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FIGURES

4.8 PUBLIC HEALTH

This section presents the methodology and results of a human health risk assessment performed to assess potential impacts and public exposure associated with airborne emissions from the routine operation of the proposed Quail Brush Generation Project. Section 4.8.1 describes the affected environment, Section 4.8.2 discusses the environmental consequences from the operation of the power plant and associated facilities, Section 4.8.3 discusses cumulative impacts. Section 4.8.4 discusses mitigation measures, Section 4.8.5 presents applicable LORS, Section 4.8.6 presents permit requirements and schedules, and Section 4.8.7 presents agency contacts. Section 4.8.8 contains references cited or consulted in preparing this section. The following appendices contain supporting information referenced in the aforementioned subsections:

Appendix F.1	Emissions Calculations and Support Data
Appendix F.2	Dispersion Modeling and Air Quality Impact Analysis Support Data
Appendix F.3	Dispersion Modeling Protocol
Appendix F.4	Health Risk Assessment Support Data
Appendix F.5	Construction Emissions Analysis and Support Data
Appendix F.6	BACT Analysis for Criteria and GHG Pollutants
Appendix F.7	Mitigation of Impacts
Appendix F.8	Cumulative Impacts Protocol and Support Data
Appendix F.9	San Diego APCD Permit Application Forms
Appendix F.10	Miscellaneous Support Data

Air will be the dominant pathway for public exposure to chemical substances released by the power plant. Emissions to the air will consist primarily of combustion by-products produced by the natural gas-fired internal combustion engines (ICEs), and combustion products from the emergency generator engine. Potential health risks from combustion emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling; however, direct inhalation is considered the most likely exposure pathway. The risk assessment was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA) and the CARB.

Combustion byproducts with established CAAQS or NAAQS, including oxides of NO_x, carbon monoxide, and fine particulate matter are addressed in Section 4.7, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks potentially associated with accidental releases of stored acutely hazardous materials at the proposed plant (if any) is discussed in Section 4.9, Hazardous Materials Handling.

4.8.1 Affected Environment

The existing plant site is located west and northwest of the City of Santee, California (San Diego County). The site is located on the north side of SR 52, adjacent to and east of Sycamore Landfill Road. The Sycamore Landfill lies to the north of the site approximately 0.42 miles. The City of Santee lies in close proximity to the site to the northeast (1.3 miles), east (0.94 miles), and southeast (0.3 miles). The topography of the plant site and surrounding area is essentially low rolling hills, with elevations ranging from 250 to over 800 feet amsl. The plant site elevation ranges from approximately 415 to 530 feet amsl. The site and immediate surrounding area to the north, west, and south-southwest are primarily uninhabited vacant open space. The site occupies approximately 11 acres within a 21.6-acre parcel of presently vacant "open space" land. The MCAS Miramar boundary is to the north of the plant site approximately 1.55 miles, and the main runway complex at MCAS Miramar is 6 miles to the northwest. Gillespie Field (airport) lies approximately 3 miles to the southeast, and Montgomery Field (airport) lies 6.4 miles to the southwest.

Per the 2000 census tract map (Appendix F.4, Figure F.4-1), the plant site is situated in a non-numerated census tract. Based on the revised census tract map (Figure 4.8-1), a majority of the site is located in tract #0095.04, with a small portion of the southern extent of the site potentially lying within tract #0166.06. Figure 4.8-1 shows the site and surrounding census tracts within the same 6-mile radius. The Census Findings table (Appendix F.4) presents a summary of data for each identified census tract within the 6-mile radius.

According to the Auer land use classification scheme, a 3-kilometer radius boundary around the proposed plant site yields a predominately rural classification. This is consistent with the current City of San Diego land use and general plan designation for the site and surrounding area as "open space," i.e., a large portion of the land surrounding the proposed site (to the southwest, west, northwest, and northeast) is vacant. The site is zoned RS-1-8 (single family residential), although it is unlikely that residential units will be built in such close proximity to the Sycamore Landfill. The Sycamore Landfill, which lies to the north of the plant site, is zoned "industrial employment" (SANDAG 2007).

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools (public and private), day care facilities, convalescent homes, and hospitals are of particular concern. The 10 nearest sensitive receptors closest to the plant site are listed in Table 4.8-1. Appendix F.4 contains a list of all sensitive receptors within a radius of 6 miles from the site. Figure 4.8-2 shows all sensitive receptors within 6 miles of the plant site.

Table 4.8-1 Ten Nearest Sensitive Receptors Closest To The Project

Receptor Type	Distance from Site, ft.	Latitude, Longitude
Hospital	2,754	-117.02216, 32.84553
Daycare	3,581	-117.02179, 32.84254
Daycare	4,271	-117.01870, 32.84249
Daycare	4,501	-117.01973, 32.84070
Daycare	4,770	-117.01617, 32.84312
Daycare	4,775	-117.01954, 32.83984
School	4,856	-117.01494, 32.84459

Receptor Type	Distance from Site, ft.	Latitude, Longitude
School	5,046	-117.01297, 32.84981
Daycare	5,252	-117.01524, 32.84190
Daycare	5,311	-117.01603, 32.84073

Air quality and health risk data presented by CARB in the *2009 Almanac of Emissions and Air Quality* (CARB 2009b) for the San Diego air basin shows that over the period 1990 through 2007, the average concentrations for the top ten toxic air contaminants (TACs) have been substantially reduced, and the associated health risks for the air basin are showing a steady downward trend as well. CARB-estimated emissions inventory values for the top ten TACs for 2008 and ambient concentration and associated risk values for 1990-2007 are presented in Table 4.8-2 for the air basin. Toxics emissions data presented in the SDAPCD (SDAPCD 2007:2009) Air Toxics "Hot Spots" Report indicate the following:

- Overall, local emissions of toxic air contaminants from industrial sources have decreased by approximately 89 percent since 1989.
- Most recent estimated emissions data from industrial sources for the period 2005-2008 indicate that such sources emitted approximately 2,019,775 pounds per year of the various toxic substances identified in the AB2588 program guidelines.
- Most recent estimated emissions data from mobile, area, and natural sources for the period 2005-2008 indicate that such sources emitted approximately 62,843,978 pounds per year of the various toxic substances identified in the AB2588 program guidelines.

