SCOPE OF SUPPLY

THREE (3) COMPLETE AND UNUSED SGT-400 60HZ GAS TURBINE DUAL FUEL DRIVEN GENERATOR PACKAGES SUITABLE TO BE LOCATED OUTDOORS, EACH PACKAGE CONTAINS THE FOLLOWING:

ITEM / TAG NO.	QTY	PRODUCT / MATERIAL / ITEM
SGT-400	1	Unit 1 (Turbine Power Generator A)
SGT-400	1	Unit 2 (Turbine Power Generator B)
SGT-400	1	Unit 3 (Turbine Power Generator C)

Engine Core

- Engine core 12.9 MW(e) rating at ISO.
- Compressor assembly with variable guide vanes.
- Dry Low Emissions (DLE) combustion system designed for dual fuel operation.
- Capability to burn liquid fuel, 2.2% CO2 fuel and 1.7% CO2 fuel (with burner change out).

Exhaust Collector

- Exhaust outlet casing phased vertically.
- Exhaust outlet flexible joint.

Instrumentation

- Air inlet casing temperature thermocouples.
- Turbine compressor discharge temperature thermocouples.
- Turbine compressor discharge pressure transmitters.
- Low pressure turbine exhaust outlet temperature thermocouples.
- Engine bearing temperature monitoring.
- Rotor speed probe.
- Non-contacting turbine bearing vibration probes.
- Key phasor.

Underbase

- Separate underbases to carry the gas turbine, auxiliary gearbox and gearbox and generator fabricated steel construction.
- Integral lube oil tank constructed from carbon steel.

Lube Oil System

- Integral lube oil system serving the gas turbine, gearbox and generator.
- Main lube oil pump, gearbox driven.
- Auxiliary lube oil pump and AC motor.
- Emergency lube oil pump and explosion proof DC motor.
- On-skid lube oil piping, stainless steel.
- Lube oil pressure transmitter and switch.
- Lube oil supply temperature thermocouple and transmitter.
- Lube oil tank temperature thermocouple.
- Lube oil tank low level switch and annunciation.
- Two (2) lube oil tank immersion heaters.
- Duplex type 10 micron lube oil filter, fitted with differential pressure transmitter.

Lube Oil Breather System

- Low pressure oil mist eliminator constructed of carbon steel.
- Supply and return pipe work to turbine package Siemens Energy, Inc.

Oil Cooler

- 1 x 100% air blast lubrication oil cooler suitable for an ambient air temperature up to 104°F (40°C).
- Non-return valves for lube oil cooler piping supplied loose for fitting by others.

Engine Auxiliaries

- Turbine compressor cleaning system for on-line and off-line water washing.
- Aluminum instrument bodies.
- Instrument tagging per Siemens standards.
- Identification and warning labels in English
- Stenciled skid edge service connection identification, to Siemens format.

Paint Finish

- Standard Siemens on-shore paint finish.

Start System

- AC electric motor driven hydraulic starting system.

Dual Fuel System

- Modular Liquid fuel and Gas fuel system.
- Automatic changeover capability.

DLE Gas Fuel System

- On-skid gas fuel piping in stainless steel.
- Two rapid-acting gas shut-off valves.
- Independent control of main and pilot gas fuel valves.

DLE Liquid Fuel System

- Liquid fuel pump, AC motor driven.
- Duplex type, 10 micron, liquid fuel filter complete with differential pressure transmitter.
- On-skid fuel piping in stainless steel downstream of filter.
- Shut-off valves.
- Liquid fuel grounding.
- Independent control of primary, secondary and tertiary liquid fuel flows.
- Off-skid shut-off and thermal relief valves (Supplied loose for customer's liquid fuel off-skid piping).
- Liquid fuel startup assist design supplied for improved reliability.

Liquid Fuel Conditioning skid

- Liquid fuel conditioning system contained on a Painted carbon steel skid.
- Duplex Liquid fuel filter.
- Liquid fuel pump.
- Instrumentation for pressure and temperature monitoring Siemens Energy, Inc.

Air Intake System

- Three stage combustion air intake filter, fabricated of 316 SS.
- SS Weather hood/Vane Separator, Prefilter and HEPA filter.
- Combustion air intake silencer, fabricated of stainless steel, designed for overall sound attenuation to 85dB(A) SPL at 3ft (1m) with distance measured at 5ft (1.5m) above grade.
- Expansion joint.
- Transition duct.
- 90° elbow.

Exhaust System

- Exhaust diffuser fabricated in stainless steel.
- Exhaust flex.
- Secondary diffuser fabricated in stainless steel.
- Exhaust Silencer fabricated in painted carbon steel with stainless steel internals, designed for an overall sound attenuation of 85 dB (A) SPL at 3ft (1m) 5ft (1.5m) above grade.
- Exhaust ducting fabricated in stainless steel to a stack 15m above grade

Acoustic Enclosure

- Enclosure fitted over the turbine bolted to the underbase, for average sound attenuation to 85dB(A) SPL at 3ft (1m) with distance measured at 5ft (1.5m) above grade.
- Enclosure over the gearbox and generator bolted to the underbase, for average sound attenuation to 85dB(A) SPL at 3ft (1m) with distance measured at 5ft (1.5m) above grade.
- Internal lighting is provided.

