Scope of Supply

TM2500+ Mobile Gas Turbine Generator (Generation 6)
Each TM2500+ consists of two trailers and auxiliary equipment described below. The trailers include the main trailer and auxiliary trailer. The inlet air filter assembly and exhaust duct assembly ship loose and are assembled onto the main trailer during commissioning. In addition to the above, Seller will have ship loose and tools as required. The trailers and auxiliary equipment is described in more detail below.

One TM2500+ unit is a Unit ("Unit.") The XXX Units in this contract make up the equipment ("Equipment.")

1.1 Main Trailer
The main trailer consists of the following components:

Main Trailer and Jeep
A seven-axle, air ride suspension trailer (3+4) and a 3-axle jeep are used to transport the main trailer components. The trailer and jeep combination is approximately 108' (32.9m) long (less tractor) during transport and weighs approximately 210,000 pounds (95,254 kg) fully loaded. At the jobsite, the jeep and trailer gooseneck are removed as well as the 3 rear axles of the trailer. With these pieces removed, the main trailer is approximately 68.25' (20.8m) long during operation, measured from the plenum on one end to the footing on the other. Ten landing legs are provided to support and level the equipment at the jobsite. Appropriate site foundation is not part of the scope of supply.

Gas Turbine
The gas turbine is a General Electric LM2500 PK MDW model ISO rated for continuous duty and configured for operation on either natural gas or liquid fuel. Each is configured for optional water injection for NOx reduction, if required. Altitude, humidity, and inlet and exhaust losses will affect power output and heat rate. In addition to the inlet air filter, the engine is equipped with a stainless steel mesh screen in the inlet air stream for "last chance" protection against foreign object damage. The engine is shock mounted for shipping and shipped in position, with the exception of the coupling spacer, which is installed during commissioning.

Generator
The generator is an air-cooled, open air, 2-pole, 50/60 Hz, 0.85-.99 PF (lagging) capable Brush generator. The generator includes a brushless excitation system with permanent magnet generator. Neutral, line side cubicles, medium voltage switchgear are included. The generator is hard mounted to a base on the main trailer and includes generator air inlet filtering and air silencing. The generator is operated at class F temperature rise.

Turbine Enclosure
The equipment package is supplied with a weatherproof acoustic enclosure for the gas turbine. The enclosure is completely assembled and mounted over the equipment prior to testing and shipment. Provisions for turbine removal and personnel access are included. The turbine compartment is fully ventilated by 2 x 50% ventilation fans (provided in the air filter).

Fuel System
The gas turbine, auxiliary equipment, and controls are all configured for gas, liquid, or dual fuel operation. The TM2500+ is supplied with a natural gas fuel system using an electronically controlled fuel-metering valve. For full-load operation, the gaseous fuel must be supplied to the Auxiliary Trailer skid connection at: 320 MMBtu/hr Max; 180 °F [82 ° C]; Max; 520 +/- 20 PSIG [3,585 +/- 138 kPaG]; and filtered to 5 or less Microns. The buyer must provide gas fuel that is clean, filtered and compliant with General Electric specification MID-TD-0000-1.

The package is also equipped with a liquid fuel system. Typical liquid fuels include DF1, DF2, or JP4. For full-load operation, buyer must supply liquid fuel to the connection at the Auxiliary Trailer Skid at 40 GPM [151.4 L/min], 30 ± 10 PSIG [207 ± 69 kPaG], filtered to 5 Microns and at least 20°F (11°C) above the wax point temperature. The buyer must provide liquid fuel that is clean, filtered and compliant with General Electric specification MID-TD-0000-2.

All necessary shutoff valves, flow meter, piping and instruments between the Auxiliary Trailer Skid connection and the engine are included. Buyer must provide supply piping with sampling ports, fuel system filtration and applicable shut-off valves and containment per local codes and standards.

