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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Ambient Temperature, F	115.0	115.0	115.0
Ambient Relative Humidity, %	30.0	30.0	30.0
Atmospheric Pressure, psia	14.604	14.604	14.604
CTG Inlet Air Conditioning Effectiveness, %	85	85	85
CTG Compressor Inlet Dry Bulb Temperature, F	89.5	89.5	89.5
CTG Compr. Inlet Relative Humidity, %	83.4	83.4	83.4
Evaporative Cooler Evaporation Rate, lb/h	13103.6	10820.5	9406.2
Inlet Loss, in. H2O	4.5	4.5	4.5
Exhaust Loss, in. H2O	10.0	10.0	10.0
CTG Performance Reference	GTPE	GTPE	GTPE
CTG Load Level (percent of Base Load)	100%	80%	60%
Gross CTG Output, kW	73,988	59,194	44,391
Gross CTG Heat Rate, Btu/kWh (LHV)	10,890	11,650	13,350
Gross CTG Heat Rate, Btu/kWh (HHV)	12,084	12,927	14,813
CTG Heat Input, MBtu/h (LHV)	805.7	689.6	592.6
CTG Heat Input, MBtu/h (HHV)	894.1	765.2	657.6
CTG Water Injection Flow, lb/h	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0
Injection Fluid/Fuel Ratio	0.0	0.0	0.0
CTG Exhaust Flow, lb/h	2,176,634	1,798,566	1,563,147
CTG Exhaust Temperature, F	1,023	1,070	1,100
Total CTG Fuel Flow, lb/h	38,870	33,270	28,590
CTG Fuel Temperature, F	80	80	80
CTG Fuel LHV, Btu/lb	20,728	20,728	20,728
CTG Fuel HHV, Btu/lb	23,000	23,000	23,000
HHV/LHV Ratio	1.1096	1.1096	1.1096
CTG Fuel Composition (Ultimate Analysis by Weight)			
Ar	0.00%	0.00%	0.00%
C	73.19%	73.19%	73.19%
H2	23.97%	23.97%	23.97%
N2	1.55%	1.55%	1.55%
O2	1.29%	1.29%	1.29%
S	0.00064%	0.00064%	0.00064%
Total	100.00%	100.00%	100.00%
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20

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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions			
CTG Exhaust Analysis (Volume Basis - Wet)			
Ar	0.91%	0.91%	0.91%
CO2	3.07%	3.17%	3.14%
H2O	9.79%	10.00%	9.93%
N2	72.72%	72.64%	72.66%
O2	13.52%	13.28%	13.36%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
NOx, ppmvd @15% O2	9.00	9.00	9.00
NOx, ppmvd	9.03	9.37	9.26
NOx, ppmvw (wet - uncorrected exhaust gas)	8.14	8.43	8.34
NOx, lb/h as NO2	29.9	25.8	22.3
NOx, lb/MBtu (LHV)	0.0372	0.0374	0.0376
NOx, lb/MBtu (HHV)	0.0335	0.0337	0.0339
CO, ppmvd @ 15% O2	24.93	24.02	40.84
CO, ppmvd	25.00	25.00	42.00
CO, ppmvw (wet - uncorrected exhaust gas)	22.55	22.50	37.83
CO, lb/h	48.8	40.3	58.8
CO, lb/MBtu (LHV)	0.0606	0.0584	0.0992
CO, lb/MBtu (HHV)	0.0546	0.0526	0.0894
NOTE: SO2 estimate does not include the effects of SO2 oxidation			
SO2, ppmvd @ 15% O2 (with no SO2 oxidation)	0.11	0.11	0.11
SO2, ppmvd (with no SO2 oxidation)	0.11	0.12	0.11
SO2, ppmvw (with no SO2 oxidation)(wet - uncorrected exhaust gas)	0.10	0.10	0.10
SO2, lb/h (with no SO2 oxidation)	0.50	0.43	0.37
SO2, lb/MBtu (LHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006

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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions - continued			
UHC, ppmvd @ 15% O2	7.74	7.47	11.87
UHC, ppmvd	7.76	7.78	12.21
UHC, ppmvw (wet - uncorrected exhaust gas)	7.00	7.00	11.00
UHC, lb/h as CH4	8.7	7.2	9.8
UHC, lb/MBtu as CH4 (LHV)	0.0108	0.0104	0.0165
UHC, lb/MBtu as CH4 (HHV)	0.0097	0.0094	0.0149
VOC percentage of UHC	20%	20%	20%
VOC, ppmvd @ 15% O2	1.5	1.5	2.4
VOC, ppmvd	1.55	1.56	2.44
VOC, ppmvw (wet - uncorrected exhaust flow)	1.40	1.40	2.20
VOC, lb/h as CH4	1.7	1.4	2.0
VOC, lb/MBtu as CH4 (LHV)	0.0022	0.0021	0.0033
VOC, lb/MBtu as CH4 (HHV)	0.0019	0.0019	0.0030
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (LHV) (front half catch only)	0.0062	0.0073	0.0084
Particulates, lb/MBtu (HHV) (front half catch only)	0.0056	0.0065	0.0076
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (LHV) (front and back half catch)	0.0124	0.0145	0.0169
PM10, lb/MBtu (HHV) (front and back half catch)	0.0112	0.0131	0.0152
CTG Wet (Total) Exhaust Gas Analysis			
Molecular Wt, lb/mol	28.18	28.16	28.17
Gas Constant, ft-lbf/lbm-R	54.840	54.860	54.850
Specific Volume, ft^3/lb	37.73	38.94	39.70
Exhaust Gas Flow, acfm	1,368,740	1,167,270	1,034,282
Specific Volume, scf/lb	13.47	13.47	13.47
Exhaust Gas Flow, scfm	488,654	403,778	350,926

