APPENDIX 5.1A

Emissions and Operating Parameters

Table 5.1A-1
Gas Component Fuel Analysis Worksheet

Component	Component	Volume Percent	MW	Moles C	Moles H	Moles N	Moles O	Moles S	Weight Percent	Btu/ft3 (HHV)	Btu/ft3 (LHV)	Btu/lb (HHV)	Btu/lb (LHV)	Average MW	HHV/LHV
CH4	Methane	93.100%	16.043	93.10	372.40	0.00	0.00	0.00	0.861	1013	912.93	23,879	21,520	14.94	1.1096
C2H6	Ethane	3.400%	30.070	6.80	20.40	0.00	0.00	0.00	0.059	1792	1640.42	22,320	20,432	1.02	1.0924
C3H8	Propane	0.700%	44.097	2.10	5.60	0.00	0.00	0.00	0.018	2590	2384.70	21,661	19,944	0.31	1.0861
N-C4H10	N-Butane	0.100%	58.125	0.40	1.00	0.00	0.00	0.00	0.003	3370	3112.52	21,308	19,680	0.06	1.0827
iso-C4H10	Iso-Butane	0.100%	58.125	0.40	1.00	0.00	0.00	0.00	0.003	3363	3105.44	21,257	19,629	0.06	1.0829
N-C5H12	N-Pentane	0.100%	72.152	0.50	1.20	0.00	0.00	0.00	0.004	4016	3716.29	21,091	19,517	0.07	1.0806
iso-C5H12	Iso-Pentane	0.000%	72.152	0.00	0.00	0.00	0.00	0.00	0.000	4008	3708.33	21,052	19,478	0.00	1.0808
C6H14	Hexane	0.000%	86.179	0.00	0.00	0.00	0.00	0.00	0.000	4762	4412.47	20,940	19,403	0.00	1.0792
O2		0.00%	31.998	0.00	0.00	0.00	0.00	0.00	0.000					0.00	
N2		1.25%	28.014	0.00	0.00	2.50	0.00	0.00	0.020					0.35	
CO2		1.25%	44.009	1.25	0.00	0.00	2.50	0.00	0.032					0.55	
H2		0.00%	2.016	0.00	0.00	0.00	0.00	0.00	0.000					0.00	
H2O		0.00%	18.015	0.00	0.00	0.00	0.00	0.00	0.000					0.00	
Ash		0.00%													
Total		100.00%							1.000						
Dry Basis, Ash Free															
Total		100.00%		104.55	401.60	2.50	2.50	0.00	511.15	1032.91	932.32	22,480	20,291	17.36	1.1079
		Mol Wt		12.011	1.008	14.007	15.999	32.064							
gms/100 moles				1255.77	404.81	35.02	40.00	0.00	1735.594						
		Wt %		72.35%	23.32%	2.02%	2.30%	0.00%							
Standard Molar Volume				385.53	ft3/mole										

Table 5.1A-2 A
GE 7FA with HRSG
Emissions and Operating Parameters for
CTGs

Case	Cold Base	Cold Low	Avg. Base	Avg. Low	Avg. Peak	Hot Base	Hot Low	Hot Peak
Turbine Load, MW								
Ambient Temp, F	26.2	26.2	59	59	59	105.6	105.6	105.6
Turbine Load, %								
Chiller On/Off	Off	Off	On	On	On	On	On	On
CTG heat input, MMBtu/hr (HHV)	1902.0	1234.0	1815.0	1171.0	1815.0	1719.0	1040.0	1719.0
DB heat input, MMBtu/hr (HHV)	0.0	0.0	0.0	0.0	512.0	0.0	0.0	512.0
Total heat input, MMBtu/hr (HHV)	1902.0	1234.0	1815.0	1171.0	2327.0	1719.0	1040.0	2231.0
Stack flow, lb/hr	3,832,424	2,473,500	3,621,900	2,388,700	3,808,855	3,418,600	2,256,800	3,581,322
Stack flow, acfm	1,093,336	705,711	1,037,132	682,947	1,069,288	991,075	645,933	1,018,105
Stack flow, dscfm	802,061	517,495	752,663	498,162	780,661	694,289	470,685	716,266
Stack temp, F	195	195	195	195	180	195	195	180
Stack exhaust, vol %								
O2 (dry)	13.80%	13.76%	13.67%	13.86%	11.96%	13.48%	14.28%	11.55%
CO2 (dry)	4.11%	4.14%	4.18%	4.08%	5.16%	4.29%	3.84%	5.39%
H2O	7.60%	7.63%	8.59%	8.12%	10.14%	11.76%	8.21%	13.41%
Emissions								
NOx, ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NOx, lb/hr	13.81	8.96	13.18	8.50	16.90	12.48	7.55	16.20
NOx, lb/MMBtu	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073
SO2, ppmvd @ 15% O2	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
SO2, lb/hr	5.27	3.42	5.03	3.24	6.44	4.76	2.88	6.18
SO2, lb/MMBtu	0.0028	0.0028	0.0028	0.0028	0.0035	0.0028	0.0028	0.0036
CO, ppmvd @ 15% O2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CO, lb/hr	12.61	8.18	12.04	7.76	15.43	11.40	6.90	14.79
CO, lb/MMBtu	0.0066	0.0066	0.0066	0.0066	0.0085	0.0066	0.0066	0.0086
ROC, ppmvd @ 15% O2	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
ROC, lb/hr	4.82	3.12	4.60	2.96	5.89	4.35	2.63	5.65
ROC, lb/MMBtu	0.0025	0.0025	0.0025	0.0025	0.0032	0.0025	0.0025	0.0033
PM10, lb/hr	7.5	7.5	7.5	7.5	9.0	7.5	7.5	9.0
PM10, lb/MMBtu	0.0039	0.0061	0.0041	0.0064	0.0050	0.0044	0.0072	0.0052
PM10, gr/dscf	0.00109	0.00169	0.00116	0.00176	0.00135	0.00126	0.00186	0.00147
NH3, ppmvd@15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NH3, lb/hr	12.78	8.29	12.20	7.87	15.64	11.55	6.99	14.99

