PUBLIC HEALTH

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SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Orange Grove Project (OGP) and does not expect any significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed OGP uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the OGP would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed OGP would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

California Energy Commission (Energy Commission) staff addresses potential impacts of regulated or criteria air pollutants in the **AIR QUALITY** section of this FSA, and impacts on public and worker health from accidental releases of hazardous materials are examined in the **HAZARDOUS MATERIALS MANAGEMENT** section. Health effects from electromagnetic fields are discussed in the **TRANSMISSION LINE SAFETY AND NUISANCE** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **SOIL AND WATER RESOURCES** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **WASTE MANAGEMENT** section.

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	The National Emissions Standards for Hazardous Air Pollutants (NESHAP) requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
Local	
San Diego Air Pollution Control District (SDCAPCD) Rule 51	This rule states that no source shall cause injury, detriment, nuisance or annoyance to the public, which could endanger their comfort, repose, health and safety, or property.
SDCAPCD Rule 1200	This rule requires the use of Best Available Control Technology for Toxics (T-BACT) for major sources of emissions.
SDCAPCD Rule 1210	This rule implements the California Airborne Toxic Control Measures (ATCM).

SETTING

This section describes the environment in the vicinity of the proposed project site from the public health perspective. Characteristics of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The project site is located approximately two miles west of Pala and approximately two miles east of Interstate 15 in north San Diego County. Land in the vicinity of the proposed project is rural, with mostly agricultural and open space uses. Several rural residences are also located in the project area (OGE 2008a, Section 6.16.1). The natural gas pipeline proposed for construction for this project would be approximately 2.4 miles long, running west from the OGP site to a connection with the San Diego Gas and Electric (SDG&E) gas main (OGE 2008a, Section 2.5.2). Residences and other public receptors (commercial uses) in the project vicinity (within a 1.86-mile radius) are shown in Figure 6.16-2 (OGE 2008a). There are no sensitive receptors within this area of study. The nearest sensitive receptor is the Vivian Banks Charter School located approximately two miles west of the site. The nearest public receptors are commercial uses located on the property boundary south and west of the project site (OGE 2008a, Section 6.16.2 and Figure 6.16-2).

The OGP would have two stacks, each 80 feet high (OGE 2008a, Section 6.16.1). The location of elevated terrain (above the stack height) is important in assessing potential exposure, as an emission plume may impact high elevations before impacting lower elevations. The site's elevation is about 420 feet above mean sea level, and the topography of the immediate vicinity slopes gently upward. Terrain above stack height exists to the north, east, and west of the project where, within a half a mile, the hills begin rising relatively steeply, reaching between 1,000 and 1,500 feet elevation within about a mile from the site (OGE 2008a, Section 6.16.1 and Figure 6.16-1).

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the atmosphere is stable, for example, dispersion is reduced, and localized exposure may be increased.

The climate at the project site is characterized by dry, warm summers and mild winters. The overall climate at the project site is dominated by the semi-permanent eastern Pacific high pressure system centered off the coast of California. In the summer, the high pressure system moves to its northernmost position, which results in strong northwesterly flows and light precipitation. In the winter, the high pressure system moves southwestward toward Hawaii, which allows storms originating in the Gulf of Alaska to reach northern California, bringing wind and rain. The prevailing winds in the project area are from the west and southwest with an average wind speed of 2.18 meters per second recorded during 2002 and 2003 (OGE 2008a, Section 6.16.1). Quarterly wind roses for the region are provided in Appendix 6.2-A of the AFC (OGE 2008a).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **AIR QUALITY** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the San Diego County Air Pollution Control District (SDCAPCD). By examining average toxic concentration levels from representative air monitoring sites with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States is about 1 in 3, or 333,000 in 1 million.

The SDCAPCD air monitoring site closest to the project is the Escondido Monitoring Station, located approximately 16 miles south of Pala. This station is about the same distance from the ocean as the OGP site and provides a conservative representation of the air quality at the OGP site since the Escondido area is more heavily industrial (OGE 2008a, Section 6.2.2.2). Based on the air quality data collected at this station in the last several years, the applicant estimates average annual background concentrations of PM10 at 26.9 $\mu g/m^3$ and PM2.5 at 13.4 $\mu g/m^3$ (OGE 2008a, Table 6.2-4).

