APPENDIX B

GENERATING STATION CRITERIA POLLUTION EMISSIONS

- **Facility Total Potential to Emit – Normal Year**
- **Facility Total Potential to Emit – Commissioning Year**
- **Combined Turbines Normal Operations – 910 Hours**
- **Single Turbine Normal Operations – 910 Hours**
- **Combined Turbines Startup Operations – 200 Hours**
- **Vendor Startup Emissions Summary**
- **Startup Emissions Worksheet**
- **Combined Turbines Shutdown Emissions – 200 Hours**
- **Single Turbine Shutdown Operations**
- **Vendor Shutdown Emissions Summary**
- **Shutdown Emissions Worksheet**
- **Combined Turbines Maintenance Operations – 20 Hours**
- **Single Turbine Maintenance Operations – 20 Hours**
- **Hourly ppmv – Mass Emissions Conversions**
- **Hourly NH3 Calculations**
- **Cooling Tower Hourly Emissions**
- **Manufacturer Guarantees & Supporting Documents**

Riverside Energy Resource Center
Facility Total Potential to Emit - Normal Year

ROG

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations 910 hours/turbine	3.76	1.88	60.16	30.08	1,625.3	0.86	30.1
Startup 200 hours/turbine	3.35	2.03	13.41	8.12	284.3	0.20	8.1
Shutdown 200 hours/turbine	3.36	2.04	13.44	8.16	285.6	0.20	8.2
Maintenance 20 hours/turbine	3.76	3.76	18.80	18.80	52.6	0.04	2.5
Total Maximum 1330 hours/turbine	3.76	3.76	90.24	54.52	2,247.8	1.30	46.4
(daily = 5 hours maint, plus 19 hours normal							

SOx

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	3.24	3.24	51.83	51.83	2,800.2	1.5	51.8
Startup	2.96	2.96	11.85	11.85	414.9	0.3	11.9
Shutdown	3.24	3.24	12.96	12.96	453.6	0.3	13.0
Maintenance	3.24	3.24	16.20	16.20	45.3	0.0	2.2
Total Maximum	3.20	3.20	77.74	77.74	3,714.0	2.1	77.7
(daily = 24 hours normal operation)							

CO

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	91.86	13.78	1469.76	220.46	11,911.9	6.27	220.5
Startup	91.49	26.40	365.94	105.61	3,696.4	2.64	105.6
Shutdown	91.48	22.36	365.92	89.44	3,130.4	2.24	89.4
Maintenance	91.86	91.86	459.30	459.30	1,286.0	0.92	61.2
Total Maximum	91.86	91.86	2204.64	721.10	20,024.8	12.06	415.5
(daily = 5 hours maint, plus 19 hours normal							

PM10

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	6.00	6.00	96.00	96.00	5,187.0	2.73	96.00
Startup	5.49	5.49	21.95	21.95	768.3	0.55	21.95
Shutdown	6.00	6.00	24.00	24.00	840.0	0.60	24.00
Maintenance	6.00	6.00	30.00	30.00	84.0	0.06	4.00
Total Maximum	6.00	6.00	144.0	144.0	6,879.3	3.94	142.0
(daily = 24 hours normal operation)							

NOx

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)	30DA (lb/day)
Normal Operations	89.86	8.99	1437.76	143.78	7,768.4	4.09	143.8
Startup	80.12	32.95	320.50	131.79	4,612.7	3.29	131.8
Shutdown	80.12	13.21	320.48	52.83	1,849.1	1.32	52.8
Maintenance	89.86	89.86	449.30	449.30	1,258.0	0.90	59.9
Total Maximum	89.86	89.86	2156.64	620.03	15,488.3	9.60	328.4
(daily = 5 hours maint, plus 19 hours normal							

Riverside Energy Resource Center
Facility Total Potential to Emit - Commissioning Year

ROG

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 710 hours/turbine	3.76	1.88	60.16	30.08	1268	0.67
Commission 200 hours/turbine	3.76	3.76	90.24	90.24	526	0.38
Startup 200 hours/turbine	3.35	2.03	13.41	8.12	284	0.20
Shutdown 200 hours/turbine	3.36	2.04	13.44	8.16	286	0.20
Maintenance 20 hours/turbine	3.76	3.76	18.80	18.80	53	0.04
Total Maximum 1330 hours/turbine					2,417	1.49

SOx

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 710 hours/turbine	3.24	3.24	51.83	51.83	2185	1.15
Commission 200 hours/turbine	3.24	3.24	77.76	77.76	453	0.32
Startup 200 hours/turbine	2.96	2.96	11.85	11.85	415	0.30
Shutdown 200 hours/turbine	3.24	3.24	12.96	12.96	454	0.32
Maintenance 20 hours/turbine	3.24	3.24	16.20	16.20	45	0.03
Total Maximum 1330 hours/turbine					3,552	2.13

CO

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 710 hours/turbine	91.86	13.78	1469.76	220.46	9294	4.89
Commission 200 hours/turbine	91.86	91.86	2204.64	2204.64	12860	9.19
Startup 200 hours/turbine	91.49	26.40	365.94	105.61	3696	2.64
Shutdown 200 hours/turbine	91.48	22.36	365.92	89.44	3130	2.24
Maintenance 20 hours/turbine	91.86	91.86	459.30	459.30	1286	0.92
Total Maximum 1330 hours/turbine					30,267	19.87

PM10

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 710 hours/turbine	6.00	6.00	96.00	96.00	4,047	2.13
Commission 200 hours/turbine	6.00	6.00	144.0	144.0	840	0.60
Startup 200 hours/turbine	5.49	5.49	21.95	21.95	768	0.55
Shutdown 200 hours/turbine	6.00	6.00	24.00	24.00	840	0.60
Maintenance 20 hours/turbine	6.00	6.00	30.00	30.00	84	0.06
Total Maximum 1330 hours/turbine					6,579	3.94

NOx

	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (ton/yr)
Normal Operations 710 hours/turbine	89.86	8.99	1437.8	143.8	6,061	3.19
Commission 200 hours/turbine	89.86	89.86	2156.6	2156.6	12,580	8.99
Startup 200 hours/turbine	80.12	32.95	320.5	131.8	4,613	3.29
Shutdown 200 hours/turbine	80.12	13.21	320.5	52.8	1,849	1.32
Maintenance 20 hours/turbine	89.86	89.86	449.3	449.3	1,258	0.90
Total Maximum 1330 hours/turbine					26,361	17.69

Prime Unit Gas Turbine Emissions

910 hours - 2 units - normal operations

Ratings		Legend	
Input Rating (MMBtu/hr):	0.934	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	16	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	95	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	16	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	30	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	910	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	4.0257	2.0128	3.57	1.79	3.76	1.88	60.2	30.1	1625	0.86	30.1
UNROG	20.0000	11.2200	17.75	9.96	18.68	10.48	0.0	167.7	9060	4.77	167.7
SOx	3.4680	3.4680	3.08	3.08	3.24	3.24	51.8	51.8	2800	1.47	51.8
CO	98.3512	14.7527	87.27	13.09	91.86	13.78	1469.8	220.5	11912	6.27	220.5
PM10	6.4240	6.4240	5.70	5.70	6.00	6.00	96.0	96.0	5187	2.73	96.0
NOx	96.2099	9.6210	85.37	8.54	89.86	8.99	1437.8	143.8	7768	4.09	143.8