No health studies prepared by the local San Diego County Health Department were identified for use in the plant health risk assessment which directly pertained to the Project impact region.

In addition, a review of the 2007 through 2009 air toxics inventory summaries published by the SDAPCD, indicates that the closest AB2588 reporting source to the proposed plant, i.e., the Sycamore Landfill, is not listed in any of the these toxics emissions summaries.

Table 4.8-2 Top Ten Toxic Air Contaminants for the San Diego Air Basin

TAC	Year 2008 Emissions (tons/yr)	Maximum Concentration	Predicted Cancer Risk, per million
Acetaldehyde	524	0.88 ppb	4
Benzene	770	0.373 ppb	35
1,3 Butadiene	233	0.073 ppb	27
Carbon tetrachloride	0.09	nd	nd
Chromium 6	0.06	0.034 ng/m^3	5
Para-Dichlorobenzene	122	nd	nd
Formaldehyde	1282	2.24 ppb	16
Methylene Chloride	359	0.14 ppb	<1
Perchloroethylene	422	0.03 ppb	1
Diesel Particulate Matter (DPM)	1,607	1.4 $\mu g/m^3$	420

4.8.2 Environmental Consequences

4.8.2.1 Significance Criteria

Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health risk. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (i.e., a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10-in-one million due to a project is considered to be a significant impact on public health. For example, the 10-in-one-million risk level is used by the Air Toxics Hot Spots (AB 2588) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

Non-Cancer Risk

Non-cancer health effects can be either chronic or acute. In determining potential non-cancer health risks (chronic and acute) from air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard index, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for each pollutant affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this health risk assessment, all hazard quotients were summed regardless of target organ. This method leads to a conservative (upper bound) assessment. RELs used in the hazard quotient and index calculations were those published in the CARB/OEHHA listings dated February 2011 (CARB 2011: Appendix F.4).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard index's calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure of no more than 24 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the duration of exposure is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. Average concentrations, for specified averaging periods, are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

4.8.2.2 Construction Phase Impacts

The construction phase of the proposed Project is expected to take approximately 18 months. No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable LORS will be followed (see Section 4.7). In addition, mitigation measures to reduce air emissions from construction impacts will be implemented as described in Section 4.7 (and Appendix F.5).

Temporary emissions from construction-related activities are discussed in Section 4.7, and quantified in Appendix F.5. Ambient air modeling for particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), carbon monoxide, sulfur dioxide (SO_2) and NO_x was performed as described in Section 4.7. Construction-related emissions are temporary and localized, resulting in no long-term impacts to the public.

Small quantities of hazardous waste may be generated during the construction phase of the Project. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to Section 4.11 (Waste Management) for more information. No acutely hazardous materials will be used or stored onsite during construction (see Section 4.9, Hazardous Materials Handling). To ensure worker safety during construction, safe work practices will be followed (see Section 4.10, Worker Safety).

4.8.2.3 Operations Phase Impacts

Environmental consequences potentially associated with operations of the power plant are potential human exposure to chemical substances emitted into the air. The human health risks potentially associated with these chemical substances were evaluated in a health risk assessment. The chemical substances potentially emitted to the air from the proposed plant include ammonia (as ammonia slip from the SCR NOx control system), volatile organic compounds (VOCs) and PAHs from the combustion engines, and DPM from the emergency fire pump engine. These chemical substances are listed in Table 4.8-3.

Table 4.8-3 Chemical Substances Potentially Emitted to the Air from the Project

Criteria Pollutants	Noncriteria Pollutants (Continued)
Carbon monoxide	Benzene*
NO_x	Ethylbenzene*
Particulate matter	Formaldehyde*
SO_x	Hexane*
VOCs	Propylene
Noncriteria Pollutants (Toxic Pollutants)	**Biphenyl***
Diesel PM	Toluene*
Ammonia (urea use)	Xylenes*
Acetaldehyde*	Methanol*
Acrolein*	PAHs*
1,3-Butadiene*	Naphthalene*

Notes: *Federal VOC HAP

Emissions of criteria pollutants will adhere to NAAQS or CAAQS as discussed in Section 4.7, Air Quality. The proposed plant also will include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under SDAPCD rules. Offsets will not be required because the proposed plant is a non-major source under District NSR Rules 20.1 and 20.2. Finally, air dispersion modeling results (presented in Section 4.7) show that emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the Project is not anticipated to have a significant impact on public health from emissions of criteria pollutants.

Potential impacts associated with emissions of toxic pollutants to the air from the proposed power plant were addressed in a health risk assessment, presented in Appendix F.4. The risk assessment was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the HARP model (Version 1.4d). (CARB 2003, CARB 2009a, OEHHA/CARB 2003).

4.8.2.4 Public Health Impact Study Methods

Emissions of toxic pollutants potentially associated with the plant were estimated using emission factors derived from sources such as the SDAPCD, CARB, USEPA, and source test data on similar engines. Concentrations of these pollutants in air potentially associated with the emissions were estimated using the AERMOD dispersion modeling programs. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in the risk assessment process, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were subsequently characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR). The hypothetical MEI is an individual assumed to be located at the MIR point (assumed residential receptor) where the highest concentrations of air pollutants associated with plant emissions are predicted to occur, based on air dispersion modeling. Human health risks associated with emissions from the proposed plant are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any location in the vicinity of the plant. The highest concentration location represents the MIR, unless this receptor location lies in an area which is clearly not appropriate for characterization of the MEI health risks, i.e., lake or river surface locations, river beds, freeway or roadway locations, airports, or land areas zoned that would preclude residential or worker occupation over the course of the power plant lifetime.