The San Diego County APCD does not have data on ambient airborne toxic air contaminants as the monitoring stations were recently installed and the data is currently under review. The nearest CARB air toxics monitoring stations that actively report values are located at El Cajon and Chula Vista, approximately 35 miles southeast and 40 miles south of Pala, respectively. Although staff does not consider these locations to be representative of air quality in the OGP area, they do serve to show the upper-bound levels of toxic air contaminants found in the SDCAPCD. In 2007, the background cancer risk calculated by the California Air Resources Board (CARB) for the El Cajon site was 119 in one million and for the Chula Vista site, the background cancer risk was 77 in one million (CARB 2008). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total at each site. The risk from 1,3-butadiene was about 34 in one million at El Cajon and 21 in a million at Chula Vista, while the risk from benzene was about 44 in one million at El Cajon and 25 in one million at Chula Vista. Formaldehyde accounts for about 16% of the 2007 average calculated cancer risk based on air toxics monitoring results for the El Cajon and Chula Vista stations, with a risk of about 19 and 13 in one million, respectively. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed OGP.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk in all areas of California during the past few years. For example, in one large air district, cancer risk was 342 in one million based on 1992 data and in 2002, the average inhalation cancer risk decreased to 162 in one million (BAAQMD 2004, p. 12). Similar reductions occurred throughout the state's major metropolitan areas. In comparison to these "background" risks from all stationary and mobile sources, staff has estimated the theoretical maximum cancer risk as a result of all emissions from the proposed OGP to be 0.64 in one million, a value less than 1% of the existing background cancer risk found in Chula Vista.

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff attempts to conduct a study and analysis of existing public health issues in the project vicinity. This analysis is prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed project. Assessing existing health concerns in the project area will provide staff with a basis on which to evaluate the significance of any additional health impacts from the proposed OGP and evaluate any proposed mitigation. According to the San Diego County Health and Human Services Agency, the Hazardous Materials Division of the County of San Diego Department of Environmental Health, and the SDCAPCD, there are no known health studies conducted in the project area (OGE 2008a, Section 6.16.3).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The **PUBLIC HEALTH** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- identify the types and amounts of hazardous substances that OGP could emit to the environment;

- estimate worst-case concentrations of project emissions in the environment using dispersion modeling;
- estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the California Air Resources Board and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- assuming that an individual’s exposure to cancer-causing agents occurs continuously for 70 years; and
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother’s milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively high concentrations of pollutants. Acute effects are temporary in nature and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12-100% of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The Reference Exposure Levels are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. The Total Hazard Index is calculated separately for acute and chronic effects. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of 10 in 1 million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in 1 million is consistent with the level of significance adopted by many air districts. In general, these air districts would not approve a project with a cancer risk exceeding 10 in 1 million. The SDCAPCDD also uses 10 in 1 million as the level of "Significant Health Risk" (OGE 2008a, Section 6.16.4.5).

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in 1 million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in 1 million, staff would deem such risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **AIR QUALITY** analysis.

Site disturbances occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for this site in 2008 identified no "Recognized Environmental Conditions" per the American Society for Testing and Materials Standards (ASTM) definition. That is, there was no evidence or record of any use, spillage or disposal of hazardous substances on the site, nor any other environmental concern that would require remedial action (OGE 2008a, Section 6.14.1.2 and Appendix 6.14-A). In the event that any unexpected contamination is encountered during construction of the OGP, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **WASTE MANAGEMENT** for a more detailed analysis of this topic.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40 substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the California Air Resources Board (ARB) as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased coughing, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants recommended a chronic reference exposure level (see discussion of reference exposure levels in Method of Analysis section above) for diesel exhaust particulate matter of 5 micrograms of diesel particulate matter per cubic meter of air ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6).[1] The Scientific Review Panel did not recommend a value for an acute Reference Exposure Level since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved the panel's recommendations regarding health effect levels.