Emission Rate Source

ROG	CARB 1999 BACT guidance - Table I (.0027 lb/mmBTUhhv)
SOx	AP42
CO	40 ppmv and 6 ppmv (controlled) guarantee
PM10	Mfr Guarantee
NOx	25 ppmv and 2.5 ppmv (controlled) guarantee

Prime Unit Gas Turbine Emissions

910 hours - 1 unit - normal operations

Ratings

Input Rating (MMcf/hr):	0.4670
Average hours of operation per day:	16
Average days of operation per week:	5
Average weeks of operation per year:	26
Average Loading (%):	95
Maximum hours of operation per day:	16
Maximum days of operation per month:	30
Maximum weeks of operation per year:	52
Maximum days per week:	7
Maximum Annual Hours	910

Legend

U-EF	Emission Factor for uncontrolled emissions
C-EF	Net emission factor for controlled emissions
AHU	Average hourly uncontrolled emissions
AHC	Average hourly controlled emissions
MHU	Maximum hourly uncontrolled emissions
MHC	Maximum hourly controlled emissions
MDU	Maximum daily uncontrolled emissions
MDC	Maximum daily controlled emissions
AA	Annual average controlled emissions
APTE	Annual potential to emit
30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	4.026	2.013	1.79	0.89	1.88	0.94	30.1	15.0	813	0.43	15.0
UNROG	20.00	11.22	8.87	4.98	9.34	5.24	149.4	83.8	4530	2.38	83.8
SOx	3.4680	3.4680	1.54	1.54	1.62	1.62	25.9	25.9	1400	0.74	25.9
CO	98.3512	14.7527	43.63	6.55	45.93	6.89	734.9	110.2	5956	3.13	110.2
PM10	6.4240	6.4240	2.85	2.85	3.00	3.00	48.0	48.0	2594	1.37	48.0
NOx	96.2099	9.6210	42.68	4.27	44.93	4.49	718.9	71.9	3884	2.04	71.9

Emission Rate Source

ROG	CARB 1999 BACT guidance - Table I (.0027 lb/mmBTUhhv)
SOx	AP42
CO	40 ppmv and 6 ppmv (controlled) guarantee
PM10	Manufacturer guarantee
NOx	25 ppmv and 2.5 ppmv (controlled) guarantee

Heat input @ 1050 Btu/cf, 0.467 MMcf/hr

Prime Unit Gas Turbine Emissions

200 hours, 2 units - startup operations

Ratings			**Legend**
Input Rating (MMBtu/hr):	0.842	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	30	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	200	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmcf)	C-EF (lb/mmcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	3.9817	2.4113	2.35	1.42	3.35	2.03	13.4	8.1	284	0.20	8.1
UNROG	16.2218	9.8241	9.56	5.79	13.66	8.27	0.0	33.1	1158	0.83	33.1
SOx	3.5194	3.5194	2.07	2.07	2.96	2.96	11.9	11.9	415	0.30	11.9
CO	108.650	31.3567	64.04	18.48	91.49	26.40	365.9	105.6	3696	2.64	105.6
PM10	6.5175	6.5175	3.84	3.84	5.49	5.49	22.0	22.0	768	0.55	22.0
NOx	95.1578	39.1300	56.09	23.06	80.12	32.95	320.5	131.8	4613	3.29	131.8

Emission Rate Source

ROG	See Startup Worksheet
SOx	See Startup Worksheet
CO	See Startup Worksheet
PM10	See Startup Worksheet
NOx	See Startup Worksheet

Prime Unit Gas Turbine Emissions

200 hours, 1 unit - startup operations

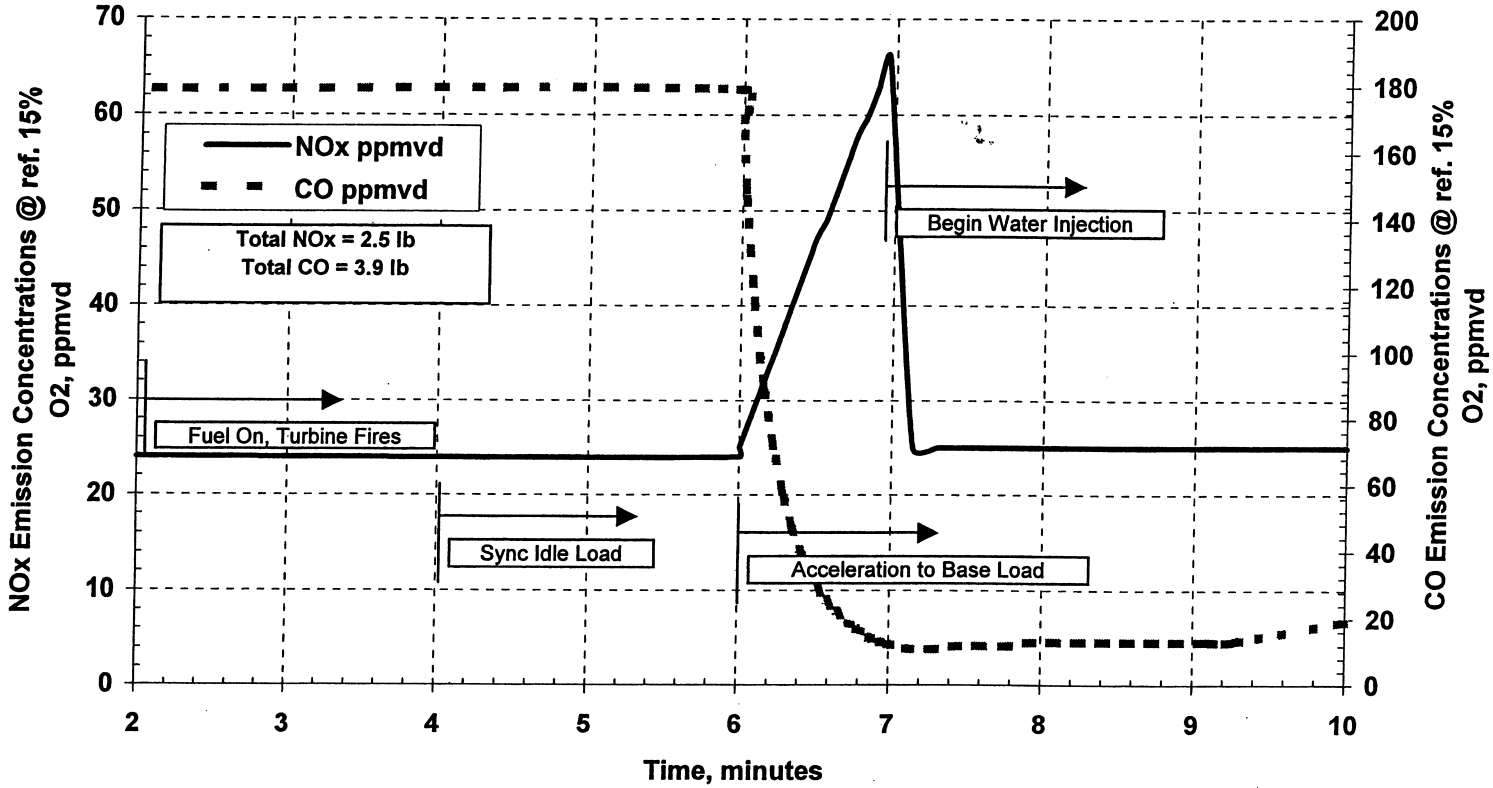
Ratings			**Legend**
Input Rating (MMBtu/hr):	0.421	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	30	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	200	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	3.98	2.41	1.17	0.71	1.68	1.02	6.7	4.1	142	0.10	4.1
UNROG	16.22	9.82	4.78	2.90	6.83	4.14	0.0	16.5	579	0.41	16.5
SOx	3.52	3.52	1.04	1.04	1.48	1.48	5.9	5.9	207	0.15	5.9
CO	108.65	31.36	32.02	9.24	45.74	13.20	183.0	52.8	1848	1.32	52.8
PM10	6.52	6.52	1.92	1.92	2.74	2.74	11.0	11.0	384	0.27	11.0
NOx	95.16	39.13	28.04	11.53	40.06	16.47	160.2	65.9	2306	1.65	65.9

