7.6 PUBLIC HEALTH

To assess the potential impact of the proposed Marsh Landing Generating Station (MLGS) on public health, a human health risk assessment (HRA) was performed, based on the project's emissions of toxic air contaminants (TACs). This section describes the methodology and results of the HRA for the project. The purpose of the HRA is to evaluate potential public exposure and adverse health effects due to TAC emissions associated with routine project operations. Impacts due to the project's emissions of criteria pollutants (i.e., pollutants for which federal or California ambient air quality standards [AAQS] have been promulgated) are described in Section 7.1, Air Quality. Potential public exposure to accidental releases of hazardous materials on the project site during operation is addressed in Section 7.12, Hazardous Materials Handling. Potential exposure to hazardous substances encountered due to facility demolition activities in support of the project is discussed in Section 7.12, Hazardous Materials Handling.

7.6.1 Affected Environment

The project is located within the existing Contra Costa Power Plant (CCPP) site, in an unincorporated area of Contra Costa County, California. The MLGS site is located about 1/10 of a mile east of the City of Antioch limits. The land uses within a 3-mile radius of the site are water and scattered wetlands to the north and northeast; and industrial, residential, and open space in all other directions (see Section 7.4, Land Use, for a detailed analysis of surrounding land uses).

The California Energy Commission (CEC) defines sensitive receptors as infants and children, the elderly, the chronically ill, and any other members of the general population who are more susceptible to the effects of exposure to environmental contaminants than the population at large. For the purposes of this analysis, sensitive receptors are defined as the locations occupied by groups of individuals that may be more susceptible to health risks from a chemical exposure: schools (public and private), day care facilities, convalescent homes, parks, and hospitals. Figure 7.6-1 shows the sensitive receptors within 3 miles of the project and the nearby residences; however, the HRA approach treats all receptors as sensitive receptors. Appendix O also contains a list of all the sensitive receptors and nearby residences. The closest non-conforming residence is located approximately 1,600 feet east of the project boundary, near the Sportsman Yacht Club. The closest residential neighborhood is approximately 2,000 feet southwest of the project boundary.

Several studies have been conducted recently to address health risks in the neighborhoods surrounding the project site. In November 2007, The Greater Bay Area Cancer Registry (GBACR) of the Northern California Cancer Center investigated potential excess of invasive breast cancer among female residents in Contra Costa County. The methodology, results, discussion, and conclusions of this study are described in *Breast Cancer Concern at Turner Elementary School, Antioch, CA: Report on Cancer Incidence from the Greater Bay Area Cancer Registry, February 2008*. A 1998 to 2002 period was studied, during which the number of breast cancer cases among residents was compared to the number of cases expected to occur if the residents had the same pattern of cancer occurrence as the entire nine-county Greater Bay Area.

The results of this study showed that there were 109 observed cases of invasive breast cancer for women of all ages in the years 1998 through 2002 for specific census tracts in Contra Costa County; 107 cases were expected in the target population of the nine counties mentioned above. This corresponds to a standard incidence ratio (SIR) of 1.02 and a 99 percent confidence level interval of 0.8 to 1.3. A SIR above one indicates a higher than expected number of cases, while a number less than one indicates fewer cancer cases than would be expected. If the confidence interval includes one, then there is no statistically significant difference between the expected and the observed number of cases. This concludes that the "incidence rate of invasive female cancer among the residents of the target area did not significantly differ from residents in the Greater Bay Area."

Similar to the study above is the GBACR report, *Breast Cancer Concern in Contra Costa County: Report on Cancer Incidence from the Greater Bay Area Cancer Registry, November 2007*. Periods between 1988 through 1992 and 1998 through 2002 were studied using data collected for the 1990 and 2000 U.S. Censuses. The region of concern was Port Chicago in Contra Costa County, which is different from the target area studied in the study discussed above.

The study concluded that there were 63 observed cases of invasive breast cancer for women of all ages during the years 1988 through 1992 for specific census tracts in Contra Costa County, versus 52 cases expected in the nine counties of the entire San Francisco Bay region. This results in a SIR of 1.21 and a 99 percent confidence level interval from 0.8 to 1.7. Since the confidence level includes one, there is no statistically significant difference between the expected and observed number of cases. The results also show that there were 43 observed cases of invasive breast cancer for women of all ages in the years 1998 through 2002, versus 50.4 cases expected. The SIR and confidence interval were not calculated for this time period, because the observed cases were less than the expected number. The study concludes that during 1988 through 1992 and 1998 through 2002, the "incidence of invasive female cancer among the residents of the target area did not significantly differ from the rate for residents in the Greater Bay Area."

The Bay Area Air Quality Management District (BAAQMD) conducted a study titled, *Community Air Risk Evaluation Program, Phase I Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area, September 2006*. The goal of this program was to identify locations with high toxic emissions levels and sensitive populations within the Bay Area, and to use the resulting information for Air District funding, regulatory authority, and other TAC reduction programs. A 2- by 2-kilometer (km) grid system covering the Bay Area with corresponding emissions inventories of TAC from stationary facilities, on-road mobile sources, off-road mobiles sources, and other distributed area sources was developed for this study.

The BAAQMD study showed that diesel particulate matter (DPM) accounts for about 80 percent of the cancer risk in the Bay Area that is related to airborne toxics. The study also finds that more wood burning occurs in Contra Costa County than in San Francisco County. A carbon-14 analysis concluded that during summer and winter, new carbon (wood burning, forest fires, food preparation) and old carbon (fossil fuel combustion) each contribute about half of the total carbon collected on DPM filter samples in the Bay Area. On-road mobile sources contribute 34 percent to cancer toxicity-weighted emissions by source category, while construction equipment contributes 32 percent, and industrial and commercial equipment contributes 9 percent. Acrolein, formaldehyde, and diesel particulates account for 83 percent of the chronic air toxics risk. The largest sources of these emissions are on-road mobile and aircraft emissions. Finally, acrolein accounts for 94 percent of the acute risk due to toxic air emissions. Most of the acute toxics emissions are from aircraft and on-road mobile sources.

The study includes an emission density plot of DPM emissions throughout the Bay Area. This graphic shows that total emissions of particulates less than or equal to 10 microns in diameter (PM_{10}) from diesel sources near the MLGS project area are around 10 to 50 pounds per day (lbs/day). The highest DPM emissions, more than 200 lbs/day, occur near the more densely populated areas in portions of San Francisco and Oakland. Acrolein emissions are highest near airports. Additional phases of this study are currently in progress.