Appendix 6.2-C and Tables 6.2-5 through 6.2-7 of the AFC (OGE 2008a) present estimates of the maximum daily emissions for onsite construction activities, total off-site emissions for construction of the gas pipeline, and total emissions from construction traffic. Modeling the daily emissions of construction activities using a 12-hour work day resulted in annual PM10 concentrations of 0.311 µg/m3 and annual PM2.5 concentrations of 0.0881 µg/m3 (OGE 2008a, Section 6.2.4.2). Construction of the entire project including linear facilities is anticipated to take place over a period of six months, while heavy construction activities that contribute to HAP emissions would last only three months (OGE 2008a, Section 6.16.5.1). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from 8 to 70 years. Due to the short duration of construction for this project, health risks from construction emissions are not expected.

Mitigation measures are proposed by Energy Commission staff to reduce the maximum calculated PM10 emissions. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in 90% reductions of emissions. In order to further mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, Energy Commission staff recommends the use of ultra-low sulfur diesel fuel and Tier 2 or Tier 1 California Emission Standards for Off-Road Compression-Ignition Engines or the installation of an oxidation catalyst and soot filters on diesel equipment. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and filtration. The degree of particulate matter reduction is comparable for both mitigation measures in the range of approximately 85–92%. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed OGP include two combustion turbine generators, one black start engine and one diesel-fueled emergency firewater pump. As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

Tables 6.16-2 through 6.16-4 (OGE 2008a) list toxic air contaminants expected to be emitted from all project sources as combustion byproducts along with their anticipated amounts (emission factors). Toxic Air Contaminant emission factors were obtained from the Environmental Protection Agency (EPA) AP-42 database of emission factors. Table 6.16-1 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from project pollutants. The toxicity values include Reference Exposure Levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health Table 2** lists the toxic emissions potentially emitted by the OGP and shows how each contributes to the health risk analysis.

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant’s screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP). Ambient concentrations were used in conjunction with Reference Exposure Levels and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother’s milk.

The above method of assessing health effects is consistent with OEHHA’s Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003) referred to earlier and results in the following health risk estimates.

Public Health Table 2
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Benzene			✔	✔	✔
Benzo(a)anthracene			✔		
Benzo(a)pyrene			✔		
Benzo(b)fluoranthene			✔		
Benzo(k)fluoranthene			✔		
1,3-Butadiene			✔	✔	
Chrysene			✔		
Dibenz(a,h)anthracene			✔		
Diesel Exhaust (PM10)			✔	✔	
Ethylbenzene			✔	✔	
Formaldehyde			✔	✔	✔
Hexane				✔	
Indenol(1,2,3-cd)anthracene			✔		
Napthalene		✔	✔	✔	
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔

Source: OEHHA 2003, Appendix L and OGE 2008a, Table 6.16-1

Impacts

The applicant's screening health risk assessment for the project including emissions from all sources resulted in a maximum acute Hazard Index (HI) of 1.54 and a maximum chronic HI of 0.0413. The maximum acute and chronic HI occurred at locations just beyond the north boundary and near the center western boundary of the project, respectively (OGE 2008a, Section 6.16.6.2). The highest acute and chronic hazard indices at a residential location were calculated to be 0.538 and 0.00204, respectively, both occurring at residences northeast of the facility. As **Public Health Table 3** shows, the chronic HI at the point of maximum impact is less than 1.0 while the acute HI is more than 1.0, indicating that no long-term adverse health effects are expected but short-term health effects may be significant. However, the maximal hazard indices at any residential or public receptor are below the level of significance.

As shown in **Public Health Table 3**, total worst-case individual cancer risk was calculated by the applicant to be 3.65 in 1 million at the location of maximum impact, which is outside the western property line at an elevation of about 995 feet. The highest cancer risk at a residence was calculated to be 0.178 in a million for a residence on a hill northeast of the project (OGE 2008a, Section 6.16.6.1).

Public Health Table 3
Operation Hazard/Risk at Point of Maximum Impact: Applicant Assessment

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	1.54	1.0	Yes
Chronic Noncancer	0.0413	1.0	No
Individual Cancer	3.65 in a million	10.0 in a million	No

Source: OGE 2008a, Tables 6.16-5 and 6.16-6.