Emission Rate Source

ROG	See Startup Worksheet
SOx	See Startup Worksheet
CO	See Startup Worksheet
PM10	See Startup Worksheet
NOx	See Startup Worksheet

Predicted NOx and CO Concentrations During10 minute Startup at 73°F Amb. Temperature. - LM6000 PC-SPRINT w/ VIGVs



Acceleration to base load is based on 10 minute startup, 72.8°F, RH of 60.0% with 5.0 inH2O, 12.0 inH2O at 730.0ft. MSL, Fuel: Site Gas Fuel#900-744, 21153 Btu/lb,LHV, Water NOx control to 25ppmvd. Water Injection starts at ~10000kW. 290ERT 60Hz, 13.8kV, 0.9PF (14839). **NOT FOR GUARANTEE**

Karl Lany

From: andrew.morton@ps.ge.com
Sent: Wednesday, February 18, 2004 5:38 PM
To: rbg@ci.riverside.ca.us; dtateosian@powereng.com
Cc: harry.cotham@ss.ps.ge.com; jimmy.holub@ps.ge.com
Subject: FW: Riverside Air Permit Issue

RIVERSIDE RTUP EMISSION 72 RIVERSIDE RTUP EMISSION 10

Bob, attached are the NOx and CO emissions during the 10-minute start-up for the 73F and 100F degree days and comments from our SCR supplier. Note that the ATS Express SCR is fitted with an ammonia pre-heater that heats the injection chamber, allowing for injection of NH3 once the unit has reached base load after 10 minutes. Emission levels will be within specified requirements soon after the injection begins.

Begin comments:
"During a cold start, it will take some time before the SCR ammonia injection chamber is hot enough to heat the ammonia for injection and the catalysts are hot enough to react effectively. That being said, it has been our experience that air permits will allow for this during the 10 minute start-up of the CTG, so expected emissions out of the SCR stack during the 10 minute start will be the same as what is coming from the turbine. The SCR includes an electric pre-heater for the ammonia injection chamber, eliminating the need to wait for the ammonia injection chamber to come to temperature. Upon completion of the 10 minute CTG start cycle, the SCR will be ready to inject ammonia and the catalysts will be at an adequate temperature to react with the exhaust. After 10 minutes, the SCR will be fully capable of making the guaranteed emissions levels.

Short answer is during the 10 minute start, the emissions levels are per the attached performance. After 10 minutes, the SCR can meet the guaranteed emissions levels per our guarantee PROVIDED that RPU does not disable/deactivate the ammonia injection grid pre-heater prior to the 10 minute start.

The volumetric air flow of the SCR's tempering air fans is 18,200 CFM. I've attached Excel versions of the expected start-up emissions that included the volumetric air flow from the turbine. Add these together for each case and you have the total volumetric air flow of the system."
End comment.

Notes:
- 10 minute startups assume SCR purge requirements have been satisfied prior to startup
- gas turbine volumetric flow rates are shown in the attached spreadsheet for the stated load conditions.
- Cases shown have no inlet air conditioning during startup

Let me know if you need additional info on this subject or others.

Regards,
Andrew

Startup Emissions Worksheet
(per turbine)

Emission Rates (lb/hr) @ Various Loads

Stage	Uncontrolled NOx (Lb/hr)	Control Efficiency	Controlled NOx (Lb/hr)	Uncontrolled CO (Lb/hr)	Control Efficiency	Controlled CO (Lb/hr)	Uncontrolled ROG (Lb/hr)	Control Efficiency	Controlled ROG (Lb/hr)	PM10 (Lb/hr)	SOx (Lb/hr)	Fuel Flow Factor	Fuel (mmcf/min)
40 min	44.93	90%	**4.493**	45.93	85%	**6.890**	1.88	50.00%	**0.940**	3.00	1.62	1	0.0078
10 min	44.93	0%	**44.930**	45.93	54%	**21.128**	1.88	20%	**1.504**	3.00	1.62	1.00	0.0078
4 min	4.49	0%	**4.490**	62.056	45%	**34.131**	0.19	0%	**0.188**	1.13	0.61	0.38	0.0029
0 min	0.000	0%	**0.000**	0.00	0%	**0.000**	0.00	0%	**0.000**	0.00	0.00	0.0010	0.000

Notes:

Hourly Emissions During Startup

Load	Uncontrolled NOx (Lb/hr)	Controlled NOx (Lb/hr)	Uncontrolled CO (Lb/hr)	Controlled CO (Lb/hr)	Uncontrolled ROG (Lb/hr)	Controlled ROG (Lb/hr)	PM10 (Lb/hr)	SOx (Lb/hr)	Fuel (mmcf for period)	Fuel (mmcf accumulated)
4min (0-20%)	0.15	0.15	2.07	1.14	0.01	0.01	0.04	0.02	0.00	
6min (20-100%)	2.47	2.47	5.40	2.76	0.10	0.08	0.21	0.11	0.032	0.032
30 min(100%)	22.47	12.36	22.97	**7.00**	0.94	**0.61**	1.50	0.81	0.233	0.265
20min (100%)	14.98	1.50	15.31	**2.30**	0.63	**0.31**	1.00	0.54	0.156	0.421
Total per startup	**40.06**	**16.47**	**45.74**	**13.20**	**1.68**	**1.02**	**2.74**	**1.48**		

Note: Emission rates based upon simple average of initial and achieved load per time period

Prime Unit Gas Turbine Emissions

200 hours, 2 units - shutdown operations

Ratings		**Legend**	
Input Rating (MMBtu/hr):	0.934	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	30	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	200	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmcf)	C-EF (lb/mmcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	3.5974	2.1842	2.35	1.43	3.36	2.04	13.4	8.2	286	0.20	8.2
UNROG	14.6563	8.8985	9.58	5.82	13.69	8.31	0.0	33.2	1164	0.83	33.2
SOx	3.4690	3.4690	2.27	2.27	3.24	3.24	13.0	13.0	454	0.32	13.0
CO	97.9443	23.9400	64.04	15.65	91.48	22.36	365.9	89.4	3130	2.24	89.4
PM10	6.4240	6.4240	4.20	4.20	6.00	6.00	24.0	24.0	840	0.60	24.0
NOx	85.7816	14.1413	56.08	9.25	80.12	13.21	320.5	52.8	1849	1.32	52.8

Emission Rate Source

ROG	See startup rate
SOx	Normal Operation rate
CO	See Shutdown Worksheet - GE specification rates
PM10	Normal Operation rate
NOx	See Shutdown Worksheet - GE specification rates

Prime Unit Gas Turbine Emissions

200 hours, 1 unit - shutdown operations

Ratings			**Legend**
Input Rating (MMBtu/hr):	0.467	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	5	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	26	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	4	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	30	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	52	MDC	Maximum daily controlled emissions
Maximum days per week:	7	AA	Annual average controlled emissions
Maximum Annual Hours	200	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	3.5974	2.1842	1.18	0.71	1.68	1.02	6.7	4.1	143	0.10	4.1
UNROG	14.6563	8.8985	4.79	2.91	6.84	4.16	27.4	16.6	582	0.42	16.6
SOx	3.4690	3.4690	1.13	1.13	1.62	1.62	6.5	6.5	227	0.16	6.5
CO	97.9443	23.9400	32.02	7.83	45.74	11.18	183.0	44.7	1565	1.12	44.7
PM10	6.4240	6.4240	2.10	2.10	3.00	3.00	12.0	12.0	420	0.30	12.0
NOx	85.7816	14.1413	28.04	4.62	40.06	6.60	160.2	26.4	925	0.66	26.4

Emission Rate Source

ROG	See startup rate
SOx	Normal Operation rate
CO	See Shutdown Worksheet - GE specification rates
PM10	Normal Operation rate
NOx	See Shutdown Worksheet - GE specification rates

Shutdown Emissions

Shutdowns are estimated to take 8 minutes to bring the turbine down. Upon initiation of the shutdown procedure, ammonia injection will be turned off. Approximately 7 minutes into the shutdown, water injection will be turned off.

