

APPENDIX 5.1A

## Emission and Operating Parameters

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## APPENDIX 5.1A

# Emissions and Operating Parameters

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**Table 5.1A-1  
NCPA Lodi Energy Center  
Emissions from the Existing Gas Turbine**

Parameter	
Standard Temp (F)	60
Heat Input Rate (MMBtu/hr)	463
Power Generation (MW)	49
Exhaust O2 Conc	0.00%
CO2 F-Factor (dscf/MMBtu)	1,040
Exhaust Flow Rate (dscfm)	67,212
Higher Heating Value (Btu/lb)	22,525
Daily Operating Hours	24
Annual Operating Days	365

Device	Gas Turbine
Make	General Electric
Model	LM5000
Fuel	Natural Gas

Pollutant	Exhaust Concentration (ppmvd @ 15% O2)	Emission Factors (lb/MMBtu)	Maximum Emissions		
			Hourly (lb)	Daily (lb)	Annual (tons)
CO	13	0.029	13.4	322	58.8
NOx	3.0	0.011	5.20	112	20.4
PM10 ---->gr/dscf	0.0035	0.004	2.0	48	8.8
SOx (as SO2)	0.5	0.0028	1.30	31	5.7
VOC (as CH4)	10	0.0128	5.92	142	25.9

Notes

- Standard temperature as specified in Section 3.47 of Rule 1020 of the SJVUAPCD Rules and Regulations.
- Fuel consumption (in MMBtu/hr) is limited by Permit Condition 22.
- Power generation is specified in the Permit to Operate.
- Exhaust O2 concentration corresponds to the USPEPA f-factor.
- CO2 F-factor obtained from 40 CFR Part 60, Method 19.
- Exhaust flow rate calculated from heat input rate and the USEPA F-factor from 40 CFR Part 60, Method 19.
- Fuel sulfur content (in gr/100 scf) is limited by Permit Condition 35.
- Higher heating value (in Btu/lb) corresponds to a higher heating value of 1,004 Btu/scf.
- Daily NOx, CO, and VOC emissions are limited by Permit Conditions 31, 33, and 34, respectively. Hourly emissions of CO and VOC were calculated from the daily emissions and the daily operating hours. Exhaust concentrations (in ppmv @ 15% O2) were calculated from the hourly emission rate, exhaust flow rate, exhaust O2 concentration, and reference O2 concentration. Hourly NOx mass emissions were calculated from the NOx concentration limit in Condition 27.
- Daily PM10 emissions are limited by Permit Condition 22. Hourly emissions were calculated from the daily emissions and the daily operating hours. Exhaust PM10 concentration (in gr/dscf @ 12% CO2) was calculated from the hourly emission rate, heat input rate, CO F-factor, and reference CO2 concentration.
- Hourly SOx emissions were calculated from the heat input rate (in MMBtu/hr), the higher heating value (in Btu/lb), and the fuel sulfur content (in gr/100 scf). Daily SOx emissions were calculated from the hourly emissions and the daily operating hours. Exhaust SOx concentration (in ppmv @ 15% O2) was calculated from the hourly emission rate, exhaust flow rate, exhaust O2 concentration, and reference O2 concentration.
- Except for SO2, emission factors (in lb/MMBtu) were calculated from the hourly emission rate (in lb/hr) and the heat input rate (MMBtu/hr). For SO2, the emission factor (in lb/MMBtu) was calculated from the fuel sulfur content limit and the heat content of the natural gas fuel.
- Annual emissions were calculated from the daily emissions and annual operating days.

**Table 5.1A-2  
NCPA Lodi Energy Center  
Emissions from the Existing Emergency Diesel Fire Pump Engine**

Parameter	
Power Output (bhp)	240
Fuel Consumption (Btu/hp-hr)	6,700
Higher Heating Value (Btu/gal)	135,100
Fuel Density (lb/gal)	7.0
Fuel Sulfur Content, wt	0.015%
Heat Input Rate (MMBtu/hr)	1.6
Exhaust Rate (dscfm @ 15% O <sub>2</sub> )	872
Exhaust Rate (dscfm @ 12% CO <sub>2</sub> )	317
Daily Operating Hours	24
Annual Operating Hours	50

