ATTACHMENT

REVISED PUBLIC HEALTH TABLES

TABLE 5.9-6 (REVISED 5/11/08)
SUMMARY OF POTENTIAL HEALTH RISKS

Receptor	Carcinogenic Risk[a] (per million)	Cancer Burden	Acute Health Hazard Index	Chronic Health Hazard Index
Maximum Incremental Cancer Risk (MICR) at PMI	~~0.16~~ **0.10**	0	~~0.10~~ **0.09**	~~0.005~~ **0.003**
Maximally Exposed Individual Resident (MEIR)	~~0.075~~ **0.068**		~~0.057~~ **0.036**	~~0.0021~~ **0.0019**
Maximally Exposed Individual Worker [b] (MEIW)	~~0.080~~ **0.021**		~~0.030~~ **0.020**	Not applicable
Significance Level	10	1.0	1.0	1.0

Notes:

[a] Derived (Adjusted) Method used by San Diego Air Pollution Control District to determine compliance with Regulation 1200.

[b] The worker is assumed to be exposed at the work location 8 hours per day, instead of 24, 245 days per year, instead of 365, and for 40 years, instead of 70. Hence, a 70 year-based chronic HHI is not applicable to a worker.

Table 5.9B-5 (Revised 5/11/08)
Calculation of Cancer Risk
Carlsbad Energy Center

Compound	Annual Average Emissions Per Turbine (g/s)	Derived (OEHHA) Method			Average Point Estimate			High-End Point Estimate			Derived (Adjusted) Method			Worker Exp: Derived (OEHHA) Method		
		Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (2)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (3)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (4)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (5)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (6)
Gas Turbines																
Ammonia	7.71E-01	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Propylene	9.31E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Acetaldehyde	4.93E-03	3.77E-06	1.86E-02	1.88E-03	2.60E-06	1.28E-02	1.29E-03	3.77E-06	1.86E-02	1.88E-03	2.90E-06	1.43E-02	1.44E-03	5.72E-07	2.82E-03	2.85E-04
Acrolein	4.46E-04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Benzene	4.02E-04	3.77E-05	1.52E-02	1.53E-03	2.60E-05	1.05E-02	1.06E-03	3.77E-05	1.52E-02	1.53E-03	2.90E-05	1.17E-02	1.18E-03	5.72E-06	2.30E-03	2.32E-04
1,3-Butadiene	5.30E-05	2.26E-04	1.20E-02	1.21E-03	1.56E-04	8.27E-03	8.35E-04	2.26E-04	1.20E-02	1.21E-03	1.74E-04	9.22E-03	9.31E-04	3.43E-05	1.82E-03	1.84E-04
Ethylbenzene	3.94E-03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Formaldehyde	4.43E-02	7.91E-06	3.51E-01	3.54E-02	5.46E-06	2.42E-01	2.44E-02	7.91E-06	3.51E-01	3.54E-02	6.08E-06	2.69E-01	2.72E-02	1.20E-06	5.32E-02	5.37E-03
Hexane	3.13E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Naphthalene	2.00E-04	4.52E-05	9.06E-03	9.15E-04	3.12E-05	6.25E-03	6.31E-04	4.52E-05	9.06E-03	9.15E-04	3.48E-05	6.98E-03	7.04E-04	6.86E-06	1.37E-03	1.39E-04
PAHs (1)(listed individually below)	1.58E-05	3.98E-02	6.30E-01	6.36E-02	8.05E-03	1.27E-01	1.29E-02	4.02E-02	6.36E-01	6.42E-02	3.98E-02	6.30E-01	6.36E-02	1.47E-02	2.33E-01	2.35E-02
Benzo(a)anthracene		*3.98E-03*			*8.05E-04*			*4.02E-03*			*3.98E-03*			*1.47E-03*		
Benzo(a)pyrene		*3.98E-02*			*8.05E-03*			*4.02E-02*			*3.98E-02*			*1.47E-02*		
Benzo(b)fluoranthrene		*3.98E-03*			*8.05E-04*			*4.02E-03*			*3.98E-03*			*1.47E-03*		
Benzo(k)fluoranthrene		*3.98E-03*			*8.05E-04*			*4.02E-03*			*3.98E-03*			*1.47E-03*		
Chrysene		*3.98E-04*			*8.05E-05*			*4.02E-04*			*3.98E-04*			*1.47E-04*		
Dibenz(a,h)anthracene		*1.43E-02*			*3.47E-03*			*1.48E-02*			*1.43E-02*			*5.17E-03*		
Indeno(1,2,3-cd)pyrene		*3.98E-03*			*8.05E-04*			*4.02E-03*			*3.98E-03*			*1.47E-03*		
Propylene oxide	3.57E-03	4.90E-06	1.75E-02	1.77E-03	3.38E-06	1.21E-02	1.22E-03	4.90E-06	1.75E-02	1.77E-03	3.76E-06	1.34E-02	1.36E-03	7.43E-07	2.65E-03	2.68E-04
Toluene	1.61E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Xylene	7.88E-03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			1.05E+00 per ug/m3	1.06E-01 in one million		4.19E-01 per ug/m3	4.23E-02 in one million		1.06E+00 per ug/m3	1.07E-01 in one million		9.55E-01 per ug/m3	9.64E-02 in one million		2.97E-01 per ug/m3	3.00E-02 in one million