Following is shutdown emission data from the turbine manufacturer:

Emissions, lbs/shutdown*

NOx	CO	VOC	SOx	PM10
2.7	5.2	1.20	0.13	2.00

* Shutdown emissions for NOx and CO taken from turbine manufacturer data for 8 minute shutdown, based on ambient conditions of 33 deg. F, relative humidity = 80.0%. Shutdown emissions for VOC, SOx, and PM10 provided by applicant.

SOURCE: SCAQMD Engineering Report for similar LM6000 permitted in 2002-2003

SCEC
1582-1 N. Batavia
Orange, CA 92667
(714) 282-2450 Fax (714) 282-2455

Project: RPU - ERC
Project # 2248.220 Date: 2/25/01
By: KAL Checked by: Page 1 of 1

Shutdown Emissions (controlled)

PER GE 8min specifications

NOx @ 2.7 lb/8min = 0.338 lb/min

CO @ 5.2 lb/8min = 0.65 lb/min

Normal Operation

NOx @ 4.493 lb/hr = 0.075 lb/min

CO @ 6.89 lb/hr = 0.115 lb/min

VOC @ 0.94 lb/hr = 0.0157 lb/min

Shutdown Total 1hr Emissions

NOx = (0.338 lb/min x 8) + (0.075 lb/min x 52)

= 6.604 lb/hr

likewise:

CO = 11.18 lb/hr

Shutdown Emissions Worksheet
(per turbine)

Shutdown rates taken from Agua Mansa application - Worksheet is disabled

Emission Rates (lb/hr) @ Various Loads

Load	Uncontrolled NOx (Lb/hr)	Control Efficiency	Controlled NOx (Lb/hr)	Uncontrolled CO (Lb/hr)	Control Efficiency	Controlled CO (Lb/hr)	Uncontrolled ROG (Lb/hr)	Control Efficiency	Controlled ROG (Lb/hr)	PM10 (Lb/hr)	SOx (Lb/hr)	Operating Factor	Fuel (mmcf/min)
100%		90.000%	**0.000**		85.00%	**0.000**		50.00%	**0.000**	0.00	0.00	1	0.0078
10%		40%	**0.000**	0.00	75%	**0.000**	#DIV/0!	45%	**#DIV/0!**	0.00	0.00	0.37	0.0029
0%		0%	**0.000**	0.000	10%	**0.000**	#DIV/0!	10%	**#DIV/0!**	0.00	0.00	0.0002	0.000

Notes:

Hourly Emissions During Shutdown

Load	Uncontrolled NOx (Lb/hr)	Controlled NOx (Lb/hr)	Uncontrolled CO (Lb/hr)	Controlled CO (Lb/hr)	Uncontrolled ROG (Lb/hr)	Controlled ROG (Lb/hr)	PM10 (Lb/hr)	SOx (Lb/hr)	Fuel (mmcf for period)	Fuel (mmcf accumulated)
5min (0-10%)	0.00	**0.00**	0.00	**0.00**	#DIV/0!	**#DIV/0!**	0.00	0.00	0.007	
15 min(10-100%	0.00	**0.00**	0.00	**0.00**	#DIV/0!	**#DIV/0!**	0.00	0.00	0.080	0.087
40min (100%)	0.00	**0.00**	0.00	**0.00**	0.00	**0.00**	0.00	0.00	0.311	0.399
Total per shutdown	**40.06**	**6.60**	**45.74**	**11.18**	**1.68**	**1.02**	**3.00**	**1.62**		

Note: Emission rates based upon simple average of initial and achieved load per time period

Prime Unit Gas Turbine Maintenance Emissions

20 hours - 2 units

Ratings		**Legend**	
Input Rating (MMcf/hr):	0.934	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	1	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	1	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	5	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	4	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	2	MDC	Maximum daily controlled emissions
Maximum days per week:	1	AA	Annual average controlled emissions
Maximum Annual Hours	20	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/mmcf)	C-EF (lb/mmcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	4.026	4.026	2.63	2.63	3.76	3.76	18.8	18.8	53	0.04	2.5
UNROG	48.010	48.010	31.39	31.39	44.84	44.84	0.0	224.2	628	0.45	29.9
SOx	3.468	3.468	2.27	2.27	3.24	3.24	16.2	16.2	45	0.03	2.2
CO	98.351	98.351	64.30	64.30	91.86	91.86	459.3	459.3	1286	0.92	61.2
PM10	6.424	6.424	4.20	4.20	6.00	6.00	30.0	30.0	84	0.06	4.0
NOx	96.210	96.210	62.90	62.90	89.86	89.86	449.3	449.3	1258	0.90	59.9

Emission Rate Source

ROG	Uncontrolled Emissions per Mfr.
SOx	AP42
CO	40 ppmv
PM10	Mfr. Guarantee
NOx	25 ppmv

Heat input @ 1050 Btu/cf, 0.467 MMcf/hr

Prime Unit Gas Turbine Maintenance Emissions

20 hours - 1 unit

Ratings			**Legend**
Input Rating (MMBtu/hr):	0.467	U-EF	Emission Factor for uncontrolled emissions
Average hours of operation per day:	4	C-EF	Net emission factor for controlled emissions
Average days of operation per week:	1	AHU	Average hourly uncontrolled emissions
Average weeks of operation per year:	1	AHC	Average hourly controlled emissions
Average Loading (%):	70	MHU	Maximum hourly uncontrolled emissions
Maximum hours of operation per day:	5	MHC	Maximum hourly controlled emissions
Maximum days of operation per month:	4	MDU	Maximum daily uncontrolled emissions
Maximum weeks of operation per year:	2	MDC	Maximum daily controlled emissions
Maximum days per week:	1	AA	Annual average controlled emissions
Maximum Annual Hours	20	APTE	Annual potential to emit
		30DA	Thirty day average daily emissions

	U-EF (lb/MMcf)	C-EF (lb/MMcf)	AHU (lb/hr)	AHC (lb/hr)	MHU (lb/hr)	MHC (lb/hr)	MDU (lb/day)	MDC (lb/day)	AA (lb/yr)	APTE (tons/yr)	30DA (lb/day)
ROG	4.03	4.03	1.32	1.32	1.88	1.88	9.4	9.4	26	0.02	1.3
UNROG	48.01	48.01	15.69	15.69	22.42	22.42	0.0	112.1	314	0.22	14.9
SOx	3.47	3.47	1.13	1.13	1.62	1.62	8.1	8.1	23	0.02	1.1
CO	98.35	98.35	32.15	32.15	45.93	45.93	229.7	229.7	643	0.46	30.6
PM10	6.42	6.42	2.10	2.10	3.00	3.00	15.0	15.0	42	0.03	2.0
NOx	96.21	96.21	31.45	31.45	44.93	44.93	224.7	224.7	629	0.45	30.0