Device	IC Engine
Make	Cummins
Model	6CTA8.3-F1
Fuel	Diesel

Pollutant	Exhaust Concentration (ppmvd @ 15% O <sub>2</sub> )	Emission Factors (lb/bhp-hr)	Maximum Emissions		
			Hourly (lb)	Daily (lb)	Annual (tons)
CO	423	0.00668	1.6	38	0.04
NO <sub>x</sub>	520	0.013	3.2	78	0.08
PM <sub>10</sub> ---->gr/dscf @ 12% O <sub>2</sub>	0.10	0.00110	0.26	6	0.01
SO <sub>x</sub>	2.9	0.00010	0.02	0.6	0.00
VOC (as CH <sub>4</sub> )	274	0.00247	0.59	14	0.01

Notes

1. Power output (in bhp) was specified in the Permit to Operate.
2. Fuel consumption (in gal/hr) and higher heating value (in Btu/gal) were obtained from Table 3.3-1 of AP-
3. Fuel density (lb/gal) reflects the typical value for diesel.
4. Fuel sulfur content (in wt%) and annual operating hours are limited by the ATCM.
5. Heat input rate was calculated from the power output (in bhp), fuel consumption rate (in Btu/hp-hr), and higher heating value (in Btu/gal).
6. Exhaust flow rates at reference concentrations were calculated from the heat input rate and F-factors from 40 CFR Part 60 Method 19.
7. CO, NO<sub>x</sub>, PM<sub>10</sub>, and VOC emission factors (in lb/bhp-hr) were obtained from Table 3.3-1 of AP-42.
8. SO<sub>x</sub> emission factor (in g/bhp-hr) was calculated from the fuel consumption rate (in Btu/hp-hr), the higher heating value (in Btu/gal), the fuel density (in lb/gal), and the fuel sulfur content (in weight %).
9. Hourly emissions were calculated from the emissions factor (in g/bhp-hr) and the power output (in bhp). Daily and annual emissions were calculated from the hourly emissions and the corresponding operating
10. Exhaust CO, NO<sub>x</sub>, SO<sub>x</sub>, and VOC concentrations (in ppmvd @ 15% O<sub>2</sub>) were calculated from the hourly emission rates and the exhaust flow rate at the reference O<sub>2</sub> or CO<sub>2</sub> concentrations. Exhaust PM and PM<sub>10</sub> concentrations (in gr/dscf @ 12% CO<sub>2</sub>) were calculated from the hourly emission rates and the exhaust flow rate at the reference CO<sub>2</sub> concentration.