Table 5.1A-2 B
Siemens SGT6500F
Emissions and Operating Parameters for CTGs

Case	Cold Base	Cold Low	Avg. Base	Avg. Low	Avg. Peak	Hot Base	Hot Low	Hot Peak
Turbine Load, MW								
Ambient Temp, F	26.2	34.4	59	59	59	105.6	105.6	105.6
Turbine Load, %								
Chiller On/Off	Off	Off	On	On	On	On	On	On
CTG heat input, MMBtu/hr (HHV)	2182.6	1289.3	2047.9	1224.4	2078.5	1947.6	1089.1	1961.2
DB heat input, MMBtu/hr (HHV)	0.0	0.0	0.0	0.0	500.0	0.0	0.0	500.0
Total heat input, MMBtu/hr (HHV)	2182.6	1289.3	2047.9	1224.4	2578.5	1947.6	1089.1	2461.2
Stack flow, lb/hr	3,743,929	3,618,382	3,490,402	3,366,340	3,746,737	3,353,360	3,020,582	3,597,570
Stack flow, acfm	1,052,625	1,082,889	982,219	993,833	1,024,686	971,547	874,296	994,688
Stack flow, dscfm	775,572	770,214	717,584	713,107	760,420	676,144	640,502	715,351
Stack temp, F	184	230	182	219	162	194	206	162
Stack exhaust, vol %								
O2 (dry)	12.46%	15.90%	12.34%	15.77%	10.72%	12.26%	15.82%	10.57%
CO2 (dry)	4.88%	2.91%	4.95%	2.99%	5.87%	4.99%	2.96%	5.96%
H2O	8.75%	5.62%	9.80%	6.31%	11.23%	12.47%	6.17%	13.98%
Emissions								
NOx, ppmvd @ 15% O2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
NOx, lb/hr	15.85	9.36	14.87	8.89	18.72	14.14	7.91	17.87
NOx, lb/MMBtu	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073	0.0073
SO2, ppmvd @ 15% O2	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
SO2, lb/hr	6.04	3.57	5.67	3.39	7.14	5.39	3.02	6.81
SO2, lb/MMBtu	0.0028	0.0028	0.0028	0.0028	0.0034	0.0028	0.0028	0.0035
CO, ppmvd @ 15% O2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
CO, lb/hr	14.47	8.55	13.58	8.12	17.10	12.91	7.22	16.32
CO, lb/MMBtu	0.0066	0.0066	0.0066	0.0066	0.0082	0.0066	0.0066	0.0083
ROC, ppmvd @ 15% O2	2.00	2.00	2.00	2.00	3.00	2.00	2.00	3.00
ROC, lb/hr	5.53	3.26	5.19	3.10	9.79	4.93	2.76	9.35
ROC, lb/MMBtu	0.0013	0.0013	0.0013	0.0013	0.0047	0.0013	0.0013	0.0048
PM10, lb/hr	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
PM10, lb/MMBtu	0.0034	0.0058	0.0037	0.0061	0.0036	0.0039	0.0069	0.0038
PM10, gr/dscf	0.00113	0.00114	0.00122	0.00123	0.00115	0.00129	0.00137	0.00122
NH3, ppmvd@15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
NH3, lb/hr	14.67	8.66	13.76	8.23	17.33	13.09	7.32	16.54

Table 5.1A-3 **Auxiliary Boiler**		
Boiler Mfr	to be determined	
Burner Mfr	to be determined	
Model	to be determined	
Steam Production	lb/hr	30,000
Fuel		natural gas
Fuel Sulfur Content	gr/100 scf	1.00
Fuel Consumption	MMBtu/hr	37
Exhaust Flow	acfm	12,063
Stack Velocity	ft/sec	41.0
Exhaust Temperature	deg. F	375
Exhaust Stack Diameter	in	30
Exhaust Stack Height	ft	30
Operating Profile		
Annual Operation	hrs	3850
Emissions		
NOx	PPM	9
CO	PPM	50
ROC	PPM	10
NOx	lb/MMBTU	0.0108
CO	lb/MMBTU	0.0366
ROC	lb/MMBTU	0.0042
PM10	lb/MMBTU	0.0075
SO2	lb/MMBTU	0.0014
NOx	lb/hr	0.40
CO	lb/hr	1.36
ROC	lb/hr	0.16
PM10	lb/hr	0.28
SO2	lb/hr	0.05

Table 5.1A-4
Cooling Tower Emissions

PM10 Emissions based on TDS Level	
TDS level, ppm	9000
PM10, lb/hr	4.16
PM10, lb/day	99.9
PM10, tpy	18.22
PM10, lb/hr	1.83
PM10, lb/day	43.9
PM10, tpy	8.02
PM2.5, lb/hr	0.62
PM2.5, lb/day	15.0
PM2.5, tpy	2.73

Based on 8760 hrs/yr

12	cells	
44.34	Height, ft	
10.8	Diameter, ft	
69	exhaust temp, F	
1513000	air flow, CFM	
	PM10 fraction[a]	0.44
	PM2.5 fraction[a]	0.15

Heat rejection rate: not explicitly included in the design specification sheet

Exhaust mass flow rate: 107,900 lb/min

Liquid to gas mass flow ratio: 0.918

Note:
a. See notes for calculations.

Notes to Table 5.1A-4

Calculation of PM10 and PM2.5 from cooling towers

Wet cooling towers cool water by evaporating a portion of the water through contact with the air. The nature of the contact is such that water droplets are entrained in the air and are carried out of the cooling tower. The entrained droplets are called "drift."

