PURCHASE AGREEMENT FOR TURNKEY POWER GENERATION **RE: NSOL04272015 R1.0**

SIR,

IN REFERENCE TO YOUR NEED FOR GENERATING POWER, RPCONNECT AND NOVOSOL POWER COMPANY WILL SUPPLY TURNKEY POWER GENERATORS AVAILABLE FOR IMMEDIATE DELIVERY.

WE WILL DELIVER AND INSTALL MOBILE POWER STATION USING ANY NUMBER OF GE LM2500 GAS TURBINE SYSTEMS. THEY CAN BE INITIALLY INSTALLED WITH DIESEL UNTIL A MINI-TERMINAL AND LOGISTICS CAN BE ESTABLISHED TO PROVIDE NATURAL GAS AS A CLEAN FUEL. THE GE LM2500 IS AN EXCELLENT DISTRIBUTED POWER PLANT. ALL PRODUCTS WILL BE AVAILABLE FOR OCEAN SHIPMENT WITHIN 45-DAYS OF CONTRACT COMPLETION, THEY CAN BE DELIVERED IN 90-DAYS, THEN COMMISSIONED AND PRODUCING POWER WITHIN 15 TO 20 DAYS AFTER ARRIVAL AT SITE. WE WILL ALSO PROVIDE TURNKEY, THE BALANCE PLANT ELECTRICAL AND FUEL TURMINAL AND FUEL SUPPLY MANAGEMENT SYSTEMS.

MULTIPLE GAS TURBINES CAN BE SYNCHRONIZED INTO A "MICRO" GRID OR AS REDUNDANT BACKUP POWER AND MORE UNITS CAN BE ADDED AS THE POWER NEEDS OF THE FACILITIES GROWS. YOU ADD AS THE NEED INCREASES.

RPCONNECT NOVOSOL WILL PROVIDE WITH THE EQUIPMENT, THE CONSTRUCTION, INSTALLATION AND COMMISSIONING SERVICES. THEY WILL ENSURE CONTINUING PERFORMANCE AND RELIABLE OPERATION OF THE ENTIRE POWER NETWORK. WEWILL TRAIN PERSONNEL AND LOCALS THAT THE SITES ARE SELF SUFFICIENT IN OPERATIONS AND MAINTENANCE.

ALL UNITS WILL BE OUTFITTED WITH TELEMETRICS TO ENSURE CONSTANT REMOTE MONITORING AND CONTROL PLUS OUT OF PERFORMANCE DISPATCH SERVICE CAPABILITY TO MAXIMIZE THE UNIT UPTIME AND PEAK PERFORMANCE.

WE LOOK FORWARD TO DELIVERING ON OUR PROJECTS AND ESTABLISHING A MODERN POWER SOLUTION THAT WILL EXPAND ACROSS THE WIDE SPECTRUM OF YOUR OPPORTUNITIES.

PLEASE NOTE THAT WE HAVE BEEN OFFERED 2 UNITS OF NEW GE TM2500 POWER GENERATORS, FOR IMMEDIATE DELIVERY WITH FULL WARRANTY. WE WILL REQUIRE $500,000 DEPOSIT PER UNIT TO SECURE THE UNITS.

PRICING AND AVAILABILITY ARE SUBJECT TO PRIOR SALE, ALL PRICING IS VALID FOR 21-DAYS.

REGARDS,

ROBERT H BUCHER
NOVOSOL POWER COMPANY

NOUBIKKO P. ULANDAY
CEO, RPCONNECT

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LETTER OF PURCHASE

PURCHASE PRICING (SEE ANNEX A FOR SCOPE OF SUPPLY AND ANNEX B FOR TERMS AND CONDITIONS)

PER UNIT (NOVOSOL CURRENTLY HAS 6-UNITS AVAILABLE FOR DIRECT SALE: All inclusve

TM 2500 POWER GENERATOR EQUIPMENT -	
5 MW ORC HEAT RECOVERY SYSTEM	
SYSTEM MOBILIZATION AND 1ST YEAR CONSUMABLES	
DIESEL / LNG BI- FUEL CONTROL	
LNG TRAINS, VAPORIZER AND 3000 METRIC TON STORAGE TANKS	
OPERATOR AND MAINTENANCE TRAINING PLUS DOCUMENTATION	
BALANCE OF PLANT PACKAGE (HV / MV TRANS, BREAKERS & AVR)	
INSTALLATION, COMMISSIONING AND OPERATOR TRAINING SERVICE	
DELIVERY PORT OF ENTRY PNG, OCEAN SHIPPING AND INSURANCE	
BASIC SPARE COMPLIMENT	

2 UNITS	**GE TM2500 MW COMBINED CYCLE POWER GENERATOR POWER PLANTS FOR 64 MW CONTINUOUS POWER --**	

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ANNEX A: PURCHASE TERMS & CONDITIONS

TERMS WILL BE AS FOLLOWS:

- DEPOSIT OF 10% TO SECURE TOTAL PROJECT
- 40% ON CONTRACT SIGNATURE
- 40% ON SHIPMENT
- BALANCE DUE ON ARRIVAL AT SITE
- PAYMENTS WILL BE MADE IN US-DOLLARS.
- PAYMENTS WILL BE MADE IN US-DOLLARS.
- PAYMENTS WILL BE MADE WITHIN 5-DAYS OF PRESENTATION OF INVOICE FOR THE MILESTONE.