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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions			
NOTE: Exhaust Analysis does not include the effects of post combustion control			
Stack Exhaust Analysis (Volume Basis - Wet)			
Ar	0.92%	0.92%	0.92%
CO2	2.44%	2.39%	2.29%
H2O	8.41%	8.27%	8.05%
N2	73.32%	73.39%	73.48%
O2	14.91%	15.02%	15.26%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
Stack Emissions			
NOx, ppmvd @15% O2 w/o SCR (does not account for added margin	9.00	9.00	9.00
NOx, ppmvd w/o SCR	7.08	6.93	6.61
NOx, ppmvw w/o SCR	6.48	6.35	6.08
NOx, lb/h as NO2 w/o SCR (includes correction adder)	29.94	25.77	22.29
NOx, lb/MBtu (LHV) as NO2 w/o SCR	0.0372	0.0374	0.0376
NOx, lb/MBtu (HHV) as NO2 w/o SCR	0.0335	0.0337	0.0339
NOx, ppmvd @15% O2 w/ SCR	5.00	5.00	5.00
NOx, ppmvd w SCR	3.93	3.85	3.67
NOx, ppmvw w SCR	3.60	3.53	3.38
NOx, lb/h as NO2 w/ SCR (includes NOx margin applied to CTG)	16.63	14.32	12.38
NOx, lb/MBtu (LHV) as NO w SCR	0.0206	0.0208	0.0209
NOx, lb/MBtu (HHV) as NO2 w SCR	0.0186	0.0187	0.0188
SCR NH3 slip, ppmvd @15% O2	10.00	10.00	10.00
SCR NH3 slip, lb/h	11.90	10.19	8.76
CO, ppmvd @ 15% O2 w/o Catalyst	24.93	24.02	40.84
CO, ppmvd w/o Catalyst	19.60	18.49	29.99
CO, ppmvw w/o Catalyst	17.95	16.96	27.57
CO, lb/h w/o Catalyst (includes CO correction as applied to CTG and margin)	48.80	40.25	58.81
CO, lb/MBtu (LHV) w/o SCR	0.0606	0.0584	0.0992
CO, lb/MBtu (HHV) w/o SCR	0.0546	0.0526	0.0894
CO Reduction % w/ Catalyst	86%	86%	86%
CO, ppmvd @ 15% O2 w/ Catalyst	3.49	3.36	5.72
CO, ppmvd w/ Catalyst	2.74	2.59	4.20
CO, ppmvw w/ Catalyst	2.51	2.37	3.86
CO, lb/h w/ Catalyst (includes CO margin applied to CTG)	6.83	5.64	8.23
CO, lb/MBtu (LHV) w SCR	0.0085	0.0082	0.0139
CO, lb/MBtu (HHV) w SCR	0.0076	0.0074	0.0125
SO2, ppmvd@15% O2 w/o scrubber (with no SO2 oxidation)	0.111	0.111	0.111
SO2, ppmvd w/o scrubber (with no SO2 oxidation)	0.09	0.09	0.08
SO2, ppmvw w/o scrubber (with no SO2 oxidation)	0.08	0.08	0.08
SO2, lb/h w/o scrubber (with no SO2 oxidation)	0.50	0.43	0.37
SO2, lb/MBtu (LHV) w/o scrubber	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) w/o scrubber	0.0006	0.0006	0.0006

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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions - continued			
NOTE: UHC calculations do NOT include the effect of any oxidation in the CO catalyst.			
UHC, ppmvd @ 15% O2	7.74	7.47	11.87
UHC, ppmvd	6.08	5.75	8.72
UHC, ppmvw	5.57	5.28	8.02
UHC, lb/h as CH4	8.68	7.17	9.79
UHC, lb/MBtu (LHV)	0.0108	0.0104	0.0165
UHC, lb/MBtu (HHV)	0.0097	0.0094	0.0149
VOC, ppmvd @ 15% O2 w/o Catalyst	1.55	1.49	2.37
VOC, ppmvd w/o Calatyst	1.22	1.15	1.74
VOC, ppmvw w/o Catalyst	1.11	1.06	1.60
VOC, lb/h as CH4 w/o Catalyst (includes correction adder)	1.74	1.43	1.96
VOC, lb/MBtu (LHV) w/o CO catalyst	0.0022	0.0021	0.0033
VOC, lb/MBtu (HHV) w/o CO catalyst	0.0019	0.0019	0.0030
VOC Reduction % w/ Catalyst	16%	16%	16%
VOC, ppmvd @ 15% O2 w/ Catalyst	1.30	1.26	1.99
VOC, ppmvd w/ Calatyst	1.02	0.97	1.46
VOC, ppmvw w/ Catalyst	0.94	0.89	1.35
VOC, lb/h as CH4 w/ Catalyst (includes VOC correction as applied to CTG)	1.46	1.20	1.65
VOC, lb/MBtu (LHV) w CO catalyst	0.0018	0.0017	0.0028
VOC, lb/MBtu (HHV) w CO catalyst	0.0016	0.0016	0.0025
Particulate without the effect of SO2 oxidation and SCR catalysts			
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/MBtu (front half catch only)	0.0062	0.0073	0.0084
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (front and back half catch)	0.0124	0.0145	0.0169
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/MBtu (front half catch only)	0.0062	0.0073	0.0084
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (front and back half catch)	0.0124	0.0145	0.0169
Particulate including the effect of SO2 oxidation and SCR catalysts [includes (NH4)2-(SO4)]			
Particulates, lb/h (front half catch only)	5.3	5.3	5.2
Particulates, lb/MBtu(front half catch only)	0.0066	0.0076	0.0088
Particulates, lb/h (front and back half catch)	10.3	10.3	10.2
Particulates, lb/MBtu(front and back half catch)	0.0128	0.0149	0.0173
PM10, lb/h (front half catch only)	5.3	5.3	5.2
PM10, lb/MBtu(front half catch only)	0.0066	0.0076	0.0088
PM10, lb/h (front and back half catch)	10.3	10.3	10.2
PM10, lb/MBtu(front and back half catch)	0.0128	0.0149	0.0173
NOTE: SO2 to SO3 conversion rate (assumed), wt%	30.0%	30.0%	30.0%
Remaining SO2 in Exhaust Gas, lb/h	0.35	0.30	0.26
Amount of SO2 converted to SO3, lb/h	0.15	0.13	0.11
Maximum Exhaust Gas ammonium sulfate [(NH4)2-(SO4)] (assuming 100% conversion from SO3), lb/h	0.31	0.26	0.23
Maximum H2SO4 (assuming 100% conversion from SO3 to H2SO4), lb/hr	0.23	0.20	0.17