The *Community Health Indicators for Contra Costa County 2007* study calculated for the years 2002 through 2004, a rate of 170.5 cancer deaths per 100,000 people for Contra Costa County, compared to a rate of 163.3 cancer deaths per 100,000 people for the State of California as a whole. Contra Costa residents have a slightly higher cancer mortality rate on average than California residents overall, with an even higher cancer mortality rate in Antioch (206.4 cancer deaths per 100,000 people). The study found that most deaths (four out of five) in Contra Costa County are caused by chronic diseases, with heart disease and cancer as the top two leading causes of death, accounting for half of all deaths. Chronic lower respiratory disease causes about 4 to 6 percent of deaths for residents aged 55 and older. Currently, program and policy strategies are targeting chronic disease prevention and the elimination of health inequities among those residents at greatest risk for poor health outcomes.

7.6.2 Environmental Consequences

This section describes the evaluation of potential public health risks due to demolition, construction, and operation of the proposed power generation facility and the methodology and results of the HRA. A significant impact is defined as a maximum incremental cancer risk greater than 10 in 1 million, a chronic total hazard index (THI) greater than 1.0, or an acute THI greater than 1.0. Also, uncertainties in the HRA are discussed and other potential health impacts of the project are described.

7.6.2.1 Public Health Impact Assessment Approach

The potential human health risks posed by the project's emissions were assessed using procedures consistent with the BAAQMD Risk Assessment Procedures for Regulation 2, Rule 5 (BAAQMD, 2005a), BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines (BAAQMD, 2005b), Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines (Cal-EPA/OEHHA, 2002) and guidance from BAAQMD staff. The BAAQMD and OEHHA guidelines were developed to provide risk assessment procedures, as required under the Air Toxics Hot Spots Information and Assessment Act of 1987, Assembly Bill 2588 (Health and Safety Code Sections 44360 et seq.). The Hot Spots law established a statewide program to inventory air toxics emissions from individual facilities, as well as guidance for execution of risk assessments and requirements for public notification of potential health risks.

As recommended by BAAQMD staff and OEHHA Guidelines, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program (HARP) was used to perform an OEHHA Tier 1 HRA for the project. HARP includes two modules: a dispersion module and a risk module. The HARP dispersion module incorporates the USEPA ISCST3 air dispersion model, and the HARP risk module implements the latest Risk Assessment Guidelines developed by OEHHA. For consistency with the criteria pollutant modeling, the dispersion modeling was conducted with AERMOD. CARB has created a beta version software package, HARP File Converter, to convert AERMOD dispersion results into a format that can be read into the HARP risk module. Thus, HARP with AERMOD was used for this HRA.

The HRA was conducted in four steps using the HARP:

1. Hazard identification and emission quantification
2. Exposure assessment
3. Dose-response assessment
4. Risk characterization

First, hazard identification was performed to determine the potential health effects that could be associated with MLGS emissions. The purpose was to identify whether pollutants emitted during MLGS operation could be characterized as potential human carcinogens, or associated with other types of adverse health effects. Based on BAAQMD and OEHHA guidelines, a list of pollutants with potential cancer and noncancer health effects associated with the emissions from the project has been constructed in Table 7.6-1. Note that the two Flex Plant 10 (FP10) and two Simple Cycle turbines are the only sources of TACs associated with normal MLGS operations and that the same group of TACs are emitted by the turbines of both configurations.

Second, an exposure assessment was conducted to estimate the extent of public exposure to the project emissions. Public exposure is quantified based on the predicted maximum short- and long-term ground-level concentrations resulting from project emissions, the exposure pathway(s), and the duration of exposure to those emissions. Dispersion modeling was performed using the AERMOD model to estimate the highest ground-level concentrations near the project site. The methods used in the dispersion modeling were consistent with the approach described in Section 7.1, Air Quality, and the modeling protocol submitted for the project to CEC and BAAQMD (URS, 2008).

Third, a dose-response assessment was performed in HARP incorporating the maximum 1-hour and annual ground level concentrations predicted by AERMOD to characterize the relationship between pollutant exposure and the potential incidence of an adverse health effect in the exposed populations. The dose-response relationship is expressed in terms of potency factors for cancer risk and reference exposure levels (RELs) for acute and chronic noncancer risks. The OEHHA guidelines provide potency factors and RELs for an extensive list of TACs, including those listed in Table 7.6-1. All exposure pathways were included in this analysis, except the beef/dairy pasture pathways, because no cattle exist within 10 km of the project site. For the drinking water pathway, the Contra Loma and Antioch Municipal Water Reservoirs were included in the HRA. Fish consumption was assumed to come from the San Joaquin River. For the calculation of cancer risk, the duration of exposure to project emissions was assumed to be 24 hours per day, 365 days per year, for 70 years, at all receptors. The cancer risk was calculated in HARP using the Derived (Adjusted) Method, and the chronic THI was calculated in HARP using the Derived (OEHHA) Method.

Fourth, risk characterization was performed to integrate the health effects and public exposure information and provide qualitative estimates of health risks resulting from project emissions. Risk modeling was performed using HARP to estimate cancer and noncancer health risks due to project operational emissions. The HARP model uses OEHHA equations and algorithms to calculate health risks based on input parameters such as emissions, “unit” ground-level concentrations, and toxicological data.

Detailed descriptions of the model input parameters and results of the HRA are given in Section 7.6.2.4.

7.6.2.2 Demolition/Construction Phase Emissions

Due to the relatively short duration of the project demolition and construction (i.e., 33 months), significant long-term public health effects are not expected to occur as a result of project construction emissions. Of air pollutants emitted during the construction period, diesel particulate matter (DPM) has the largest potential for human health risk. DPM has been classified by CARB and OEHHA as a TAC and a carcinogen. However, the exposure assessment conducted for carcinogens is typically 70 years. Due to the short duration of the construction effort, significant carcinogenic health risks are not predicted for the construction period.

During the demolition of the existing structures, some asbestos may be encountered. Emissions of asbestos when structures are demolished will be less than significant due to the prior removal of all regulated asbestos-containing material in compliance with BAAQMD Regulation 11, Rule 2, Asbestos Demolition, Renovation, and Removal.

