

Mariposa Energy Project
 Table 5.1B.4R
 Turbine Criteria Pollutant Emission Estimates
 January 2010

Daily Emissions based on Maximum daily operation of 24 hours/day
 Annual Emissions based on Maximum annual operation of 4000 hours/year

Normal Operation Scenario(1)				Fuel Input ^{1,3}		Emissions ^{1,3} (Per Turbine)																
						NOx			CO			VOC			Particulates			SO ₂ ²				
Ambient	GE	RH	Load	Per CT	Per CT	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	lb/hr	lb/day	lb/yr	Max lb/hr	lb/day	Avg lb/hr	lb/yr	
Temp F	Date	%	%	MMBtu/hr (HHV)	lb/hr																	
17	1/29/2009	80	100	465	22,108	4.24	102	16,960	4.1	99	16,519	1.16	28	4,633	2.5	60	10,000	0.88	21.1	0.33	1,302	
46	1/27/2009	95	100	481	22,891	4.40	105	17,580	4.3	103	17,147	1.19	29	4,765	2.5	60	10,000	0.91	21.8	0.34	1,348	
59	1/27/2009	60	100	465	22,117	4.25	102	16,988	4.1	99	16,533	1.16	28	4,626	2.5	60	10,000	0.88	21.1	0.33	1,302	
59	12/9/2008	60	50	282	12,364	2.6	62	10,400	2.4	59	9,790	0.78	19	3,120	2.5	60	10,000	0.53	12.8	0.20	790	
93	1/27/2009	26	100	391	18,591	3.6	86	14,276	3.5	84	13,945	0.97	23	3,896	2.5	60	10,000	0.74	17.7	0.27	1,095	
93	12/9/2008	26	50	270	11,842	2.4	58	9,600	2.3	56	9,324	0.71	17	2,840	2.5	60	10,000	0.51	12.3	0.19	757	
112	1/29/2009	15	100	338	16,092	3.09	74	12,348	3.0	72	12,041	0.84	20	3,374	2.5	60	10,000	0.64	15.3	0.24	947	

50% load

(1) Source: GE Gas Turbine Performance Sheets for 17, 46, 59, 93 and 112F.

Data for 17 and 112F (Base Load) are based on January 29, 2009 data.

Data for 46, 59, and 93F (Base Load) are based on January 27, 2009 data.

Data for 59 and 93F (50% Load) are based on December 9, 2008 data

(2) Maximum SO₂ Emissions based on a emission factor of 0.00189 lb SO₂ per MMBtu natural gas - Source: 0.66 gr sulfur/100 cf natural gas, using method in AP-42 ch.1 table 1.4-2 and natural gas heat value of 1047 btu/scf.

(3) Per CTG, assuming BACT levels of 2.5 ppm NO_x, 4 ppm CO, and 2 ppm VOC. Daily emissions represent 24 hours per day per CTG. Annual emissions represent 4000 hours per CTG per year.

Modeling Scenarios

Normal Operation Scenario(1)				Exhaust Stack Conditions						Maximum Exhaust Emissions Rates (pound per hour)(per turbine)												
				Stack Temp	Flow	Stack Height	Stack Diameter	Velocity	NOx		CO		SOx			PM10		PM2.5				
Ambient	GE	RH	Load	F	lb/hr	ACFM ^a	Feet	Feet	ft/s	1-Hour ^b	Annual ^c	1-Hour ^b	8-Hour ^d	1-Hour ^b	3-Hour ^e	24-Hour ^f	Annual ^c	24-Hour ^f	Annual ^c	24-Hour ^f	Annual ^c	
Temp F	Date	%	%																			
17	1/29/2009	80	100	780	1127562	607693	79.5	12.0	89.6	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
46	1/27/2009	95	100	840	1083789	612224	79.5	12.0	90.2	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
59	1/27/2009	60	100	848	1051375	597341	79.5	12.0	88.0	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
59	12/9/2008	60	50	743	842305	440226	79.5	12.0	64.9	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
93	1/27/2009	26	100	861	930219	533924	79.5	12.0	78.7	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
93	12/9/2008	26	50	781	787723	424813	79.5	12.0	62.6	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	
112	1/29/2009	15	100	863	845007	485749	79.5	12.0	71.6	18.506	2.493	18.105	9.737	0.910	0.910	0.910	0.1625	2.50	1.206	2.50	1.206	

50% load

^a Assumes exhaust gases have an average molecular weight of 28.0 lb/lbmol, pressure of 1 atm, and gas constant equal to 0.7302 atm ft³/(lbmol R).

^bMaximum 1-hr scenario assumes one startup lasting 30 minutes, 15 minutes of steady state operation, and one shutdown lasting 15 minutes.

^cAnnual emission rate for NO_x, SO_x, PM10, and PM2.5 were conservatively based on 4,000 hours of turbine operation at full capacity with air inlet chiller operating, plus 300 startup and shutdown events. The annual SO₂ emission rate is based on

^d8-Hour Scenario assumes 3 startups, 3 shutdowns, and the balance of steady-state

^e3-Hour Scenario assumes 3 hours of steady-state operation

^f24-hour PM10/PM2.5 emission rate estimate based on the worst-case 1-hour emission rate (full capacity with air inlet chiller operating).