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Case Number	1	2	3
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	115	115	115
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack			
Stack Exit Temperature, F	850	850	850
Stack Diameter, ft (estimated)	17.0	17.0	17.0
Stack Flow, lb/h	2,743,743	2,396,427	2,154,361
Stack Flow, scfm	613,684	536,001	481,500
Stack Flow, acfm	1,556,617	1,358,774	1,221,164
Stack Exit Velocity, ft/s	114.0	100.0	90.0
Post Combustion Emissions Control			
CO Catalyst			
CO removed in CO Catalyst, %wt	86%	86%	86%
CO removed in CO Catalyst, lb/h (includes CO correction as applied to CTG)	41.97	34.62	50.57
Selective Catalytic Reduction (SCR)			
NOx Removed, lb/h as NO2	13.31	11.45	9.91
NOx Removed, percent	44.4%	44.4%	44.4%
NH3 Slip, lb/h	11.9	10.2	8.8
Stack Exhaust Gas Analysis (Wet)			
Molecular Wt, lb/mol	28.3	28.3	28.3
Specific Volume, ft^3/lb	34.0	34.0	34.0
Specific Volume, scf/lb	13.4	13.4	13.4

Notes:

1. The emissions estimates shown in the table above are per stack.
2. The dry air composition used is 0.98% Ar, 78.03% N2 and 20.99%O2
3. Standard conditions are defined as 60 F, 14.696 psia, Norm conditions are defined as 0 C, 1.103 bar
4. The CTG performance is a General Electric GTPE estimate.
5. The VOC oxidation rates are Black & Veatch estimates based on typical data.
6. UHC calculations do not include the effects of oxidation in the CO catalyst. The VOC/UHC ratio is assumed to be 20% for natural gas firing (typical for GE turbines).
7. The front half catch of particulate emissions is assumed to be half the amount of the front and back half catch.
particulates. The assumption that 100% SO3 is converted to ammonium sulfates results in "worst case" particulate emissions.
9. The SO2 oxidation rate was assumed to be 30%.

SR4/2 Preparer: J.Arthur Filepath: c:_project\patrick\tracy\[emission2-8.xls]input Reviewer: P.Elrod

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Case Number	4	5	6
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Ambient Temperature, F	98.0	98.0	98.0
Ambient Relative Humidity, %	24.0	24.0	24.0
Atmospheric Pressure, psia	14.604	14.604	14.604
CTG Inlet Air Conditioning Effectiveness, %	85	85	85
CTG Compressor Inlet Dry Bulb Temperature, F	74.1	74.1	74.1
CTG Compr. Inlet Relative Humidity, %	81.5	81.5	81.5
Evaporative Cooler Evaporation Rate, lb/h	12396.3	10229.0	8736.1
Inlet Loss, in. H2O	4.5	4.5	4.5
Exhaust Loss, in. H2O	10.0	10.0	10.0
CTG Performance Reference	GTPE	GTPE	GTPE
CTG Load Level (percent of Base Load)	100%	80%	60%
Gross CTG Output, kW	78,676	62,945	47,204
Gross CTG Heat Rate, Btu/kWh (LHV)	10,700	11,340	13,020
Gross CTG Heat Rate, Btu/kWh (HHV)	11,873	12,583	14,447
CTG Heat Input, MBtu/h (LHV)	841.8	713.8	614.6
CTG Heat Input, MBtu/h (HHV)	934.1	792.0	682.0
CTG Water Injection Flow, lb/h	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0
Injection Fluid/Fuel Ratio	0.0	0.0	0.0
CTG Exhaust Flow, lb/h	2,270,403	1,874,380	1,601,053
CTG Exhaust Temperature, F	1,012	1,051	1,100
Total CTG Fuel Flow, lb/h	40,610	34,440	29,650
CTG Fuel Temperature, F	80	80	80
CTG Fuel LHV, Btu/lb	20,728	20,728	20,728
CTG Fuel HHV, Btu/lb	23,000	23,000	23,000
HHV/LHV Ratio	1.1096	1.1096	1.1096
CTG Fuel Composition (Ultimate Analysis by Weight)			
Ar	0.00%	0.00%	0.00%
C	73.19%	73.19%	73.19%
H2	23.97%	23.97%	23.97%
N2	1.55%	1.55%	1.55%
O2	1.29%	1.29%	1.29%
S	0.00064%	0.00064%	0.00064%
Total	100.00%	100.00%	100.00%
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20