To ensure worker safety during demolition and construction, safe work practices will be followed (see Section 7.7, Worker Safety and Health). Section 7.1, Air Quality, presents a detailed analysis of the potential environmental impacts due to criteria pollutant emissions during construction and a discussion of measures that will be implemented to control or reduce these emissions.

7.6.2.3 Operational Phase Emissions

Facility operations were evaluated to determine whether particular substances would be used or generated at the project site that could cause adverse health effects upon their release to the air. The only sources of TAC emissions associated with facility operations would be the four natural-gas–fired combustion turbine generators (CTGs). The substances that would be emitted from facility operations with potential toxicological impacts are shown in Table 7.6-1. These air toxic species were identified in the list of emission factors published in *California Air Toxics Emission Factor* (CATEF) (CARB, 1996) and U.S. EPA AP-42 (U.S. EPA, 1995). In addition, potential emissions from ammonia slip from the turbine/ heat recovery steam generator HRSG selective catalytic reduction (SCR) systems were included.

Worst-case estimates of annual turbine emissions of TACs were made by assuming that:

- Each FP10 turbine would operate with a maximum higher heating value (HHV) fuel energy input rate of 2,271 MMBtu/hr (100 percent load, 20°F) for 4,383 hours per year.
- Each Simple Cycle turbine would operate with a maximum HHV fuel energy input rate of 2,202 million British thermal units per hour (MMBtu/hr) (100 percent load at 20 degrees Fahrenheit [°F]), for 877 hours per year.

Model simulations to estimate both hourly and annual average impacts used the following stack parameters:

- For the FP10 units, exhaust temperature and stack exhaust velocity values corresponding to 100 percent load operations at an ambient temperature of 94°F with power augmentation and evaporative cooling.
- For the Simple Cycle units, exhaust temperature and stack exhaust velocity values corresponding to 60 percent load at an ambient temperature of 60°F, with no evaporative cooling.

These emission parameter combinations were determined from the turbine screening modeling described in Section 7.1, Air Quality, to produce the highest ground-level impacts outside the project site. This parameter combination ensures that impacts from the HRA will not be underestimated for any operating condition.

Emission factors for natural-gas–fired turbines were obtained from the CATEF database for natural-gas–fired combustion turbines and for all substances that have a controlled emissions factor from the carbon monoxide (CO) catalyst from Table 3.4-1 in the background document for AP-42, Section 3.1, for natural-gas–fired combustion turbines. The emission factors and estimated maximum hourly and annual emissions from each FP10 combined-cycle CTG/HRSG are summarized in Table 7.6-2. Maximum hourly and annual emissions from each 5000F Simple Cycle CTG are presented in Table 7.6-3. Under the Clean Air Act, Section 112, a major source of hazardous air pollutants (HAPs) is a source that emits 10 tons per year or more of any HAP or 25 tons per year or more of any combination of HAPs. The Project is not a major source of HAPs, a summary of the annual HAP emissions can be found in Appendix O.

7.6.2.4 Model Input Parameters

The HRA was conducted using worst-case turbine emissions (short-term and long-term). Cancer and chronic noncancer health effects were evaluated using the HARP model with estimated annual average emission rates for the Simple Cycle and FP10 combined-cycle turbines. Acute noncancer health effects were analyzed based on the maximum hourly emissions from all four turbines.

Dispersion modeling was performed using the AERMOD model and methods consistent with the approach described in Section 7.1, Air Quality (e.g., building downwash and meteorological input data), and the modeling protocol submitted for review to CEC and BAAQMD (URS, 2008). The AERMOD model is run with unit emission rates, 1 gram per second emissions, for each source to calculate the concentration of TACs per unit emission rate from each source. HARP then uses this information along with the estimated source emission rates for specific TAC compounds (as described above) to calculate ground-level concentrations for each chemical species. Meteorological data for the years 2000, 2001, 2002, 2004, and 2005 (the same years used in the air quality modeling analysis described in Section 7.1) were used in the HRA. Risk values were modeled for all sensitive receptors within 3 miles of the project site and at all grid and census receptors within 6 miles of the site. The same grid and refined receptors used in the air quality modeling were used in the HRA (see Section 7.1 for more details). The grid receptors extend 10 km in all directions from the project boundary, including receptors spaced every 25 meters (m) along the facility property line. Additional receptors were added on the hill approximately 6 km to the southwest of the project to ensure accurate pollutant concentrations were estimated by AERMOD in this area of complex terrain. To be certain that the maximum potential risks resulting from project emissions would be addressed, all receptors were treated as sensitive receptors.

Toxicological data, cancer potency factors, and RELs for specific chemicals are built into the CARB's HARP model. The pollutant-specific cancer potency factors and RELs used in the HRA are listed in Table 7.6-1. The HARP model uses the toxicological data in conjunction with the other input data described above to perform health risk estimates based on OEHHA equations and algorithms.

7.6.2.5 Calculation of Health Effects

Adverse health effects are expressed in terms of cancer or noncancer health risks. Cancer risk is typically reported as "lifetime cancer risk," which is the estimated maximum increase in the risk of developing cancer caused by long-term exposure to a pollutant suspected of being a carcinogen. The calculation of cancer risk conservatively assumes an individual is exposed continuously to the maximum pollutant concentrations 24 hours per day for 70 years. Although such continuous lifetime exposure to maximum TAC levels is unlikely, the goal of the approach is to produce a conservative worst-case estimate of potential cancer risk.

Noncancer risk is typically reported as a THI. The THI is calculated for each target organ as a fraction of the maximum acceptable exposure level or REL for an individual pollutant. The REL is generally the level at (or below) which no adverse health effects are expected. The THIs are calculated for both short-term (acute) and long-term (chronic) exposures to noncarcinogenic substances by adding the ratios of predicted concentrations to RELs for all pollutants.

Both cancer and noncancer risk estimates produced by the HRA represent incremental risks (i.e., risks due to the modeled sources only) and do not include potential health risks posed by existing background concentrations. The HARP model performs all of the necessary calculations to estimate the potential lifetime cancer risk and the acute and chronic noncancer THIs due to the project's TAC emissions.

