APPENDIX 5.1D

Screening Heath Risk Assessment

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Screening Health Risk Assessment

The screening level health risk assessment has been prepared using CARB's Hotspots Analysis and Reporting Program (HARP) computer program (Version 1.4a, July 2008) and associated guidance in the OEHHA's *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments* (August 2003). The HARP model was used to assess cancer risk as well as chronic and acute risk impacts. The most recent health database[1] provided by CARB, reflecting the RELs adopted by OEHHA in December 2008, has been used. Although the December 2008 RELs include 8-hour RELs for acetaldehyde, acrolein and formaldehyde, these 8-hour RELs have not yet been incorporated into the HARP software.

Modeling Inputs

HAP emission rates used in the screening health risk assessment are shown in Appendix 5.1A, Table 5.1A-7 (emission factors and emission rates in pounds per hour and tons per year), and in Tables 5.1D-2 and 5.1D-3 (emission rates in grams per second and stack parameters used for modeling, respectively). Maximum hourly heat input rate was used in calculating emissions for acute impacts; annual average heat input rate was used in calculating emission rates for the chronic and cancer risk analyses. Stack parameters reflect the turbine operating cases that produced the highest 1-hour average and annual average unit impacts in the screening analysis.

Risk Analysis Method

The dispersion analysis was performed using AERMOD in accordance with the procedures outlined in Appendix 5.1B, using the modeling inputs described above. AERMOD produces output files containing modeled concentrations of each compound shown in Table 5.1D-2 at every receptor. However, because the HARP model was designed to use modeling output files from the ISCST3 model, rather than the current recommended guideline AERMOD model, the AERMOD results must be reformatted before they can be used in HARP.

The HARP On-Ramp is a tool provided by CARB that reformats output files from models other than ISCST3 so that they can be read by the HARP Risk Module. Version 1 of the On-Ramp tool was used to create files required by HARP to complete the screening health risk assessment.

Summary of Results

The results of the screening level health risk assessment are summarized in Table 5.1D-1.

[1] February 2009, available at http://www.arb.ca.gov/toxics/harp/data.htm.

TABLE 5.1D-1
Screening Level Risk Assessment Results

Risk Methodology	A2PP
Modeled Residential Cancer Risk (in one million)	
Residential: Derived (OEHHA) Method at PMI	0.7
Residential: Derived (OEHHA) Method at nearest residential receptor	0.04
Modeled Worker Cancer Risk (in one million)	
Worker Exposure: Derived (OEHHA) Method at PMI	0.1
Worker Exposure: Derived (OEHHA) Method at workplace	0.006
Modeled Acute and Chronic Impacts	
Acute HHI	0.01
Chronic HHI	0.007

As shown in Table 5.1D-1, the cancer risk from the project is well below the significance level of 10 in one million. In addition, the acute and chronic health hazard indices are well below the significance level of one. The analysis of potential cancer risk described in this section employs extremely conservative methods and assumptions, as follows:

- The analysis includes representative weather data over four years[2] to ensure that the least favorable conditions producing the highest ground-level concentration of power plant emissions are included. The analysis then assumes that these worst-case weather conditions, which in reality occurred only once in four years, will occur every year for 70 years.
- The power plant is assumed to operate at hourly, daily, and annual emission conditions that produce the highest ground-level concentrations. In fact, the power plant is expected to operate at a variety of conditions that will produce lower emissions and impacts.
- The analysis assumes that a sensitive individual is at the location of the highest ground-level concentration of power plant emissions continuously over the entire 70-year period. In reality, people rarely live in their homes for 70 years, and even if they do, they leave their homes to attend school, go to work, go shopping, and so on.

The purpose of using these unrealistic assumptions is to consciously overstate the potential impacts. No one will experience exposures as great as those assumed for this analysis. By determining that even this highly overstated exposure will not be significant, there is a high

[2] Although the CARB guidance recommends using five years of meteorological data with HARP, only four years of representative meteorological data were available for this project. See Section 5.1.5 of the AFC.

degree of confidence that the much lower exposures that actual persons will experience will not result in a significant increase in cancer risk. In short, the analysis ensures that there will not be significant public health impacts at any location, under any weather condition, or under any operating condition.

The locations of the maximum acute, chronic, and cancer risks are shown in Figure 5.1D-1.

FIGURE 5.1D-1
Locations of Maximum Acute, Chronic, and Cancer Risks from Project Operation