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Case Number	4	5	6
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions			
CTG Exhaust Analysis (Volume Basis - Wet)			
Ar	0.93%	0.93%	0.93%
CO2	3.09%	3.17%	3.20%
H2O	8.28%	8.44%	8.49%
N2	73.91%	73.85%	73.83%
O2	13.79%	13.61%	13.56%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
NOx, ppmvd @15% O2	9.00	9.00	9.00
NOx, ppmvd	8.95	9.20	9.28
NOx, ppmvw (wet - uncorrected exhaust gas)	8.20	8.43	8.49
NOx, lb/h as NO2	31.2	26.6	23.1
NOx, lb/MBtu (LHV)	0.0371	0.0373	0.0375
NOx, lb/MBtu (HHV)	0.0334	0.0336	0.0338
CO, ppmvd @ 15% O2	25.15	24.45	24.25
CO, ppmvd	25.00	25.00	25.00
CO, ppmvw (wet - uncorrected exhaust gas)	22.93	22.89	22.88
CO, lb/h	51.5	42.4	36.2
CO, lb/MBtu (LHV)	0.0611	0.0594	0.0589
CO, lb/MBtu (HHV)	0.0551	0.0536	0.0531
NOTE: SO2 estimate does not include the effects of SO2 oxidation			
SO2, ppmvd @ 15% O2 (with no SO2 oxidation)	0.11	0.11	0.11
SO2, ppmvd (with no SO2 oxidation)	0.11	0.11	0.11
SO2, ppmvw (with no SO2 oxidation)(wet - uncorrected exhaust gas)	0.10	0.10	0.11
SO2, lb/h (with no SO2 oxidation)	0.52	0.44	0.38
SO2, lb/MBtu (LHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006

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Case Number	4	5	6
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions - continued			
UHC, ppmvd @ 15% O2	7.68	7.48	7.42
UHC, ppmvd	7.63	7.65	7.65
UHC, ppmvw (wet - uncorrected exhaust gas)	7.00	7.00	7.00
UHC, lb/h as CH4	9.0	7.4	6.4
UHC, lb/MBtu as CH4 (LHV)	0.0107	0.0104	0.0103
UHC, lb/MBtu as CH4 (HHV)	0.0096	0.0094	0.0093
VOC percentage of UHC	20%	20%	20%
VOC, ppmvd @ 15% O2	1.5	1.5	1.5
VOC, ppmvd	1.53	1.53	1.53
VOC, ppmvw (wet - uncorrected exhaust flow)	1.40	1.40	1.40
VOC, lb/h as CH4	1.8	1.5	1.3
VOC, lb/MBtu as CH4 (LHV)	0.0021	0.0021	0.0021
VOC, lb/MBtu as CH4 (HHV)	0.0019	0.0019	0.0019
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (LHV) (front half catch only)	0.0059	0.0070	0.0081
Particulates, lb/MBtu (HHV) (front half catch only)	0.0054	0.0063	0.0073
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (LHV) (front and back half catch)	0.0119	0.0140	0.0163
PM10, lb/MBtu (HHV) (front and back half catch)	0.0107	0.0126	0.0147
CTG Wet (Total) Exhaust Gas Analysis			
Molecular Wt, lb/mol	28.34	28.33	28.33
Gas Constant, ft-lbf/lbm-R	54.510	54.530	54.540
Specific Volume, ft^3/lb	37.23	38.23	39.47
Exhaust Gas Flow, acfm	1,408,785	1,194,292	1,053,226
Specific Volume, scf/lb	13.39	13.39	13.39
Exhaust Gas Flow, scfm	506,678	418,299	357,302

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Case Number	4	5	6
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions			
NOTE: Exhaust Analysis does not include the effects of post combustion control			
Stack Exhaust Analysis (Volume Basis - Wet)			
Ar	0.94%	0.94%	0.94%
CO2	2.50%	2.46%	2.34%
H2O	6.98%	6.86%	6.61%
N2	74.48%	74.54%	74.65%
O2	15.10%	15.21%	15.46%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
Stack Emissions			
NOx, ppmvd @15% O2 w/o SCR (does not account for added margin	9.00	9.00	9.00
NOx, ppmvd w/o SCR	7.14	7.00	6.67
NOx, ppmvw w/o SCR	6.64	6.52	6.23
NOx, lb/h as NO2 w/o SCR (includes correction adder)	31.24	26.64	23.08
NOx, lb/MBtu (LHV) as NO2 w/o SCR	0.0371	0.0373	0.0375
NOx, lb/MBtu (HHV) as NO2 w/o SCR	0.0334	0.0336	0.0338
NOx, ppmvd @15% O2 w/ SCR	5.00	5.00	5.00
NOx, ppmvd w SCR	3.97	3.89	3.70
NOx, ppmvw w SCR	3.69	3.62	3.46
NOx, lb/h as NO2 w/ SCR (includes NOx margin applied to CTG)	17.35	14.80	12.82
NOx, lb/MBtu (LHV) as NO w SCR	0.0206	0.0207	0.0209
NOx, lb/MBtu (HHV) as NO2 w SCR	0.0186	0.0187	0.0188
SCR NH3 slip, ppmvd @15% O2	10.00	10.00	10.00
SCR NH3 slip, lb/h	12.44	10.55	9.08
CO, ppmvd @ 15% O2 w/o Catalyst	25.15	24.45	24.25
CO, ppmvd w/o Catalyst	19.97	19.03	17.96
CO, ppmvw w/o Catalyst	18.57	17.72	16.77
CO, lb/h w/o Catalyst (includes CO correction as applied to CTG and margin)	51.45	42.42	36.22
CO, lb/MBtu (LHV) w/o SCR	0.0611	0.0594	0.0589
CO, lb/MBtu (HHV) w/o SCR	0.0551	0.0536	0.0531
CO Reduction % w/ Catalyst	86%	86%	86%
CO, ppmvd @ 15% O2 w/ Catalyst	3.52	3.42	3.40
CO, ppmvd w/ Catalyst	2.80	2.66	2.51
CO, ppmvw w/ Catalyst	2.60	2.48	2.35
CO, lb/h w/ Catalyst (includes CO margin applied to CTG)	7.20	5.94	5.07
CO, lb/MBtu (LHV) w SCR	0.0086	0.0083	0.0082
CO, lb/MBtu (HHV) w SCR	0.0077	0.0075	0.0074
SO2, ppmvd@15% O2 w/o scrubber (with no SO2 oxidation)	0.111	0.111	0.111
SO2, ppmvd w/o scrubber (with no SO2 oxidation)	0.09	0.09	0.08
SO2, ppmvw w/o scrubber (with no SO2 oxidation)	0.08	0.08	0.08
SO2, lb/h w/o scrubber (with no SO2 oxidation)	0.52	0.44	0.38
SO2, lb/MBtu (LHV) w/o scrubber	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) w/o scrubber	0.0006	0.0006	0.0006