Water Injection System
The equipment package is capable of water injection for NOx reduction. For full-load operation, the demineralized water must be supplied to the Auxiliary Trailer Skid connection at 28 GPM [106 L/min], 15 PSIG [103 kPaG] Minimum, 40 to 140 °F [4 to 60 °C) filtered to 10 Microns. The buyer must provide demineralized water that is clean, filtered and compliant with General Electric specification MID-TD-0000-3.

All necessary shutoff valves, flow meter, piping and instruments between the Auxiliary Trailer Skid connection and the engine are included. Buyer must provide supply piping with sampling ports, fuel system filtration and applicable shut-off valves and containment per local codes and standards.

Lube Oil Systems
The equipment package is supplied with two separate lube oil systems; one for the gas turbine and one for the generator. The oil reservoirs and piping are all stainless steel, and the lube oil system valves have stainless steel trim. Each lube oil system has a pump, simplex filters, necessary valves and instrumentation, and thermostatic-controlled electric heaters. A dual fan, single core fin fan cooler is provided to cool turbine, generator lube oil and hydraulic oil. The cooler is mounted on the Auxiliary Trailer and the rest of the lube oil systems are mounted on the Main Trailer. Buyer must provide any additional containment per local codes and standards.

Switchgear
The equipment package is supplied with a 3 section NEMA 3R switchgear enclosure. The switchgear includes a set of generator circuit breaker equipment, 2 sets of incoming line voltage monitoring equipment, a marshalling cabinet and a set of switchgear accessories. Permanent cable terminations from the neutral and line-side of the generator are also included.

1.2 Auxiliary Trailer
The Auxiliary Trailer is approximately 48’ (14.6 m) long and 8’-6” (2.6 m) wide and weighs

approximately 62,000 pounds (28,122 kg) fully loaded. The trailer is provided with a tandem air ride suspension and includes the equipment listed below. Four landing legs are provided to support and level the trailer at site.

Auxiliary Trailer Skid
The Auxiliary Trailer Skid includes fuel and water injection system components not mounted on the main trailer. The pumps, filters and necessary instrumentation are connected to the main trailer components at site with interconnect hoses. The Auxiliary Trailer Skid also includes the hydraulic start system and water wash system described below.

Electro-Hydraulic Start System
The equipment package is supplied with a hydraulic starting system, which includes an electric motor driven hydraulic pump assembly, filters, and a fin/fan heat exchanger mounted on the auxiliary equipment module. A hydraulic motor is also mounted on the gas turbine accessory gearbox to turn the gas generator shaft. All piping and fittings on the base plates, plus hydraulic connections between the auxiliary equipment module and the main base plate are also furnished.

"Off Line" Soak Wash System
The equipment package is supplied with an "off-line" cleaning system, with a water wash reservoir and all necessary filters and instrumentation supplied. Buyer is required to provide purified water to the standards listed in the water injection system.

Fire Protection System
The equipment package is supplied with an installed fire protection system complete with hydrocarbon sensing and thermal detectors, piping and nozzles in the engine compartment. The fire protection system includes cylinders containing CO2 mounted on the Auxiliary Trailer. An included 24 VDC battery and charger (located in the control house) powers the fire protection system. All alarms and shutdowns are annunciated at the unit control panel. An alarm sounds at the turbine if the gas detectors detect high gas levels, or if the system is preparing to release the CO2. When activated, the package shuts down, and the primary CO2 cylinder is discharged into the turbine compartment via multiple nozzles, and the ventilation dampers automatically close. After a time delay and if required, the reserve supply of CO2 is discharged.

Fin Fan Cooler
The equipment package is supplied with a 100% redundant dual fan, single core cooler with separate coils for the turbine, generator lube oil and hydraulic oil. The cooler is equipped with all interconnect piping and instrumentation necessary for the three circuits.

Control House
The basic equipment package is supplied with a lighted, insulated 22' (6.7 m) long by 8'-6" (2.6 m) wide control house. The control house is equipped with an access door, air conditioner/heater, and a hand held fire extinguisher. The control house is used to package the equipment listed below.