Health risks potentially associated with concentrations of carcinogenic pollutants in air were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 $\mu g/m^3$ over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a

concentration in air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in air were performed by comparing modeled concentrations in air with the RELs. An REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are typically based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB 2011), and are presented in Table 4.8-4.

Table 4.8-4 Toxicity Values Used To Characterize Health Risks

Compound	Unit Risk Factor ($\mu g/m^3)^{-1}$	Chronic Reference Exposure Level ($\mu g/m^3$)	Acute Reference Exposure Level ($\mu g/m^3$)
Acetaldehyde	2.70E-06	1.40E+02	4.70E+02
Acrolein	--	3.50E-01	2.50E+00
Ammonia	--	2.00E+02	3.20E+03
Biphenyl	--	--	--
Benzene	2.90E-05	6.00E+01	1.30E+03
1,3-Butadiene	1.70E-04	2.00E+01	--
Diesel PM	3.00E-04	5.00E+00	--
Ethylbenzene	2.50E-06	2.00E+03	--
Formaldehyde	6.00E-06	9.00E+00	5.50E+01
Hexane	--	7.00E+03	--
Methanol	--	4.00E+03	2.80E+04
Naphthalene	3.40E-05	9.00E+00	--
PAHs (as BaP for HRA)	1.10E-03	--	--
Propylene	--	3.00E+03	--
Toluene	--	3.00E+02	3.70E+04
Xylene (mixed isomers)	--	7.00E+02	2.20E+04

Source: CARB/OEHHA 2/2011

Tables 4.8-5 and 4.8-6 delineate the maximum hourly and annual emissions of all identified air toxic pollutants from the power plant processes. Total plant HAP emissions are well below the federal major source significance levels of 10 tons per year (tpy) of any single HAP, and 25 tpy of all HAPs. As such, the plant is not a major source of HAPS or air toxic pollutants, and any NESHAPs standards under 40 CFR 63 are not applicable to the plant.

Table 4.8-5 Air Toxic Emissions Estimates

Toxic	Max Hourly Emissions (lbs)	Max Annual Emissions (lbs)
Wartsila Engines (11)		
Total PAHs w/o Naphthalene	0.0001	0.266
Naphthalene	0.0065	26.244
Ethylbenzene	0.0185	74.466
1-3 Butadiene	0.0953	384.063

Toxic	Max Hourly Emissions (lbs)	Max Annual Emissions (lbs)
Acetaldehyde	0.1374	533.798
Acrolein	0.0153	61.770
Benzene	0.0566	228.304
Formaldehyde	0.6139	2475.076
Toluene	0.0622	250.708
Biphenyl	0.0561	226.171
Hexane	0.2937	1184.196
Propylene	1.3971	5632.931
Methanol	0.6615	2667.108
Xylenes	0.1678	676.378
Ammonia	11.88	47900.2
Fuel Gas Heater		
Total PAHs w/o Naphthalene	0.00000157	0.00664
Naphthalene	0.00000118	0.00498
Ethylbenzene	0.0000373	0.158
1-3 Butadiene	0	0
Acetaldehyde	0.0000348	0.147
Acrolein	0.0000177	0.0749
Benzene	0.0000169	0.0716
Formaldehyde	0.0000667	0.282
Toluene	0.000144	0.608
Hexane	0.0000247	0.105
Propylene	0.00287	12.1
Xylenes	0.000107	0.452
Warm Start Heater		
Total PAHs w/o Naphthalene	0.00000157	0.00774
Naphthalene	0.00000118	0.0058
Ethylbenzene	0.0000373	0.184
1-3 Butadiene	0	0
Acetaldehyde	0.0000348	0.172
Acrolein	0.0000177	0.0872
Benzene	0.0000169	0.0834
Formaldehyde	0.0000667	0.329
Toluene	0.000144	0.708
Hexane	0.0000247	0.122
Propylene	0.00287	14.1
Xylenes	0.000107	0.526

Notes: See Appendix F.1 for detailed emissions data.

Table 4.8-6 Diesel Engine Exhaust Emissions

Toxic / Source	Max Hour Emissions (lb)	Max Daily Emissions (lb)	Max Annual Emissions (lb)
DPM / Fire Pump	0.03	0.03	1.43

Notes: See Appendix F.1 for detailed emissions data.

4.8.2.5 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the power plant MIR location is estimated to be 1.53 x 10^{-6} (1.53 per one million). Excess lifetime cancer risks less than 1 x 10^{-6} are unlikely to represent significant public health impacts that require additional controls of plant emissions. Risks higher than 1 x 10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed on Table 4.8-7. Risks associated with pollutants potentially emitted from the plant are presented in Table 4.8-8. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix F.4. As described previously, human health risks associated with emissions from the proposed power plant are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the plant.

The MIR location data is as follows: (Hotspots Analysis and Reporting Program [HARP] PMI Summary file)

- Receptor # : 36
- UTM Coordinates: 497427mE, 3634740mN
- Type of Receptor: Near Fenceline

The noted receptor does not lie in an area that is precluded from being used as the MIR because it is possible that someone could be at or near the fence line. As such, the noted receptor was used as the basis for the upper bound health risks associated with the plant emissions.