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Case Number	4	5	6
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions - continued			
NOTE: UHC calculations do NOT include the effect of any oxidation in the CO catalyst.			
UHC, ppmvd @ 15% O2	7.68	7.48	7.42
UHC, ppmvd	6.10	5.82	5.50
UHC, ppmvw	5.67	5.42	5.13
UHC, lb/h as CH4	9.00	7.43	6.35
UHC, lb/MBtu (LHV)	0.0107	0.0104	0.0103
UHC, lb/MBtu (HHV)	0.0096	0.0094	0.0093
VOC, ppmvd @ 15% O2 w/o Catalyst	1.54	1.50	1.48
VOC, ppmvd w/o Calatyst	1.22	1.16	1.10
VOC, ppmvw w/o Catalyst	1.13	1.08	1.03
VOC, lb/h as CH4 w/o Catalyst (includes correction adder)	1.80	1.49	1.27
VOC, lb/MBtu (LHV) w/o CO catalyst	0.0021	0.0021	0.0021
VOC, lb/MBtu (HHV) w/o CO catalyst	0.0019	0.0019	0.0019
VOC Reduction % w/ Catalyst	16%	16%	16%
VOC, ppmvd @ 15% O2 w/ Catalyst	1.29	1.26	1.25
VOC, ppmvd w/ Calatyst	1.02	0.98	0.92
VOC, ppmvw w/ Catalyst	0.95	0.91	0.86
VOC, lb/h as CH4 w/ Catalyst (includes VOC correction as applied to CTG)	1.51	1.25	1.07
VOC, lb/MBtu (LHV) w CO catalyst	0.0018	0.0017	0.0017
VOC, lb/MBtu (HHV) w CO catalyst	0.0016	0.0016	0.0016
Particulate without the effect of SO2 oxidation and SCR catalysts			
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/MBtu (front half catch only)	0.0059	0.0070	0.0081
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (front and back half catch)	0.0119	0.0140	0.0163
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/MBtu (front half catch only)	0.0059	0.0070	0.0081
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (front and back half catch)	0.0119	0.0140	0.0163
Particulate including the effect of SO2 oxidation and SCR catalysts [includes (NH4)2-(SO4)]			
Particulates, lb/h (front half catch only)	5.3	5.3	5.2
Particulates, lb/MBtu(front half catch only)	0.0063	0.0074	0.0085
Particulates, lb/h (front and back half catch)	10.3	10.3	10.2
Particulates, lb/MBtu(front and back half catch)	0.0123	0.0144	0.0167
PM10, lb/h (front half catch only)	5.3	5.3	5.2
PM10, lb/MBtu(front half catch only)	0.0063	0.0074	0.0085
PM10, lb/h (front and back half catch)	10.3	10.3	10.2
PM10, lb/MBtu(front and back half catch)	0.0123	0.0144	0.0167
NOTE: SO2 to SO3 conversion rate (assumed), wt%	30.0%	30.0%	30.0%
Remaining SO2 in Exhaust Gas, lb/h	0.37	0.31	0.27
Amount of SO2 converted to SO3, lb/h	0.16	0.13	0.11
Maximum Exhaust Gas ammonium sulfate [(NH4)2-(SO4)] (assuming 100% conversion from SO3), lb/h	0.32	0.27	0.24
Maximum H2SO4 (assuming 100% conversion from SO3 to H2SO4), lb/hr	0.24	0.20	0.18

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CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	98	98	98
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack			
Stack Exit Temperature, F	850	850	850
Stack Diameter, ft (estimated)	17.0	17.0	17.0
Stack Flow, lb/h	2,812,083	2,430,364	2,193,524
Stack Flow, scfm	625,220	540,351	487,328
Stack Flow, acfm	1,586,015	1,370,320	1,236,051
Stack Exit Velocity, ft/s	116.0	101.0	91.0
Post Combustion Emissions Control			
CO Catalyst			
CO removed in CO Catalyst, %wt	86%	86%	86%
CO removed in CO Catalyst, lb/h (includes CO correction as applied to CTG)	44.25	36.48	31.15
Selective Catalytic Reduction (SCR)			
NOx Removed, lb/h as NO2	13.88	11.84	10.26
NOx Removed, percent	44.4%	44.4%	44.4%
NH3 Slip, lb/h	12.4	10.5	9.1
Stack Exhaust Gas Analysis (Wet)			
Molecular Wt, lb/mol	28.4	28.4	28.5
Specific Volume, ft^3/lb	33.8	33.8	33.8
Specific Volume, scf/lb	13.3	13.3	13.3