Staff conducted an independent quantitative health risk assessment and compared the results to those presented by the applicant. Emitting units assessed include two natural gas-fired combustion turbines, a natural gas-fired black start engine, and a diesel fire water pump, for a total of four emitting sources evaluated.

Staff's health risk assessment of power plant operations included the following:

- Stack parameters, building parameters, emission rates and locations of sources were obtained from the AFC and modeling files provided by the applicant.
- Emissions from the two combustion turbine generator stacks, the black start engine and the diesel fire water pump were included in the analysis.
- Use of a receptor grid of -1200 to 1200 m east and -1200 to 1200 m north, at 100 m increments.
- Exposure pathways assessed include inhalation, dermal absorption, soil ingestion, locally grown produce and mother's milk.

Atmospheric dispersion modeling was conducted using the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a, which includes air dispersion modeling using EPA's ISCST model. Screening meteorological data were used to predict project risks and hazards because the local metrological data was not presented to staff in a usable format. Also, due to the severe terrain of the project area, and the tendency of the ISCST air dispersion model to over-predict ground level concentrations in such situations of severe terrain, cancer risk and chronic hazard index were calculated based on the annual average modeling results predicted by AERMOD at the maximum impact location for NOx, SOx and PM (provided by Will Walters of Aspen Engineering, e-mail correspondence September 29, 2008). The maximum Chi/Q value predicted is 0.86 (ug/m^3)/(g/sec), at a location about one-half mile west southwest from the project, at an elevation approximately 450 feet above the project site.

The emission factors used in staff's analysis of cancer risk and hazard were obtained from the AFC and are listed in **Public Health Table 4**. For cancer risk calculations using the HARP model, Staff used the "Derived(Adjusted)Method" and for chronic noncancer hazard Staff used the "Derived(OEHHA)Method". The following receptor locations were quantitatively evaluated in staff's analysis:

- The point of maximum impact (PMI) located west of the site (70 year residential scenario)
- The Maximally Exposed Individual Resident (MEIR) located northeast of the site (70 year residential scenario)

Ground level concentrations (GLCs) predicted at the maximum impact location using AERMOD results are listed in **Public Health Table 5.** Annual facility emissions in units of pounds/year are converted to units of g/sec/facility for this analysis. GLCs at the PMI were determined by multiplying the g/sec emission factor (the sum of emissions from all three sources) for each substance by the Chi/Q value. GLCs were then entered into the HARP program according to the protocol outlined in Topic 8 of the HARP How-to Guide ("*How to Perform Health Analyses Using a Ground Level Concentration*").

Results of staff's analysis using screening and local meteorology, as well as the Chi/Q approach, are summarized in Public Health Table 6 and are compared to the results presented in the AFC.

Public Health Table 4
Emission Rates Used in the Cancer Risk and Hazard Analyses

Substance	Annual Average Emissions (lbs/year)	Maximum 1-Hour Emissions (lbs/hour)
EMISSION RATES FROM OPERATION OF EACH COMBUSTION TURBINE		
Ammonia	9.64E+03	3.01E+00
1,3-Butadiene	6.50E-01	2.03E-04
Acetaldehyde	6.05E+01	1.89E-02
Acrolein	9.67E+00	3.02E-03
Benzene	1.81E+01	5.67E-03
Ethylbenzene	4.84E+01	1.51E-02
Formaldehyde	1.07E+03	3.35E-01
Propylene Oxide	4.38E+01	1.37E-02
Toluene	1.96E+02	6.14E-02
Xylenes	9.67E+01	3.02E-02
Benzo(a)anthracene	1.98E-01	6.19E-05
Benzo(a)pyrene	1.35E-01	4.23E-05
Benzo(b)fluoranthene	9.92E-02	3.10E-05
Benzo(k)fluoranthene	9.92E-02	3.10E-05
Chrysene	2.21E-01	6.90E-05
Dibenz(a,h)anthracene	1.98E-01	6.19E-05
I(1,2,3-cd)pyrene	1.98E-01	6.19E-05
Naphthalene	1.16E+01	3.64E-03
EMISSION RATES FROM OPERATION OF BLACK START ENGINE		
1,3-Butadiene	3.40E-03	2.43E-04
Acetaldehyde	1.06E-01	7.60E-03
Acrolein	6.54E-02	4.67E-03
Benzene	5.60E-03	4.00E-04
Ethylbenzene	5.05E-04	3.61E-05
Formaldehyde	6.72E-01	4.80E-02
Methanol	3.18E-02	2.27E-03
n-Hexane	1.41E-02	1.01E-03
Phenol	3.05E-04	2.18E-05
Toluene	5.19E-03	3.71E-04
Xylenes	2.34E-03	1.67E-04
Benzo(a)anthracene	1.23E-06	8.80E-08
Benzo(a)pyrene	4.82E-08	3.44E-09
Benzo(b)fluoranthene	9.91E-07	7.08E-08
Benzo(k)fluoranthene	1.50E-07	1.07E-08
Chrysene	2.80E-07	2.00E-08
Dibenz(a,h)anthracene	4.82E-08	3.44E-09
I(1,2,3-cd)pyrene	1.35E-07	9.67E-09
Naphthalene	3.85E-04	2.75E-05