Table 4.8-7 Health Effects Significant Threshold Levels

	Significance Thresholds	
Risk Category	**SDAPCD**	**State of California**
Cancer Risk per million	<= 1.0 without T-BACT <= 10.0 with T-BACT	<= 1.0 without T-BACT <= 10.0 with T-BACT
Acute Hazard Index	1.0	1.0
Chronic Hazard Index	1.0	1.0
Cancer Burden	1.0	1.0

Notes: T-BACT = best available control technology for air toxic compounds

Table 4.8-8 Project Health Risk Assessment Summary

Plant Total (All Processes)		
Risk Category	**Plant Values**	**Applicable Significance Threshold**
Cancer Risk (at MIR)	1.53E -06	<= 10.0 with T-BACT
Chronic Hazard Index (at MIR)	0.00609	1.0
Acute Hazard Index (at MIR)	0.0576	1.0
Acute Hazard Index (at Acute MIR)	0.115	1.0
Cancer Burden	0.0	1.0

Notes: No acute REL has been established for diesel PM.
Acute HI at the Acute MIR may differ from the Acute HI at the Cancer MIR.

Cancer risks potentially associated with plant emissions also were assessed in terms of cancer burden. Cancer burden is defined as the hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the Project. The commonly defined zone used to estimate cancer burden is the area within the isopleth surrounding the plant where receptors have a multi-pathway cancer risk equal to or greater than 1.0×10^{-6}. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the plant. Cancer burden is calculated as the worst-case product of the 1.0×10^{-6} excess lifetime cancer risk and the number of individuals at that risk level. A worst-case estimate of cancer burden was calculated based on the following assumptions.

The 1.0×10^{-6} cancer risk was applied to all affected portions of identified census tracts within the radius area defined by the distance to the highest 1.0×10^{-6} concentration. A detailed listing and map of affected census tracts and population estimates are provided in Appendix F.4. Figures presented in Appendix F.4 show the 6-mile radius plot in relationship to the census tract locations and site. This procedure results in a conservatively high estimate of cancer burden. The calculated cancer burden for the Project is essentially zero.

As described previously, human health risks associated with emissions from the proposed power plant are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 1.53×10^{-6}. The estimated cancer burden was zero, indicating that emissions from the plant would not be associated with any increase in cancer cases in the previously defined population. In addition, the cancer burden is less than the Rule 1200 threshold value of 1.0. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that plant emissions are unlikely to represent a significant public health impact in terms of cancer risk.

The acute non-cancer hazard quotient associated with concentrations in air is shown in Table 4.8-8. The acute non-cancer hazard quotients for all target organs fall below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant impact to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix F.4. As described previously, human health risks associated with emissions from the proposed plant are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any other location in the vicinity of the plant.

Detailed risk and hazard values are provided in the HARP output presented in Health Risk Assessment CD (Appendix F.4).

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air. Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a conservatively high estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans (i.e., the assumption being that humans are as sensitive as the most sensitive animal species). Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

An excess lifetime cancer risk of 1×10^{-6} is typically used as a screening threshold of significance for potential exposure to carcinogenic substances in air. The excess cancer risk level of 1×10^{-6}, which has historically been judged to be an acceptable risk, originates from efforts by the Food and Drug Administration to use quantitative risk assessment for regulating carcinogens in food additives in light of the zero tolerance provision of the Delany Amendment (Hutt 1985). The associated dose, known as a “virtually safe dose” has become a standard used by many policy makers and the lay public for evaluating cancer risks. However, a study of regulatory actions pertaining to carcinogens found that an acceptable risk level can often be determined on a case-by-case basis. This analysis of 132 regulatory decisions, found that regulatory action was not taken to control estimated risks below 1×10^{-6} (one-in-one million), which are called de minimis risks. De minimis risks are historically considered risks of no regulatory concern. Chemical exposures with risks above 4×10^{-3} (four-in-ten thousand), called de manifestis risks, were consistently regulated. De manifestis risks are typically risks of regulatory concern. The risks falling between these two extremes were regulated in some cases, but not in others (Travis et al 1987).

The estimated lifetime cancer risks to the maximally exposed individual located at the Project MIR are well below the 10×10^{-6} significance level (for sources equipped with T-BACT), and the aggregated cancer burden associated this risk level is less than 1.0 excess cancer case. In addition, the cancer burden is less than the Rule 1200 threshold value of 1.0. These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the power plant emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstate the risks from plant emissions. Based on the results of this risk assessment, there are no significant public health impacts anticipated from operational emissions of toxic pollutant to the air from the proposed power plant.

A screening risk calculation for construction impacts, based upon emissions of diesel particulate, and the inhalation pathway is presented in Appendix F.4, Table F.4-8. (SCAQMD 2005).

4.8.2.6 Hazardous Materials

Hazardous materials may be used and stored at the plant site. There will be no hazardous materials stored in quantities above threshold limits onsite. Descriptions of their uses are presented in Section 4.9 Hazardous Materials Handling. Use of chemicals at the proposed plant will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases with the potential to migrate offsite could result in potential impacts to the public.

The CalARP and CFR Title 40 Part 68 under the Clean Air Act establish emergency response planning requirements for acutely hazardous materials stored at quantities above allowable thresholds. These regulations require that an offsite consequence analysis be completed and that an RMP be prepared as part of a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material. The Project will not store quantities above allowable thresholds onsite and hence the CalARP program does not apply.

4.8.2.7 Operation Odors

Small amounts of ammonia (from the use of urea) used to control NO_x emissions may be emitted at the exhaust stack but would not produce objectionable odors. The expected exhaust gas ammonia concentration, known as ammonia "slip," will be less than 10 ppm. After mixing with the atmosphere, the concentration at ground level will be far below the detectable odor threshold of 5 ppm that the Compressed Gas Association has determined to be acceptable, as well as being below the ACGIH Threshold Limit Value (TLV) and Short Term Exposure Limit (STEL) values of 25 and 35 ppm respectively (adopted 2003). Therefore, potential ammonia emissions are not expected to create objectionable odors. Other combustion contaminants, such as NO_x, CO, SO_x, and VOCs are not present at concentrations that could produce objectionable odors.