7.6.2.6 Health Effects Significance Criteria

Various state and local agencies provide different significance criteria for cancer and noncancer health effects. For the project, the BAAQMD guidelines provide the significance criteria for potential cancer and noncancer health effects due to project-related emissions. BAAQMD Regulation 2, Rule 5 states that if a HRA for a project predicts a cancer risk of greater than 1.0 in one million (1.0×10^{-6}), and/or a chronic hazard index greater than 0.20, then Toxic Best Available Control Technology (TBACT) must be applied. For carcinogenic health effects, an exposure is considered significant when the predicted increase in lifetime cancer risk exceeds 10 in 1 million (1.0×10^{-5}). For noncarcinogenic acute and chronic health effects, an exposure that affects each target organ is considered significant when the corresponding THI exceeds a value of 1.0.

7.6.2.7 Estimated Lifetime Cancer Risk

The maximum incremental cancer risk resulting from project emissions was estimated to be 0.072 in 1 million, at a location approximately 100 m north of the MLGS property boundary (receptor located at 608,297 m east, 4,208,656 m north[1]). The peak cancer risk predicted at a sensitive receptor was 0.032 in 1 million, at the Black Diamond Middle School, approximately 5 km south of the project (608,300 m east, 4,203,259 m north). Table 7.6-4 presents the detailed cancer risk results of the HRA for the project operations.

The estimated cancer risks at all locations are well below the significance criterion of 10 in 1 million and the TBACT threshold of 1 in 1 million. Thus, the project emissions are expected to pose a less-than-significant increase in terms of carcinogenic health risk. All HARP and AERMOD model files are provided electronically on a DVD that is supplied separately with this AFC.

7.6.2.8 Estimated Chronic and Acute Total Hazard Indices

The maximum chronic THI resulting from project's operational emissions was estimated to be 0.003 at a location approximately 100 m north of the MLGS property boundary (608,297 m east, 4,208,656 m north). The maximum predicted chronic THI at a sensitive receptor due to TAC emissions of the project was 0.001, at the Black Diamond Middle School, approximately 5 km south of the project (608,300 m east, 4,203,259 m north).

The maximum acute THI resulting from project emissions was estimated to be 0.072 at a location approximately 9.5 km southwest of the project (600,654 m east, 4,202,196 m north). The maximum acute THI at a sensitive receptor was estimated to be 0.034, at the Black Diamond Middle School, approximately 5 km south of the project (608,300 m east, 4,203,259 m north). Table 7.6-4 presents the detailed noncancer results of the HRA for the project operations.

The estimated chronic and acute THIs are well below the significance criterion of 1.0 and the TBACT chronic threshold of 0.2. Thus, the project emissions of noncarcinogenic TACs would not be expected to pose a significant risk.

7.6.2.9 Uncertainty in the Public Health Impact Assessment

Sources of uncertainty in the results of HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals to humans. For this reason, assumptions used in HRAs are typically designed to provide sufficient health protection to avoid underestimation of risk to the public. Some sources of uncertainty applicable to this HRA and the procedures and assumptions used to ensure health-protective results are discussed below.

The turbine emission rates were derived using vendor data regarding ammonia slip rates and emission factors from CATEF and AP-42 for the other air toxics. Both the short- and long-term turbine emissions estimates were developed assuming that all turbines would operate continuously at the same time and at the maximum fuel energy input rate. Under actual operating conditions, the turbines would typically operate fewer hours per year and at lower loads. Consequently, the emissions used for this HRA are likely to be higher than what would be experienced under normal plant operation.

Dispersion models approved for regulatory applications contain assumptions that lead to overprediction of ground-level concentrations. For example, the modeling performed in the HRA assumed a conservation of mass (i.e., all of the pollutants emitted from the sources remained in the atmosphere while

[1] Coordinates are provided in accordance with the Universal Transverse Mercator and North American Datum, 1983, Zone 10.

being transported downwind). During the transport of pollutants from sources toward receptors, none of the emitted material was assumed to be removed from the source plumes by means of chemical reactions or losses at the ground surface due to reactions, gravitational settling, or turbulent impaction. In reality, these mechanisms work to reduce the level of pollutants remaining in the atmosphere during plume travel.

The exposure characteristics assessed in the HRA included the assumption that residents would be exposed to turbine emissions continuously at the same location for 24 hours per day, 365 days per year, for 70 years. It is extremely unlikely that any resident would actually experience such exposure to the maximum predicted concentrations of TACs over this period. The conservative exposure assumption leads to overpredicted risk estimates in the HRA modeling.

The toxicity data used in the HRA contain uncertainties due to the extrapolation of health effects data from animals to humans. Typically, safety factors are applied when doing the extrapolation. Furthermore, the human population is much more diverse, both genetically and culturally, than bred experimental animals. The intraspecies variability is expected to be much greater among humans than in laboratory animals. With all of the uncertainty in the assumptions used to extrapolate toxicity data, significant measures are taken to ensure that sufficient health protection is built into the available health effects data.

Conservative measures to compensate for all of these uncertainties and ensure that potential health risks are not underestimated are compounded in the final HRA predictions. Therefore, the actual risk numbers are expected to be well below the values presented in this analysis.

7.6.2.10 Criteria Pollutants

The dispersion of the project's emissions of criteria pollutants (nitrogen dioxide, CO, sulfur dioxide, and particulate matter with an aerodynamic diameter of 10 and 2.5 microns or less [PM_{10} and $PM_{2.5}$]) was modeled, and an evaluation of their impacts on air quality is presented in Section 7.1, Air Quality. The federal and state AAQS set limits on the allowable levels of air pollutants in the ambient air necessary to protect public health. The results of the air quality analysis show that the project would not cause a violation of any state or federal AAQS and would not significantly contribute to existing violations of federal such standards. Therefore, no significant adverse health effects are anticipated to result from the project's criteria pollutant emissions.

7.6.3 Cumulative Impacts

A cumulative HRA was performed to evaluate the combined impacts of the project emissions with those of the existing CCPP Units 6 and 7 (combined 690-megawatt [MW]), and Gateway Generating Station (GGS) Units 1 and 2 (combined 530-MW) and the GGS natural gas preheater. The only units at CCPP that will remain in service after the proposed MLGS begins operation will be Units 6 and 7, two natural-gas–fired utility boilers. Unit 7 is equipped with SCR to reduce emissions of NO_X and Unit 6 is equipped with a low NO_x burner. GGS Units 1 and 2 will be combined-cycle gas turbines burning natural gas with HRSG and duct firing. The other emission source at GGS is a small natural gas preheater that is also fueled by natural gas. The cumulative HRA modeling was performed according to the methodology described in previous sections to predict the cancer and noncancer health risks due to the project, plus the existing CCPP boilers, GGS gas turbines, and preheater.