Public Health Table 4 (continued)
Emission Rates Used in the Cancer Risk and Hazard Analyses

Substance	**Annual Average Emissions** (lbs/year)	**Maximum 1-Hour Emissions** (lbs/hour)
EMISSION RATES FROM OPERATION OF DIESEL FIRE WATER PUMP		
Benzene	5.98E-02	1.15E-03
Toluene	2.62E-02	5.04E-04
Xylenes	1.83E-02	3.51E-04
Propylene	1.65E-01	3.18E-03
1,3-Butadiene	2.51E-03	4.82E-05
Formaldehyde	7.56E-02	1.45E-03
Acetaldehyde	4.92E-02	9.45E-04
Acrolein	5.93E-03	1.14E-04
Benzo(a)anthracene	1.08E-04	2.07E-06
Benzo(a)pyrene	1.21E-05	2.32E-07
Benzo(b)fluoranthene	6.35E-06	1.22E-07
Benzo(k)fluoranthene	9.93E-06	1.91E-07
Chrysene	2.26E-05	4.35E-07
Dibenz(a,h)anthracene	3.74E-05	7.19E-07
Indeno(1,2,3-cd)pyrene	2.40E-05	4.62E-07
Naphthalene	5.44E-03	1.05E-04

Public Health Table 5
Ground Level Concentrations Based on AERMOD

Substance	**Annual Average Emissions** (lbs/year)			**Annual Average Emissions** (g/sec)	**Ground Level Conc.** (ug/m3)
	Each Turbine	**Black Start Engine**	**Fire Water Pump**	**All Sources**	**All Sources**
Ammonia	9.64E+03			1.39E-01	1.19E-01
1,3-Butadiene	6.50E-01	3.40E-03	2.51E-03	9.44E-06	8.12E-06
Acetaldehyde	6.05E+01	1.06E-01	4.92E-02	8.73E-04	7.50E-04
Acrolein	9.67E+00	6.54E-02	5.93E-03	1.40E-04	1.21E-04
Benzene	1.81E+01	5.60E-03	5.98E-02	2.62E-04	2.25E-04
Ethylbenzene	4.84E+01	5.05E-04		6.96E-04	5.99E-04
Formaldehyde	1.07E+03	6.72E-01	7.56E-02	1.55E-02	1.33E-02
n-Hexane		1.41E-02		2.03E-07	1.75E-07
Propylene Oxide	4.38E+01			6.31E-04	5.43E-04
Toluene	1.96E+02	5.19E-03	2.62E-02	2.83E-03	2.43E-03
Xylenes	9.67E+01	2.34E-03	1.83E-02	1.39E-03	1.20E-03
B(a)anthracene	1.98E-01	1.23E-06	1.08E-04	2.85E-06	2.45E-06
B(a)pyrene	1.35E-01	4.82E-08	1.21E-05	1.95E-06	1.68E-06
B(b)fluoranthene	9.92E-02	9.91E-07	6.35E-06	1.43E-06	1.23E-06
B(k)fluoranthene	9.92E-02	1.50E-07	9.93E-06	1.43E-06	1.23E-06
Chrysene	2.21E-01	2.80E-07	2.26E-05	3.18E-06	2.73E-06
Di(a,h)anthracene	1.98E-01	4.82E-08	3.74E-05	2.85E-06	2.45E-06
I(1,2,3-cd)pyrene	1.98E-01	1.35E-07	2.40E-05	2.85E-06	2.45E-06
Naphthalene	1.16E+01	3.85E-04	5.44E-03	1.68E-04	1.44E-04