Modern cooling towers have high efficiency drift eliminators which recover much of the entrained water. The high-efficiency drift eliminator proposed for this project will reduce drift to less than 0.0005% of circulated cooling tower water.

The water that is entrained contains dissolved solids. When a water droplet that contains solids evaporates, the dissolved solids form a single particle, which remains suspended in the air. The volume of a droplet can be calculated if its diameter is known. The mass of water in the droplet can be calculated from the volume. The mass of solids in the droplet (and the resulting particle) can be calculated from the mass of the water droplet and the concentration of solids in the water. The volume of the particle can be calculated if the density of the solid is known. The diameter of a spherical particle can be calculated from the particle volume.

The size of the final aerosol particle depends on the volume fraction of solid material and the droplet diameter as follows:

$$D_s = D_d \times (F_v)^{1/3}$$

Where:

D_s = diameter of solid particle
D_d = diameter of liquid droplet
F_v = volume fraction of solid material

This equation can be converted to calculate the resulting particle diameter for a cooling tower by accounting for the density of the particle:

$$D_s = D_d \times (\square_d / \square_s \times TDS/1{,}000{,}000)^{1/3}$$

Where:

D_s = diameter of solid particle
D_d = diameter of liquid droplet
$\square_d$ = density of droplet = 1 g/cm^3
$\square_s$ = density of solid particle = 2.2 g/cm^3 for sodium chloride
TDS = total dissolved solids, ppmw

The above equation predicts the physical diameter of a particle formed from a cooling tower droplet. This equation assumes that a single particle will be formed when a droplet evaporates, because there is no evidence that multiple particles will be formed.

The term "aerodynamic diameter" has been developed by aerosol physicists in order to provide a simple means of categorizing the sizes of particles having different shapes and densities with a single dimension. The aerodynamic diameter is the diameter of a spherical particle having a density of 1 gm/cm3 that has the same inertial properties [i.e.

terminal settling velocity in the gas as the particle of interest. The PM_{10} and $PM_{2.5}$ standards refer to aerodynamic diameter.

Therefore, in order to calculate PM_{10} and $PM_{2.5}$ emissions, the aerodynamic diameter of the cooling tower particles must be calculated as follows[1]:

$$D_a = D_s \times (\square_s)^{0.5}$$

The following table represents the predicted mass distribution of drift droplet size for cooling tower drift dispersed from Marley TU12 Excel Drift Eliminators. This table was provided by the cooling tower vendor.

Mass in Droplets (%)		Droplet Size (Microns)
0.2	Larger Than	525
1.0	Larger Than	375
5.0	Larger Than	230
10.0	Larger Than	170
20.0	Larger Than	115
40.0	Larger Than	65
60.0	Larger Than	35
80.0	Larger Than	15
88.0	Larger Than	10

Using the equations described above, a solids density of 2.2 gm/cm^3 (based on the density of sodium chloride), and the droplet size distribution in the previous table, the following particle diameter distribution can be derived:

[1] http://www.epa.gov/air/oaqps/eog/bces/module3/diameter/diameter.htm accessed August 8, 2008

Mass in Droplets (%)		Aerodynamic Particle Size (Microns)
0.2	Larger Than	124.5
1.0	Larger Than	89.0
5.0	Larger Than	54.6
10.0	Larger Than	40.3
20.0	Larger Than	27.3
40.0	Larger Than	15.4
60.0	Larger Than	8.3
80.0	Larger Than	3.6
88.0	Larger Than	2.4

Based upon this particle size distribution, 44% of the particles emitted from the cooling tower will be PM_{10} or smaller. 15% of the particles emitted from the cooling tower will be $PM_{2.5}$ or smaller.

Table 5.1A-5

Diesel Fire Pump Performance and Emissions

Engine		
Fire Pump Mfr		Clarke
Engine Mfr		John Deere
Model		JU6H-UF40
Useable Horsepower	hp	300
Power Production	kw	n/a
Speed	rpm	2100
Fuel		CA Diesel
Specific Gravity		0.825
Fuel Sulfur Content	wt %	0.0015%
Fuel Consumption	gph	14
	Btu/bhp-hr	0
Exhaust Flow	acfm	1740
Stack Velocity	ft/sec	212.7
Exhaust Temperature	deg. F	770
Exhaust Pipe Diameter	in	5
Exhaust Stack Height	ft	40
Pump		
Speed	rpm	N/A
Capacity	gpm	N/A
Pump Efficiency	%	N/A
Brake Horsepower	bhp	N/A
Operating Profile		
Annual Operation	hrs	50
Emissions		
NOx	g/bhp-hr	4.36
CO	g/bhp-hr	0.32
ROC	g/bhp-hr	0.29
PM10	g/bhp-hr	0.12
NOx	lb/hr	2.88
CO	lb/hr	0.21
ROC	lb/hr	0.19
PM10	lb/hr	0.08
SO2	lb/hr	0.0029

Table 5.1A-6

Emergency Generator Performance and Emissions

Engine		
Fire Pump Mfr		N/A
Engine Mfr		Caterpillar
Model		C32 ATAAC
Useable Horsepower	hp	1500
Power Production	kw	1000
Speed	rpm	1800
Fuel		CA Diesel
Specific Gravity		0.825
Fuel Sulfur Content	wt %	0.0015%
Fuel Consumption	gph	74.3
	Btu/bhp-hr	0
Exhaust Flow	acfm	8387
Stack Velocity	ft/sec	400.4
Exhaust Temperature	deg. F	965
Exhaust Pipe Diameter	in	8
Exhaust Stack Height	ft	40
Pump		
Speed	rpm	N/A
Capacity	gpm	N/A
Pump Efficiency	%	N/A
Brake Horsepower	bhp	N/A
Operating Profile		
Annual Operation	hrs	50
Emissions		
NOx	g/bhp-hr	4.82
CO	g/bhp-hr	0.19
ROC	g/bhp-hr	0.01
PM10	g/bhp-hr	0.023
NOx	lb/hr	15.94
CO	lb/hr	0.63
ROC	lb/hr	0.03
PM10	lb/hr	0.08
SO2	lb/hr	0.0156