Digital Control System
The control system features an integrated electronic fuel management system with a programmable sequencer, vibration monitor, fire system monitor, digital meter, and a digital

generator protective relay module. A desktop or laptop PC with separate workstation and chair is provided for HMI control. Alarm and shutdown events are displayed on the HMI automatically. A dedicated 24V DC battery system with power charger is included in the control house.

Generator Protective Relays
The equipment package is supplied with two (2) Integrate Generator Protection System (IGPS) microprocessor-based relay modules, mounted in the turbine control panel. The IGPS are configured for 50Hz or 60Hz, to be selected at site. The IGPS includes all functions necessary for protection of the generator.

Unit Motor Control Center
A freestanding lineup of motor controls for all TM2500+ package motors is supplied. The motor control center is installed in the control house and also includes a 45 kVA lighting and distribution transformer.

Battery and Charger System
The equipment package is supplied with a 24 VDC NiCad battery system for control power and fire system and charger for each. In addition a 125 VDC NiCad battery system with charger is supplied for the generator lube pump. The 125VDC battery charger has a selector switch to receive power from either the MCC or an external generator to charge the batteries. The battery systems are fully wired and mounted in racks and are installed in the control house along with the wall-mounted chargers.

1.3 Gas Turbine Air Filter Assembly
The air filter is approximately 27' (8.2 m) long and 10'-11" (3.33 m) wide and weighs approximately 20,000 pounds (9072 kg) fully loaded. The air filter is equipped with a two-stage filtration system for both ventilation and combustion air with panel type pre-filters housed in hinged doors and high efficiency barrier filters. An inlet plenum with hatch is provided for access to the FOD screen and maintenance.

Ventilation fans for the turbine enclosure are installed in the air filter assembly. Two 50% fans are installed. A bypass damper is also installed. All of the items listed are housed in the filter house that is complete with access door for maintenance, separate air paths and turning vanes and the necessary instrumentation. For connection to the Main Trailer, the air filter is hard mounted directly on top of the combustion and ventilation inlet plenum.

1.4 Gas Turbine Exhaust Assembly
The exhaust is approximately 17' (5.2 m) long and 10'-3" (3.1 m) wide and weighs approximately 20,000 pounds (9,072 kg) fully loaded.

1.5 Grounding
Each trailer is supplied with grounding pads for inter-connection between each trailer to a grounding grid. Completing the trailer-to-trailer ground inter-connection the connections to site grounding grid are not included. The grounding grid must be compliant with the General Electric "Specification for Grounding of Mobile Generation Unit."

1.6 TM2500+ Design Information

Ambient design limits	41F (5C) to 122F (50C)
Seismic Design Criteria (GTG Package)	IBC 2009, site class D, occupancy category III, seismic design category C, Occupancy importance factor 1.25, response modification factor 2.5, spectral response acceleration at 0.2 sec-g 0.48, spectral response acceleration at 1 sec-g 0.20, g levels for base acceleration 0.24
Maximum Wind Speed (Wind Load)	75 MPH
Roof Live / Snow Load	20 PSF
Near Field Noise at 3 ft horizontal and 5 ft vertical	90 dB(A) arithmetic average

TM2500+ Codes and Standards:
Seller considers the applicable sections of the following US and ISO Codes and Standards to be the most relevant Standards for gas turbine equipment. Our designs and procedures are generally compliant with applicable sections of the following:

ANSI/AFBMA	
Std 9	Loading Ratings and Fatigue Life for Ball Bearings.
Std 11	Load Ratings and Fatigue Life for Roller Bearings.
ANSI A58.1	Minimum Design Loads for Buildings and Other Structures (Used for Snow Loads)
ANSI B1.1	Unified Inch Screw Threads (Seller complies at the customer's connection)
ANSI B1.20.1	Pipe Threads
ANSI B16.5	Steel Pipe Flanges and Flanged Fittings
ANSI B16.9	Factory - Made Wrought Steel Butt Welding Fittings
ANSI B16.21	Non-metallic Flat Gaskets for Pipe Flanges. (Spiral-wound gaskets per API 601 may be used, particularly in turbine compartment piping.)
ANSI B31.1	Pressure Piping and gas turbine piping systems comply.
ANSI B133.2	Basic Gas Turbine. Seller complies, with the exception of paragraph: 8.5 Loose items such as jackscrews and eyebolts are not furnished. Provisions for use of such items are not included in the design.
ANSI B133.3	Gas Turbine Auxiliary Equipment. Seller complies fully with design portions only. Seller uses its own lube oil flushing procedure. Atomizing air receiver is not applicable.
ANSI B133.4	Gas Turbine Controls and Protection Systems
ANSI B133.5	Gas Turbine Electrical Equipment
ANSI B133.8	Gas Turbine Installation Sound Emissions
ANSI C37.90	Relays Associated with Electric Power Apparatus
ANSI C37.90.1	Guide for Surge Withstand Capability (SWS) Tests
ANSI C50.10	General Requirements for Synchronous Machines
ANSI C50.13	Requirements for Cylindrical Rotor Synchronous Generators
ANSI C50.14	Requirements for Combustion Gas Turbine Driven Cylindrical Rotor Synchronous Generators (Seller does not provide a peak reserve rating. Not all of the prototype tests indicated in Table 2 have necessarily been conducted.)
ANSI C57.94	American Standard, Guide for Installation and Maintenance of Dry Type Transformers
ANSI C83.16	Relays
ANSI S1.2	Method for the Physical Measurement of Sound
ANSI S1.4	Specification for Sound Level Meters
ANSI S1.13	Method for the Measurement of Sound Pressure Levels
ANSI/ASHRAE 52.1-1992	Gravimetric and Dust Spot Procedures for Testing Air-cleaning Devices Used in General Ventilation for Removing Particulate Matter
ANSI/IEEE C37.2	Electrical Power System Device Function Numbers (Seller complies with respect to device designations except that in a few cases device numbers had to be modified or added to fit Seller's needs.)
ANSI/IEEE 100	IEEE Standard Dictionary of Electrical and Electronics Terms
ANSI/NEMA MG1	Motors and Generators
ANSI/NEMA MG2	Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motor and Generators
ANSI/NFPA 12	Carbon Dioxide Extinguishing Systems
ANSI/NFPA 70	National Electrical Code (Electrical components are designed to meet the intent of this Code for Class 1, Group D, Div. 2, Hazardous area classification where appropriate.).

API 614	Special-Purpose Gear Units for Petroleum, Chemical, and Gas Industry Services
API 614	Lubrication, Shaft-Sealing, and Control - Oil Systems for Special - Purpose Applications
API 616	Gas Turbine for Refinery Services
API 650	Storage Tanks
API 670	Vibration Monitoring Systems
API 671	Special-Purpose Gear Units for Petroleum, Chemical, and Gas Industry Services
API 678	Accelerometer - Based Vibration Monitoring System
API RP11PGT	Packaged Combustion Gas Turbines
ASME PTC22	Gas Turbine Power Plants - Performance Test Codes
ASME Section VIII	ASME Boiler and Pressure Vessel Code
ASME Section IX	ASME Boiler and Pressure Vessel Code
AWS D1.1	American Welding Specification
EIA RS-232	Interface between Data Terminal Equipment and Data Communication Equipment Employing Serial Binary Interchange
IEC 34.1	Rotating Electrical Machines - Rating and Performance
IEC 34.3	Rotating Electrical Machines - Turbine Type Synchronous Machines
IEEE Std. 421	IEEE Standard Criteria and Definitions for Excitation Systems for Synchronous Machines
JIC	Hydraulic Standards for Industrial Equipment
IBC	International Building Code 2009 (Used for Wind Loads and Seismic Design)

Ambient Site Conditions:

None.

Site Requirements:

None.

State and Local Laws:

None.