**Table 5.1A-3**  
**NCPA Lodi Energy Center**  
**Emissions and Operating Parameters for the CTG/HRSG**

Case	Cold Base	Cold Low	Cold Peak	Avg. Base	Avg. Low	Avg. Peak	Hot Base	Hot Low	Hot Peak
CTG Gross Power, MW	184.6	92.3	184.6	171.0	85.5	171.0	159.4	79.7	159.4
Ambient Temp, F	23.7	23.7	23.7	61.2	61.2	61.2	107.7	107.7	107.7
Turbine Load, %									
Evap Cooler On/Off	Off	Off	Off	On	On	On	On	On	On
CTG heat input, MMBtu/hr (HHV)	1885.3	1220.0	1885.3	1777.4	1157.4	1777.4	1688.9	1096.5	1688.9
DB heat input, MMBtu/hr (HHV)	0.0	0.0	222.0	0.0	0.0	210.9	0.0	0.0	222.0
Total heat input, MMBtu/hr (HHV)	1885.3	1220.0	2107.2	1777.4	1157.4	1988.2	1688.9	1096.5	1910.8
Stack flow, lb/hr	3,777,613	2,483,814	3,845,814	3,555,531	2,419,490	3,621,670	3,422,443	2,443,573	3,488,558
Stack flow, acfm	1,042,217	658,458	1,044,503	991,425	653,353	997,358	970,700	674,017	977,368
Stack flow, dscfm	778,706	512,506	787,959	727,039	496,067	736,030	684,224	491,289	692,655
Stack temp, F	183	158	172	187	167	178	190	173	181
Stack exhaust, vol %									
O2 (dry)	13.78%	13.90%	13.03%	13.71%	14.04%	12.95%	13.64%	14.34%	12.78%
CO2 (dry)	4.08%	4.01%	4.50%	4.12%	3.93%	4.54%	4.15%	3.76%	4.64%
H2O	7.61%	7.50%	8.31%	8.76%	8.45%	9.46%	11.89%	11.27%	12.64%
<b>Emissions</b>									
NOx, ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NOx, lb/hr	13.64	8.83	15.25	12.86	8.38	14.39	12.22	7.94	13.83
NOx, lb/MMBtu	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072	0.0072
SO2, ppmvd @ 15% O2	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
SO2, lb/hr (short-term)	5.37	3.47	6.00	5.06	3.30	5.66	4.81	3.12	5.44
SO2, lb/MMBtu (short-term)	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
SO2, lb/hr (long-term)	5.37	3.47	6.00	5.06	3.30	5.66	4.81	3.12	5.44
SO2, lb/MMBtu (long-term)	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028	0.0028
CO, ppmvd @ 15% O2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CO, lb/hr	12.46	8.06	13.93	11.75	7.65	13.14	11.16	7.25	12.63
CO, lb/MMBtu	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066	0.0066
VOC, ppmvd @ 15% O2	1.40	1.40	2.00	1.40	1.40	2.00	1.40	1.40	2.00
VOC, lb/hr	3.33	2.16	5.32	3.14	2.04	5.02	2.98	1.94	4.82
VOC, lb/MMBtu	0.0018	0.0018	0.0028	0.0018	0.0018	0.0028	0.0018	0.0018	0.0029
PM10, lb/hr	9.0	9.0	11.0	9.0	9.0	11.0	9.0	9.0	11.0
PM10, lb/MMBtu	0.0048	0.0074	0.0058	0.0051	0.0078	0.0062	0.0053	0.0082	0.0065
PM10, gr/dscf	0.00135	0.00205	0.00163	0.00144	0.00212	0.00174	0.00153	0.00214	0.00185
NH3, ppmvd@15% O2	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
NH3, lb/hr	25.25	16.34	28.23	23.81	15.50	26.63	22.62	14.69	25.60

**Table 5.1A-4  
 NCPA Lodi Energy Center  
 Emissions and Operating Parameters for Auxiliary Boiler**

**Boiler Emission Characteristics**

Auxiliary Boiler, MMBtu/hr (HHV)	65
Boiler Rating, lb/hr	45,000
NOx, ppmvd @ 3% O2	7.00
CO, ppmvd @ 3% O2	50.00
VOC (as CH4), ppmvd @ 3% O2	10.00
NOx (as NO2), lb/hr	0.55
NOx, lb/MMBtu	0.0084
CO, lb/hr	2.37
CO, lb/MMBtu	0.0365
POC (as CH4), lb/hr	0.27
POC, lb/MMBtu	0.0042
PM10, lb/hr	0.47
PM10, lb/MMBtu	0.0072
SO2, grains/100 scf	1.0
SO2, lb/hr	0.19
SO2, lb/MMBtu	0.0028

**Table 5.1A-5**  
**NCPA Lodi Energy Center**  
**Calculation of Cooling Tower Emissions**

Typical Worst-Case Design Parameters	
Water Flow Rate, 10E6 lbm/hr	29.99
Water Flow Rate, gal/min	60,000
Drift Rate, %	0.0005
Drift, lbm water/hr	149.94
PM10 Emissions based on TDS Level	
TDS level, ppm (from W-P specs)	3000
PM10, lb/hr	0.45
PM10, lb/day	10.8
PM10, tpy	1.97

Based on 8760 hrs/yr

**Table 5.1A-6**  
**NCPA Lodi Energy Center**  
**Calculations for Maximum Hourly, Daily, Quarterly and Annual Criteria Pollutant Emissions**

Assumptions for Daily and Annual Ops:	CTG/HRSG					Max Possible CTG/HRSG Hours (SO2, PM10)	Auxiliary Boiler Total Hours	
	Hot Start Hours	Cold Start Hours	Duct Firing Hours	Base Load Hours	Total Hours (NOx, CO, VOC)			
Daily	0	6	12	6	24	24	12	per day
Q1	100	42	350	1184	1676	2160	142	per quarter
Q2	100	42	350	1208	1700	2184	142	per quarter
Q3	40	36	1100	800	1976	2208	76	per quarter
Q4	72	36	700	1040	1848	2208	108	per quarter