Emission Rate Source

ROG	3ppmv uncontrolledguarantee
SOx	AP42, converted from hhv of 1020 to hhv of 1048
CO	40 ppmv guarantee
PM10	Mfr Guarantee
NOx	25 ppmv and 2.5 ppmv (controlled) guarantee

Heat input @ 1050 Btu/cf, 0.467 MMcf/hr

SCEC
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Project: 274-ERC
Project # 2248.2201 Date: 2/25/04
By: KAL Checked by: Page 1 of 1

NOX, CO, ROG Hourly Emissions

DSCFM = mmBTU/hr × DSCF × $\left(20.9 / 20.9 - \%O_2\right)$ × 1 hr / 60 min

O_2 = 14.38%

Fuel = 490 mmBTU/hr @ 1050 BTU/cf

DSCFM = 490 mmBTU/hr × 8710 DSCF/mmBTU × $\frac{20.9}{20.9-14.38}$ × 1 hr / 60 min

= 228014 DSCFM

NOX = 25 ppmv @ 15% O_2 = 27.63 ppmv @ 14.38% O_2
CO = 42 ppmv @ 15% O_2 = 46.41 ppmv @ 14.38% O_2
ROG = 3 ppmv @ 15% O_2 = 3.32 ppmv @ 14.38% O_2

LB/HR = ppmv (actual) × MW × 1.557E-07 × DSCFM

MW NOX = 46.01
MW CO = 28.0
MW ROG = 16.0

NOX LB/hr = 27.63 × 46.01 × 1.557E-07 × 228014
= 44.93 LB/hr

CO LB/hr = 46.41 × 28.0 × 1.557E-07 × 228014
= 45.93 LB/hr

ROG LB/hr = 3.32 × 16.0 × 1.557E-07 × 228014
= 1.88 LB/hr

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Project: RPU-ERC
Project # 2248-2201 Date: 3/2/04
By: KAL Checked by: Page 1 of 1

NH_3 Emissions

MW = 17.03
Slip = 5 ppmv @ 15% O_2
O_2 = 14.38%
Flow = 228,014 DSCFM

ACTUAL NH_3 Concentration

$$= 5\text{ ppmv} \times \frac{20.9 - 14.38}{20.9 - 15}$$

$$= 5.525 \text{ ppmv @ } 14.38\% \ O_2$$

$$NH_3 \text{ LB/hr} = \text{ppmv(actual)} \times MW \times 1.557E^{-07} \times \text{DSCFM}$$

$$= 5.585 \text{ ppmv} \times 17.03 \times 1.557E^{-07} \times 228.014 \text{ DSCFM}$$

$$= \underline{3.325 \text{ LB/hr.}}$$

Cooling Tower Emissions Summary
One Unit - Normal Year Operations
Riverside ERC

Equipment Information:

Equipment Type: Cooling Tower	Capacity (tons): 3,140	Water Flow Per Cell (gpm): 1,863
Manufacturer: Evapco	Air Flow Per Cell (acfm) 204,333	Drift Rate (%): 0.001
Model: 314-0772	# of Cells: 3	TDS Level (ppm): 2644
	Annual Operating Schedule: 1330	

Emission Rates:

Pollutant	Per Cell Emission Rate (lbs/hr)	Total Emission Rate (lbs/hr)	Total Emission Rate (g/s)		Comments
PM_{10}	0.02	0.07	0.009	24-Hour	
PM_{10}	0.004	0.011	0.0014	Annual	annual emissions averaged over 1330 hours
$PM_{2.5}$	0.02	0.07	0.01	24-Hour	
$PM_{2.5}$	0.004	0.011	0.0014	Annual	annual emissions averaged over 1330 hours

TURBINE GEN SET PERFORMANCE
FOR
RPU - City of Riverside - Capacity Addition

GUARANTEED PARAMETERS		JOBSITE LOCATION: Riverside, CA	Emissions per Unit with GE Supplied SCR
			100% to 50% Load
Btu/kW·hr, LHV	AT	NET PLANT KW	NOx EMISSIONS
8973		96783	2.5 PPMVD AT 15%O2
(kJ/kW·hr, LHV)			CO EMISSIONS
9467		GUARANTEE	6 PPMVD AT 15%O2
			VOC EMISSIONS
			2 PPMVD AT 15%O2
		Date: 1/6/2004	PM EMISSIONS
			3 lb/hr Per Unit.
			NH3 SLIP
NOT VALID WITHOUT STAMP			5 PPMVD AT 15 % O2

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(2) GE LM6000PC GAS TURBINE w/SPRINT & VIGVs
FUEL:	21153 Btu/lb / (49201 kJ/kg) LHV, GAS FUEL (#900-744)
FUEL TEMP:	50°F(28°C) above dew point,@ GEAEP BASEPLATE Maximum Fuel Temperature 250°F(121.1°C)
Fuel Specification:	MID-TD-0000-1 Latest Revision
GENERATOR OUTPUT:	13.8 kV, 60 Hz
POWER FACTOR:	≥ .9
AMBIENT TEMP:	100.0°F / (37.8°C)
AMBIENT WET BULB:	68.0°F / (20°C)
INLET CONDITIONING:	CHILL TO 46.0°F / (7.8°C), 95% INLET REL HUM
ALTITUDE:	730.0 ft/ (222.5 m)
INLET FILTER LOSS:	≤ 5.00 inH_2O/ (127.0 mmH_2O)
EXHAUST LOSS:	≤ 12.00 inH_2O/ (304.8 mmH_2O)
NOX CONTROL:	WATER
Water Specification:	MID-TD-0000-3 Latest Revision
INJECTION RATE:	22960 PPH/ (10414.5kG/hr) ±20% FLOW
INJECTION TEMP:	100 °F/ (37.8 °C) @ GEAEP BASEPLATE
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
FIELD TEST METHODS	
PERFORMANCE:	GE AERO ENERGY PRODUCTS SGTGPTM
NOx EMISSION:	SCAQMD Method 100.1
CO EMISSION:	SCAQMD Method 100.1
VOC EMISSION:	SCAQMD Method 25.3
*PM	SCAQMD Method 5.1
NH3 SLIP	CTM O27

** SI values are for reference purposes only

THIS GUARANTEE SUPERSEDES ANY PREVIOUS GUARANTEES PRESENTED

* **Conditions for PM Guarantee** requires that each unit have more that 300 fired hours of operation prior to testing. Also, each unit must operate at **Base Load 3 to 4 hours** just prior to commencing PM Compliance Test.

TURBINE GEN SET PERFORMANCE
FOR
RPU - City of Riverside - Capacity Addition

GUARANTEED PARAMETERS

JOBSITE LOCATION: Riverside, CA

Far Field Noise:
70 dBA for 2 main units at a distance of 90 ft from any nearest point of the GTG/SCR Scope of Supply equipment as measured 5 ft above grade over a flat hard ground plane in a free field condition.