Emissions from the CCPP Units 6 and 7 are released from a shared stack and thus are examined together for this analysis. Air toxic emission rates for the CCPP Units were estimated from the fuel energy input data provided in the continuous emissions monitoring system (CEMS) data for these units from 2005 through 2007. The combined maximum hourly and annual fuel heat inputs were used to determine the TAC emission rates in conjunction with the CATEF emission factors for natural gas boilers with no controls. Ammonia slip emissions from Unit 7 were estimated to be at the permit limit of 10 parts per million at 3 percent oxygen. Unit 6 does not have an SCR and thus emits no ammonia. The exit temperature and exhaust flow rate for the combined boiler stack used in the model represented full load operating mode.

The assumed combined emission rates from CCPP Units 6 and 7 are presented in Table 7.6-5. Data used in calculating the CCPP Units 6 and 7 emission rates are provided in Appendix O.

Emissions from each GGS turbine were estimated using the CATEF and AP-42 natural gas turbine emission factors in conjunction with the maximum hourly fuel heat input (394.5 MMBtu/hr) and assumed to operate at full load for 4,000 hours per year, based on the 2006 PG&E License Petition Amendment to CEC requesting modifications to the predecessor Contra Costa Unit 8 project (PG&E, 2006). Ammonia slip emissions, stack exit temperature, and exhaust flow rate were obtained from the 2000 AFC submittal for Contra Costa Unit 8.

The emission rates from each GGS turbine are presented in Table 7.6-6. Data used in calculating the GGS Units 1 and 2 emission rates are provided in Appendix O.

Emissions from the GGS preheater were estimated using the CATEF natural gas boiler emission factors in conjunction with the maximum hourly fuel heat input (11.92 MMBtu/hr) and assumed operation at maximum capacity for 123 hours per year. Stack exit temperature and exhaust flow rate for this unit were obtained from the 2000 AFC submittal for Contra Costa Unit 8, which was the predecessor project to GGS.

The emission rates from the GGS preheater are presented in Table 7.6-7. Data used in calculating the GGS preheater emission rates are provided in Appendix O.

The predicted cumulative health risks associated with the TAC emissions from the MLGS, CCPP, and GGS projects based on HARP model results are summarized in Table 7.6-8. As shown in this table, the maximum cancer risk was predicted to be 0.114 in 1 million at a receptor located approximately 1,100 m east of the property boundary (receptor located at 609,804 m east, 4,208,796 m north). The estimated cancer risk at all locations is below the significance criteria of 10 in 1 million. Therefore, the project's emissions along with the CCPP and GGS emissions would not pose a significant cancer risk to any populations potentially exposed to these emissions.

The maximum chronic noncancer THI from cumulative sources was predicted to be 0.006, located approximately 1,100 meters east of the property boundary (receptor located at 609,804 m east, 4,208,796 m north). The maximum acute noncancer THI from cumulative sources was predicted to be 0.086 at a location approximately 30 m north of the property boundary (608,452 m east, 4,208,595 m north).

The estimated chronic and acute THIs are both below the THI significance criterion of 1.0. Therefore, the health risk of the project's combined with CCPP and GGS facilities would not pose a significant noncancer health risk to any populations that would potentially be exposed to these emissions. By definition, the project would not therefore contribute to a cumulatively significant impact, and cumulative impacts of the project would be less than significant.

7.6.4 Mitigation Measures

The criteria pollutant emissions from the project will be mitigated by the use of Best Available Control Technology (BACT) and through emissions offsets. These measures are described in Section 7.1, Air Quality. The toxic pollutant emissions from the project will also be mitigated by the exclusive use of natural gas fuel. In addition, pollution control technologies employed to control criteria pollutants (specifically, the oxidation catalyst on the turbines) will further reduce turbine emissions of organic TACs listed in Table 7.6-1. These measures satisfy the BAAQMD requirements for toxics (TBACT) for natural-gas–fired generation units.

The HRA presented in the foregoing subsections shows that the health effects impacts of the project as proposed would be well below the significance thresholds identified in Section 7.6.2.6. Therefore, no further mitigation of emissions from the project is required to protect public health.

7.6.5 Laws, Ordinances, Regulations, and Standards

The project will be constructed and operated in accordance with all laws, ordinances, regulations, and standards (LORS) applicable to protecting public health. This section briefly discusses the identified LORS. Table 7.6-9 provides a summary of the requirements of the applicable LORS, the agencies that are principally responsible for public health, and the locations in this document where each of these issues is addressed.

7.6.5.1 Federal

The federal Clean Air Act of 1970, 42 USC 7401 et seq., as amended in 1977 and 1990, requires that the public be protected from unhealthful exposure to air pollutants. Based on the results of the risk assessment, health risks due to project emissions of air toxics would not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the facility. Increases in emissions of criteria pollutants will be fully offset.

7.6.5.2 State

California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part (1), requires that protection of environmental quality be ensured and that a quantitative HRA be performed. The HRA discussed in this section of the AFC satisfies this requirement.

The California Clean Air Act, TAC Program, HSC § 39650, et seq. requires quantification of TAC emissions, use of BACT, and preparation of an HRA. The project would not cause unsafe exposure to TACs based on results of the HRA discussed in this section of the AFC, and a BACT assessment for the project has been performed (see Section 7.1, Air Quality).

HSC, Part 6, § 44300 et seq. (Air Toxics “Hot Spots”) requires inventorying of TACs and HRA, as well as public notification of predicted health risks. The HRA discussed in this section of the AFC satisfies this requirement.

HSC § 41700 prohibits emissions in quantities that adversely affect public health, other businesses, or property. Section 7.1, Air Quality, and the HRA discussed in this section of the AFC satisfy this requirement.

7.6.5.3 Local

BAAQMD Regulation 2, Rule 2, Section 317 requires use of TBACT for major HAP sources to achieve Maximum Available Control Technology. The project will not be a major source of HAPs. Therefore, this regulation does not apply.

BAAQMD Regulation 2, Rule 5 requires an HRA to estimate the maximum potential public exposure and health risk for purpose of approving the permit to operate and issuing public notice if necessary. The HRA discussed in this section of the AFC satisfies this requirement.