Table 5.1A-7
CPV Vaca Station
Operating Cases

	Case 1		Case 2		Case 3		Case 4	
	Daily Cycling		Weekly Cycling		Base Load		Full annual	
	Turbine 1	Turbine 2	Turbine 1	Turbine 2	Turbine 1	Turbine 2	Turbine 1	Turbine 2
				Annual				
Number of hot starts per year =	365	365	0	365		12		
Duration of hot start (hrs/start) =	1	1	1	1	1	1	1	1
Hours of hot start per year (hrs/year) =	365	365	0	365	0	12	0	0
Number of cold starts per year =	0	0	52	0	12			
Duration of cold start (hrs/start) =	3	3	3	3	3	3	3	3
Hours of cold start per year (hrs/year)=	0	0	156	0	36	0	0	0
Duration gas turbine offline prior to hot start (hrs) =	4	4	4	4	4	4	4	4
Hours gas turbine offline per year due to hot starts (hrs/year) =	1460	1460	0	1460	0	48	0	0
Duration gas turbine offline prior to cold start (hrs) =	72	72	72	72	72	72	72	72
Hours gas turbine offline per year due to cold starts (hrs/year) =	0	0	3744	0	864	0	0	0
Total potential operating hours per year (hrs/year)	7300	7300	5016	7300	7896	8712	8760	8760
Hours of startup per year (hrs/year)	365	365	156	365	36	12	0	0
Hours of duct firing per year (hrs/year)	3500	3500	3500	3500	3500	3500	3500	3500
Hours gas turbine baseline operation per year (hrs/year) =	3435	3435	1360	3435	4360	5200	5260	5260
				Daily				
Hours of startup per day (hrs/day) =	1	1	3	1	3	1	0	0
Hours of duct firing per day (hrs/day) =	23	23	21	23	21	23	24	24
Hours gas turbine baseline operation per day (hrs/day) =	0	0	0	0	0	0	0	0

Table 5.1A-8A
Calculation of Daily and Annual Fuel Use (GE)

Scenario 1 Daily Cycling

	Operating Hours			Max Hourly Fuel Use,
	max. hour	hrs/day	hrs/yr	MMBtu
Turbine 1, no DB	0	1	3800	1815.0
Turbine 2, no DB	0	1	3800	1815.0
Turbine 1, w/ DB	1	23	3500	2327.0
Turbine 2, w/ DB	1	23	3500	2327.0

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	1,815.0	6,897,000
Turbine 2, no DB	n/a	1,815.0	6,897,000
Turbine 1, w/ DB	2,327.0	53,521.0	8,144,500
Turbine 2, w/ DB	2,327.0	53,521.0	8,144,500
Total, All Units	4,654.0	110,672.0	30,083,000
Each	2,327.0	55,336	

Scenario 2 Weekly Cycling

	Operating Hours			Max Hourly Fuel Use,
	max. hour	hrs/day	hrs/yr	MMBtu
Turbine 1, no DB	0	3	1516	1815.0
Turbine 2, no DB	0	3	1516	1815.0
Turbine 1, w/ DB	1	21	3500	2327.0
Turbine 2, w/ DB	1	21	3500	2327.0

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	5,445.0	2,751,540
Turbine 2, no DB	n/a	5,445.0	2,751,540
Turbine 1, w/ DB	2,327.0	48,867.0	8,144,500
Turbine 2, w/ DB	2,327.0	48,867.0	8,144,500
Total, All Units	4,654.0	108,624	21,792,080
Each	2,327.0	54,312	

Scenario 3 Base Load

	Operating Hours			Max Hourly Fuel Use,
	max. hour	hrs/day	hrs/yr	MMBtu
Turbine 1, no DB	0	3	4396	1815.0
Turbine 2, no DB	0	3	4396	1815.0
Turbine 1, w/ DB	1	21	3500	2327.0
Turbine 2, w/ DB	1	21	3500	2327.0

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	5,445.0	7,978,740
Turbine 2, no DB	n/a	5,445.0	7,978,740
Turbine 1, w/ DB	2,327.0	48,867.0	8,144,500
Turbine 2, w/ DB	2,327.0	48,867.0	8,144,500
Total, All Units	4,654.0	108,624	32,246,480
Each	2,327.0	54,312	

Scenario 4 Full annual

	Operating Hours			Max Hourly Fuel Use,
	max. hour	hrs/day	hrs/yr	MMBtu
Turbine 1, no DB	0	0	5260	1815.0
Turbine 2, no DB	0	0	5260	1815.0
Turbine 1, w/ DB	1	24	3500	2327.0
Turbine 2, w/ DB	1	24	3500	2327.0

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	0.0	9,546,900
Turbine 2, no DB	n/a	0.0	9,546,900
Turbine 1, w/ DB	2,327.0	55,848.0	8,144,500
Turbine 2, w/ DB	2,327.0	55,848.0	8,144,500
Total, All Units	4,654.0	111,696	35,382,800
Each	2,327.0	55,848	

Table 5.1A-8B
Calculation of Daily and Annual Fuel Use (Siemens)

Scenario **1** **Daily Cycling**

	Operating Hours			Max Hourly Fuel Use, MMBtu
	max. hour	hrs/day	hrs/yr	
Turbine 1, no DB	0	1	3800	2047.9
Turbine 2, no DB	0	1	3800	2047.9
Turbine 1, w/ DB	1	23	3500	2578.5
Turbine 2, w/ DB	1	23	3500	2578.5