This guarantee coincides with the previous guarantee issued on 12/15/2003

TG6000-0000401202-100
14765 14754

GUARANTEE

Date: 12/15/2003

Near Field Noise:
84 dba average around the package (Vertical Distance of 5ft. above grade at a horizontal distance of 3ft. from the exterior plane of equipment or if equipment enclosed, its enclosure)

NOT VALID WITHOUT STAMP

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(2) GE LM6000PC GAS TURBINE w/SPRINT & VIGVs
FUEL:	21153 Btu/lb / (49201 kJ/kg) LHV, GAS FUEL (#900-744)
FUEL TEMP:	50°F(28°C) above dew point,@ GEAEP BASEPLATE Maximum Fuel Temperature 250°F(121.1°C)
GENERATOR OUTPUT:	13.8 kV, 60 Hz
POWER FACTOR:	≥ .9
AMBIENT TEMP:	100.0°F / (37.8°C)
AMBIENT WET BULB:	68.0°F / (20°C)
INLET CONDITIONING:	CHILL TO 46.0°F / (7.8°C), 95% INLET REL HUM
ALTITUDE:	730.0 ft/ (222.5 m)
INLET FILTER LOSS:	≤ 5.00 inH_2O/ (127.0 mmH_2O)
EXHAUST LOSS:	≤ 12.00 inH_2O/ (304.8 mmH_2O)
NOX CONTROL:	WATER
INJECTION RATE:	22960 PPH/ (10414.5kG/hr) ±20% FLOW
INJECTION TEMP:	100 °F/ (37.8 °C) @ GEAEP BASEPLATE
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
FIELD TEST METHODS	
PERFORMANCE:	GE AERO ENERGY PRODUCTS SGTGPTM
NEAR FIELD NOISE:	ANSI / ASME PTC - 36

** SI values are for reference purposes only

THIS GUARANTEE SUPERSEDES ANY PREVIOUS GUARANTEES PRESENTED

EXH WGHT % WET (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	1.2278
N2	72.0007
O2	14.6215
CO2	5.1900
H2O	6.9544
SO2	0.0000
CO	0.0027
HC	0.0002
NO_+_NO2	0.0028

EXH MOLE % DRY (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9677
N2	80.9253
O2	14.3877
CO2	3.7132
SO2	0.0000
CO	
HC	0.0030
NOX	0.0003
	0.0028

EXH MOLE % WET (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8629
N2	72.1550
O2	12.8285
CO2	3.3108
H2O	10.8375
SO2	0.0000
CO	0.0027
HC	0.0003
NOX	0.0025

Aero Energy Fuel Number	**900-744**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	98.5565	96.8910
Ethane	0.6290	1.1590
Ethylene	0.0000	0.0000
Propane	0.0655	0.1770
Propylene	0.0000	0.0000
Butane	0.0177	0.0630
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0043	0.0190
Cyclopentane	0.0000	0.0000
Hexane	0.0034	0.0180
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.4394	1.1851
Nitrogen	0.2842	0.4879
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000

Btu/lb, LHV	21153
Btu/scf, LHV	912
Btu/scf, HHV	1012
Btu/lb, HHV	23465
Fuel Temp, °F	77.0
NOx Scalar	0.991
Specific Gravity	0.56

TOTAL SPRINT FLOW, PPH	4891.382429
HPC SPRINT FLOW, GPM	0
LPC SPRINT FLOW, GPM	9.77
GT OUTPUT, SHP	67949
GT AVG HR, BTU/HP-HR	6263
GENERATOR EFFICIENCY	0.982852944
EXHAUST TEMPERATURE, °R	1290.1
MEDIA INJ TEMP, °R	518.67
MEDIA INJ FLOW, PPH	22960
FUEL FLOW, PPH	20118
FUEL LHV, BTU/LB	21153
T48, °F	1586.0
INLET FLOW, PPS	286.12
EXHAUST AVG MW	28.2

TURBINE GEN SET PERFORMANCE
FOR
RPU - City of Riverside - Capacity Addition

GUARANTEED PARAMETERS JOBSITE LOCATION: Riverside, CA

Availability and Starting Reliability and Forced Outage Rate

RPU Formula: SR % = 100 – (100 x (SF+FOE) / (SF+SS))	RPU Formula: FOR= FOH/(FOH+SH)	RPU Formula: A % = 100 x ((PH-FOH-MOH-POH-AOH)/(PH-POH-AOH))
97.49	1.80	98.09

This guarantee coincides with the previous guarantee issued on 12/15/2003

TG6000-0000401202-100

GUARANTEE

Date: 12/12/2003

NOT VALID WITHOUT STAMP

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(2) GE LM6000PC GAS TURBINE w/SPRINT & VIGVs
FUEL:	21153 Btu/lb / (49201 kJ/kg) LHV, GAS FUEL (#900-744)
FUEL TEMP:	50°F(28°C) above dew point,@ GEAEP BASEPLATE Maximum Fuel Temperature 250°F(121.1°C)
GENERATOR OUTPUT:	13.8 kV, 60 Hz
POWER FACTOR:	≥ .9
AMBIENT TEMP:	100.0°F / (37.8°C)
AMBIENT WET BULB:	68.0°F / (20°C)
INLET CONDITIONING:	CHILL TO 46.0°F / (7.8°C), 95% INLET REL HUM
ALTITUDE:	730.0 ft/ (222.5 m)
INLET FILTER LOSS:	≤ 5.00 inH_2O/ (127.0 mmH_2O)
EXHAUST LOSS:	≤ 12.00 inH_2O/ (304.8 mmH_2O)
NOX CONTROL:	WATER
INJECTION RATE:	22960 PPH/ (10414.5kG/hr) ±20% FLOW
INJECTION TEMP:	100 °F/ (37.8 °C) @ GEAEP BASEPLATE
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS

NOTES:
- Basis for each is SPS - ORAP.
- ORAP definitions for Availability and Starting Reliability are slightly different than the formulas in the spec, and both have been included attached graphs.

** SI values are for reference purposes only

THIS GUARANTEE SUPERSEDES ANY PREVIOUS GUARANTEES PRESENTED

Estimated Average Engine Performance NOT FOR GUARANTEE

GE Aero Energy
A GE Power Systems Business

Performance By: **Johnny Metcalf**
Project Info:

Engine: **LM6000 PC-SPRINT w/ VIGVs**
Deck Info: **GE125M - Multiple Cardpacks being used, See Cardpack Row Below** Date: **01/29/2004**
Generator: **290ERT 60Hz, 13.8kV, 0.9PF (14839)** Time: **11:32:25 AM**
Fuel: **Site Gas Fuel#900-744, 21153 Btu/lb,LHV** Version: **3.0.16**

			NOx, lbs	CO, lbs
Startup Ramp Rate:	11173 kW/min	Total Emissions at Startup	2.5	3.9