7.6.6 Involved Agencies and Agency Contacts

Agencies likely to be involved in the project are shown in Table 7.6-10.

7.6.7 Permits Required and Permit Schedule

The Authority to Construct permitting process that would otherwise apply is superseded in the case of CEC power plant licensing projects by the Determination of Compliance process, which is its functional equivalent. The CEC's final decision on this AFC application will serve as the principal approval required to ensure that the project's impacts to public health would be within acceptable levels. However, a Permit to Operate would be awarded following BAAQMD confirmation that the project has been constructed to operate as described in the permit applications.

7.6.8 References

BAAQMD (Bay Area Air Quality Management District), 2005a. Regulation 2 Permits— Rule 5 New Source Review of Toxic Air Contaminants. June 2005.

BAAQMD (Bay Area Air Quality Management District), 2005b. BAAQMD Air Toxics NSR Program Health Risk Screening Analysis (HRSA) Guidelines. June 2005.

BAAQMD (Bay Area Air Quality Management District), 2006. Community Air Risk Evaluation Program. *Phase I Findings and Policy Recommendations Related to Toxic Air Contaminants in the San Francisco Bay Area.* September 2006.

Cal-EPA/OEHHA (California Environmental Protection Agency and Office of Environmental Health Hazard Assessment), 1999. Air Toxics Hot Spots Program Risk Assessment Guidelines, Part I. Technical Support Document for the Determination of Acute Reference Exposure Levels for Airborne Toxicants.

Cal-EPA/OEHHA (California Environmental Protection Agency and Office of Environmental Health Hazard Assessment), 2000. Air Toxics Hot Spots Program Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels.

Cal-EPA/OEHHA (California Environmental Protection Agency and Office of Environmental Health Hazard Assessment), 2002. Air Toxics Hot Spots Program Risk Assessment Guidelines, The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, Public Review Draft.

Cal-EPA/OEHHA (California Environmental Protection Agency and Office of Environmental Health Hazard Assessment), 2005. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors.

California Air Resources Board (CARB). 1996. California Air Toxics Emission Factor (CATEF) Database, Version 1.2.

CARB (California Air Resources Board), 2003. HARP User Guide – Software for Emission Inventory Database Management, Air Dispersion Modeling Analyses, and Health Risk Assessment version 1.3, Air Resources, Board, California Environmental Protection Agency. December 2003.

Cocker, D., 2002. Mira Loma Air Quality Study; The Center for Environmental Research & Technology at UC Riverside (CE-CERT).

Contra Costa Health Services, 2007. Community Health Indicators for Contra Costa County 2007. http://www.cchealth.org/health_data/hospital_council_2007/

The Greater Bay Area Cancer Registry of the Northern California Cancer Center, 2007. Breast cancer concern in Contra Costa County: Report on cancer incidence from the Greater Bay Area Cancer Registry. November 2007.

The Greater Bay Area Cancer Registry of the Northern California Cancer Center, 2008. Breast cancer concern at Turner Elementary School, Antioch, CA: Report on cancer incidence from the Greater Bay Area Cancer Registry. February 2008.

Pacific Gas and Electric (PG&E), 2006. Pacific Gas and Electric's Gateway Generating Station License Petition Amendment. Submitted to California Energy Commission, December 2006.

U.S. EPA (U.S. Environmental Protection Agency), 1995. AP-42 Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition.

URS Corporation, 2008. Air Quality Modeling Protocol for the Contra Costa New Generation Project, Contra Costa County. Prepared by URS for Bay Area Air Quality Management District, California Energy Commission, U.S. Environmental Protection Agency Region IX and National Park Service.

Table 7.6-1
Toxicity Values Used To Characterize Health Risks

Compound	Sources of Emissions	Inhalation Cancer Potency Factor $(mg/kg\text{-}day)^{-1}$	Chronic REL ($\mu g/m^3$)	Acute REL ($\mu g/m^3$)
Ammonia	Turbines	—	2.0E+02	3.2E+03
1,3-Butadiene	Turbines	6.0E-01	2.0E+01	—
Acetaldehyde	Turbines	1.0E-02	9.0E+00	—
Acrolein	Turbines	—	6.0E-02	1.9E-01
Benzene	Turbines	1.0E-01	6.0E+01	1.3E+03
Ethylbenzene[1]	Turbines	8.7E-03	2.0E+03	—
Formaldehyde	Turbines	2.1E-02	3.0E+00	9.4E+01
Hexane	Turbines	—	7.0E+03	—
Propylene	Turbines	—	3.0E+03	—
Propylene oxide	Turbines	1.3E-02	3.0E+01	3.1E+03
Toluene	Turbines	—	3.0E+02	3.7E+04
Xylenes	Turbines	—	7.0E+02	2.2E+04
Polycyclic Aromatic Hydrocarbons (PAHs)				
Naphthalene	Turbines	1.2E-01	9.0E+00	—
Benzo(a)anthracene	Turbines	3.9E-01	—	—
Benzo(a)pyrene	Turbines	3.9E+00	—	—
Benzo(b)fluoranthene	Turbines	3.9E-01	—	—
Benzo(k)fluoranthene	Turbines	3.9E-01	—	—
Chrysene	Turbines	3.9E-02	—	—
Dibenz(a,h)anthracene	Turbines	4.1E-00	—	—
Indeno(1,2,3-cd)pyrene	Turbines	3.9E-01	—	—

Source: Cal-EPA/OEHHA, 2005 and 2007

Notes:
[1] In November 2007, OEHHA adopted the new ethylbenzene cancer potency factor presented above, but the HARP risk assessment module has not yet been updated to incorporate the new cancer risk factor for this pollutant.
— = not applicable
mg/kg-day = milligrams per kilogram per day
$\mu g/m^3$ = micrograms per cubic meter
REL = reference exposure levels

Table 7.6-2
Emission Rates from the Operation of Each FP10 Combined-Cycle CTG/HRSG

