

Manufacturer's Emission Estimates - Siemens SGT6-5000F																
Air Emissions Summary (2)																
			Case 1	Case 6	Case 11	Case 3	Case 8	Case 13	Case 4	Case 9	Case 14	2x1 600	2x1 600	2x1 600		
CASE			1AA	1AB	1AC	1BA	1BB	1BC	1CA	1CB	1CC	7A	7B	7C		
Ambient Temp.	Deg F.		5	50	85	5	50	85	5	50	85	5	50	85		
Ambient Relative Humid.	%		80%	80%	77%	80%	80%	77%	80%	80%	77%	80%	80%	77%		
Gas Turbine Load	Percent		BASE	BASE	BASE	75.0%	75.0%	75.0%	60.0%	60.0%	60.0%	BASE	BASE	BASE		
Turbine Fuel	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG		
Duct Burner Fuel	Type		-	-	-	-	-	-	-	-	-	NG	NG	NG		
<b>GAS TURBINE INPUT (Per Turbine)</b>																
Fuel (7)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG		
Fuel Sulfur - Annual Average	ppmv		13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5		
Fuel Sulfur - Annual Average	grains/100 scf		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8		
SO2 Emission factor - Annual Average	lb/MM Btu		0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240	0.00240		
Fuel Sulfur - Short Term Average	ppmv		27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1	27.1		
Fuel Sulfur - Short Term Average	grains/100 scf		1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6		
SO2 Emission factor - Short Term Average	lb/MM Btu		0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480	0.00480		
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21325	21325	21325		
Fuel Heating Value (LHV)	Btu/scf		952	952	952	952	952	952	952	952	952	952	952	952		
Fuel Temperature	Deg F		365	365	365	365	365	365	365	365	365	365	365	365		
Turbine Output (Gross @ Generator Terminals)	kW		223935	198830	172579	167654	148775	129046	133811	118688	102887	223935	198830	172579		
Heat Rate (LHV)	Btu/kWh		8939	9182	9584	9511	9783	10234	10110	10432	10995	8939	9182	9584		
Heat Consumption (LHV)	MM Btu/h		2002	1826	1654	1595	1455	1321	1353	1238	1131	2002	1826	1654		
<b>GAS TURBINE EMISSIONS (Per Turbine) - Uncontrolled</b>																
Exhaust Flow	lb/h		4400719	4086935	3715853	3639080	3380202	3074790	3197211	2979118	2732691	4400719	4086935	3715853		
Exhaust Pressure	inches Water															
Exhaust Temp.	Deg F.		1059	1087	1124	1059	1087	1124	1059	1087	1124	1059	1087	1124		
NOx	ppmvd @ 15% O2		9	9	9	9	9	9	9	9	9	9	9	9		
NOx as NO2	lb/h		75	69	62	60	55	50	51	47	43	75	69	62		
SO2 - Annual Average	ppmvd @ 15% O2															
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	4.8	4.4	4.0		
SO2 - Short Term Average	ppmvd @ 15% O2															
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	9.6	8.8	7.9		
CO	ppmvd @ 15% O2		4	4	4	4	4	4	10	10	10	4	4	4		
CO	lb/h		21	19	17	17	15	14	35	32	29	21	19	17		
VOC	ppmvd @ 15% O2		1	1	1	1	1	1	5	5	5	1	1	1		
VOC as CH4	lb/h		2.9	2.7	2.4	2.3	2.1	1.9	9.8	9	8.2	2.9	2.7	2.4		
Particulates (PM10 front- and back-half)	lb/h		9	9	8	8	8	8	8	8	8	9	9	8		
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.88	0.87	0.86		
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	75.09	74.52	72.92		
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	12.59	12.6	12.25		
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	3.83	3.75	3.71		
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	7.61	8.26	10.26		
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.46	28.38	28.16		
<b>DUCT BURNER INPUT (Per HRSG) (2)(3) - Uncontrolled</b>																
Fuel (4)	Type		NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG		
Fuel Heating Value (LHV)	Btu/lb		21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21,325	21325	21325	21325		
Heat Consumption (LHV)	MM Btu/h		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	600.0	600.0	600.0		
NOx	lb/hr	0.08										52.8	52.8	52.8		
SO2	lb/hr											1.44	1.44	1.44		
CO	lb/hr	0.08										52.8	52.8	52.8		
VOC	lb/hr	0.01										6.6	6.6	6.6		
PM10	lb/hr	0.015										9.90	9.90	9.90		
Addition to Exhaust Flow	lb/hr											28,136.0	28,136.0	28,136.0		
<b>COMBINED GAS TURBINE AND DUCT BURNER EMISSIONS (Per Turbine/HRSG) - Uncontrolled</b>																
Exhaust Flow	lb/h		4,400,719	4,086,935	3,715,853	3,639,080	3,380,202	3,074,790	3,197,211	2,979,118	2,732,691	4,428,855	4,115,071	3,743,989		
NOx - AirPermits calculated	ppmvd @ 15% O2		9.2	9.3	9.2	9.2	9.3	9.3	9.2	9.3	9.3	12.1	12.3	12.5		
NOx AS NO2	lb/h		75.0	69.0	62.0	60.0	55.0	50.0	51.0	47.0	43.0	127.8	121.8	114.8		
SO2 - Annual Average	ppmvd @ 15% O2		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4					
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	6.2	5.8	5.4		
SO2 - Short Term Average	ppmvd @ 15% O2		0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8					
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	12.5	11.6	10.8		
CO - AirPermits calculated	ppmvd		6.0	5.9	6.1	5.8	5.6	6.1	13.7	13.7	14.2	20.7	22.0	24.2		
CO - AirPermits calculated	ppmvd @ 15% O2		4.2	4.2	4.1	4.3	4.2	4.3	10.4	10.4	10.3	11.4	11.9	12.5		
CO	lb/h		21.0	19.0	17.0	17.0	15.0	14.0	35.0	32.0	29.0	73.8	71.8	69.8		