Public Health Table 6
Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic and Acute Hazard Indices

	Staff's Analysis HARP with ISCST Screening Meteorological Data			Applicant's Analysis		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
PMI	4.3	0.049	0.6	3.7	0.041	1.5
MEIR	1.9	0.021	0.3	0.18	0.0020	0.54
	Staff's Analysis AERMOD with Local Meteorological Data					
	Cancer Risk (per million)	Chronic HI	Acute HI			
PMI	0.64	0.0072	n/a			
MEIR	n/a	n/a	n/a			

Staff cannot explain the difference in the acute Hazard Index estimated by the applicant and that found by staff using screening meteorological data. The use of screening meteorology data should have resulted in a higher acute hazard index, not a lower index. (The estimates for cancer risk and chronic hazard were as expected, slightly higher using screening meteorology data.) Also, the estimated cancer risk estimated by staff using ISC and screening meteorology data is about the same as the applicant's estimate and the AERMOD air dispersion model which is generally more accurate for complex terrain gave a much lower cancer risk estimate than the use of the ISC/HARP model used by staff or the ISC/HARP model used by the applicant. However, because the cancer risk estimates are all very much less than the level of significant risk (10 in one million), staff believes that regardless of the source of the differences, the project will not cause a significant risk of cancer to the public. And, since staff's assessment using screening meteorology data found both the chronic and acute hazard indices to be less than significant (< 1.0), staff believes that the project will likewise not cause a significant acute or chronic hazard to the public.

Potential Health Impacts due to Truck Transport of Process Water

The OGP proposes to transport process water (both reclaimed and fresh) by tanker truck to the site, which would require a maximum of one round trip per hour for each of two trucks, one transporting reclaimed water and the other fresh water. Staff has requested that the applicant provide a health risk assessment for the impacts of diesel emissions on the public along the water transportation routes. The applicant modeling (provided in Exhibits 52-1 and 52-2 of Data Response 52, TRC2008f) resulted in a maximum cancer risk at a residential receptor of 3.91 in one million from diesel exhaust emissions along the road, 2.26 in one million for idling at the fresh water pickup location, and 1.71 in one million for idling at the reclaimed water pickup location. The maximum chronic HI at a residential receptor was calculated to be 0.00246 along the road, 0.00142 at the fresh water pickup station, and 0.00107 at the reclaimed water pickup station. The acute HI at all locations was found to be zero (TRC2008f, Exhibit 52-1).

Staff also analyzed cancer risks and chronic hazards due to emissions from diesel-fueled trucks hauling water to the proposed OGP site. The applicant plans to obtain reclaimed and fresh water from off-site pickup stations. The reclaimed water station is located west of the proposed site, with a one-way distance of 15.6 miles. The fresh water pickup station is located northwest of the site, with a one-way distance of 9.0 miles. Based on expected use of the proposed plant, water hauling is expected to typically occur about 60 days/year, however staff used the maximum hours possible 3200 hrs/year in its estimate of impacts. The peak expected rate of water hauling is one truck per hour for fresh water and one truck per hour for reclaimed water (OGE 2008a, AFC Section 6.11.1.3).

Atmospheric dispersion modeling was conducted using the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a. Road and emission input parameters used in the HARP model were obtained from the modeling files provided by the applicant in Data Response 52. The analysis of risks due to diesel emissions from water haul trucks included the following protocol developed by the applicant to estimate hourly and yearly diesel emissions:

- A one mile segment of roadway was segregated into 22 adjacent rectangular road segments, each treated as an area source in the dispersion modeling. The one mile segment is located on Mission Road, on the fresh water haul route.
- PM_{10} emission factor assumed to be 0.002 lb/vehicle mile traveled (applicant reported this value obtained from SCAQMD).
- 0.002 lb Diesel Exhaust PM emitted over a one mile segment of roadway during one trip per hour which is equivalent to 0.002 lb/hr over one mile or 0.00009 lb/hr over each of the 22 road segments. This is equivalent to: 1 round-trip/hr x 0.002 lb/mi x 1 mile/22 segments = 0.00009 lb/hr
- Maximum operating annual hours are 3,200 hours/year which at a rate of 0.002 lb/mi emissions during one round-trip per hour, would result in an emission rate of 6.4 lb/year over 1 mile or 0.29 lb/yr over each of the 22 road segments. This is equivalent to 0.00009 lb/hr x 3,200 hr/yr = 0.29 lb/yr
- Local meteorological data and demographic files were provided by the applicant.
- Receptors were located along both sides of the one mile road segment. 136 receptors were evaluated.

Cancer risk was determined under the Derived (Adjusted) risk assessment methods and chronic hazard under the Derived (OEHHA) method. The maximum cancer risk determined by the applicant was 3.9E-06 and the maximum chronic hazard index was 0.0025.

Staff was able to recreate the applicant's HARP analysis and obtained the same risk and hazard index results (see **Public Health Table 7**). In order to verify that the analysis identified the maximally impacted receptor, Staff conducted an additional HARP analysis using a receptor grid of -500 to 500 m east and -500 to 500 m north, at 50 m increments. The grid was centered around the road segment located closest to the receptor with maximum risk identified in the applicant's analysis. Staff's analysis resulted in a maximum cancer risk of 6.0E-06 and maximum chronic hazard index of 0.0038, located at a receptor next to the roadway.

The risks reported in this analysis are for residents along the one mile road segment of Mission Road on the fresh water haul route but are applicable to any person along any route.

Public Health Table 7
Applicant and Staff Water Transport
Cancer and Chronic Hazard Index Results

	Maximally Impacted Receptor	
	Applicant	**Staff**
Cancer Risk	3.9E-06	6.0E-06
Chronic HI	0.0025	0.0038

These results show that both the applicant's and staff's modeling of the transport of water to the project show that health impacts would be less than significant. Note that during drought conditions, the project may use more reclaimed water if fresh water is not available; however the project would require the same number of water transport truck trips. The cancer and Chronic HI could change during a drought if the truck trips along the reclaimed water route were to increase above the level used in staff's assessment (which was based on 3200 hours of operation per year or 133 days of one round-trip delivery each hour).

Cooling Tower

In addition to project TAC emission, bacterial growth in the proposed three cell packaged cooling tower, including Legionella, could present a public health risk. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

As noted in the LORS section above, the State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation applies to the OGP since it intends to use tertiary-treated recycled water provided by the Fallbrook Public Utility District (FPUD) Wastewater Treatment Plant No. 1 for cooling (OGE 2008a, Section 2.6.2.1).

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60% of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately 3-6%. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed condition of certification **PUBLIC HEALTH-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **PUBLIC HEALTH-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance.

CUMULATIVE IMPACTS

The applicant has contacted the SDCAPCD, which identified two facilities within a 6-mile radius that submitted applications for authority to construct: a thermal oxidizer for soil remediation in Escondido and an industrial dust collector in the City of Vista. The applicant identified no other sources of emissions in the project vicinity and therefore cumulative impacts from this project are not expected (OGE 2008a, Section 6.16.7).

The maximum cancer risk for emissions from OGP (calculated by staff) is 0.64 in one million.

As described above, the contribution of the OGP to both cancer risk and chronic and acute noncancer disease are comparatively very small. Even in a cumulative context including other regional sources, the estimates for cancer risk from the OGP project are less than significant. In addition, OGP's contribution to chronic and acute noncancer disease is less than significant in a cumulative context.

COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with **PUBLIC HEALTH**.

Staff concludes that construction and operation of the OGP will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of **PUBLIC HEALTH**.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received.

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the OGP and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public, including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed OGP uses a highly conservative methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the OGP would not contribute significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC HEALTH-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The Plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines but in either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the project owner may ask the CPM to re-evaluate and revise the Legionella bacteria testing requirement.

<u>Verification:</u> At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

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