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	2,047.9	7,782,074
Turbine 2, no DB	n/a	2,047.9	7,782,074
Turbine 1, w/ DB	2,578.5	59,305.2	9,024,700
Turbine 2, w/ DB	2,578.5	59,305.2	9,024,700
Total, All Units	**5,157.0**	**122,706.2**	**33,613,547**
Each	2,578.5	61,353	

Scenario **2** **Weekly Cycling**

	Operating Hours			Max Hourly Fuel Use, MMBtu
	max. hour	hrs/day	hrs/yr	
Turbine 1, no DB	0	3	1516	2047.9
Turbine 2, no DB	0	3	1516	2047.9
Turbine 1, w/ DB	1	21	3500	2578.5
Turbine 2, w/ DB	1	21	3500	2578.5

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	6,143.7	3,104,638
Turbine 2, no DB	n/a	6,143.7	3,104,638
Turbine 1, w/ DB	2,578.5	54,148.2	9,024,700
Turbine 2, w/ DB	2,578.5	54,148.2	9,024,700
Total, All Units	**5,157.0**	**120,584**	**24,258,675**
Each	2,578.5	60,292	

Scenario 3 **Base Load**

	Operating Hours			Max Hourly Fuel Use, MMBtu
	max. hour	hrs/day	hrs/yr	
Turbine 1, no DB	0	3	4396	2047.9
Turbine 2, no DB	0	3	4396	2047.9
Turbine 1, w/ DB	1	21	3500	2578.5
Turbine 2, w/ DB	1	21	3500	2578.5

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	6,143.7	9,002,631
Turbine 2, no DB	n/a	6,143.7	9,002,631
Turbine 1, w/ DB	2,578.5	54,148.2	9,024,700
Turbine 2, w/ DB	2,578.5	54,148.2	9,024,700
Total, All Units	**5,157.0**	**120,584**	**36,054,661**
Each	2,578.5	60,292	

Scenario 4 **Full annual**

	Operating Hours			Max Hourly Fuel Use, MMBtu
	max. hour	hrs/day	hrs/yr	
Turbine 1, no DB	0	0	5260	2047.9
Turbine 2, no DB	0	0	5260	2047.9
Turbine 1, w/ DB	1	24	3500	2578.5
Turbine 2, w/ DB	1	24	3500	2578.5

	Fuel Use		
	MMBtu/hr	MMBtu/day	MMBtu/yr
Turbine 1, no DB	n/a	0.0	10,772,028

Turbine 2, no DB	n/a	0.0	10,772,028
Turbine 1, w/ DB	2,578.5	61,883.7	9,024,700
Turbine 2, w/ DB	2,578.5	61,883.7	9,024,700
Total, All Units	**5,157.0**	**123,767**	**39,593,456**
Each	2,578.5	61,884	

Table 5.1A-9A Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(GE)**

Case 1: Daily Cycling

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
one hot start per GT per day	**GT 1**	**1**	**0**	**23**	**0**	**0**	per day
one shutdown per GT per day	**GT 2**	**1**	**0**	**23**	**0**	**0**	
4 hours GT downtime per day	**GT 1**	**365**	**0**	**3500**	**1460**	**3435**	per year

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	3435	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 2, base	0	0	3435	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 1, peak	0	23	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 2, peak	0	23	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 1, startups/shutdowns	1	1	365	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Gas Turbine 2, startups/shutdowns	1	1	365	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Auxiliary boiler	1	10	3850	0.40	0.40	0.05	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.00	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	23.7	0.0	0.0	2.3	0.0	0.0	21.7	0.0	0.0	8.3	0.0	0.0	12.9
Gas Turbine 2, base	0.0	0.0	23.7	0.0	0.0	2.3	0.0	0.0	21.7	0.0	0.0	8.3	0.0	0.0	12.9
Gas Turbine 1, peak	0.0	388.6	29.6	0.0	148.2	2.8	0.0	354.9	27.0	0.0	135.5	10.3	0.0	207.0	15.8
Gas Turbine 2, peak	0.0	388.6	29.6	0.0	148.2	2.8	0.0	354.9	27.0	0.0	135.5	10.3	0.0	207.0	15.8
Gas Turbine 1, startups/shutdowns	140.0	140.0	18.3	5.3	5.3	0.2	500.0	500.0	45.6	16.0	16.0	2.9	7.5	7.5	1.4
Gas Turbine 2, startups/shutdowns	140.0	140.0	18.3	5.3	5.3	0.2	500.0	500.0	45.6	16.0	16.0	2.9	7.5	7.5	1.4
Auxiliary boiler	0.4	4.0	0.8	0.1	0.5	0.0	1.4	13.6	2.6	0.2	1.6	0.3	0.3	2.8	0.5

WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,057.2	143.1	10.5	306.9	10.6	1,000.0	1,709.8	188.6	32.0	303.0	43.0	15.0	429.0	60.0
Total	299.2	1,080.0	144.3	10.6	307.4	10.7	1,002.2	1,724.2	191.2	32.4	304.8	43.3	17.3	475.9	68.6