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/yr)
Ammonia		16.1	7.06E+04
1,3-Butadiene	1.24E-07	2.82E-04	1.23E+00
Acetaldehyde	1.34E-04	3.04E-01	1.33E+03
Acrolein	3.62E-06	8.22E-03	3.60E+01
Benzene	3.26E-06	7.40E-03	3.24E+01
Ethylbenzene	1.75E-05	3.97E-02	1.74E+02
Formaldehyde	3.60E-04	8.18E-01	3.58E+03
Hexane	2.53E-04	5.74E-01	2.52E+03
Propylene	7.53E-04	1.71E+00	7.49E+03
Propylene Oxide	4.67E-05	1.06E-01	4.65E+02
Toluene	6.93E-05	1.57E-01	6.90E+02
Xylenes	2.55E-05	5.79E-02	2.54E+02
Polycyclic Aromatic Hydrocarbons (PAH)			
Benzo(a)anthracene	2.21E-08	5.01E-05	2.20E-01
Benzo(a)pyrene	1.36E-08	3.98E-05	1.32E-01
Benzo(b)fluoranthene	1.10E-08	2.51E-05	1.10E-01
Benzo(k)fluoranthene	1.07E-08	2.44E-05	1.07E-01
Chrysene	2.46E-08	5.59E-05	2.45E-01
Dibenz(a,h)anthracene	2.29E-08	5.21E-05	2.28E-01
Indeno(1,2,3-cd)pyrene	2.29E-08	5.21E-05	2.28E-01
Naphthalene	1.62E-06	3.68E-03	1.61E+01
Total PAHs		**3.98E-03**	**1.74E+01**

Notes:
1 Hourly and annual emissions based on maximum CTG/HRSG operations.
2 Annual emissions based on 4,383 hours of operations.
3 Emission factors obtained from the CATEF database for natural-gas–fired combustion turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the Background document for AP-42, Section 3.1, Table 3.4-1 for a natural-gas–fired combustion turbine with a carbon monoxide catalyst.
4 Ammonia emission rate based on an exhaust ammonia limit of 5 parts per million by volume at 15 percent oxygen provided by the turbine vendor.
5 Used a HHV of 1,024 British thermal units per standard cubic foot to convert emission factor units.

Table 7.6-3 Emission Rates from the Operation of Each 5000F Simple Cycle CTG			
Pollutant	**Emission Factor (lb/MMBtu)**	**Hourly Emission Rate (lb/hr)**	**Annual Emission Rate (lb/yr)**
Ammonia		32.91	2.89E+04
1,3-Butadiene	1.24E-07	2.73E-04	2.40E-01
Acetaldehyde	1.34E-04	2.95E-01	2.58E+02
Acrolein	3.62E-06	7.97E-03	6.99E+00
Benzene	3.26E-06	7.18E-03	6.30E+00
Ethylbenzene	1.75E-05	3.85E-02	3.38E+01
Formaldehyde	3.60E-04	7.93E-01	6.95E+02
Hexane	2.53E-04	5.57E-01	4.88E+02
Propylene	7.53E-04	1.66E+00	1.45E+03
Propylene Oxide	4.67E-05	1.03E-01	9.02E+01
Toluene	6.93E-05	1.53E-01	1.34E+02
Xylenes	2.55E-05	5.61E-02	4.92E+01
Polycyclic Aromatic Hydrocarbons (PAH)			
Benzo(a)anthracene	2.21E-08	4.86E-05	4.26E-02
Benzo(a)pyrene	1.36E-08	3.98E-05	1.32E-01
Benzo(b)fluoranthene	1.10E-08	2.43E-05	2.13E-02
Benzo(k)fluoranthene	1.07E-08	2.37E-05	2.07E-02
Chrysene	2.46E-08	5.42E-05	4.75E-02
Dibenz(a,h)anthracene	2.29E-08	5.05E-05	4.43E-02
Indeno(1,2,3-cd)pyrene	2.29E-08	5.05E-05	4.43E-02
Naphthalene	1.62E-06	3.57E-03	3.13E+00
Total PAHs		**3.86E-03**	**3.48E+00**

Notes:
[1] Hourly and annual emissions based on maximum CTG operations
[2] Annual emissions based on 877 hours of operations.
[3] Emission factors obtained from the CATEF database for natural-gas–fired combustion turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the Background document for AP-42, Section 3.1, Table 3.4-1 for a natural-gas–fired combustion turbine with a carbon monoxide catalyst.
[4] Ammonia emission rate based on an exhaust ammonia limit of 10 parts per million by volume at 15 percent oxygen provided by the turbine vendor.
[5] Used a HHV of 1,024 British thermal units per standard cubic foot to convert emission factor units.

Table 7.6-4
Estimated Cancer Risk and Acute and Chronic Noncancer Total Hazard Indices Due to MLGS Emissions of TACs

Location	Cancer Risk	Chronic Hazard Index	Acute Hazard Index
Point of maximum impact	0.072 excess risk in 1 million	0.003 total hazard index	0.072 total hazard index
Peak risk at a sensitive receptor	0.032 excess risk in 1 million	0.001 total hazard index	0.063 total hazard index

Table 7.6-5
Emission Rates from CCPP Units 6 and 7 Natural-Gas–Fired Boilers

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/yr)
Ammonia		15.5	4.33E+04
Acetaldehyde	8.66E-06	5.75E-02	3.14E+01
Benzene	4.21E-06	2.79E-02	1.52E+01
Formaldehyde	2.16E-04	1.43E+00	7.81E+02

Notes:
1. Hourly and annual emissions based on maximum fuel input obtained from CEMS data for 2005 through 2007.
2. Emission factors obtained from the CATEF database for natural gas boilers with no controls.
3. Ammonia emission rate based on an exhaust ammonia limit of 10 parts per million by volume, obtained from the Authority to Construct application for addition of Units 7 SCR in 2000. Annual ammonia emissions based on maximum hourly emissions for the maximum annual hours of operation for Unit 7 for 2005 through 2007 from CEMS data.
4. Used a natural gas fuel heating value of 1,024 British thermal units per standard cubic foot (HHV) to convert emission factor units.