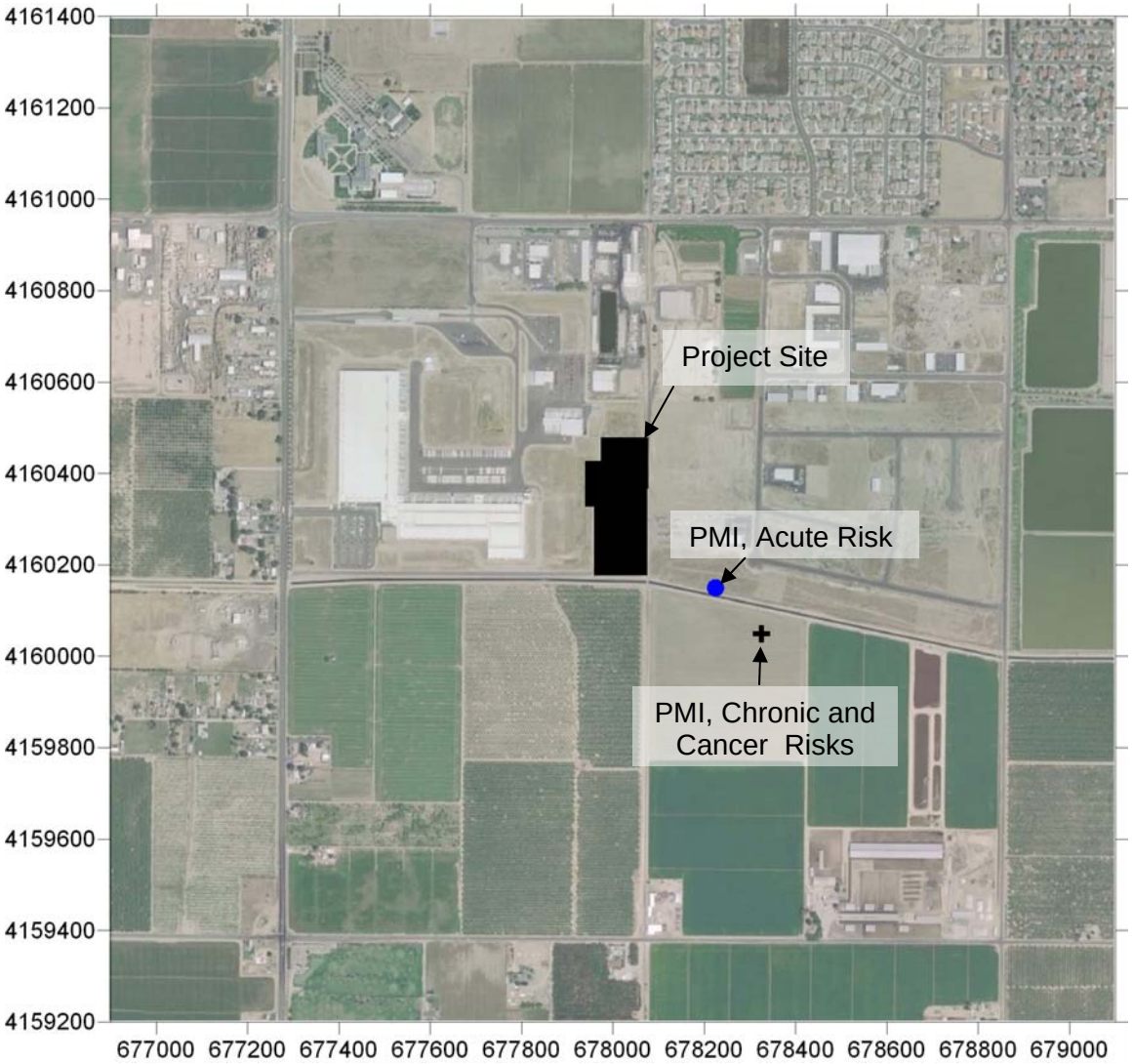

Table 5.1D-2
TID Almond 2 Power Plant
Modeling Inputs for Screening Health Risk Assessment

Emission Rates, Each CTG

Compound	Emissions per CTG, g/s	
	1-hr Average (Acute Impacts)	Annual Avg (Chronic and Cancer Impacts)
Ammonia	9.37E-01	8.86E-01
Propylene	5.37E-02	5.06E-02
Acetaldehyde	0.00E+00	0.00E+00
Acrolein	2.80E-03	2.64E-03
Benzene	4.47E-04	4.22E-04
1,3-Butadiene	8.39E-04	7.91E-04
Ethylbenzene	3.01E-05	2.83E-05
Formaldehyde	2.24E-03	2.11E-03
Hexane	4.96E-02	4.68E-02
Naphthalene	1.80E-02	1.70E-02
PAHs		
Benzo(a)anthracene	1.09E-05	1.02E-05
Benzo(a)pyrene	6.68E-06	6.30E-06
Benzo(b)fluoranthrene	5.43E-06	5.12E-06
Benzo(k)fluoranthrene	5.28E-06	4.98E-06
Chrysene	1.21E-05	1.14E-05
Dibenz(a,h)anthracene	1.13E-05	1.06E-05
Indeno(1,2,3-cd)pyrene	1.13E-05	1.06E-05
Propylene Oxide	6.29E-05	5.93E-05
Toluene	2.03E-03	1.91E-03
Xylene	9.09E-03	8.57E-03

Table 5.1D-3
TID Almond 2 Power Plant
Stack Parameters for Screening HRA

Stack Parameters, Each CTG				
	Stack Diam (m)	Stack Ht (m)	Exhaust Temp (deg K)	Exhaust Velocity (m/s)
Acute Impacts (Case 1)	3.658	24.384	718.000	31.452
Chronic and Cancer Impacts (Case 5)	3.658	24.384	727.444	29.730