GUARANTEE

PROJECT: SME ELECTRIC
LOCATION: MT USA

KW AT GEN TERMS	40152
BTU/KW-HR, LHV	8568
(KJ/KW-HR, LHV)	9039

EMISSIONS ARE VALID FOR T2 WITHIN -10F-100F
AND A GTG LOAD DOWN TO 60%

NOX:	25 PPMVD AT 15% O2 (51 mg/Nm3)
CO:	55 PPMVD AT 15% O2 (69 mg/Nm3)
VOC:	4.0 PPMVD AT 15% O2 (3 mg/Nm3)
PM10:	4 LB/HR (2 kg/hr)

Johnny Metcalf
Performance Engineer
Date: 02/24/09

NOT VALID WITHOUT SIGNATURE

VALID UNTIL 05/25/09

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(1) GE LM6000PF-SPRINT-25 DLE GAS TURBINE
FUEL:	19293Btu/lb / (44876 kJ/kg) LHV, GAS FUEL (#900-2085)
FUEL SPEC:	MID-TD-0000-1 LATEST REVISION
FUEL TEMP:	SITE FUEL TEMPERATURE OF 76.9°F(25.0°C)
GENERATOR:	BDAX 290ERT
GENERATOR OUTPUT	13.8kV, 60 Hz
POWER FACTOR:	≥ 0.85
AMBIENT TEMP:	91.5°F / (33.1°C)
AMBIENT RH:	17.0%
INLET CONDITIONING:	EVAP TO 65.6°F / (18.7°C) AT 78.4% RH
ALTITUDE:	3300.0ft / (1005.8m)
INLET FILTER LOSS:	≤ 5.00 inH_2O / (127.0 mmH_2O)
EXHAUST LOSS:	≤ 13.00 inH_2O / (330.2 mmH_2O)
NOX CONTROL:	DLE
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
FIELD TEST METHODS	
PERFORMANCE:	GE ENERGY SGTGPTM
NOX:	EPA METHOD 20
CO:	EPA METHOD 10
VOC:	EPA METHOD 25A/18
PM10:	EPA METHOD 5 / 202

BASIS OF GUARANTEE IS NOT FOR DESIGN, REFER TO PROJECT DRAWINGS FOR DESIGN REQUIREMENTS.
SI VALUES ARE FOR REFERENCE PURPOSES ONLY.

THIS GUARANTEE SUPERSEDES ANY
PREVIOUS GUARANTEES PRESENTED

GE ENERGY

Conditions for VOC Emissions Guarantee

1. Fuel must meet GE specification MID-TD-000-01.

2. The timing of test to coincide with lowest site ambient VOCs levels.

3. Gas turbine must run for a minimum of 300 total fired hours at base load prior to testing.
4. Gas turbine inlet and exhaust system must be free of any dirt,sand,mud,rust,oil or any other contaminates.
5. Re-testing (at purchaser's expense) must be allowed, if required.

6. GE receives a copy of the final test results.

7. A compressor wash prior to testing is highly recommended.

GE ENERGY

Conditions for PM10 Emissions Guarantee

1. Fuel must meet GE specification MID-TD-000-01.
2. The timing of test to coincide with lowest site ambient particulate levels.
3. Gas turbine must run for a minimum of 300 total fired hours at base load prior to testing.
4. Combustion turbine must be run for a minimum of 300 total fired hours prior to any particulate testing; combustion turbine must be operating a minimum of 3 - 4 hours at base load prior to PM / PM10 test run.
5. Gas turbine inlet and exhaust system must be free of any dirt,sand,mud,rust,oil or any other contaminates.
6. Sampling probe internal surfaces must be made of chemically inert and non-catalytic material such as quartz.
7. The filter material shall be quartz.
8. Probe wash shall be high purity acetone per EPA Method 5.
9. Re-testing (at purchaser's expense) must be allowed, if required.
10. GE receives a copy of the final test results.
11. A compressor wash prior to testing is highly recommended.
12. The area around the turbine is to be treated (e.g.sprayed down with water) to minimize airborne dust.

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

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

Engine: **LM6000 PF-SPRINT-25**
Deck Info: **G0125O - 8f6.scp**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.85PF (14839)**
Fuel: **Site Gas Fuel#900-2085, 19293 Btu/lb,LHV**

Date: **02/24/2009**
Time: **10:52:54 AM**
Version: **3.8.0**

Case #	**100**
Ambient Conditions	
Dry Bulb, °F	91.5
Wet Bulb, °F	61.1
RH, %	17.0
Altitude, ft	3300.0
Ambient Pressure, psia	13.026
Engine Inlet	
Comp Inlet Temp, °F	65.6
RH, %	78.4
Conditioning	EVAP
Tons or kBtu/hr	0
Pressure Losses	
Inlet Loss, inH20	5.00
Volute Loss, inH20	4.00
Exhaust Loss, inH20	13.00
kW, Gen Terms	**40152**
Est. Btu/kW-hr, LHV	**8396**
Guar. Btu/kW-hr, LHV	**8568**
Fuel Flow	
MMBtu/hr, LHV	337.1
lb/hr	17474
NOx Control	**DLE**
SPRINT	**LPC**
lb/hr	8258
Control Parameters	
HP Speed, RPM	10417
LP Speed, RPM	3600
PS3 - CDP, psia	391.8
T3CRF - CDT, °F	963
T48IN, °R	2043
T48IN, °F	1583
Exhaust Parameters	
Temperature, °F	865.2
lb/sec	249.1
lb/hr	896580
Energy, Btu/s- Ref 0 °R	84663
Energy, Btu/s- Ref T2 °F	52054
Cp, Btu/lb-R	0.2746
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
NOx ppmvd Ref 15% O2	25
NOx as NO2, lb/hr	34
CO ppmvd Ref 15% O2	55
CO, lb/hr	45.58
CO2, lb/hr	44033.82
HC ppmvd Ref 15% O2	22
HC, lb/hr	10.42
SOX as SO2, lb/hr	0.00