- Painted carbon steel construction with 316SS internals.
- Doors and removable side panels for personnel/maintenance access.

Ventilation System

- Ventilation inlet and outlet dampers.
- Inertial filter.
- Ventilation inlet and outlet silencers fabricated of carbon steel, designed for an overall noise level of 85dB (A) SPL at 3ft (1m) with distance measured at 5ft (1.5m) above grade.
- 2 x 100% AC electric motor driven ventilation fans operating in parallel designed for Class 1.
- Division 2 Group D area classification, and up to a maximum ambient temperature of 104°F (40°C).

Fire and Gas System

- Three (3) Triple IR flame detectors.
- Two (2) thermal detectors.
- Two (2) gas detectors.
- Four (4) CO2 cylinders, located off main skid in a weatherproof enclosure, twin-shot fire protection system.
- Audible and visible alarms for extinguish and release.
- Suitable for Class 1 Division 2 Group D area classification.
- Provision for weighing the CO2 bottles to monitor charge Siemens Energy, Inc.

Gearbox & Couplings:

Auxiliary Gearbox

- Auxiliary gearbox incorporating input shaft for start system and output drive for mechanically driven lube oil pump.

Speed Reducing Gearbox

- Parallel shaft speed reducing gearbox with an output shaft speed of 1800 rpm.
- Accelerometer vibration probe mounted on the gearbox casing.
- Designed for 12.9 MW(e) rated core.

Output Coupling

- Coupling between gas turbine and gearbox.
- Coupling with torque-limiting device between gearbox and generator.

Coupling Guard

- Coupling guard fabricated of Aluminum between gas turbine and gearbox.
- Coupling guard fabricated of Aluminum between generator and gearbox.

AC Generator and Electrical Equipment

- An 1800 rpm, 4.16 kV, 3 phase, 4 wire, 4 pole, 60 Hz, 0.8 power factor, salient pole brushless AC generator suitable for a safe area.
- Open Drip Proof (ODP).
- Generator bearing temperature detectors.
- Class 'F' insulation with class 'B' temperature rise.
- Outlet and junction boxes.
- Line side Cubicle including 3 surge capacitors, and 3 lightening arrestors.
- Neutral Cubicle including 11CT's (3 for Metering, 3 for Differential Protection, 3 for Generator Protection, 1 for CCCT, and 1 for NGR).

Electrical Accessories

- All on-package electric devices meet or exceed Class 1 Division 2 Group D classification.
- All on-package control cabling.
- Junction boxes located on external surfaces of gas turbine generator.
- Aluminum cable trays.
- Integral grounding protection.
- Emergency 'stop' push-button on turbine enclosure.

Battery Cabinet

- Fabricated of painted carbon steel.
- Suitable for locating in safe area.

Lead Acid Batteries

- 120 VDC Lead Acid batteries, charger and inverter for 24V DC Supply mounted in the battery rack Siemens Energy, Inc.

Control System:

Unit Control Panel

- Located on skid incorporating a Human machine interface (HMI).
- PLC Control System.
- Turbine sequencing and protection.
- Fault monitoring.
- HMI and front panel, text in English.
- Annunciation.
- Gas turbine speed control.
- Temperature monitoring.
- Turbine vibration monitoring.
- Generator bearing temperature monitoring.
- Monitoring of accelerometer on gearbox.
- Transient logging package for fast data logging.
- Interlocks for standard fire and gas monitor.

- Remote Desktop to be located by customer.

Generator Control Panel

- Located on skid.
- Automatic voltage regulator.
- Automatic and manual synchronizing controls with check synchronizer.
- Generator metering and protection equipment.

Any and all spare parts as noted below:

Qty	Unit	Description
		Two Year Spare Parts & Special Tools
1	Unit	Power Strip, Surge Protector, 5 Outlet, Sertrex Series
1	Unit	Relay, Switching, 24V, Terminal Block Mounted For Din 35 Rail
1	Unit	Batter AssyLogix5000
1	Unit	Element InstAir Filter Assy, (For 74/60050048/1 & /2)
1	Unit	Output Fuse- 125V/20A DC
1	Unit	Fast Acting Fuse- 3/4A 100KA @ 500VD C/600VAC
1	Unit	Fuse- 24VDC /100ADC
1	Unit	Fuse- 24VDC/ 100ADC Output Semi-Conductor
1	Unit	Filter Element, Carb STL, For Items 1 & 2 of 75/05002071
1	Unit	Filter Element, Lube Oil DC (For 74/05002028/4)
1	Unit	Filter Element, Atex, VGV Actuator (For 64/05002028/34)
		Generator 2 year spare
		a. One set bearing liners with seals
		b. Two sets of exciter diodes, forward and reverse
1	Unit	c. Two surge suppressors
		d. One bearing RTD
		e. One vibration probe