VOC	ppmvd @ 15% O2		1.0	1.0	1.0	1.0	1.0	1.0	5.1	5.1	5.1	3.8	4.0	4.2
VOC as CH4	lb/h		2.9	2.7	2.4	2.3	2.1	1.9	9.8	9.0	8.2	9.5	9.3	9.0
Particulates (PM10 front- and back-half)	lb/h		9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	18.9	18.9	17.9
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.87	0.86	0.85
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	74.25	73.62	71.96
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	10.20	10.04	9.46
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	4.91	4.91	4.98
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	9.77	10.57	12.76
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.32	28.23	28.00
Exhaust MW dry			26.99	26.79	26.21	27.05	26.86	26.27	27.11	26.91	26.33	26.46	26.23	25.60
<b>STACK EMISSIONS (Per Turbine/HRSG)</b>														
Stack Flow	lb/h		4,400,719	4,086,935	3,715,853	3,639,080	3,380,202	3,074,790	3,197,211	2,979,118	2,732,691	4,428,855	4,115,071	3,743,989
Stack Temp.	Deg F.		195	195	195	195	195	195	195	195	195	195	195	195
Stack Flow	acfm		1,288,672	1,200,100	1,099,721	1,065,123	991,846	909,530	935,142	873,775	807,769	1,303,328	1,214,756	1,114,376
Stack Velocity	ft/s		75.8	70.5	64.6	62.6	58.3	53.5	55.0	51.4	47.5	76.6	71.4	65.5
Stack Flow	scfm		808,639	738,439	641,817	668,375	609,709	529,748	587,503	536,180	469,252	816,195	749,471	661,252
Stack Flow	scfm @ 15% O2		1,138,948	1,038,821	940,969	907,404	827,757	751,524	769,729	704,304	643,432	1,480,291	1,380,164	1,282,312
NOx	ppmvd @ 15% O2		2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
NOx Emission Control Efficiency	%		72.8%	73.0%	72.8%	72.9%	73.0%	73.1%	73.0%	73.2%	73.2%	79.3%	79.7%	80.0%
NOx AS NO2	lb/h		20.4	18.6	16.9	16.3	14.8	13.5	13.8	12.6	11.5	26.5	24.7	23.0
SO2 - Annual Average	ppmvd @ 15% O2		0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42			
SO2 - Annual Average	lb/h		4.8	4.4	4.0	3.8	3.5	3.2	3.2	3.0	2.7	6.2	5.8	5.4
SO2 - Short Term Average	ppmvd @ 15% O2		0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85			
SO2 - Short Term Average	lb/h		9.6	8.8	7.9	7.7	7.0	6.3	6.5	5.9	5.4	12.5	11.6	10.8
CO annual average	ppmvd @ 15% O2		2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
CO Emission Control Efficiency	%		52.7%	52.3%	51.7%	53.4%	51.9%	53.2%	80.8%	80.8%	80.6%	82.5%	83.2%	84.0%
CO annual average	lb/h		9.9	9.1	8.2	7.9	7.2	6.6	6.7	6.1	5.6	12.9	12.0	11.2
CO 1-hr average (not in permit)	ppmvd @ 15% O2		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO 1-hr average (not in permit)	lb/h		24.8	22.7	20.5	19.8	18.1	16.4	16.8	15.4	14.0	32.3	30.1	28.0