4.8.2.8 Electromagnetic Field Exposure

Because the gen tie does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS 1999), electromagnetic field exposures are not expected to result in a significant impact on public health. The NIEHS report to the U.S. Congress found that "the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm" (NIEHS 1999).

4.8.2.9 Summary of Impacts

Results from an air toxics risk assessment based on emissions modeling indicate that there will be no significant incremental public health risks from construction or operation of the proposed Project. Results from criteria pollutant modeling for routine operations indicate that potential ambient concentrations of NO_2, carbon dioxide, SO_2, and PM_{10} will not significantly impact air quality (see Section 4.7). Potential concentrations are below the federal and California

standards established to protect public health, including the more sensitive members of the population.

4.8.3 Cumulative Impacts

The health risk assessment for the proposed Project indicates that the maximum cancer risk will be approximately 1.53 x 10^{-6} (or 1.53 in a million), versus a significance threshold of 10.0 x 10^{-6} (or 10 in one million) with T-BACT at the point of maximum exposure to air toxics from power plant emissions. This risk level is considered to be insignificant. Non-cancer chronic and acute effects will also be less than significant, i.e., HI's are less than 1. Risks below these cancer and non-cancer impact thresholds are considered de minimis. Therefore, the risk that impacts from the Project will result in a significant impact, in combination with impacts from other past, present, and reasonably foreseeable future projects, should also be very low. Existing projects are considered as air pollutant emitters in the background data that is used in health risk modeling for the air toxics risk assessment.

For the purpose of the public health cumulative analysis must also consider whether emissions from operation of the Project could potentially combine with emissions from past, present, and reasonably foreseeable projects to result in adverse health effects to the public. Cumulative impacts in the area of public health could occur if emission sources are close enough so that their plumes combine. Due to differences in emission source elevations, terrain features, wind direction, and other meteorological factors, it is unlikely that emission plumes from two or more facilities would combine unless they are located in very close proximity. Furthermore, dispersion of plumes tends to occur in parallel, preventing the mixing of plumes from separate locations. On the basis of numerous previous air dispersion modeling studies conducted by CEC staff to assess public health cumulative impacts, it has been shown repeatedly that unless two sources are within approximately 0.5 miles of each other, their cumulative health risks do not combine to turn an insignificant individual health risk into a significant one.

Only one AB2588 reporting source was noted within the 0.5 mile radius of the proposed site, i.e., the Sycamore Landfill. Toxics emitting sources at the landfill are primarily from the combustion of landfill gas in the small power plant (~4MW), the landfill gas flares, and fugitive evaporative emissions of organics from the landfill surface. Appendix F.4 contains a listing of the most recent emissions levels for the substances identified under AB2588. It is highly unlikely that these substances and the levels at which they are emitted from the landfill sources would combine with Project emissions to produce a cumulative health risk impact.

No other significant stationary sources of air toxic emissions were identified within this half-mile radius area, and as such, no cumulative impacts with respect to health impacts are expected to occur.

4.8.4 Mitigation Measures

4.8.4.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying BACT to the plant. BACT for the primary combustion sources (Wartsila engines, fuel gas heater, and warm start heaters) includes the combustion of natural gas.

The proposed Project location is in an area that is designated by the federal air agency (USEPA) as non-attainment for ozone, and attainment for particulate matter (PM10 and PM2.5), CO, SO_x, NO_2, and lead. Pursuant to SDAPCD Rules 20.1 and 20.2, offsets are not required for a minor source. The requirements for BACT and clean fuels will result in low emissions from the proposed plant. As a consequence the Project impacts are below relevant risk thresholds for both cancer and non-cancer public health impacts. Therefore, further mitigation of emissions is not required to protect public health.

4.8.4.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of natural gas as the only fuel at the proposed plant, except for the small amount of diesel fuel combusted in the emergency fire pump engine. Emissions from any tanks storing liquid organic chemicals (if any) will be minimized through the use of one or a combination of the following:

- Use of small-capacity, fixed roof tanks
- Use of low vapor pressure organic substances
- Use of exempt compounds
- Use of vapor balance and/or vapor recovery systems on a case-by-case basis as deemed appropriate

4.8.4.3 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in Section 4.9. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. The plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The Project site will include the following design features:

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of the urea system will be in accordance with applicable LORS (local and state building codes).

A RMP for the plant, if required, will be prepared prior to commencement of plant operations. The RMP will estimate the impacts presented by handling and storage of identified RMP substances at the plant. The RMP will include a hazard analysis, offsite consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment, (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining

systems that use hazardous materials. Emergency procedures for plant personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or to holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

4.8.5 Laws, Ordinances, Regulations, and Standards

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to this Project are identified in Table 4.8-9. The conformity of the Project to each of the LORS applicable to public health is also presented in this table. Table 4.8-10 summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

Table 4.8-9 Applicable LORS for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Federal Clean Air Act Title III	Public exposure to air pollutants	USEPA Region 9 CARB SDAPCD	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will not cause or contribute to a violation of federal or California air quality standards and will be minimized by applying BACT to the plant. See AFC Section 4.7 and Appendix F.4.
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings. See AFC Section 4.8 and Appendix F.4.
40 CFR Part 68 (Risk Management Plan) and CalARP Program Title 19	Public exposure to acutely hazardous materials	USEPA Region 9 San Diego County Department of Health Services San Diego County Fire Department	An offsite consequence analysis is not required because the Project will not store hazardous materials in quantities above allowable thresholds. See Section 4.8.4.3.
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	San Diego County Department of Health Services CARB SDAPCD	An offsite consequence analysis is not required because the Project will not store hazardous materials in quantities above allowable thresholds. See Section 4.8.4.3.