Table 5.1A-10A Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(GE)**

Case 2: Weekly Cycling

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
one cold start/week for GT1	**GT 1**	**0**	**3**	**21**	**0**	**0**	per day
72 hour shutdown prior to cold start	**GT 2**	**1**	**0**	**23**	**0**	**0**	
2nd GT on daily cycle	**GT 1**	**0**	**156**	**3500**	**0**	**1360**	per year
	GT 2	**365**	**0**	**3500**	**1460**	**1360**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	1360	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 2, base	0	0	1360	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 1, peak	0	21	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 2, peak	0	23	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 1, startups/shutdowns	1	3	156	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Gas Turbine 2, startups/shutdowns	1	1	156	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Auxiliary boiler	1	10	3850	0.40	0.40	0.05	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.00	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	9.4	0.0	0.0	0.9	0.0	0.0	8.6	0.0	0.0	3.3	0.0	0.0	5.1
Gas Turbine 2, base	0.0	0.0	9.4	0.0	0.0	0.9	0.0	0.0	8.6	0.0	0.0	3.3	0.0	0.0	5.1
Gas Turbine 1,	0.0	354.8	29.6	0.0	135.3	2.8	0.0	324.0	27.0	0.0	123.7	10.3	0.0	189.0	15.8

peak															
Gas Turbine 2, peak	0.0	388.6	29.6	0.0	148.2	2.8	0.0	354.9	27.0	0.0	135.5	10.3	0.0	207.0	15.8
Gas Turbine 1, startups/shutdowns	140.0	420.0	10.9	5.3	15.8	0.1	500.0	1,500.0	19.5	16.0	48.0	1.2	7.5	22.5	0.6
Gas Turbine 2, startups/shutdowns	140.0	140.0	10.9	5.3	5.3	0.1	500.0	500.0	19.5	16.0	16.0	1.2	7.5	7.5	0.6
Auxiliary boiler	0.4	4.0	0.8	0.1	0.5	0.0	1.4	13.6	2.6	0.2	1.6	0.3	0.3	2.8	0.5
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,303.4	99.8	10.5	304.6	7.6	1,000.0	2,678.9	110.2	32.0	323.2	29.7	15.0	426.0	42.9
Total	299.2	1,326.2	101.0	10.6	305.1	7.7	1,002.2	2,693.3	112.8	32.4	325.0	30.0	17.3	472.9	51.4

Table 5.1A-11A Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(GE)**

Case 3: Base Load

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
One cold start per month for GT1	**GT 1**	**0**	**3**	**21**	**0**	**0**	per day
72 hour shutdown prior to cold start	**GT 2**	**1**	**0**	**23**	**0**	**0**	
1 hot start per month for GT2	**GT 1**	**0**	**36**	**3500**	**0**	**4360**	per year
	GT 2	**12**	**0**	**3500**	**48**	**4360**	

Equipment	Operating Hours max. hour	hrs/day	hrs/yr	NOx (lbs/hr) (max)	NOx (lbs/hr) (avg)	SOx (lbs/hr)	SOx (lbs/hr) (avg)	CO (lbs/hr) (max)	CO (lbs/hr) (avg)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Gas Turbine 1, base	0	0	4360	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 2, base	0	0	4360	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 1, peak	0	21	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 2, peak	0	23	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 1, startups/shutdowns	1	3	36	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Gas Turbine 2, startups/shutdowns	1	1	36	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Auxiliary boiler	1	10	560	0.40	0.40	0.05	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.00	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	30.1	0.0	0.0	2.9	0.0	0.0	27.5	0.0	0.0	10.5	0.0	0.0	16.4
Gas Turbine 2, base	0.0	0.0	30.1	0.0	0.0	2.9	0.0	0.0	27.5	0.0	0.0	10.5	0.0	0.0	16.4
Gas Turbine 1, peak	0.0	354.8	29.6	0.0	135.3	2.8	0.0	324.0	27.0	0.0	123.7	10.3	0.0	189.0	15.8
Gas Turbine 2, peak	0.0	388.6	29.6	0.0	148.2	2.8	0.0	354.9	27.0	0.0	135.5	10.3	0.0	207.0	15.8
Gas Turbine 1, startups/shutdowns	140.0	420.0	2.5	5.3	15.8	0.0	500.0	1,500.0	4.5	16.0	48.0	0.3	7.5	22.5	0.1
Gas Turbine 2, startups/shutdowns	140.0	140.0	2.5	5.3	5.3	0.0	500.0	500.0	4.5	16.0	16.0	0.3	7.5	7.5	0.1
Auxiliary boiler	0.4	4.0	0.1	0.1	0.5	0.0	1.4	13.6	0.4	0.2	1.6	0.0	0.3	2.8	0.1
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.2	99.9	18.2
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,303.4	124.4	10.5	304.6	11.4	1,000.0	2,678.9	118.0	32.0	323.2	42.2	15.0	426.0	64.5
Total	299.2	1,326.2	125.0	10.6	305.1	11.4	1,002.2	2,693.3	118.4	32.4	325.0	42.2	17.3	472.9	72.6

Table 5.1A-12A Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(GE)**

Case 4: Full annual

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
8760 hours of baseload operation	**GT 1**	**0**	**0**	**24**	**0**	**0**	per day
(no startups/shutdowns)	**GT 2**	**0**	**0**	**24**	**0**	**0**	
	GT 1	**0**	**0**	**3500**	**0**	**5260**	per year
	GT 2	**0**	**0**	**3500**	**0**	**5260**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	5260	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 2, base	0	0	5260	13.81	13.81	5.27	1.32	12.61	12.61	4.82	7.50	12.78
Gas Turbine 1, peak	1	24	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 2, peak	1	24	3500	16.90	16.90	6.44	1.61	15.43	15.43	5.89	9.00	15.64
Gas Turbine 1,	0	0	0	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78

startups/shutdowns												
Gas Turbine 2, startups/shutdowns	0	0	0	140.00	100.00	5.27	1.32	500.00	250.00	16.00	7.50	12.78
Auxiliary boiler	1	10	200	0.40	0.40	0.05	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.00	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	36.3	0.0	0.0	3.5	0.0	0.0	33.2	0.0	0.0	12.7	0.0	0.0	19.7
Gas Turbine 2, base	0.0	0.0	36.3	0.0	0.0	3.5	0.0	0.0	33.2	0.0	0.0	12.7	0.0	0.0	19.7
Gas Turbine 1, peak	16.9	405.5	29.6	6.4	154.6	2.8	15.4	370.3	27.0	5.9	141.4	10.3	9.0	216.0	15.8
Gas Turbine 2, peak	16.9	405.5	29.6	6.4	154.6	2.8	15.4	370.3	27.0	5.9	141.4	10.3	9.0	216.0	15.8
Gas Turbine 1, startups/shutdowns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Turbine 2, startups/shutdowns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auxiliary boiler	0.4	4.0	0.0	0.1	0.5	0.0	1.4	13.6	0.1	0.2	1.6	0.0	0.3	2.8	0.0
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	33.8	811.0	131.8	12.9	309.3	12.6	30.9	740.7	120.3	11.8	282.8	46.0	18.0	432.0	71.0
Total	53.0	833.8	132.3	13.0	309.8	12.6	33.1	755.0	120.5	12.2	284.6	46.0	20.3	478.9	79.0