(1) Maximum unit risk value applied to all PAHs for purposes of this analysis.
(2) Based on modeled cancer risk from both CTG (in one million) = 0.10624 and from engine (in one million) = 0.00169
(3) Based on modeled cancer risk from both CTG (in one million) = 0.04232 and from engine (in one million) = 0.00117
(4) Based on modeled cancer risk from both CTG (in one million) = 0.10695 and from engine (in one million) = 0.00169
(5) Based on modeled cancer risk from both CTG (in one million) = 0.09639 and from engine (in one million) = 0.0013
(6) Based on modeled cancer risk from both CTG (in one million) = 0.02996 and from engine (in one million) = 0.00026

Compound	Annual Average Emissions, g/s	Derived (OEHHA) Method			Average Point Estimate			High-End Point Estimate			Derived (Adjusted) Method			Worker Exposure: Derived (OEHHA) Method		
		Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (2)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (3)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (4)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (5)	Unit Risk (per µg/m^3)	Cancer Risk Model Input (g/s per µg/m^3)	Modeled Contribution to Cancer Risk (6)
Diesel Emergency Fire Water Pump Engine Testing																
Diesel Exhaust Particulate Matter (DPM)	1.09E-07	4.15E-04	4.53E-05	1.69E-03	2.86E-04	3.12E-05	1.17E-03	4.15E-04	4.53E-05	1.69E-03	3.19E-04	3.48E-05	1.30E-03	6.29E-05	6.86E-06	2.60E-04
			per ug/m3	in one million		per ug/m3	in one million		per ug/m3	in one million		per ug/m3	in one million		per ug/m3	in one million

The combined Maximum Incremental Cancer Risk (MICR) at the Point of Maximum Impact (PMI) is 0.096 and occurs at UTME and UTMN coordinates: 469250 3666550 in NAD 27.
The combined Maximum Incremental Cancer Risk (MICR) at the Maximally-Exposed Individual Resident (MEIR) is 0.068 and occurs at UTME and UTMN coordinates: 469928 3666111 in NAD 27.
The combined Maximum Incremental Cancer Risk (MICR) at the Maximally-Exposed Individual Worker (MEIW) is 0.021 and occurs at UTME and UTMN coordinates: 469728 3666090 in NAD 27.

Table 5.9B-6 (Revised 5/11/08)
Calculation of Gas Turbine HHIs
Carlsbad Energy Center

Compound	Max Hourly Emissions Per Turbine (g/s)	HARP Acute HI (per µg/m^3)	Acute HHI Model Input (g/s per µg/m^3)	Modeled Contribution to Acute HHI (1)	Annual Average Emissions (g/s)	HARP Chronic HI (per µg/m^3)	Chronic HHI Model Input (g/s per µg/m^3)	Modeled Contribution to Chronic HHI (2)
Ammonia	1.7660	3.13E-04	5.53E-04	4.31E-03	7.71E-01	5.00E-03	3.86E-03	3.89E-04
Propylene	0.1989	--	--	--	9.31E-02	3.33E-04	3.10E-05	3.13E-06
Acetaldehyde	1.053E-02	--	--	--	4.93E-03	1.11E-01	5.47E-04	5.52E-05
Acrolein	9.519E-04	5.26E+00	5.01E-03	3.90E-02	4.46E-04	1.67E+01	7.44E-03	7.51E-04
Benzene	8.591E-04	7.69E-04	6.61E-07	5.15E-06	4.02E-04	1.67E-02	6.71E-06	6.78E-07
1,3-Butadiene	1.133E-04	--	--	--	5.30E-05	5.00E-02	2.65E-06	2.67E-07
Ethylbenzene	8.410E-03	--	--	--	3.94E-03	5.00E-04	1.97E-06	1.99E-07
Formaldehyde	9.468E-02	1.06E-02	1.00E-03	7.82E-03	4.43E-02	3.33E-01	1.48E-02	1.49E-03
Hexane	6.682E-02	--	--	--	3.13E-02	1.43E-04	4.47E-06	4.51E-07
Naphthalene	4.282E-04	--	--	--	2.00E-04	1.11E-01	2.22E-05	2.25E-06
PAHs (listed individually below)	3.379E-05	--	--	--	1.58E-05	--	--	--
Benzo(a)anthracene								
Benzo(a)pyrene								
Benzo(b)fluoranthrene								
Benzo(k)fluoranthrene								
Chrysene								
Dibenz(a,h)anthracene								
Indeno(1,2,3-cd)pyrene								
Propylene oxide	7.626E-03	3.23E-04	2.46E-06	1.92E-05	3.57E-03	3.33E-02	1.19E-04	1.20E-05
Toluene	3.431E-02	2.70E-05	9.26E-07	7.22E-06	1.61E-02	3.33E-03	5.35E-05	5.40E-06
Xylene	1.685E-02	4.55E-05	7.66E-07	5.97E-06	7.88E-03	1.43E-03	1.13E-05	1.14E-06
		Total =	6.57E-03	5.12E-02		Total =	2.69E-02	2.71E-03