Notes:

1. The emissions estimates shown in the table above are per stack.
2. The dry air composition used is 0.98% Ar, 78.03% N2 and 20.99%O2
3. Standard conditions are defined as 60 F, 14.696 psia, Norm conditions are defined as 0 C, 1.103 bar
4. The CTG performance is a General Electric GTPE estimate.
5. The VOC oxidation rates are Black & Veatch estimates based on typical data.
6. UHC calculations do not include the effects of oxidation in the CO catalyst. The VOC/UHC ratio is assumed to be 20% for natural gas firing (typical for GE turbines).
7. The front half catch of particulate emissions is assumed to be half the amount of the front and back half catch.
particulates. The assumption that 100% SO3 is converted to ammonium sulfates results in "worst case" particulate emissions.
9. The SO2 oxidation rate was assumed to be 30%.

SR4/2 Preparer: J.Arthur Filepath: c:_project\patrick\tracy\[emission2-8.xls]input Reviewer: P.Elrod

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Case Number	7	8	9
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Ambient Temperature, F	59.0	59.0	59.0
Ambient Relative Humidity, %	60.0	60.0	60.0
Atmospheric Pressure, psia	14.604	14.604	14.604
CTG Inlet Air Conditioning Effectiveness, %	85	85	85
CTG Compressor Inlet Dry Bulb Temperature, F	52.6	52.6	52.6
CTG Compr. Inlet Relative Humidity, %	92.9	92.9	92.9
Evaporative Cooler Evaporation Rate, lb/h	4561.3	3741.4	3173.9
Inlet Loss, in. H2O	4.5	4.5	4.5
Exhaust Loss, in. H2O	10.0	10.0	10.0
CTG Performance Reference	GTPE	GTPE	GTPE
CTG Load Level (percent of Base Load)	100%	80%	60%
Gross CTG Output, kW	85,020	68,012	51,014
Gross CTG Heat Rate, Btu/kWh (LHV)	10,500	11,020	12,610
Gross CTG Heat Rate, Btu/kWh (HHV)	11,651	12,228	13,992
CTG Heat Input, MBtu/h (LHV)	892.7	749.5	643.3
CTG Heat Input, MBtu/h (HHV)	990.6	831.7	713.8
CTG Water Injection Flow, lb/h	0	0	0
CTG Steam Injection Flow, lb/h	0	0	0
Injection Fluid/Fuel Ratio	0.0	0.0	0.0
CTG Exhaust Flow, lb/h	2,391,106	1,962,163	1,664,896
CTG Exhaust Temperature, F	996	1,032	1,084
Total CTG Fuel Flow, lb/h	43,070	36,160	31,030
CTG Fuel Temperature, F	80	80	80
CTG Fuel LHV, Btu/lb	20,728	20,728	20,728
CTG Fuel HHV, Btu/lb	23,000	23,000	23,000
HHV/LHV Ratio	1.1096	1.1096	1.1096
CTG Fuel Composition (Ultimate Analysis by Weight)			
Ar	0.00%	0.00%	0.00%
C	73.19%	73.19%	73.19%
H2	23.97%	23.97%	23.97%
N2	1.55%	1.55%	1.55%
O2	1.29%	1.29%	1.29%
S	0.00064%	0.00064%	0.00064%
Total	100.00%	100.00%	100.00%
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20

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Case Number	7	8	9
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions			
CTG Exhaust Analysis (Volume Basis - Wet)			
Ar	0.94%	0.94%	0.94%
CO2	3.12%	3.19%	3.23%
H2O	7.30%	7.43%	7.50%
N2	74.71%	74.65%	74.62%
O2	13.94%	13.78%	13.71%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
NOx, ppmvd @15% O2	9.00	9.00	9.00
NOx, ppmvd	8.95	9.16	9.27
NOx, ppmvw (wet - uncorrected exhaust gas)	8.29	8.48	8.58
NOx, lb/h as NO2	33.1	27.9	24.1
NOx, lb/MBtu (LHV)	0.0370	0.0373	0.0375
NOx, lb/MBtu (HHV)	0.0334	0.0336	0.0338
CO, ppmvd @ 15% O2	25.15	24.55	24.26
CO, ppmvd	25.00	25.00	25.00
CO, ppmvw (wet - uncorrected exhaust gas)	23.18	23.14	23.12
CO, lb/h	54.6	44.7	37.9
CO, lb/MBtu (LHV)	0.0611	0.0597	0.0589
CO, lb/MBtu (HHV)	0.0551	0.0538	0.0531
NOTE: SO2 estimate does not include the effects of SO2 oxidation			
SO2, ppmvd @ 15% O2 (with no SO2 oxidation)	0.11	0.11	0.11
SO2, ppmvd (with no SO2 oxidation)	0.11	0.11	0.11
SO2, ppmvw (with no SO2 oxidation)(wet - uncorrected exhaust gas)	0.10	0.11	0.11
SO2, lb/h (with no SO2 oxidation)	0.55	0.46	0.40
SO2, lb/MBtu (LHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) (with no SO2 oxidation)	0.0006	0.0006	0.0006