Table 5.1A-9B Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(Siemens)**

Case 1: Daily Cycling

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
one hot start per GT per day	**GT 1**	**1**	**0**	**23**	**0**	**0**	per day
one shutdown per GT per day	**GT 2**	**1**	**0**	**23**	**0**	**0**	
4 hours GT downtime per day	**GT 1**	**365**	**0**	**3500**	**1460**	**3435**	per year
	GT 2	**365**	**0**	**3500**	**1460**	**3435**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	3435	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 2, base	0	0	3435	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 1, peak	0	23	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 2, peak	0	23	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 1, startups/shutdowns	1	1	365	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Gas Turbine 2, startups/shutdowns	1	1	365	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Auxiliary boiler	1	10	3850	0.40	0.40	0.06	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.02	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	27.2	0.0	0.0	2.6	0.0	0.0	24.9	0.0	0.0	9.5	0.0	0.0	12.9
Gas Turbine 2, base	0.0	0.0	27.2	0.0	0.0	2.6	0.0	0.0	24.9	0.0	0.0	9.5	0.0	0.0	12.9
Gas Turbine 1, peak	0.0	430.6	32.8	0.0	164.2	3.1	0.0	393.2	29.9	0.0	150.2	11.4	0.0	172.5	13.1
Gas Turbine 2, peak	0.0	430.6	32.8	0.0	164.2	3.1	0.0	393.2	29.9	0.0	150.2	11.4	0.0	172.5	13.1
Gas Turbine 1, startups/shutdowns	140.0	140.0	18.3	6.0	6.0	0.3	500.0	500.0	45.6	16.0	16.0	2.9	7.5	7.5	1.4
Gas Turbine 2, startups/shutdowns	140.0	140.0	18.3	6.0	6.0	0.3	500.0	500.0	45.6	16.0	16.0	2.9	7.5	7.5	1.4
Auxiliary boiler	0.4	4.0	0.8	0.1	0.6	0.0	1.4	13.6	2.6	0.2	1.6	0.3	0.3	2.8	0.5
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,141.2	156.5	12.1	340.5	12.0	1,000.0	1,786.5	200.8	32.0	332.3	47.7	15.0	360.0	54.8
Total	299.2	1,164.0	157.7	12.2	341.1	12.0	1,002.2	1,800.9	203.4	32.4	334.1	48.0	17.3	406.9	63.3

Table 5.1A-10B Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(Siemens)**

Case 2: Weekly Cycling

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
one cold start/week for GT1	**GT 1**	**0**	**3**	**21**	**0**	**0**	per day
72 hour shutdown prior to cold start	**GT 2**	**1**	**0**	**23**	**0**	**0**	
2nd GT on daily cycle	**GT 1**	**0**	**156**	**3500**	**0**	**1360**	per year
	GT 2	**365**	**0**	**3500**	**1460**	**1360**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	1360	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 2, base	0	0	1360	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 1, peak	0	21	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 2, peak	0	23	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 1, startups/shutdowns	1	3	156	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Gas Turbine 2, startups/shutdowns	1	1	156	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Auxiliary boiler	1	10	3850	0.40	0.40	0.06	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.02	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	10.8	0.0	0.0	1.0	0.0	0.0	9.8	0.0	0.0	3.8	0.0	0.0	5.1
Gas Turbine 2, base	0.0	0.0	10.8	0.0	0.0	1.0	0.0	0.0	9.8	0.0	0.0	3.8	0.0	0.0	5.1
Gas Turbine 1, peak	0.0	393.1	32.8	0.0	149.9	3.1	0.0	359.1	29.9	0.0	137.1	11.4	0.0	157.5	13.1
Gas Turbine 2, peak	0.0	430.6	32.8	0.0	164.2	3.1	0.0	393.2	29.9	0.0	150.2	11.4	0.0	172.5	13.1
Gas Turbine 1, startups/shutdowns	140.0	420.0	10.9	6.0	18.1	0.1	500.0	1,500.0	19.5	16.0	48.0	1.2	7.5	22.5	0.6
Gas Turbine 2, startups/shutdowns	140.0	140.0	10.9	6.0	6.0	0.1	500.0	500.0	19.5	16.0	16.0	1.2	7.5	7.5	0.6
Auxiliary boiler	0.4	4.0	0.8	0.1	0.6	0.0	1.4	13.6	2.6	0.2	1.6	0.3	0.3	2.8	0.5
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,383.7	108.9	12.1	338.3	8.5	1,000.0	2,752.3	118.5	32.0	351.3	32.9	15.0	360.0	37.6
Total	299.2	1,406.6	110.2	12.2	338.9	8.6	1,002.2	2,766.7	121.2	32.4	353.0	33.2	17.3	406.9	46.2