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and San Diego County Department of Environmental Health	Prepare all required HazMat plans and inventories, distribute to affected agencies. See Section 4.9.
CHSC 44300 et seq.	AB2588 Air Toxics Program	SDAPCD	Participate in the AB2588 inventory and reporting program at the District level. See Section 4.7 (LORS).
SDAPCD Rule 1200 and 1210	Toxics NSR	SDAPCD	Application of BACT and T-BACT, preparation of HRA. See Sections 4.7, 4.8, and Appendices F.4, and F.6.
CHSC 25249.5	Proposition 65	OEHHA	For potential exposure to hazardous materials that may be listed under Proposition 65, the Project will comply with all signage and notification requirements. See Section 4.9.
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB SDAPCD	Based on results of risk assessment as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. See Section 4.8 and Appendices F.1 and F.4.

4.8.6 Agencies and Agency Contacts

Table 4.8-10 provides contact information for agencies involved with Public Health.

Table 4.8-10 Agencies and Agency Contacts for Public Health

Public Health Concern	Primary Regulatory Agency	Regulatory Contact	Phone	Email	Mailing Address
Public exposure to air pollutants	USEPA Region 9 San Francisco, CA	Gerardo Rios	(415) 972-3974	rios.gerardo @epa.gov	75 Hawthorne Street San Francisco, CA 94105
	CARB Sacramento, CA	Mike Tollstrup	(916) 322-6026	Mtollstr @arb.ca.gov	1001 I Street, 6th Floor Sacramento, CA 95814
	SDAPCD San Diego, CA	Tom Weeks	(858) 586-2715	tom.weeks @sdcounty.ca.gov	10124 Old Grove Road. San Diego, CA 92131
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA Sacramento, CA	Cynthia Oshita	(916) 322-2068	Coshita @oehha.ca.gov	1001 I Street, 19th Floor Sacramento, CA 95814
Public exposure to acutely hazardous materials	USEPA Region 9 San Francisco, CA	Gerardo Rios	(415) 972-3974	rios.gerardo @epa.gov	75 Hawthorne Street San Francisco, CA 94105
	San Diego County Department of Health Services	Environmental Health HazMat Division Jack Miller	(858) 505-6700	jack.miller @sdcounty.ca.gov	5500 Overland Ave, Ste 110, MS O-560 San Diego, CA 92123

4.8.7 Required Permits and Permitting Schedule

Agency-required permits or approvals related to public health include an RMP (if required) and a SDAPCD Permit to Operate.[1] These requirements are discussed in detail in Sections 4.9 Hazardous Materials Handling, and 4.7 Air Quality, respectively.

4.8.8 References

California Air Resources Board (CARB). 2003. HARP 1.4d User Guide. CalEPA-Air Resources, Revised 2011.

_____. 2009a. HARP On-Ramp Manual, Version 1, 2/3/09.

_____. 2009b. Almanac of Emissions and Air Quality, CARB, 2009.

_____. 2011. Consolidated table of OEHHA/ARB approved risk assessment health values. (http://arbis.arb.ca.gov/toxics/healthval/contable.pdf), February 2011.

Hutt. P.B. 1985. Use of quantitative risk assessment in regulatory decision making under federal health and safety statutes, in Risk Quantitation and Regulatory Policy. Eds. D.G. Hoel, R.A. Merrill and F.P. Perera. Banbury Report 19, Cold Springs Harbor Laboratory.

National Institute of Environmental Health Sciences (NIEHS). 1999. Environmental Health Institute report concludes evidence is 'weak' that EMFs cause cancer. Press release. National Institute of Environmental Health Sciences, National Institutes of Health.

OEHHA/CARB. 2003. Air Toxics Hot Spots Program Risk Assessment Guidelines, CalEPA, August 2003. HARP Model, Version 1.4d, Updated 1/20/11.

SCAQMD. 2005. Supplemental Guidelines for Preparing Risk Assessments for the Air Toxics Hot Spots Information and Assessment Act (AB2588). July 2005.

SANDAG (San Diego Association of Governments). 2007 RTP, Land Use Map dated 3/15/10, City of San Diego, Planning Department.http://www.sandiego.gov/planning/genplan/pdf/generalplan/lu2wstreetsystem8x11revised031510.pdf

SDAPCD. 2007:2009. California Air Toxics Hot Spots Information and Assessment Act, Program Reports, 2007-2009, San Diego APCD, 2007-2009.

Travis, C.C., E.A.C. Crouch, R. Wilson and E.D. Klema. 1987. Cancer risk management: A review of 132 federal regulatory cases. Environ. Sci. Technol. 21:415-420.

[1] As per SDAPCD Rule 20.5, this application shall be considered the equivalent of an application for an Authority to Construct and will trigger SDAPCD's "Determination of Compliance" (DoC) review of the proposed Project; no separate Authority to Construct will be issued. Upon the CEC's issuance of a license and SDAPCD's confirmation that the Project complies with all license and DoC conditions, SDAPCD will issue a Permit to Operate for the Project.