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Fuel: **Site Gas Fuel#900-2085, 19293 Btu/lb,LHV**

Date: **02/24/2009**
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Case #	**100**

Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
AR	1.2358
N2	72.6290
O2	15.2561
CO2	4.9113
H20	5.9589
SO2	0.0000
CO	0.0051
HC	0.0012
NOX	0.0026

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
AR	0.9631
N2	80.7097
O2	14.8427
CO2	3.4741
H20	0.0000
SO2	0.0000
CO	0.0056
HC	0.0023
NOX	0.0026

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
AR	0.8731
N2	73.1747
O2	13.4570
CO2	3.1498
H20	9.3359
SO2	0.0000
CO	0.0051
HC	0.0021
NOX	0.0023

Aero Energy Fuel Number	**900-2085 (SME Electric)**	
	Volume %	**Weight %**
Hydrogen	0.0000	0.0000
Methane	90.9710	82.7127
Ethane	1.5290	2.6057
Ethylene	0.0000	0.0000
Propane	0.7810	1.9518
Propylene	0.0000	0.0000
Butane	0.5280	1.7393
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.2150	0.8791
Cyclopentane	0.0000	0.0000
Hexane	0.0510	0.2491
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.5000	1.2472
Nitrogen	5.4260	8.6150
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	19293
Btu/scf, LHV	899
Btu/scf, HHV	996
Btu/lb, HHV	21373
Fuel Temp, °F	76.9
NOx Scalar	0.951
Specific Gravity	0.61

Estimated Average Engine Performance NOT FOR GUARANTEE, REFER TO PROJECT F&ID FOR DESIGN

GE Energy

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Project Info:

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Deck Info: **G0125O - 8f6.scp**
Generator: **BDAX 290ERT 60Hz, 13.8kV, 0.85PF (14839)**
Fuel: **Site Gas Fuel#900-2085, 19293 Btu/lb,LHV**

Date: **02/24/2009**
Time: **11:00:22 AM**
Version: **3.8.0**

Case #	**100**
Ambient Conditions	
Dry Bulb, °C	33.1
Wet Bulb, °C	16.1
RH, %	17.0
Altitude, m	1005.8
Ambient Pressure, kPa	89.812
Engine Inlet	
Comp Inlet Temp, °C	18.7
RH, %	78.4
Conditioning	EVAP
Tons or kBtu/hr	0
Pressure Losses	
Inlet Loss, mmH2O	127.00
Volute Loss, mmH2O	101.60
Exhaust Loss, mmH2O	330.20
kW, Gen Terms	**40152**
Est. kJ/kWh, LHV	**8859**
Guar. kJ/kWh, LHV	**9039**
Fuel Flow	
GJ/hr, LHV	355.7
kg/hr	7926
NOx Control	**DLE**
SPRINT	**LPC**
kg/hr	3746
Control Parameters	
HP Speed, RPM	10417
LP Speed, RPM	3600
PS3 - CDP, kPa	2701.6
T3CRF - CDT, °C	517
T48IN, °K	1135
T48IN, °C	862
Exhaust Parameters	
Temperature, °C	462.9
kg/sec	113.0
kg/hr	406686
Energy, KJ/s- Ref 0 °K	89325
Energy, KJ/s- Ref T2 °C	54920
Kj/kg-R	1.1495
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
NOx mg/Nm3 Ref 15% O2	51
NOx as NO2, kg/hr	15
CO mg/Nm3 Ref 15% O2	69
CO, kg/hr	20.67
CO2, kg/hr	19973.61
HC mg/Nm3 Ref 15% O2	16
HC, kg/hr	4.72
SOX as SO2, kg/hr	0.00

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AR	0.9631
N2	80.7097
O2	14.8427
CO2	3.4741
H20	0.0000
SO2	0.0000
CO	0.0056
HC	0.0023
NOX	0.0026

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)	
AR	0.8731
N2	73.1747
O2	13.4570
CO2	3.1498
H20	9.3359
SO2	0.0000
CO	0.0051
HC	0.0021
NOX	0.0023

Aero Energy Fuel Number	**900-2085 (SME Electric)**	
	Volume %	**Weight %**
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Propane	0.7810	1.9518
Propylene	0.0000	0.0000
Butane	0.5280	1.7393
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.2150	0.8791
Cyclopentane	0.0000	0.0000
Hexane	0.0510	0.2491
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	0.5000	1.2472
Nitrogen	5.4260	8.6150
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000

kJ/kg, LHV	44875
kJ/Nm3, LHV	35320
kJ/Nm3, HHV	39128
kJ/kg, HHV	49712
Fuel Temp, °C	25.0
NOx Scalar	0.951
Specific Gravity	0.61