Equipment	Hourly Emission Rates						
	max. hour	NOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	VOC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Gas Turbine, base	0	13.64	5.37	12.46	3.33	9.00	25.25
Gas Turbine, peak	1	15.25	6.00	13.93	5.32	11.00	28.23
Gas Turbine, startups/shutdowns	0	100.00	5.37	900.00	16.00	9.00	25.25
Auxiliary Boiler	1	0.55	0.19	2.37	0.27	0.47	0
Cooling Tower	1	0	0	0	0	0.45	0

**Table 5.1A-6 (cont'd)**

Equipment	NOx Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	81.9	16,154.2	16,481.6	10,915.0	14,189.5	28.9
Gas Turbine, peak	0.0	183.0	5,337.5	5,337.5	16,775.0	10,675.0	19.1
Gas Turbine, startups/shutdowns	160.0	600.0	14,200.0	14,200.0	7,600.0	10,800.0	23.4
Auxiliary Boiler	0.5	6.5	77.5	77.5	41.5	58.9	0.13
Cooling Tower	0	0	0	0	0	0	0
Total, CTG/HRSG only	160.0	864.9	35,691.6	36,019.1	35,289.9	35,664.4	71.3
Total	160.5	871.4	35,769.1	36,096.6	35,331.4	35,723.4	71.5

Equipment	SOx Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	32.2	8,954.1	9,082.9	5,539.9	7,515.4	15.5
Gas Turbine, peak	6.0	72.0	2,100.1	2,100.1	6,600.2	4,200.1	7.5
Gas Turbine, startups/shutdowns	0.0	32.2	762.3	762.3	408.0	579.8	1.3
Auxiliary Boiler	0.2	2.2	26.3	26.3	14.1	20.0	0.04
Cooling Tower	0	0	0	0	0	0	0
Total, CTG/HRSG only	6.0	136.4	11,816.4	11,945.3	12,548.1	12,295.3	24.3
Total	6.2	138.6	11,842.7	11,971.6	12,562.2	12,315.3	24.3

Equipment	CO Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	74.8	14,753.2	15,052.2	9,968.4	12,958.9	26.4
Gas Turbine, peak	0.0	167.1	4,874.6	4,874.6	15,320.2	9,749.2	17.4
Gas Turbine, startups/shutdowns	900.0	5,400.0	127,800.0	127,800.0	68,400.0	97,200.0	210.6
Auxiliary Boiler	2.4	28.5	337.0	337.0	180.4	256.3	0.6
Cooling Tower	0	0	0	0	0	0	0
Total, CTG/HRSG only	900.0	5,641.9	147,427.8	147,726.8	93,688.5	119,908.1	254.4
Total	902.4	5,670.4	147,764.8	148,063.9	93,868.9	120,164.4	254.9

Equipment	VOC Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	20.0	3,943.4	4,023.3	2,664.4	3,463.8	7.0
Gas Turbine, peak	0.0	63.8	1,861.3	1,861.3	5,849.9	3,722.6	6.6
Gas Turbine, startups/shutdowns	16.0	96.0	2,272.0	2,272.0	1,216.0	1,728.0	3.7
Auxiliary Boiler	0.3	3.3	38.6	38.6	20.7	29.4	0.1
Cooling Tower	0	0	0	0	0	0	0
Total, CTG/HRSG only	16.0	179.8	8,076.7	8,156.6	9,730.3	8,914.4	17.4
Total	16.3	183.1	8,115.3	8,195.2	9,751.0	8,943.8	17.5

Equipment	PM10/PM2.5 Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	54.0	15,012.0	15,228.0	9,288.0	12,600.0	26.1
Gas Turbine, peak	11.0	132.0	3,850.0	3,850.0	12,100.0	7,700.0	13.8
Gas Turbine, startups/shutdowns	0.0	54.0	1,278.0	1,278.0	684.0	972.0	2.1
Auxiliary Boiler	0.5	5.6	66.7	66.7	35.7	50.8	0.1
Cooling Tower	0.4	10.8	971.6	982.4	993.2	993.2	2.0
Total, CTG/HRSG only	11.0	240.0	20,140.0	20,356.0	22,072.0	21,272.0	41.9
Total	11.9	256.4	21,178.4	21,405.1	23,100.9	22,316.0	44.0