FIGURES

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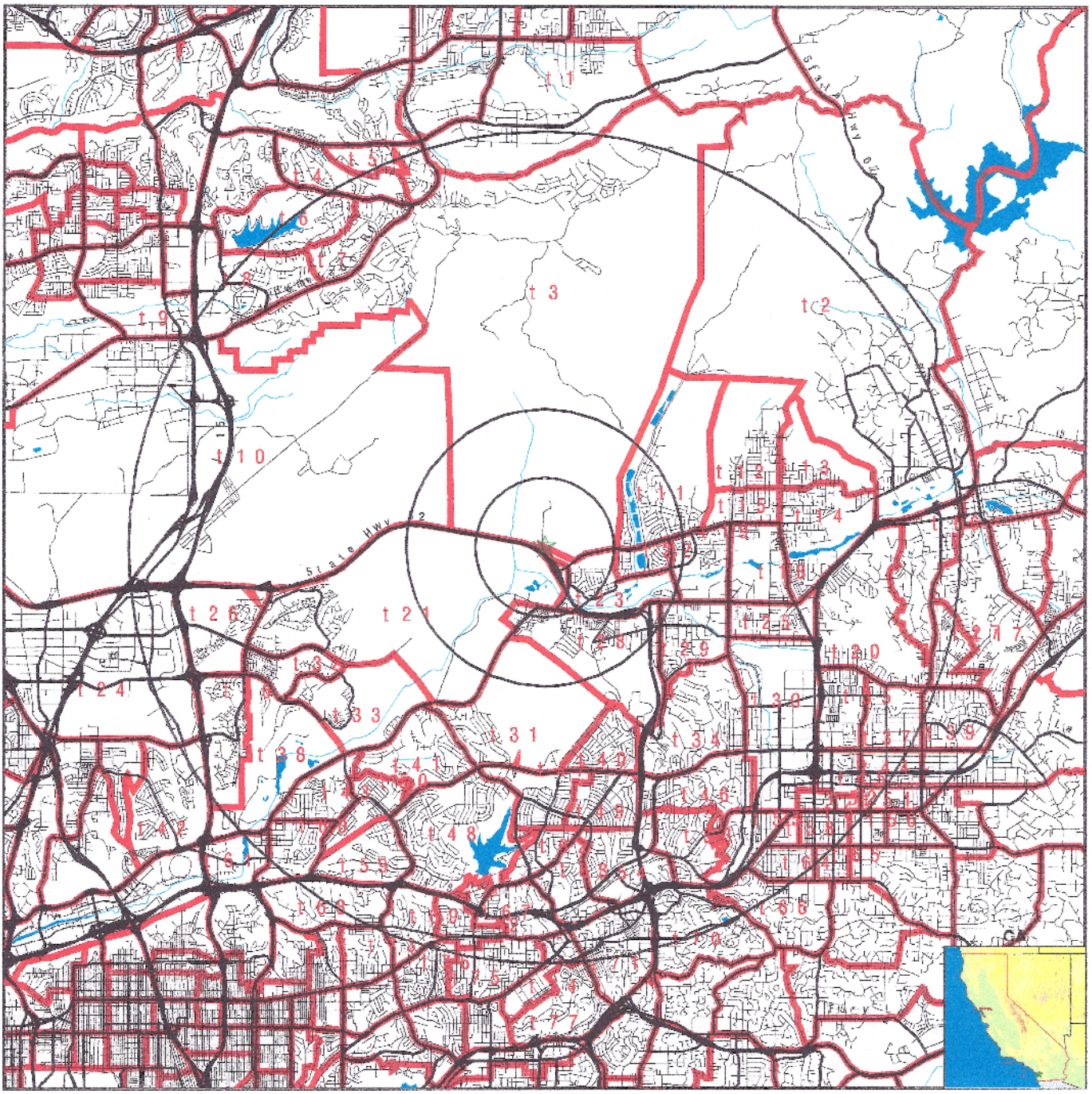

QUAIL BRUSH GENERATION PROJECT

FIGURE 4.8-1
CENSUS TRACT MAP
FOR 6-MILE RADIUS

Cogentrix

TETRA TECH EC, INC.

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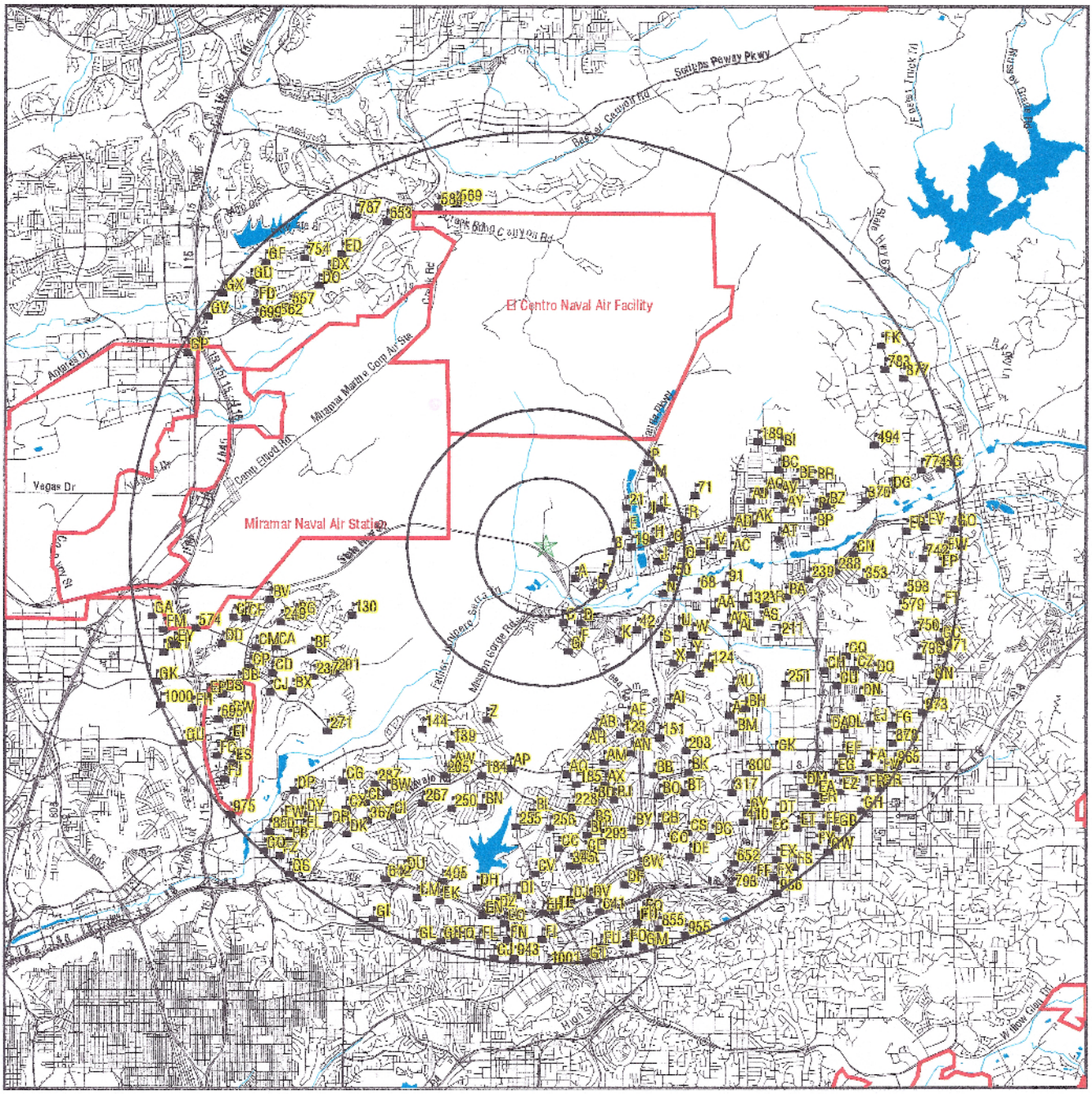