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Case Number	7	8	9
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Combustion Turbine Exhaust Emissions - continued			
UHC, ppmvd @ 15% O2	7.60	7.43	7.34
UHC, ppmvd	7.55	7.56	7.57
UHC, ppmvw (wet - uncorrected exhaust gas)	7.00	7.00	7.00
UHC, lb/h as CH4	9.4	7.8	6.6
UHC, lb/MBtu as CH4 (LHV)	0.0106	0.0103	0.0102
UHC, lb/MBtu as CH4 (HHV)	0.0095	0.0093	0.0092
VOC percentage of UHC	20%	20%	20%
VOC, ppmvd @ 15% O2	1.5	1.5	1.5
VOC, ppmvd	1.51	1.51	1.51
VOC, ppmvw (wet - uncorrected exhaust flow)	1.40	1.40	1.40
VOC, lb/h as CH4	1.9	1.5	1.3
VOC, lb/MBtu as CH4 (LHV)	0.0021	0.0021	0.0020
VOC, lb/MBtu as CH4 (HHV)	0.0019	0.0019	0.0018
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (LHV) (front half catch only)	0.0056	0.0067	0.0078
Particulates, lb/MBtu (HHV) (front half catch only)	0.0050	0.0060	0.0070
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (LHV) (front and back half catch)	0.0112	0.0133	0.0155
PM10, lb/MBtu (HHV) (front and back half catch)	0.0101	0.0120	0.0140
CTG Wet (Total) Exhaust Gas Analysis			
Molecular Wt, lb/mol	28.45	28.45	28.44
Gas Constant, ft-lbf/lbm-R	54.300	54.320	54.330
Specific Volume, ft^3/lb	36.68	37.60	38.91
Exhaust Gas Flow, acfm	1,461,763	1,229,622	1,079,685
Specific Volume, scf/lb	13.33	13.34	13.34
Exhaust Gas Flow, scfm	531,224	436,254	370,162

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Case Number	7	8	9
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions			
NOTE: Exhaust Analysis does not include the effects of post combustion control			
Stack Exhaust Analysis (Volume Basis - Wet)			
Ar	0.94%	0.94%	0.94%
CO2	2.60%	2.55%	2.44%
H2O	6.24%	6.15%	5.92%
N2	75.13%	75.17%	75.26%
O2	15.08%	15.18%	15.43%
SO2	0.00001%	0.00001%	0.00001%
Total	100.0%	100.0%	100.0%
Stack Emissions			
NOx, ppmvd @15% O2 w/o SCR (does not account for added margin	9.00	9.00	9.00
NOx, ppmvd w/o SCR	7.36	7.23	6.89
NOx, ppmvw w/o SCR	6.90	6.79	6.48
NOx, lb/h as NO2 w/o SCR (includes correction adder)	33.07	27.92	24.10
NOx, lb/MBtu (LHV) as NO2 w/o SCR	0.0370	0.0373	0.0375
NOx, lb/MBtu (HHV) as NO2 w/o SCR	0.0334	0.0336	0.0338
NOx, ppmvd @15% O2 w/ SCR	5.00	5.00	5.00
NOx, ppmvd w SCR	4.09	4.02	3.83
NOx, ppmvw w SCR	3.84	3.77	3.60
NOx, lb/h as NO2 w/ SCR (includes NOx margin applied to CTG)	18.37	15.51	13.39
NOx, lb/MBtu (LHV) as NO w SCR	0.0206	0.0207	0.0208
NOx, lb/MBtu (HHV) as NO2 w SCR	0.0185	0.0187	0.0188
SCR NH3 slip, ppmvd @15% O2	10.00	10.00	10.00
SCR NH3 slip, lb/h	13.19	11.07	9.50
CO, ppmvd @ 15% O2 w/o Catalyst	25.15	24.55	24.26
CO, ppmvd w/o Catalyst	20.58	19.72	18.57
CO, ppmvw w/o Catalyst	19.29	18.51	17.47
CO, lb/h w/o Catalyst (includes CO correction as applied to CTG and margin)	54.55	44.71	37.92
CO, lb/MBtu (LHV) w/o SCR	0.0611	0.0597	0.0589
CO, lb/MBtu (HHV) w/o SCR	0.0551	0.0538	0.0531
CO Reduction % w/ Catalyst	86%	86%	86%
CO, ppmvd @ 15% O2 w/ Catalyst	3.52	3.44	3.40
CO, ppmvd w/ Catalyst	2.88	2.76	2.60
CO, ppmvw w/ Catalyst	2.70	2.59	2.45
CO, lb/h w/ Catalyst (includes CO margin applied to CTG)	7.64	6.26	5.31
CO, lb/MBtu (LHV) w SCR	0.0086	0.0084	0.0083
CO, lb/MBtu (HHV) w SCR	0.0077	0.0075	0.0074
SO2, ppmvd@15% O2 w/o scrubber (with no SO2 oxidation)	0.111	0.111	0.111
SO2, ppmvd w/o scrubber (with no SO2 oxidation)	0.09	0.09	0.09
SO2, ppmvw w/o scrubber (with no SO2 oxidation)	0.09	0.08	0.08
SO2, lb/h w/o scrubber (with no SO2 oxidation)	0.55	0.46	0.40
SO2, lb/MBtu (LHV) w/o scrubber	0.0006	0.0006	0.0006
SO2, lb/MBtu (HHV) w/o scrubber	0.0006	0.0006	0.0006