Case #	**100**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**110**	**111**	**112**	**113**	**114**	**115**	**116**	**117**
Ambient Conditions																		
Dry Bulb, °F	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
Wet Bulb, °F	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2	63.2
RH, %	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Altitude, ft	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0	730.0
Ambient Pressure, psia	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313	14.313
Engine Inlet																		
Temperature, °F	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
RH, %	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Conditioning	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
Tons or kBtu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pressure Losses																		
Inlet Loss, inH20	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Volute Loss, inH20	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Exhaust Loss, inH20	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Time, min	10.0000	9.25	9.08	8.92	8.76	8.60	8.44	8.27	8.11	7.95	7.79	7.62	7.46	7.30	7.14	6.95	6.89	6.82
kW, Gen Terms	**44693**	**36274**	**34468**	**32655**	**30842**	**29029**	**27215**	**25402**	**23589**	**21777**	**19964**	**18152**	**16340**	**14527**	**12716**	**10657**	**9916**	**9174**
Est. Btu/kW-hr, LHV	**8659**	**8878**	**8970**	**9081**	**9212**	**9365**	**9534**	**9718**	**9929**	**10196**	**10501**	**10863**	**11317**	**11873**	**12612**	**13458**	**13975**	**14584**
Guar. Btu/kW-hr, LHV	**8836**	**9060**	**9153**	**9266**	**9400**	**9556**	**9728**	**9916**	**10131**	**10404**	**10715**	**11085**	**11548**	**12115**	**12869**	**13733**	**14260**	**14881**
Fuel Flow																		
MMBtu/hr, LHV	387.0	322.1	309.2	296.5	284.1	271.9	259.5	246.9	234.2	222.0	209.6	197.2	184.9	172.5	160.4	143.4	138.6	133.8
lb/hr	18295	15225	14616	14019	13431	12852	12266	11670	11073	10497	9911	9322	8742	8154	7582	6781	6551	6325
lb/min	305	254	244	234	224	214	204	195	185	175	165	155	146	136	126	113	109	105
scfm	7073	5887	5651	5419	5193	4970	4743	4513	4280	4058	3831	3604	3379	3153	2932	2621	2533	2445
lbs	1096.6	866.8	825.8	786.3	748.4	712.1	677.3	644.1	612.6	582.6	554.2	527.5	502.3	478.6	456.6	433.3	425.8	418.6
scf	25433.1	20103.5	19151.9	18234.9	17355.6	16513.0	15706.2	14936.6	14204.4	13510.2	12851.8	12230.6	11646.1	11097.7	10586.7	10046.5	9872.6	9704.4
NOx Control	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**Water**	**NONE**	**NONE**	**NONE**
Water Injection																		
lb/hr	19755	15764	14711	13653	12581	11619	10686	9744	8828	8019	7188	6385	5655	4902	4210	0	0	0
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0
SPRINT	**LPC**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**	**OFF**
lb/hr	7093	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Control Parameters																		
HP Speed, RPM	10565	10340	10256	10187	10122	10057	9994	9929	9863	9777	9691	9620	9555	9479	9400	9307	9267	9227
LP Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
CDP, psia	425.599	380.575	369.976	358.511	346.106	333.349	320.201	306.364	291.416	281.222	271.016	260.793	250.344	240.110	229.283	216.355	211.689	206.943
CDT, °F	998.0	1001.0	989.5	976.7	962.0	946.5	931.8	916.8	901.3	887.1	872.6	857.5	842.2	826.6	810.6	789.9	782.9	775.9
T48, °R	2023	1963	1945	1929	1915	1902	1889	1877	1869	1845	1819	1791	1761	1728	1697	1672	1656	1640
Exhaust Parameters																		
Temperature, °F	832.3	816.0	810.7	807.6	806.9	807.5	809.3	812.6	819.5	811.3	801.4	790.3	779.6	766.5	755.8	751.6	745.4	739.7
lb/sec	277.3	253.3	247.5	240.9	233.4	225.6	217.4	208.7	198.9	193.3	187.7	182.2	176.4	170.9	164.8	157.2	154.6	151.8
lb/hr	998176	911750	890957	867189	840246	812237	782805	751283	716063	695839	675835	655872	635061	615218	593262	565787	556385	546634
Energy, Btu/s- ref 0 °R	93135	83037	80688	78247	75702	73156	70554	67849	64998	62647	60252	57836	55410	52991	50551	47684	46619	45558
Cp, Btu/lb-R	0.2778	0.2739	0.2733	0.2729	0.2726	0.2723	0.2721	0.2720	0.2721	0.2714	0.2705	0.2696	0.2688	0.2678	0.2670	0.2647	0.2643	0.2640
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)																		
REF @ 15% O2	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15	15
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	66	63	60
NOx as NO2, lb/hr	39	32	31	30	28	27	26	25	23	22	21	20	19	17	16	38	35	32
NOx, min	0.65	0.54	0.52	0.50	0.47	0.45	0.43	0.41	0.39	0.37	0.35	0.33	0.31	0.29	0.27	0.63	0.58	0.54
CO ppmvd Ref 15% O2	19	13	13	13	13	13	13	13	13	13	12	12	12	11	11	13	14	16
CO, lb/hr	17.85	10.46	10.06	9.56	8.97	8.75	8.39	7.87	7.36	6.95	6.37	5.81	5.37	4.79	4.29	4.39	4.74	5.18
CO, min	0.30	0.17	0.17	0.16	0.15	0.15	0.14	0.13	0.12	0.12	0.11	0.10	0.09	0.08	0.07	0.07	0.08	0.09
HC ppmvd Ref 15% O2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
HC, lb/hr	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00
Total Emissions From Startup To Full Load																		
NOx, lbs	**2.5**	2.0	1.9	1.8	1.7	1.6	1.6	1.5	1.4	1.4	1.3	1.3	1.2	1.1	1.1	1.1	1.0	1.0
CO, lbs	**3.9**	3.6	3.6	3.6	3.6	3.5	3.5	3.5	3.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.3
Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)																		
AR	1.2256	1.2312	1.2326	1.2339	1.2351	1.2361	1.2372	1.2382	1.2391	1.2406	1.2423	1.2440	1.2456	1.2475	1.2492	1.2593	1.2595	1.2598
N2	71.8713	72.1998	72.2798	72.3549	72.4259	72.4879	72.5481	72.6092	72.6624	72.7505	72.8482	72.9491	73.0444	73.1523	73.2528	73.8409	73.8566	73.8719
O2	14.7876	15.5782	15.7180	15.8348	15.9275	16.0100	16.0885	16.1606	16.2044	16.3796	16.5744	16.7821	16.9870	17.2205	17.4371	17.9278	18.0152	18.0999
CO2	5.0486	4.5723	4.4927	4.4278	4.3788	4.3350	4.2934	4.2566	4.2376	4.1352	4.0212	3.8991	3.7777	3.6392	3.5108	3.2955	3.2384	3.1830
H20	7.0622	6.4148	6.2734	6.1451	6.0291	5.9275	5.8293	5.7321	5.6531	5.4908	5.3106	5.1227	4.9423	4.7377	4.5475	3.6711	3.6251	3.5804
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0018	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0010	0.0010	0.0010	0.0009	0.0009	0.0008	0.0008	0.0007	0.0008	0.0009	0.0009
HC	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
NOX	0.0027	0.0024	0.0024	0.0024	0.0023	0.0023	0.0023	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019	0.0019	0.0046	0.0043	0.0041
Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)																		
AR	0.9668	0.9635	0.9629	0.9624	0.9621	0.9617	0.9614	0.9612	0.9610	0.9603	0.9595	0.9587	0.9578	0.9569	0.9560	0.9544	0.9541	0.9537
N2	80.8494	80.5659	80.5181	80.4790	80.4490	80.4223	80.3970	80.3744	80.3620	80.3020	80.2356	80.1648	80.0949	80.0155	79.9422	79.8087	79.7775	79.7473
O2	14.5637	15.2190	15.3294	15.4198	15.4891	15.5508	15.6093	15.6616	15.6902	15.8287	15.9823	16.1459	16.3074	16.4909	16.6601	16.9642	17.0366	17.1067
CO2	3.6151	3.2478	3.1858	3.1350	3.0961	3.0615	3.0287	2.9993	2.9833	2.9055	2.8193	2.7275	2.6368	2.5339	2.4389	2.2673	2.2266	2.1873
H20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0020	0.0013	0.0013	0.0012	0.0012	0.0012	0.0012	0.0012	0.0011	0.0011	0.0010	0.0010	0.0009	0.0009	0.0008	0.0008	0.0009	0.0010
HC	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001
NOX	0.0027	0.0024	0.0024	0.0023	0.0023	0.0023	0.0022	0.0022	0.0022	0.0021	0.0021	0.0020	0.0019	0.0019	0.0018	0.0044	0.0041	0.0039
Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)																		
AR	0.8605	0.8670	0.8685	0.8700	0.8713	0.8725	0.8737	0.8749	0.8759	0.8776	0.8795	0.8815	0.8834	0.8855	0.8875	0.8990	0.8993	0.8996
N2	71.9596	72.4962	72.6257	72.7469	72.8612	72.9610	73.0580	73.1562	73.2413	73.3857	73.5461	73.7121	73.8696	74.0483	74.2149	75.1706	75.1987	75.2259
O2	12.9624	13.6946	13.8268	13.9384	14.0282	14.1081	14.1844	14.2550	14.2999	14.4654	14.6498	14.8463	15.0400	15.2611	15.4665	15.9783	16.0588	16.1368