1) Based on modeled non-cancer acute HHI from both CTG (-) = 0.0512
2) Based on modeled non-cancer chronic HHI from both CTG (-) = 0.00271

Table 5.9B-7 (Revised 5/11/08)
Calculation of HHI Modeling Inputs for Gas Turbines During Commissioning Hours without Oxidation Catalyst
Carlsbad Energy Center

Compound	Max Hourly Emissions Per Turbine g/s	HARP Acute HI (per $\mu g/m^3$)	Acute HHI Model Input (g/s per $\mu g/m^3$)	Modeled Contribution to Acute HHI (1)
Ammonia	1.7660	3.13E-04	5.53E-04	4.31E-03
Propylene	0.1989	--	--	--
Acetaldehyde	1.05E-02	--	--	--
Acrolein	1.68E-03	5.26E+00	8.86E-03	6.91E-02
Benzene	3.15E-03	7.69E-04	2.42E-06	1.89E-05
1,3-Butadiene	1.13E-04	--	--	--
Ethylbenzene	8.41E-03	--	--	--
Formaldehyde	1.87E-01	1.06E-02	1.98E-03	1.54E-02
Hexane	6.68E-02	--	--	--
Naphthalene	4.28E-04	--	--	--
PAHs (listed individually below)	3.38E-05	--	--	--
Benzo(a)anthracene				
Benzo(a)pyrene				
Benzo(b)fluoranthrene				
Benzo(k)fluoranthrene				
Chrysene				
Dibenz(a,h)anthracene				
Indeno(1,2,3-cd)pyrene				
Propylene oxide	7.63E-03	3.23E-04	2.46E-06	1.92E-05
Toluene	3.43E-02	2.70E-05	9.26E-07	7.22E-06
Xylene	1.68E-02	4.55E-05	7.66E-07	5.98E-06
		Total =	1.14E-02	8.89E-02

1) Based on modeled non-cancer acute HHI from both CTG (-) = 0.08887

Table 5.9B-8 (Revised 5/11/08)
Calculation of Emergency Fire Water Pump Engine HHIs
Carlsbad Energy Center

Non-Criteria Pollutant	Max Hourly Emissions (g/s)	HARP Acute HI (per $\mu g/m^3$)	Acute HHI Model Input (g/s per $\mu g/m^3$)	Modeled Contribution to Acute HHI	Annual Average Emissions (g/s)	HARP Chronic HI (per $\mu g/m^3$)	Chronic HHI Model Input (g/s per $\mu g/m3$)	Modeled Contribution to Chronic HHI
Fire Water Pump Engine								
DPM	NA	NA	NA	NA	1.09E-07	0.2	2.18E-08	< 0.0001
Acrolein	1.05E-07	5.26E+00	5.55E-07	3.27E-04				
Arsenic	4.98E-09	5.26E+00	2.62E-08	1.55E-05				
Benzene	5.80E-07	7.69E-04	4.46E-10	2.63E-07				
Copper	1.28E-08	1.00E-02	1.28E-10	7.52E-08				
Formaldehyde	5.37E-06	1.06E-02	5.69E-08	3.36E-05				
Hydrogen chloride	5.80E-07	4.76E-04	2.76E-10	1.63E-07				
Mercury	6.22E-09	5.56E-01	3.46E-09	2.04E-06				
Nickel	1.21E-08	1.67E-01	2.02E-09	1.19E-06				
Toluene	3.28E-07	2.70E-05	8.85E-12	5.22E-09				
Xylenes	1.32E-07	4.55E-05	6.00E-12	3.54E-09				
		Total =	6.44E-07	3.80E-04				