Table 7.6-6 Emission Rates from the Operation of Each Gateway Generating Station Combined-Cycle CTG			
Pollutant	**Emission Factor (lb/MMBtu)**	**Hourly Emission Rate (lb/hr)**	**Annual Emission Rate (lb/yr)**
Ammonia		29.58	1.18E+05
1,3-Butadiene	1.24E-07	4.89E-05	1.96E-01
Acetaldehyde	1.34E-04	5.28E-02	2.11E+02
Acrolein	3.62E-06	1.43E-03	5.71E+00
Benzene	3.26E-06	1.29E-03	5.14E+00
Ethylbenzene	1.75E-05	6.90E-03	2.76E+01
Formaldehyde	3.60E-04	1.42E-01	5.68E+02
Hexane	2.53E-04	9.98E-02	3.99E+02
Propylene	7.53E-04	2.97E-01	1.19E+03
Propylene Oxide	4.67E-05	1.84E-02	7.37E+01
Toluene	6.93E-05	2.74E-02	1.09E+02
Xylenes	2.55E-05	1.01E-02	4.02E+01
Polycyclic Aromatic Hydrocarbons (PAH)			
Benzo(a)anthracene	2.21E-08	8.71E-06	3.48E-02
Benzo(a)pyrene	1.36E-08	3.98E-05	1.32E-01
Benzo(b)fluoranthene	1.10E-08	4.35E-06	1.74E-02
Benzo(k)fluoranthene	1.07E-08	4.24E-06	1.70E-02
Chrysene	2.46E-08	9.71E-06	3.88E-02
Dibenz(a,h)anthracene	2.29E-08	9.05E-06	3.62E-02
Indeno(1,2,3-cd)pyrene	2.29E-08	9.05E-06	3.62E-02
Naphthalene	1.62E-06	6.40E-04	2.56E+00
Total PAHs		7.24E-04	2.87E+00

Notes:
1. Hourly and annual emissions based on maximum CTG fuel flow and annual operational hours obtained from the 2000 AFC submittal.
2. Annual emissions based on 4,000 hours of operations.
3. Emission factors obtained from the CATEF database for natural-gas–fired combustion turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the Background document for AP-42, Section 3.1, Table 3.4-1 for a natural-gas–fired combustion turbine with a carbon monoxide catalyst.
4. Ammonia emission rate based on an exhaust ammonia limit of 10 parts per million by volume, obtained from the 2000 AFC submittal.
5. Used a HHV of 1,024 British thermal units per standard cubic foot to convert emission factor units.

Table 7.6-7
Emission Rates from the Gateway Generating Station Natural-Gas–Fired Preheater

Pollutant	Emission Factor (lb/MMBtu)	Hourly Emission Rate (lb/hr)	Annual Emission Rate (lb/yr)
Acetaldehyde	8.66E-06	1.03E-04	1.27E-02
Benzene	4.21E-06	5.02E-05	6.16E-03
Formaldehyde	2.16E-04	2.57E-03	3.16E-01

Notes:
[1] Hourly and annual emissions based on maximum fuel input. Annual emissions based on 123 hours per year of operations. Both obtained from the 2000 AFC submittal.
[2] Emission factors obtained from the CATEF database for natural gas boilers with no controls.
[3] Used a HHV of 1,024 British thermal units per standard cubic foot to convert emission factor units.

Table 7.6-8
Health Risk Assessment Estimated Cancer Risk and Acute and Chronic Noncancer Total Hazard Indices Due to MLGS, CCPP and Gateway Generating Station

Cancer Risk	Chronic Hazard Index	Acute Hazard Index
0.114 excess risk in 1 million	0.006 total hazard index	0.086 total hazard index

Notes:
The estimated risks are due to the project plus existing CCPP Units 6 and 7, GGS Units 1 and 2, and GGS preheater.

Table 7.6-9
Applicable Public Health Laws, Ordinances, Regulations, and Standards

Authority	Administering Agency	Requirement	AFC Section(s)
Federal			
Clean Air Act (CAA)	U.S. EPA CARB BAAQMD	Protect public from unhealthful exposure to air pollutants.	7.6, 7.1
State			
California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part (1)	CEC	Ensure protection of environmental quality; requires quantitative HRA.	7.6.
California Clean Air Act, TAC Program, HSC § 39650, et seq.	BAAQMD with CARB oversight	Requires quantification of TAC emissions, use of BACT, and preparation of an HRA.	7.6, 7.1
HSC, Part 6, § 44300 et seq. (Air Toxics “Hot Spots”)	BAAQMD with CARB/OEHHA oversight	Requires inventorying of TACs and HRA, as well as public notification of predicted health risks.	7.6.2.1
HSC § 41700	BAAQMD with CARB oversight	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	7.1
Local			
BAAQMD Regulation 2, Rule 2, Section 317	BAAQMD	Requires use of TBACT for major HAP sources to achieve MACT.	7.6.2.6
BAAQMD Regulation 2, Rule 5	BAAQMD	Requires an HRA to estimate the maximum potential public exposure and health risk for purpose of approving the permit to operate and issuing public notice if necessary.	7.6.2

Notes:

AFC = Application for Certification
BAAQMD = Bay Area Air Quality Management District
BACT = Best Available Control Technology
CARB = California Air Resources Board
CCR = California Code of Regulations
CEC = California Energy Commission
HSC = Health and Safety Code
HAP = hazardous air pollutant
HRA = Health Risk Assessment
LORS = Laws, Ordinances, Regulations, and Standards
MACT = Maximum Available Control Technology
OEHHA = Office of Environmental Health Hazard Assessment
TAC = toxic air contaminant
TBACT = Toxic Best Available Control Technology
U.S. EPA = United States Environmental Protection Agency

Table 7.6-10
Involved Agencies and Agency Contacts

Agency	Contact/Title	Telephone
California Energy Commission	Keith Golden Air Quality Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
	Mike Ringer Public Health Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
California Air Resources Board	Mike Tollstrup 1001 I Street Sacramento, CA 95814	(916) 322-6026
Bay Area Air Quality Management District	Brian Bateman Manager, Toxics Evaluation Section 939 Ellis Street San Francisco, CA 94109	(415) 771-6000

SOURCES: ESRI (base features); USGS (7.5' quads: Antioch North 1978, Jersey Island 1978, Brentwood 1978, Antioch South 1980).

1000 0 1000 2000
Scale in Feet
1"=2,000 Feet (1:24,000)

N

SENSITIVE RECEPTORS LOCATED WITHIN 3 MILES OF THE PROJECT SITE

Marsh Landing Generating Station
Mirant Marsh Landing, LLC
Contra Costa County, California

May 2008
28067344

URS

FIGURE 7.6-1

5/22/08 vsa ..\T:\Mirant Contra Costa-Marsh Landing\Graphics\7.06 Public Health\7.6-1_sensitive_receptors_22x34.ai