Estimated Average Engine Performance NOT FOR GUARANTEE

GE Aero Energy
A GE Power Systems Business

Performance By: Johnny Metcalf
Project Info:

Engine: LM6000 PC-SPRINT w/ VIGVs
Deck Info: GE125M - Multiple Cardpacks being used, See Cardpack Row Below
Generator: 290ERT 60Hz, 13.8kV, 0.9PF (14839)
Fuel: Site Gas Fuel#900-744, 21153 Btu/lb,LHV

Date: 01/29/2004
Time: 11:32:25 AM
Version: 3.0.16

						NOx, lbs	CO, lbs											
CO2	3.2176	2.9224	2.8735	2.8338	2.8041	2.7774	2.7522	2.7300	2.7189	2.6552	2.5842	2.5079	2.4319	2.3449	2.2642	2.1355	2.0988	2.0632
H20	10.9955	10.0163	9.8021	9.6077	9.4319	9.2777	9.1285	8.9807	8.8609	8.6130	8.3374	8.0493	7.7723	7.4576	7.1644	5.8115	5.7395	5.6697
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0018	0.0012	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0010	0.0010	0.0010	0.0009	0.0009	0.0008	0.0007	0.0008	0.0009	0.0010
HC	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
NOX	0.0024	0.0022	0.0021	0.0021	0.0021	0.0021	0.0020	0.0020	0.0020	0.0020	0.0019	0.0019	0.0018	0.0017	0.0017	0.0041	0.0039	0.0037

Aero Energy Fuel Number	900-744	
	Volume %	Weight %
Hydrogen	0.0000	0.0000
Methane	98.5565	96.8910
Ethane	0.6290	1.1590
Ethylene	0.0000	0.0000
Propane	0.0655	0.1770
Propylene	0.0000	0.0000
Butane	0.0177	0.0630
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0043	0.0190
Cyclopentane	0.0000	0.0000
Hexane	0.0034	0.0180
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.4394	1.1851
Nitrogen	0.2842	0.4879
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000
Btu/lb, LHV	21153	
Btu/scf, LHV	912	
Btu/scf, HHV	1012	
Btu/lb, HHV	23465	
Fuel Temp, °F	77.0	
NOx Scalar	0.991	
Specific Gravity	0.56	

Engine Exhaust																		
Exhaust MW	28.0	28.1	28.1	28.2	28.2	28.2	28.2	28.2	28.2	28.3	28.3	28.3	28.3	28.4	28.4	28.5	28.5	28.5
Exhaust Flow, ACFM	557320	501214	487398	472930	457727	442464	426817	410503	393204	379357	365264	351045	336715	322451	307974	291293	284928	278571
Exhaust Flow, SCFM	212268	193652	189020	183693	177644	171372	164834	157895	150198	145844	141531	137231	132762	128497	123798	117497	115527	113485
Exhaust Flow, Btu/lb	336	328	326	325	324	324	324	325	327	324	321	317	314	310	307	303	302	300
Exhaust Flow, Calories/s	23469963	20925279	20333299	19718293	19076843	18435414	17779645	17097855	16379433	15787056	15183426	14574627	13963368	13353613	12738952	12016385	11747907	11480529
Inlet Flow Wet, pps	268.2	247.9	242.9	238.7	235.2	231.2	225.9	219.3	212.0	212.1	212.1	212.1	212.2	212.1	212.3	212.4	212.4	212.3
Inlet Flow Dry, pps	265.4	245.3	240.4	236.2	232.7	228.7	223.5	217.0	209.8	209.8	209.9	209.9	210.0	209.9	210.0	210.1	210.1	210.1
Shaft HP	61014	49603	47158	44704	42252	39800	37349	34899	32450	30002	27555	25109	22664	20219	17776	15000	14000	13000
Generator Information																		
Capacity kW	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333	60333
Efficiency	0.982	0.981	0.980	0.980	0.979	0.978	0.977	0.976	0.975	0.973	0.972	0.969	0.967	0.964	0.959	0.953	0.950	0.946
Inlet Temp, °F	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8th Stage Bleed																		
Flow, pps	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	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CDP Bleed																		
Flow, pps	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	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Est. Gas Pressure at Baseplate, psi	**549.8**	**481.3**	**466.4**	**451.0**	**434.9**	**418.6**	**401.9**	**384.5**	**366.2**	**351.9**	**337.5**	**323.0**	**308.5**	**294.1**	**279.4**	**260.7**	**254.5**	**248.4**
CardPack	**81e**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**	**7tx**
NSI	**327**	**305**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
NSI	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

GE AERO ENERGY PRODUCTS/ GE LM6000PC SPRINT w/ VGVs Standard Estimated Average Engine Performance NOT FOR GUARANTEE
GENERATOR: 290ERT 60Hz 13.80kV 0.90pf
City of Riverside - Capacity Addition

CASE #	100
AMBIENT	
DB, °F	100.0
WB, °F	68.0
RH, %	19.0
ALT, FT	730.0
Ambient Pressure, psia	14.313
ENGINE INLET	
TEMP, °F	46.0
RH, %	95.0
CONDITIONING	CHILL
TONS or kBTU	1293
kW, Gen Terms	49800
Est. Btu/kW-hr, LHV	8545
Guar. Btu/kW-hr, LHV	8719
Aux and BOP Loads, kW	2818
FUEL	
MMBTU/HR, LHV	426
PPH	20118
NOZZLE WATER	
PPH	22960
TEMP °F	59
NOZZLE STEAM	
PPH	0
TEMP °F	0
SPRINT	LPC
PPH	4891
INLET LOSS, INH2O	5
VOLUTE LOSS, INH2O	4
EXHAUST LOSS,INH2O	12
HP COMP, RPM	3600
LP COMP, RPM	10567
COMP DISCH, PSIA	439
COMP DISCH, °F	997
T48, °R	2046
EXHAUST PARAMETERS	
°F	830
PPS	296
PPH	1064462

Net Plant

96783	**kW**
8794	Est. Btu/kW-hr, LHV
8973	**Guar. Btu/kW-hr, LHV**

EMISSIONS (NOT FOR USE IN ENVIRONMENTAL PERMITS, NOX & CO PPMVD ARE @ 15% O2)

NOx, PPMVD	25
NOx, PPH	43
CO, PPMVD	42
CO, PPH	44
HC, PPMVD	10
HC, PPH	7
VOC, PPMVD	3
VOC, PPH	2
PM10, PPH	11