VOC	ppmvd @ 15% O2	30%	0.5	0.5	0.5	0.6	0.6	0.5	2.9	2.9	2.8	1.6	1.6	1.7
VOC as CH4	lb/h	30%	2.0	1.9	1.7	1.6	1.5	1.3	6.9	6.3	5.7	6.7	6.5	6.3
Particulates (PM10 front- and back-half)	lb/h		11.0	10.8	9.6	9.6	9.4	9.3	9.3	9.2	9.1	21.5	21.3	20.1
Particulates minus sulfates	lb/h		9.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	18.9	18.9	17.9
Argon	% VOL	39.95	0.88	0.87	0.86	0.88	0.88	0.86	0.88	0.88	0.86	0.87	0.86	0.85
Nitrogen	% VOL	28	75.09	74.52	72.92	75.19	74.62	73.01	75.29	74.71	73.11	74.25	73.62	71.96
Oxygen	% VOL	32	12.59	12.60	12.25	12.89	12.89	12.53	13.17	13.15	12.81	10.20	10.04	9.46
Carbon Dioxide	% VOL	44	3.83	3.75	3.71	3.69	3.62	3.58	3.57	3.50	3.46	4.91	4.91	4.98
Water	% VOL	18	7.61	8.26	10.26	7.34	8.00	10.02	7.09	7.76	9.77	9.77	10.57	12.76
Exhaust MW			28.46	28.38	28.16	28.47	28.40	28.17	28.49	28.42	28.19	28.32	28.23	28.00
Exhaust MW dry			26.99	26.79	26.21	27.05	26.86	26.27	27.11	26.91	26.33	26.46	26.23	25.60
Ammonia Slip	ppmvd		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Ammonia Slip	lb/h		14.7	13.7	12.8	12.1	11.3	10.5	10.6	10.0	9.3	15.1	14.1	13.2
Sulfate Conversion (Atmospheric)	%		20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Sulfate Particulates (Atmospheric)	lb/hr		2.0	1.8	1.6	1.6	1.4	1.3	1.3	1.2	1.1	2.58	2.40	2.23
Sulfate Conversion (In-stack)	%		5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Sulfate Conversion (In-Stack)	lb/hr		0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.6	0.6	0.6
<b>SITE CONDITIONS</b>														
Elevation	ft.		115	115	115	115	115	115	115	115	115	115	115	115
Stack Height	ft.		150	150	150	150	150	150	150	150	150	150	150	150
Stack Diameter	ft.		19	19	19	19	19	19	19	19	19	19	19	19
Site Pressure	psia		14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64	14.64

2. Duct burner emission estimates are based on the following emission factors.

NOx 0.080 lb/MM Btu (HHV)

CO 0.080 lb/MM Btu (HHV)

VOC 0.010 lb/MM Btu (HHV)

PM10 (front & back half) 0.015 lb/MM Btu (HHV)

3. Case 2 is the firing rate that produces a temperature of 1600 F downstream of the duct burner. This firing rate corresponds to maximum firing rate for conventional HRSG design.

4. Emission estimates are based on the following gas compositions and properties.

Constituent Percent Composition

H2	0.0	C3H8	0.5	MW, lb/lbmole	16.64
N2	0.3	C4H8	0.0	Btu/scf (LHV)	952
CO2	0.0	IC4H10	0.1	Btu/scf (HHV)	1,047
CH4	96.9	NC4H10	0.1		
C2H4	0.0	IC5H12	0.0		
C2H6	2.0	NC5H12	0.0		
C3H6	0.0	C5+	0.1		
		Total	99.2		