Equipment	NH3 Emissions						
	Max lb/hr	Max lb/day	Max lb/Q1	Max lb/Q2	Max lb/Q3	Max lb/Q4	Total tons/yr
Gas Turbine, base	0.0	151.5	42,124.4	42,730.5	26,062.6	35,356.2	73.1
Gas Turbine, peak	28.2	338.7	9,879.7	9,879.7	31,050.4	19,759.3	35.3
Gas Turbine, startups/shutdowns	0.0	151.5	3,586.1	3,586.1	1,919.3	2,727.5	5.9
Auxiliary Boiler	0	0	0	0	0	0	0
Cooling Tower	0	0	0	0	0	0	0
Total, CTG/HRSG only	28.2	641.8	55,590.2	56,196.3	59,032.3	57,843.0	114.3
Total	28.2	641.8	55,590.2	56,196.3	59,032.3	57,843.0	114.3

**Table 5.1A-7  
NCPA Lodi Energy Center  
Greenhouse Gas Emissions Calculations**

Unit	Rated Capacity, MW	Operating Hours per year	Maximum Fuel Use, MMBtu/yr	Estimated Gross MWh	Maximum Emissions, metric tonnes/yr				Estimated Emissions, metric tonnes/MWh		
					CO2	CH4	N2O	SF6	CO2	CH4	N2O
CTG, base load	267.3	6260	11,801,854	1,673,486	623,964	10.62	1.18	--	0.373	6.35E-06	7.05E-07
CTG, peak load	292.3	2500	5,268,076	730,868	278,523	4.74	0.53	--	0.381	6.49E-06	7.21E-07
Auxiliary boiler	n/a	468	30,420	n/a	1,608	0.03	0.00	--	n/a	n/a	n/a
Total	--	--	17,100,350	2,404,353	904,095	15.39	1.71	9.45E-04	0.376	6.40E-06	7.11E-07
CO2-Equivalent					904,095	323.20	530.11	22.60			

**Natural Gas GHG Emission Rates (Note 1)**

	Emission Factors, kg/MMBtu			Emission Factor
	CO2 (2)	CH4 (3)	N2O (3)	SF6 (5)
Natural Gas	52.870	9.00E-04	1.00E-04	n/a
Global Warming Potential (4)	1	21	310	23,900

- Notes: 1. Calculation methods and emission factors from ARB, "Regulation for the Mandatory Reporting of Greenhouse Gas Emissions," December 5, 2007 (Staff's Suggested Modifications to the Originally Proposed Regulation Order Released October 19, 2007). [http://www.arb.ca.gov/cc/ccei/reporting/GHGReportRegUpdate12\\_05\\_07.pdf](http://www.arb.ca.gov/cc/ccei/reporting/GHGReportRegUpdate12_05_07.pdf)
2. Appendix A, Table 4; heat content 1000 to 1025 Btu/scf.
3. Appendix A, Table 6.
4. Appendix A, Table 2.
5. Sulfur hexafluoride (SF6) will be used as an insulating medium in one new 230 kV breaker. Estimates of the SF6 contained in a breaker of this size range from 161 to 208 lbs, depending on the manufacturer. Breaker manufacturers guarantee leakage rates below 1%, so a maximum leakage rate of 1% per year is assumed.

