SECTION 18049 - GAS TURBINE DATA TO BE SUBMITTED WITH BID

PART 1 - GENERAL

1.01 PERFORMANCE GUARANTEES:

The Bidder guarantees the performance of the equipment furnished to be at least as stated below when operated under the conditions specified. If (steam) (water) injection is required for NO_x control, the guarantees shall include the effect of the (water) (steam) injection.

A. Unit Performance Guarantees:

1. Unit Operating Conditions:

Gas Turbine Inlet:	Wet Bulb	_____ °F
	Dry Bulb	_____ °F
Bus Voltage:		_____ volts
System Power Factor:		90%
Evaporative Cooler Operating:		(Yes) (No)
Fuel:		Natural Gas

a. Base net output rating of turbine-generator, kW _____

(1) Fuel Input, MMBtu/Hr (HHV) (LHV) _____

(2) Exhaust gas flow, lbs/hr _____

(3) Exhaust gas temperature, °F _____

(4) Exhaust gas specific heat, Btu/lb/°F _____

(5) Analysis of turbine exhaust gas, % vol.

(a) CO_2 _____

(b) N_2 _____

(c) H_2O _____

(d) O_2 _____

(e) VOC _____

(f) Particulate _____

(6) (Steam) (Water) injection lb/hr _____

b. Peak net output rating of_____

(1) Fuel Input, MMBtu/Hr (HHV) (LHV) Turbine-generator, kW _____

(2) Exhaust gas flow, lbs/hr _____

(3) Exhaust gas temperature, ^{o}F _____

(4) Exhaust gas specific heat, Btu/lb/^{o}F _____

(5) Analysis of turbine exhaust gas, % vol.

(a) CO_2 _____

(b) N_2 _____

(c) H_2O _____

(d) O_2 _____

(e) VOC _____

(f) Particulate _____

(6) (Steam) (Water) injection lb/hr _____

c. The net heat rate including all losses and auxiliary power uses will not exceed Btu/kWh (based on (HHV) (LHV) of fuel and net power to step-up transformer

(1) Peak load

Heat Rate, Btu/kWhr _____

Load, kW _____

(2) Baseload

Heat Rate, Btu/kWhr _____

Load, kW _____

(3) 3/4 load

Heat Rate, Btu/kWhr _____

Load, kW _____

(4) 1/2 load

Heat Rate, Btu/kWhr _____

Load, kW _____

d. The spinning reserve net heat input will not exceed the following:

Heat input, Btu/hr (HHV) (LHV) _____

At minimum stable operating load of, kW _____

e. The maximum generator capability at ____ volts, 90% power factor, when temp. rises are in accordance with ANSI standard C50 will be, kW: _____

f. NO_x Emissions Control System:

(Steam pressure/temperature) ____/_____

(Minimum quality of water required) _____

Flow required at peak output, lb/hr _____

Flow required at base output, lb/hr _____

Flow required at 1/2 of baseload, lb/hr _____

g. Exhaust Emissions (Corrected to 15% Oxygen):

At Peak Rating:

CO, ppm by volume _____

NO_x, ppm by volume _____

SO_2, ppm by volume _____

VOC, ppm by volume _____

Particulate, ppm by volume _____

At Base Rating:

CO, ppm by volume _____

NO_x, ppm by volume _____

SO_2, ppm by volume _____

VOC, ppm by volume _____

Particulate, ppm by volume _____

h. Evaporative cooler water requirements:

Flow required at peak output, gpm _____

Flow required at base output, gpm _____

Flow required at 1/2 of base output, gpm _____

Minimum water quality required pH ____to____

Alkalinity, ppm max _____

Hardness, ppm max _____

B. Other Guarantees:

1. Silencing: When operating at baseload service rating, the sound pressure level is decibels to the reference level of 0.0002-microbar at all ground-level locations 3 feet from the unit will not exceed the following (based on 80°F, background noise 10 dB lower all octaves):

Octave Band

No.	
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
"A" Level	_____

The above values are maximum values and the orientation of maximum sound pressure level is _____.