- Target Property
- Roads
- Waterways
- Environmental or Public Receptor
- Federal Lands Linear Features
- Federal Lands Area

QUAIL BRUSH GENERATION PROJECT

FIGURE 4.8-2
SENSITIVE RECEPTORS MAP FOR 6-MILE RADIUS

Cogentrix

TETRA TECH EC, INC.

DATA ADEQUACY WORKSHEETS

DATA ADEQUACY WORKSHEET

Adequacy Issue: Adequate ____ Inadequate ____ Revision No. 0 Date ____

Technical Area: **Public Health** Project: Quail Brush Power Project Technical Staff: ____

Project Manager: Eric Solorio Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 4.7 (Air Quality), subsections 4.7.2.1, 4.7.2.2, 4.7.2.3, 4.7.3, (pgs 4.7-2 thru 4.7-12). Appendices F.1, F.2, F.5, F.7, and F.8. Section 4.7 (Air Quality),subsection 4.7.4 (pgs 4.7-12,13). Subsection 4.7.6 (pgs 33-36). Section 4.8.1 (Public Health), Pgs 4.8-1 thru 4.8-6. Appendix F.4.		
Appendix B (g) (9) (A)	An assessment of the potential risk to human health from the project's hazardous air emissions using the Air Resources Board Hotspots Analysis and Reporting Program (HARP) (HSC §§44360-44366) or its successor and Approved Risk Assessment Health Values. These values should include the cancer potency values and noncancer reference exposure levels approved by the Office of Environmental Health Hazard Assessment (OEHHA Guidelines, Cal-EPA 2005).	Section 4.8 (Public Health) pgs. 4.8-1 thru 4.8-21. Appendices F.1 and F.4.		
Appendix B (g) (9) (B)	A listing of the input data and output results, in both electronic and print formats, used to prepare the HARP health risk assessment.	Section 4.8 (Public Health) pgs. 4.8-1 thru 4.8-21. Appendices F.1 and F.4. (HARP and modeling input/output files are on the enclosed CD)		
Appendix B (g) (9) (C)	Identification of available health studies through the local public health department concerning the potentially affected population(s) within a six-mile radius of the proposed power plant site related to respiratory illnesses, cancers or related diseases.	Section 4.8.1 (pgs 4.8-3), Appendix F.4.		
Appendix B (g) (9) (D)	A map showing sensitive receptors within the area exposed to the substances identified in subsection (g)(9)(A).	Section 4.8, Figure 4.8-2. Appendix F.4		
Appendix B (g) (9) (E)	For purposes of this section, the following definitions apply:			

DATA ADEQUACY WORKSHEET

Adequacy Issue: Adequate ____ Inadequate ____ Revision No. 0 Date ____

Technical Area: **Public Health** Project: Quail Brush Power Project Technical Staff: ____

Project Manager: Eric Solorio Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (9) (E) (i)	A sensitive receptor refers to infants and children, the elderly, and the chronically ill, and any other member of the general population who is more susceptible to the effects of the exposure than the population at large;	Section 4.8.2, pgs 4.8-6 thru 4.8-11. Appendix F.4 for sensitive receptor listing.		
Appendix B (g) (9) (E) (ii)	An acute exposure is one which occurs over a time period of less than or equal to one (1) hour; and	Section 4.8.2, pgs 4.8-6 thru 4.8-11. Appendix F.4.		
Appendix B (g) (9) (E) (iii)	A chronic exposure is one which is greater than twelve (12) percent of a lifetime of seventy (70) years.	Section 4.8.2, pgs 4.8-6 thru 4.8-11. Appendix F.4.		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 4.8.5 (pgs 4.8-19 thru 4.8-20.		
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 4.8.7 (pg 4.8-21)		

DATA ADEQUACY WORKSHEET

Adequacy Issue: Adequate ____ Inadequate ____ Revision No. 0 Date ____

Technical Area: **Public Health** Project: Quail Brush Power Project Technical Staff: ____

Project Manager: Eric Solorio Docket: ____ Technical Senior: ____

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 4.8.7 (pg 4.8-21)		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 4.7.8 (Air Quality) Section 4.8.6 (pgs 4.8-21)		