**Table 5.1A-8  
NCPA Lodi Energy Center  
Calculation of Noncriteria Pollutant Emissions from the CTG/HRSG**

Compound	Emission Factor, lb/MMBtu (1)	Maximum Hourly Emissions, lb/hr (2)	Total Annual Emissions (3)	
			lb/yr	tpy
Ammonia	(4)	28.23	228,661.8	114.3
Propylene	7.68E-04	1.62	13,108.5	6.6
<b>Hazardous Air Pollutants</b>				
Acetaldehyde	4.00E-05	8.43E-02	682.8	0.34
Acrolein	6.40E-06	1.35E-02	109.2	5.46E-02
Benzene	1.20E-05	2.53E-02	204.8	1.02E-01
1,3-Butadiene	4.30E-07	9.06E-04	7.3	3.67E-03
Ethylbenzene	3.20E-05	6.74E-02	546.2	2.73E-01
Formaldehyde	7.10E-04	1.50	12,119.7	6.06
Hexane	2.58E-04	0.54	4,403.5	2.20
Naphthalene	1.30E-06	2.74E-03	22.2	1.11E-02
PAHs (5)	3.14E-07	6.61E-04	5.4	2.68E-03
Propylene oxide	4.76E-05	1.00E-01	812.5	0.41
Toluene	1.30E-04	2.74E-01	2,219.1	1.11
Xylene	6.40E-05	1.35E-01	1,092.5	0.55
<b>Total HAPs</b>		<b>2.74</b>	<b>22,225.3</b>	<b>11.11</b>

Notes:

- (1) All factors except individual PAHs, hexane and propylene from AP-42, Table 3.4-1. Individual PAHs, hexane and propylene are CATEF mean results as AP-42 does not include factors for these compounds. MMscf converted to MMBtu using typical fuel analysis.
- (2) Based on maximum hourly turbine fuel use of 2,107 MMBtu/hr (HHV)
- (3) Based on total annual fuel use of 17,069,930 MMBtu/yr
- (4) Based on 10 ppm ammonia slip from SCR system.
- (5) Emission factors for individual PAHs weighted by cancer risk relative to B(a)P and summed to obtain overall B(a)P equivalent emission rate for HRA. Total of "Adjusted EF" plus naphthalene equals Total PAH EF of 2.2 E-06 lb/MMBtu shown in AP-42, Table 3.4-1.

	Mean EF (Note 1)	Adjusted EF (Note 5)	PEF Equiv.	PEF-Weighted EF
PAHs (as B(a)P)				
Benzo(a)anthracene	2.25E-08	1.55E-07	0.1	1.55E-08
Benzo(a)pyrene	1.38E-08	9.55E-08	1	9.55E-08
Benzo(b)fluoranthrene	1.13E-08	7.76E-08	0.1	7.76E-09
Benzo(k)fluoranthrene	1.10E-08	7.56E-08	0.1	7.56E-09
Chrysene	2.51E-08	1.73E-07	0.01	1.73E-09
Dibenz(a,h)anthracene	2.34E-08	1.61E-07	1.05	1.70E-07
Indeno(1,2,3-cd)pyrene	2.34E-08	1.61E-07	0.1	1.61E-08

**Table 5.1A-9  
NCPA Lodi Energy Center  
Calculation of Noncriteria Pollutant Emissions from Auxiliary Boiler**

Compound	Emission Factor, lb/MMscf (1)	Hourly Emissions, lb/hr (2)	Total Annual Emissions (3)	
			lb/yr	tpy
Propylene	5.30E-01	3.43E-02	16.1	8.03E-03
Hazardous Air Pollutants				
Acetaldehyde	3.10E-03	2.01E-04	0.1	4.69E-05
Acrolein	2.70E-03	1.75E-04	0.1	4.09E-05
Benzene	5.80E-03	3.75E-04	0.2	8.78E-05
1,3-Butadiene	n/a	--	--	--
Ethylbenzene	6.90E-03	4.47E-04	0.2	1.04E-04
Formaldehyde	1.23E-02	7.96E-04	0.4	1.86E-04
Hexane	4.60E-03	2.98E-04	0.1	6.97E-05
Naphthalene	3.00E-04	1.94E-05	9.1E-03	4.54E-06
PAHs (excluding naphthalene)	1.00E-04	6.47E-06	3.0E-03	1.51E-06
Propylene oxide	n/a	--	--	--
Toluene	2.65E-02	1.72E-03	0.8	4.01E-04
Xylene	1.97E-02	1.28E-03	0.6	2.98E-04
Total HAPs			2.5	1.24E-03

Notes:

- (1) All factors from Ventura County APCD, "AB2588 Combustion Emission Factors," Natural Gas Fired External Combustion Equipment 10-100 MMBtu/hr. Available at <http://www.vcapcd.org/pubs/Engineering/AirToxics/combem.pdf>
- (2) Based on maximum hourly heat input of 64740 scf/hr
- (3) Based on total annual fuel use of 30.3 MMscf/yr