Table 5.9B-9 (Revised 5/11/08)
Summary of Modeling Inputs
Carlsbad Energy Center

Emitting Unit	Derived (OEHHA) Method Cancer Risk Model Input (Res)	Average Point Estimate Cancer Risk Model Input (Res)	High-end Point Estimate Cancer Risk Model Input (Res)	Derived (Adjusted) Method Cancer Risk Model Input (Res)	Derived (OEHHA) Method Cancer Risk Model Input (Worker)	Acute HHI Model Input	Chronic HHI Model Input
Turbine acute HHI wo ox cat						1.140E-02	
Each Turbine	1.052E+00	4.191E-01	1.059E+00	9.545E-01	2.967E-01	6.568E-03	2.685E-02
Fire Water Pump Engine	4.526E-05	3.119E-05	4.526E-05	3.479E-05	6.860E-06	6.442E-07	2.181E-08

All modeling input values are in units of g/s per $\mu g/m^3$

Table 5.9B-10 (Revised 5/11/08)

Maximum Annual Non-Criteria Pollutant Emissions For Existing Units Fueled with Natural Gas

Toxic Air Contaminant	Emission Factors		Maximum Heat Input						Natural Gas Heat Content	Operating Scenario	Annual Fuel Consumption						Annual Emissions						
	lb/MMscf		MMBtu/hr						Btu/scf (HHV)		MMscf/year						tons/year						
	Boiler[1]	Gas Turbine[2]	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Gas Turbine		hrs/yr	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Gas Turbine	Boiler 1	Boiler 2	Boiler 3	Boiler 4	Boiler 5	Gas Turbine	All Units
Propylene (non-HAP)	1.55E-02 (4)		1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.07	0.07	0.08	0.216	0.231	0.000	0.66
Benzene	2.10E-03	1.22E-02	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.01	0.01	0.01	0.029	0.031	0.017	0.11
Formaldehyde	7.50E-02	7.24E-01	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.33	0.33	0.36	1.046	1.120	0.986	4.17
Hexane	1.30E-03 (4)	2.59E-01	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.01	0.01	0.01	0.018	0.019	0.35	0.41
Naphthalene	6.10E-04	1.30E-03	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.00	0.00	0.00	0.0085	0.0091	0.0018	0.028
Dichlorobenzene	1.20E-03		1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.01	0.01	0.01	0.017	0.018	0	0.051
Toluene	3.40E-03	1.33E-01	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.01	0.01	0.02	0.047	0.051	0.181	0.33
1,3-Butadiene		4.39E-04	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0	0	0	0	0	0.00060	0.00060
Acetaldehyde	8.87E-03 (3)	4.08E-02	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.04	0.04	0.04	0.124	0.132	0.056	0.43
Acrolein	8.00E-04 (4)	6.50E-03	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.00	0.00	0.00	0.011	0.012	0.0089	0.043
Ethyl Benzene	6.90E-02	3.26E-02	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.30	0.30	0.33	0.962	1.030	0.044	2.97
PAHs (other)	1.00E-04 (4)	2.20E-03	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.00	0.00	0.00	0.0014	0.0015	0.0030	0.0072
Xylene	2.00E-02	6.53E-02	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0.09	0.09	0.10	0.279	0.299	0.089	0.94
Propylene oxide		2.96E-02	1,013.0	1,013.0	1,128.0	3,245.0	3,475.0	317.0	1,019.3	8,760	8,706	8,706	9,694	27,887	29,864	2,724	0	0	0	0	0	0.040	0.040
Total HAPs =																							9.52

(1) SDAPCD 2005 Toxic Inventory Report for the Encina Power Plant, November 17, 2006, and from:

USEPA. *Compilation of Air Pollutant Emission Factors,* Volume I, Stationary Area and Point Sources, Section 1.4, Natural Gas Combustion, Table 1.4-3, July 1998. Assume no control systems.

(2) All factors from the SDAPCD 2005 Toxic Inventory Report for the Encina Power Plant, November 17, 2006.

(3) CATEF database

(4) Ventura County APCD AB2588 emission factors for natural gas external combustion equipment (greater than 100 MMBtu/hr), May 17, 2001.