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Case Number	7	8	9
CTG Model	GE 7EA	GE 7EA	GE 7EA
Diluent	DN 9/42	DN 9/42	DN 9/42
CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack Emissions - continued			
NOTE: UHC calculations do NOT include the effect of any oxidation in the CO catalyst.			
UHC, ppmvd @ 15% O2	7.60	7.43	7.34
UHC, ppmvd	6.22	5.97	5.62
UHC, ppmvw	5.83	5.60	5.29
UHC, lb/h as CH4	9.44	7.75	6.57
UHC, lb/MBtu (LHV)	0.0106	0.0103	0.0102
UHC, lb/MBtu (HHV)	0.0095	0.0093	0.0092
VOC, ppmvd @ 15% O2 w/o Catalyst	1.52	1.49	1.47
VOC, ppmvd w/o Calatyst	1.24	1.19	1.12
VOC, ppmvw w/o Catalyst	1.17	1.12	1.06
VOC, lb/h as CH4 w/o Catalyst (includes correction adder)	1.89	1.55	1.31
VOC, lb/MBtu (LHV) w/o CO catalyst	0.0021	0.0021	0.0020
VOC, lb/MBtu (HHV) w/o CO catalyst	0.0019	0.0019	0.0018
VOC Reduction % w/ Catalyst	16%	16%	16%
VOC, ppmvd @ 15% O2 w/ Catalyst	1.28	1.25	1.23
VOC, ppmvd w/ Calatyst	1.04	1.00	0.94
VOC, ppmvw w/ Catalyst	0.98	0.94	0.89
VOC, lb/h as CH4 w/ Catalyst (includes VOC correction as applied to CTG)	1.59	1.30	1.10
VOC, lb/MBtu (LHV) w CO catalyst	0.0018	0.0017	0.0017
VOC, lb/MBtu (HHV) w CO catalyst	0.0016	0.0016	0.0015
Particulate without the effect of SO2 oxidation and SCR catalysts			
Particulates, lb/h (front half catch only)	5.0	5.0	5.0
Particulates, lb/MBtu (front half catch only)	0.0056	0.0067	0.0078
Particulates, lb/h (front and back half catch)	10.0	10.0	10.0
Particulates, lb/MBtu (front and back half catch)	0.0112	0.0133	0.0155
PM10, lb/h (front half catch only)	5.0	5.0	5.0
PM10, lb/MBtu (front half catch only)	0.0056	0.0067	0.0078
PM10, lb/h (front and back half catch)	10.0	10.0	10.0
PM10, lb/MBtu (front and back half catch)	0.0112	0.0133	0.0155
Particulate including the effect of SO2 oxidation and SCR catalysts [includes (NH4)2-(SO4)]			
Particulates, lb/h (front half catch only)	5.3	5.3	5.3
Particulates, lb/MBtu(front half catch only)	0.0060	0.0071	0.0082
Particulates, lb/h (front and back half catch)	10.3	10.3	10.3
Particulates, lb/MBtu(front and back half catch)	0.0116	0.0137	0.0159
PM10, lb/h (front half catch only)	5.3	5.3	5.3
PM10, lb/MBtu(front half catch only)	0.0060	0.0071	0.0082
PM10, lb/h (front and back half catch)	10.3	10.3	10.3
PM10, lb/MBtu(front and back half catch)	0.0116	0.0137	0.0159
NOTE: SO2 to SO3 conversion rate (assumed), wt%	30.0%	30.0%	30.0%
Remaining SO2 in Exhaust Gas, lb/h	0.39	0.33	0.28
Amount of SO2 converted to SO3, lb/h	0.17	0.14	0.12
Maximum Exhaust Gas ammonium sulfate [(NH4)2-(SO4)] (assuming 100% conversion from SO3), lb/h	0.34	0.29	0.25
Maximum H2SO4 (assuming 100% conversion from SO3 to H2SO4), lb/hr	0.25	0.21	0.18

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CTG Fuel Type	Cust Gas	Cust Gas	Cust Gas
CTG Load	100%	80%	60%
CTG Inlet Air Conditioning In Operation?	Evap. Cooler	Evap. Cooler	Evap. Cooler
Ambient Temperature, F	59	59	59
HRSG Firing	Unfired	Unfired	Unfired
Fuel Sulfur Content (grains/100 standard cubic feet)	0.20	0.20	0.20
Stack			
Stack Exit Temperature, F	850	850	850
Stack Diameter, ft (estimated)	17.0	17.0	17.0
Stack Flow, lb/h	2,879,241	2,460,369	2,211,680
Stack Flow, scfm	638,232	545,382	489,887
Stack Flow, acfm	1,619,093	1,383,138	1,242,596
Stack Exit Velocity, ft/s	119.0	102.0	91.0
Post Combustion Emissions Control			
CO Catalyst			
CO removed in CO Catalyst, %wt	86%	86%	86%
CO removed in CO Catalyst, lb/h (includes CO correction as applied to CTG)	46.92	38.45	32.61
Selective Catalytic Reduction (SCR)			
NOx Removed, lb/h as NO2	14.70	12.41	10.71
NOx Removed, percent	44.4%	44.4%	44.4%
NH3 Slip, lb/h	13.2	11.1	9.5
Stack Exhaust Gas Analysis (Wet)			
Molecular Wt, lb/mol	28.5	28.5	28.5
Specific Volume, ft^3/lb	33.7	33.7	33.7
Specific Volume, scf/lb	13.3	13.3	13.3

Notes:

1. The emissions estimates shown in the table above are per stack.
2. The dry air composition used is 0.98% Ar, 78.03% N2 and 20.99%O2
3. Standard conditions are defined as 60 F, 14.696 psia, Norm conditions are defined as 0 C, 1.103 bar
4. The CTG performance is a General Electric GTPE estimate.
5. The VOC oxidation rates are Black & Veatch estimates based on typical data.
6. UHC calculations do not include the effects of oxidation in the CO catalyst. The VOC/UHC ratio is assumed to be 20% for natural gas firing (typical for GE turbines).
7. The front half catch of particulate emissions is assumed to be half the amount of the front and back half catch.
particulates. The assumption that 100% SO3 is converted to ammonium sulfates results in "worst case" particulate emissions.
9. The SO2 oxidation rate was assumed to be 30%.

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