**Table 5.1A-10**  
**NCPA Lodi Energy Center**  
**Calculation of Noncriteria Pollutant Emissions from Cooling Tower**

Constituent	Concentration in Cooling Tower Return Water	Emissions (1)		
		Emissions, lb/hr	Emissions, ton/yr	Emissions, lbs/year
Ammonia	0.02 ppm	3.00E-06	1.31E-05	0.0
Copper	0.025 ppm	3.75E-06	1.64E-05	0.0
Silver	0 ppm	0.00E+00	0.00E+00	0.0
Zinc	0.025 ppm	3.75E-06	1.64E-05	0.0
Hazardous Air Pollutants				
Arsenic	0 ppm	0.00E+00	0.00E+00	0.000
Cadmium	0.025 ppm	3.75E-06	1.64E-05	0.033
Chromium (III)	0.025 ppm	3.75E-06	1.64E-05	0.033
Lead	0.05 ppm	7.50E-06	3.28E-05	0.066
Mercury	0 ppm	0.00E+00	0.00E+00	0.000
Nickel	0.025 ppm	3.75E-06	1.64E-05	0.033
Dioxins/furans	-- ppm	--	--	--
PAHs	--	--	--	--
Total HAPs			8.21E-05	0.16

Note: (1) Emissions calculated from maximum drift rate of 149.94 lb/hr.

**Table 5.1A-11  
NCPA Lodi Energy Center  
Calculation of Noncriteria Pollutant Emissions from the Existing Units**

**Gas Turbine**

Parameter	
Heat Input Rate (MMBtu/hr @ HHV) (1)	463.0
Annual Operating Hours	8,760

Pollutant	Emission Factor lb/MMBtu (2)	Maximum Annual Emissions (tpy)
Ammonia (3)	0.0335	67.94
Propylene	7.68E-04	1.56
<b>HAPs</b>		
Acetaldehyde	4.00E-05	0.08
Acrolein	6.40E-06	0.01
Benzene	1.20E-05	0.02
1,3-Butadiene	4.30E-07	0.00
Ethylbenzene	3.20E-05	0.06
Formaldehyde	7.10E-04	1.44
Hexane	2.58E-04	0.52
Naphthalene	1.30E-06	0.00
PAHs	1.30E-07	0.00
Benz(a)anthracene	2.25E-08	inc
Benzo(a)pyrene	1.38E-08	inc
Benzo(b)fluoranthene	1.13E-08	inc
Benzo(k)fluoranthene	1.10E-08	inc
Chrysene	2.51E-08	inc
Dibenz(a,h)anthracene	2.34E-08	inc
Indeno(1,2,3-cd)pyrene	2.34E-08	inc
Propylene oxide	4.76E-05	0.10
Toluene	1.30E-04	0.26
Xylene	6.40E-05	0.13
<b>TOTAL HAPS</b>		<b>2.64</b>

Notes

- Heat input rate (in MMBtu/hr) is limited by Permit Condition 28.
- All factors except individual PAHs, hexane and propylene from AP-42, Table 3.4-1. Individual PAHs, hexane and propylene are CATEF mean results as AP-42 does not include factors for these compounds. MMscf converted to MMBtu using typical fuel analysis.
- Based on permitted ammonia slip limit of 25 ppmc.
- Annual TAC emissions were calculated from the emission factor (in lb/MMBtu), the heat input rate in MMBtu/hr, and annual operating hours.

**Table 5.1A-11 (cont'd)**  
**Emergency Diesel Fire Pump Engine**

Parameter	Maximum Daily
Power Output (bhp)	240
Fuel Consumption (Btu/hp-hr)	6,700
Higher Heating Value (Btu/gal)	135,100
Annual Operating Hours	50

Pollutant	Emission Factor (lb/bhp-hr)	Maximum Annual Emissions (tpy)
DPM (1)	1.10E-03	6.60E-03
<b>TOTAL HAPS</b>		0.00

Notes

1. Per ARB guidance, DPM is used as a surrogate for all TACs from Diesel ICE. DPM is not a HAP.