headworks expansion component may cause odors.	Alt 2 - ● Alt. 3 - ● Alt. 4 - ● Alt. 5 - ●	No feasible mitigation has been identified.
Pipeline Component		
12.4.1. The pipeline component may exceed emission threshold levels.	Alt 2 - ● Alt 3 - ⊙ Alt 4 - ⊙	2.4.11 Dust Control Program
Storage Reservoir Component		
12.5.1. The storage reservoir component may exceed emission threshold levels.	Alt 2 - ● Alt 3 - ●	2.4.10 Vehicle and Equipment Exhaust Control Program 2.4.11 Dust Control Program
Geysers Steamfield Component		
12.8.1. The geysers steamfield component may exceed emission threshold levels.	Alt 4 - ●	2.4.10 Vehicle and Equipment Exhaust Control Program

Source: Parsons Engineering Science, Inc. 1996

Notes:

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

● Significant impact before and after mitigation

SUMMARY OF IMPACTS BY ALTERNATIVE

Table 4.12-13

Summary of Impacts by Alternative - Air Quality

Component	Alt 1	Alt 2A	Alt 2B	Alt 2C	Alt 2D	Alt 3A	Alt 3B	Alt 3C	Alt 3D	Alt 3E	Alt 4	Alt 5A	Alt 5B
No Action (No Project) Alternative	==	--	--	--	--	--	--	--	--	--	--	--	--
Headworks Expansion	--	●	●	●	●	●	●	●	●	●	●	●	●
Urban Irrigation	--	==	==	==	==	==	==	==	==	==	--	--	--
Pipelines	--	●	●	●	●	⊙	⊙	⊙	⊙	⊙	⊙	❍	--
Storage Reservoirs	--	●	●	●	●	●	●	●	●	●	--	--	--
Pump Stations	--	❍	❍	❍	❍	❍	❍	❍	❍	❍	❍	--	--
Agricultural Irrigation	--	==	==	==	==	==	==	==	==	==	--	--	--
Geysers Steamfield	--	--	--	--	--	--	--	--	--	--	●	--	--
Discharge	--	==	==	==	==	==	==	==	==	==	==	❍	==

Source: Parsons Engineering Science, Inc., 1995

Notes: Level of Significance Codes

-- Not applicable

== No impact

❍ Less than significant impact; no mitigation proposed

⊙ Significant impact; less than significant after mitigation

● Significant impact before and after mitigation

PREPARERS, REFERENCES, AND CONSULTATION AND COORDINATION

Preparers

Ivy Edmonds, Parsons Engineering Science, Inc.

Reviewers

Patricia I. Collins, Harland Bartholomew & Associates, Inc.
Anders J. Hauge, Harland Bartholomew & Associates, Inc.
Robin P. Cort, Ph.D., Parsons Engineering Science, Inc.
Doug Cook, Parsons Engineering Science, Inc.
Claire Chapin, Parsons Engineering Science, Inc.
John Cummings, Ph.D., Peer Review Committee
David Ziegler, Peer Review Committee

References

HBA Team Documents

Parsons Engineering Science, Inc. *Human Health Risks from Chemical and Biological Components of Reclaimed Water.* (Appendix J-3)

Other References

Bay Area Air Quality Management District. 1995, *Bay Area Air Quality Management District Rules and Regulations, Regulation 2 Rule 2.* June 7.

Bay Area Air Quality Management District. 1994. *Improving Air Quality Through Local Plans and Programs*. October.

Bay Area Air Quality Management District. 1994. *Bay Area Air Quality Management District Risk Management Policy Memorandum with May 25, 1994 Updated Screening Levels*.

Bay Area Air Quality Management District. 1985. *Guidelines for Assessing Impacts of Projects and Plans.* November.

California Air Resources Board. 1990-1993. *California Air Quality Data*.

CH2M Hill. 1995. Memorandum from Carol Abramson on Modeling Results, December 7.

CH2M Hill. 1993. *Permit Application Package To The Bay Area Air Quality Management District For Authority To Construct The Laguna Advanced Treatment Upgrade Project*. November.

City of Santa Rosa. 1994. *Initial Study for Laguna Subregional Wastewater Treatment Plan-Advances Treatment Upgrade*. February.

City of Santa Rosa. 1990. *AB 2588 Emission Inventory Report to the Bay Area Air Quality Management District*. December.

EPA. 1995. *Compilation of Air Pollution Emission Factors, Volume I: Stationary Point and Area Sources* AP-42, 5th edition. U.S. Environmental Protection Agency, Research Triangle Park, NC. January.

EPA. 1993. *Federal Register, 40 Code of Federal Regulations* Parts 6, 51, and 93. November 30.

EPA. 1992. *Control of Open Fugitive Dust Sources.* September.

EPA. 1991. *Nonroad Engine and Vehicle Emission Study - Report*, U.S. November.

LSA Associates, Inc. 1991. *Santa Rosa Subregional Sludge Beneficial Use Project EIR.* February.

Consultation And Coordination

Persons Contacted

Carol Abramson, CH2M Hill
Sean Connolly, Northern Sonoma Air Pollution Control District
Barbara Lee, Northern Sonoma Air Pollution Control District
Randy Frazier, Bay Area Air Quality Management District
Scott Lutz, Bay Area Air Quality Management District
Scott Stinebaugh, Laguna Plant
Doug Hackley, UNOCAL
Ed Vogue, UNOCAL
Wade Eakle, U.S. Army Corps of Engineers

Correspondence

Memorandums from Rich Maurer on construction scenarios, July 5, July 31, August 6, August 7, 1995, October 27, and November 4.

Memorandum from Stan Kline at Rust Environment & Infrastructure, September 28, 1995.