2. Silencing: When operating at baseload service rating, the sound pressure level is decibels to the reference level of 0.0002-microbar at all ground-level locations 10 feet from the air inlet filter will not exceed the following (based on 80°F, below 5 mph wind, and background noise 10 dB lower all octaves):

Octave Band No.	
1	_____
2	_____
3	_____
4	_____
5	_____
6	_____
7	_____
8	_____
"A" Level	_____

The above values are maximum values and the orientation of maximum sound pressure level is_____

_____

_____

1.02 EXPECTED UNIT PERFORMANCE:

The Bidder shall submit with the Bid the following expected performance data by filling in the blanks provided:

A. Unit Performance Guarantees:

1. Unit Operating Conditions:

Gas Turbine Inlet: Wet Bulb	_____ºF
Dry Bulb	_____ºF
Bus Voltage:	_____ volts
System Power Factor:	90%
Evaporative Cooler Operating:	(Yes) (No)

Fuel: Natural Gas

a. Base net output rating of turbine-generator, kW _____

(1) Fuel Input, MMBtu/Hr (HHV) (LHV) _____

(2) Exhaust gas flow, lbs/hr _____

(3) Exhaust gas temperature, ºF _____

(4) Exhaust gas specific heat, Btu/lb/ºF _____

(5) Analysis of turbine exhaust gas, % vol.

(a) CO_2 _____

(b) N_2 _____

(c) H_2O _____

(d) O_2 _____

(6) (Steam) (Water) injection lb/hr _____

b. Peak net output rating of_____

(1) Fuel Input, MMBtu/Hr (HHV) (LHV)

Turbine-generator, kW _____

(2) Exhaust gas flow, lbs/hr _____

(3) Exhaust gas temperature, ^{o}F _____

(4) Exhaust gas specific heat, Btu/lb/^{o}F _____

(5) Analysis of turbine exhaust gas, % vol.

(a) CO_2 _____

(b) N_2 _____

(c) H_2O _____

(d) O_2 _____

(6) (Steam) (Water) injection lb/hr _____

c. The net heat rate including all losses and auxiliary power uses will not exceed Btu/kWh (based on (HHV) (LHV) of fuel and net power to step-up transformer

(1) Peak load

Heat Rate, Btu/kWhr _____

Load, kW _____

(2) Baseload

Heat Rate, Btu/kWhr _____

Load, kW _____

(3) 3/4 load

Heat Rate, Btu/kWhr _____

Load, kW _____

(4) 1/2 load

Heat Rate, Btu/kWhr _____

Load, kW _____

d. The spinning reserve net heat input will not exceed the following:

Heat input, Btu/hr (HHV) (LHV) _____

At minimum stable operating load of, kW _____

e. The maximum generator capability at ____ volts, 90% power factor, when temp. rises are in accordance with ANSI standard C50 will be, kW: _____

f. No_x Emissions Control System:

(Steam pressure/temperature) _____/_____

(Minimum quality of water required) _____

Flow required at peak output, lb/hr _____

Flow required at base output, lb/hr _____

Flow required at 1/2 of baseload, lb/hr _____

g. Exhaust Emissions:

At Peak Rating:

CO, ppm by volume _____

NO_x, ppm by volume _____

SO_2, ppm by volume

based on ___% sulfur by weight in fuel _____

At Base Rating:

CO, ppm by volume _____

NO_x, ppm by volume _____

SO_2, ppm by volume

based on ___% sulfur by weight in fuel _____

h. Evaporative cooler water requirements:

Flow required at peak output, gpm _____

Flow required at base output, gpm _____

Flow required at 1/2 of base output, gpm _____

Minimum water quality required pH ____to_____

Alkalinity, ppm max _____

Hardness, ppm max _____

2. Turbine Parts Life: Anticipated hours of operation at base rating before maintenance inspections are required based on ___ starts per year.

Combustion inspection, hrs _____

Hot gas inspection, hrs _____

Major inspection, hrs _____

3. Turbine Maintenance: Anticipated maintenance requirements at base rating based upon ___ starts per year.

a. Anticipated number of maintenance man-hours required for:

Combustion inspection, man-hours _____

Hot gas inspection, man-hours _____

Major inspection, man-hours _____

b. Anticipated average number of maintenance man-hours expended per year, man-hrs _____

c. Anticipated unit maintenance costs, mils/kWh (based on $25 per man-hour) _____

4. Firing Temperatures:

Firing temp. at peak rating, F _____

Firing temp. at base rating, F _____

Firing temp. quoted above is measured at (location on turbine) _____

5. Pressure Losses: The following pressure drops are in inches of water based on standard air with the unit operating under:

a. "Peak rating" conditions:

Total pressure loss to inlet flange at package, In. H_2O _____

Total pressure loss from turbine exhaust flange, In. H_2O _____

b. "Base rating" conditions:

Total pressure loss to inlet flange at package, In. H_2O _____

Total pressure loss from turbine exhaust flange, In. H_2O _____

6. Standby Requirements:

Standby energy consumption per hour ___^oF, kW-hr _____

Max. standby ac power demand, kW _____

Max. demand on battery, amps ___ volts _____

7. Start-Up Time: Normal start/normal load

Cold standstill to ready for synchronizing, minutes _____

Synchronizing to baseload, minutes _____

Cooling air requirements, cfm

Base load _____

Peak load _____

Period of time cooling air is required after trip, minutes _____

1.03 DESCRIPTION OF EQUIPMENT:

The Bidder shall furnish equipment in accordance with the Specifications, and guarantees the performance of the following equipment to meet the requirements specified. The Bidder shall submit with the Bid the following equipment data:

A. Equipment Data:

1. Prime Mover and Power Train:

Combustion turbine, Mfgr. and type _____

Power turbine, Mfgr. and type _____

Type of burners _____

Gas turbine speed, rpm _____

Power turbine speed, rpm _____

Reduction gear manufacturer _____

Reduction gear capacity at 100,000-hr service rating, kW _____

Speed regulation full load to no load under normal conditions, percent _____

Increase in speed over full-load speed with full load suddenly thrown off, percent _____

2. Generator: (Data based __ F cooling water and __ ft. MSL, excepted as otherwise noted)

Manufacturer and type _____

Rated voltage, volts _____

Speed, rpm _____

Short-circuit ratio _____

Rated kVA and basis of rating _____

Exciter type _____

Field voltage - no load _____

Field voltage - peak capacity, 0.9-pf _____

Field current - peak capacity, 0.9-pf amps _____

Max. total temp. w/_ F ambient at:

Base Capacity/and Peak Capacity, Kva _____/_____

Rotor, degrees C (by resistance) _____/_____

Stator, degrees C (by detector) _____/_____

Calculated telephone interference factor,
TIF of generator:
Balanced: _____
Residual: _____

Lowest cooling air temp. permitted at windings during operation, F _____

Percent reactance on the peak kVA base and at rated voltage of __ kV:
Direct axis synchronous at rated current, X_d _____
Transient unsaturated at rated current, X'_{du} _____
Transient saturated, X'_d _____
Subtransient (at rated voltage) X''_d _____
Zero sequence (at rated voltage) X_o _____
Negative sequence (at rated voltage) X_2 _____
Synchronous impedance, Z_d _____
Three-phase capacitance to ground, mfd _____

3. Metal-Clad Switchgear:
Manufacturer of switchgear structure _____
Manufacturer and type of circuit breakers _____
Manufacturer and type of switchgear relays _____

4. Generator Accessory Equipment:
Manufacturer and type of arresters _____
Manufacturer and type of capacitors _____
Manufacturer and type of main breaker _____
Manufacturer of neutral transformer and resistor _____
Telephone influence factor suppression accessories, if required to meet specified TIF; description _____

5. Auxiliary Power Apparatus:
Manufacturer and type of motor starters _____
Manufacturer of transformers _____
Station auxiliary transformer kVA/volt rating _____/____
Starting motor transformer kVA/volt rating _____/____

6. Silencing Equipment:
   - Manufacturer _____
   - Inlet, ft in length _____
   - Exhaust, ft in length _____
   - Other, describe _____
   - _____
   - _____
7. Exhaust Connection Dimensions _____
8. Intake Evaporative Air Cooler
   - Manufacturer _____
   - Face area _____
9. Inlet Air Filter:
   - Number of stages _____
   - Pressure drop across filters _____
   - Face area _____
10. Generator Air Filter:
    - Manufacturer and Model Number _____
    - Face area _____
11. Starting System:
    - Type _____
    - Manufacturer _____
    - Horsepower and Voltage _____
12. Lubricating Oil and Special Fluids:
    - Type and quantity for combustion turbine _____
    - Type and quantity for power turbine _____
    - Type and quantity for generator _____
    - Special fluids required, list _____
    - _____
13. Other:
    - Ac standby power connected load, kW _____
    - Dc standby power connected load, kW _____
    - Describe other major equipment _____
    - _____

_____

14. Major Component Weights: (in pounds)

Combustion Turbine Unit _____

Power Turbine Unit _____

Generator and Exciter _____

Other Major Equipment _____

Describe _____

_____

_____

Heaviest piece to be handled during erection (identify piece) _____

Heaviest piece to be handled after erection (identify piece) _____

Heaviest piece to be handled for routine inspection of

hot gas path _____

Compressor rotor _____

Power turbine rotor _____

Generator rotor _____

PART 2 - PRODUCTS - Not Applicable.

PART 3 - EXECUTION - Not Applicable.

END OF SECTION 18049