Table 5.1A-11B Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(Siemens)**

Case 3: Base Load

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
One cold start per month for GT1	**GT 1**	**0**	**3**	**21**	**0**	**0**	per day
72 hour shutdown prior to cold start	**GT 2**	**1**	**0**	**23**	**0**	**0**	
1 hot start per month for GT2	**GT 1**	**0**	**36**	**3500**	**0**	**4360**	per year
	GT 2	**12**	**0**	**3500**	**48**	**4360**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	4360	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 2, base	0	0	4360	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 1, peak	0	21	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 2, peak	0	23	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 1, startups/shutdowns	1	3	36	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Gas Turbine 2, startups/shutdowns	1	1	36	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Auxiliary boiler	1	10	560	0.40	0.40	0.06	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.02	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	34.5	0.0	0.0	3.3	0.0	0.0	31.5	0.0	0.0	12.0	0.0	0.0	16.4
Gas Turbine 2, base	0.0	0.0	34.5	0.0	0.0	3.3	0.0	0.0	31.5	0.0	0.0	12.0	0.0	0.0	16.4
Gas Turbine 1, peak	0.0	393.1	32.8	0.0	149.9	3.1	0.0	359.1	29.9	0.0	137.1	11.4	0.0	157.5	13.1
Gas Turbine 2, peak	0.0	430.6	32.8	0.0	164.2	3.1	0.0	393.2	29.9	0.0	150.2	11.4	0.0	172.5	13.1
Gas Turbine 1, startups/shutdowns	140.0	420.0	2.5	6.0	18.1	0.0	500.0	1,500.0	4.5	16.0	48.0	0.3	7.5	22.5	0.1
Gas Turbine 2, startups/shutdowns	140.0	140.0	2.5	6.0	6.0	0.0	500.0	500.0	4.5	16.0	16.0	0.3	7.5	7.5	0.1
Auxiliary boiler	0.4	4.0	0.1	0.1	0.6	0.0	1.4	13.6	0.4	0.2	1.6	0.0	0.3	2.8	0.1
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	280.0	1,383.7	139.7	12.1	338.3	12.9	1,000.0	2,752.3	131.9	32.0	351.3	47.5	15.0	360.0	59.2
Total	299.2	1,406.6	140.2	12.2	338.9	12.9	1,002.2	2,766.7	132.3	32.4	353.0	47.6	17.3	406.9	67.3

Table 5.1A-12B Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions **(Siemens)**

Case 4: Full annual

Assumptions for Daily and Annual Ops:		**hot start hrs**	**cold start hrs**	**duct fire hrs**	**downtime hrs**	**base load hrs**	
8760 hours of baseload operation	**GT 1**	**0**	**0**	**24**	**0**	**0**	per day
(no startups/shutdowns)	**GT 2**	**0**	**0**	**24**	**0**	**0**	
	GT 1	**0**	**0**	**3500**	**0**	**5260**	per year
	GT 2	**0**	**0**	**3500**	**0**	**5260**	

	Operating Hours			NOx (lbs/hr)	NOx (lbs/hr)	SOx (lbs/hr)	SOx (lbs/hr)	CO (lbs/hr)	CO (lbs/hr)	ROC (lbs/hr)	PM10 (lbs/hr)	NH3 (lbs/hr)
Equipment	max. hour	hrs/day	hrs/yr	(max)	(avg)		(avg)	(max)	(avg)			
Gas Turbine 1, base	0	0	5260	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 2, base	0	0	5260	15.85	15.85	6.04	1.51	14.47	14.47	5.53	7.50	14.67
Gas Turbine 1, peak	1	24	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 2, peak	1	24	3500	18.72	18.72	7.14	1.78	17.10	17.10	9.79	7.50	17.33
Gas Turbine 1, startups/shutdowns	0	0	0	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Gas Turbine 2, startups/shutdowns	0	0	0	140.00	100.00	6.04	1.51	500.00	250.00	16.00	7.50	14.67
Auxiliary boiler	1	10	200	0.40	0.40	0.06	0.01	1.36	1.36	0.16	0.28	0.00
WSAC	1	24	8760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.83	0.00
Firepump Engine	1	1	50	2.88	2.88	0.00	0.00	0.21	0.21	0.19	0.08	0.00
Emergency Engine	1	1	50	15.94	15.94	0.02	0.02	0.63	0.63	0.03	0.08	0.00

Detailed Calculations for Maximum Hourly, Daily, and Annual Criteria Pollutant Emissions

	NOx Emissions			SOx Emissions			CO Emissions			ROC Emissions			PM10 Emissions		
Equipment	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy	Max lb/hr	Max lb/day	Total tpy
Gas Turbine 1, base	0.0	0.0	41.7	0.0	0.0	4.0	0.0	0.0	38.1	0.0	0.0	14.5	0.0	0.0	19.7
Gas Turbine 2, base	0.0	0.0	41.7	0.0	0.0	4.0	0.0	0.0	38.1	0.0	0.0	14.5	0.0	0.0	19.7
Gas Turbine 1, peak	18.7	449.3	32.8	7.1	171.3	3.1	17.1	410.3	29.9	6.5	156.7	11.4	7.5	180.0	13.1
Gas Turbine 2, peak	18.7	449.3	32.8	7.1	171.3	3.1	17.1	410.3	29.9	6.5	156.7	11.4	7.5	180.0	13.1
Gas Turbine 1, startups/shutdowns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gas Turbine 2, startups/shutdowns	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Auxiliary boiler	0.4	4.0	0.0	0.1	0.6	0.0	1.4	13.6	0.1	0.2	1.6	0.0	0.3	2.8	0.0
WSAC	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8	43.9	8.0
Fire Pump Engine	2.9	2.9	0.1	0.0	0.0	0.0	0.2	0.2	0.0	0.2	0.2	0.0	0.1	0.1	0.0
Emergency Engine	15.9	15.9	0.4	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.1	0.1	0.0
Total, Turbines only	37.4	898.6	148.9	14.3	342.7	14.2	34.2	820.7	136.0	13.1	313.4	51.9	15.0	360.0	65.7
Total	56.7	921.5	149.4	14.4	343.3	14.2	36.4	835.1	136.1	13.4	315.2	51.9	17.3	406.9	73.8