THIS PRICE DOES NOT INCLUDE:

- IMPORT DUTIES, CUSTOM CLEARANCES AND PHI VAT OR ANY OTHER TAXES OF ANY KIND
- CONSTRUCTION, ENVIRONMENT AND OTHER PERMITS
- CONSTRUCTION PILINGS AND FOUNDATION IF IT IS NEEDED BY STUDY

CONDITIONS:
THE CUSTOMER WILL BE RESPONSIBLE TO SECURE ANY AND ALL RELEVANT INSURANCE, CONSTRUCTION AND OPERATING PERMITS FROM THE NATIONAL AND LOCAL GOVERNMENT AGENCIES AND THE CUSTOMER WILL PAY ANY AND ALL SUCH FEES. THE CUSTOMER WILL BE RESPONSIBLE FOR ANY STUDIES AND ANALYSIS IN REGARDS TO ENVIRONMENT, STRUCTURAL, SITE, GRID, ETC. BEYOND THE EQUIPMENT AND PROGRAMMING PROVIDED.

WARRANTY:
THE WARRANTY WILL BE FOR A PERIOD OF 1 YEAR OR 6000-OPERATING HOURS FROM START UP DATE. THE SUPPLIER RESERVES THE RIGHT TO USE NEW OR REMANUFACTURED SYSTEMS, SUB-ASSEMBLIES AND PARTS TO ENSURE DELIVERY AND CONTINUED OPERATION OF THE GENSET THROUGH THE WARRANTY PERIOD.

SPARE PARTS & SPARES DEPOT:
EACH UNIT SHOULD HAVE EMERGENCY SPARE PARTS; ALL UNITS MAY SHARE TOTAL SPARES COMPLIMENT. A DETAILED LIST OF SPARES SUPPLIED AND PRICES WILL BE PROVIDED PRIOR TO SHIPMENT.

OPTIONAL SERVICES:
THE CUSTOMER IS ALSO REQUIRED TO PROVIDE THE ELECTRICAL / GRID SIDE CONNECTIONS, QUALIFIED PERSONNEL AND CERTIFICATIONS OF COMPLIANCE. OPTIONAL MAINTENANCE AND OPERATIONAL SERVICE IS AVAILABLE IF REQUESTED.

SCOPE OF SUPPLY

MOBILE GAS TURBINE POWER PLANTS

No of Units	KVA	Fuel Type	Unit Model Number	Total ISO kW Delivered
2	31760	Diesel / Gas	GE LM2500 gas turbine power plant	64,000 kW

NOVOSOL proposes supply of a POWER GENSET unit, each capable of providing continuous 27 MW lpus 5 MW from the ORC heat recovery system at ISO conditions. The core of the GENSET proposed is a GE TM2500 Aero-derivative turbine generator that are configured to operate on multi-fuels; Diesel, Kerosene, Propane, LNG, etc or a mixture as locally available. The TM2500 GENSET is coupled with a synchronous GE generator providing continuous power at 13.8 KV at 60Hz.

- Power Generation System
  - Base load outputs on gas at 90 degree F inlet is 27 MW
  - Primary: Exhaust and Inlet, Turbine, Generator, Switchgear.
  - Auxiliary Hydraulic Starter, Lube oil coolers, Control and Battery Room.
  - Diesel fuel connection point / Duel fuel options
  - Black start generator
  - High Voltage connection point to 115 KV substation at site
  - On board ACB and Control Room.
  - 85 dBa at 1 meter.
  - Permanent Mount
  - Small Site footprint, 78m x 21m. (235ft x 64ft)

- Turbine Power System
  - 36.7% efficient w/ heat rate of 9,280 BTU/KWH
  - 13.8kV (60Hz)
  - Air cooled Generator with brushless excitation, Class 1, Group D, Division 2
  - ISO Rated at 32550 kVA, 13.8 kV

- ORC heat ecovery and power generation
  - Exhaust hear turbine power up to 5 MW
  - Multi-units in parallel
  - 13.8kV (60Hz)

- fuel storage and supply
  - Natural gas fuel receipt, pumping stations, insulation and controls, control equipment and sensors and piping
  - 200 m3 storage tanks
  - 100% for 10-day peak time storage
  - Truck or sea based supply logistics

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GAS TURBINE

Customer Data

- Fuel Gas supply pressure is 2723 kPa at a rate of 264 MIL MJ/hr.
- Water (for NOx suppression): Minimum supply pressure is 100 kPa up to 100 lpm (max.)
- Inlet/Exhaust Air
- Nominal inlet air flow 4250 m3
- Exhaust stack height is 6 m when fully assembled
- Emissions: Gas Fuel: 25 ppm NOx with water injection
- Emissions: Liquid Fuel: 42 ppm NOx with water injection
- Noise: Approximately 85 dBa
- Waste: Lubricating oils (turbine & generator) and Turbine wash detergent and rinse water

Customer Responsibility

- Site acquisition, permits and preperation
- All foundations, civil works and facilities for equipment operations as required
- Front Loader, Telescopic Boom, 20 MT crane and 3 MT fork-lift to support installation
- Any and all extra enclosures for personnel, spare parts and auxilliaries
- any multi-genset piping, valving and cabling.
- any service water systems & deminearlized water systems

The power units are designed to operate in low level elevation site conditions, a high temperature and humidity climate with moderate dust load in the air intakes. All unit operations are based on manufacturers documentation for new or remanufactured performance.

Exclusions

NOVOsol has not made any provision in this proposal for any environmental impact study or permits. Any national or local studies or permits required shall be the responsibility of the customer. NOVOsol will provide the spare parts required for the continued operation of the GENSET based on a minimum of 24-hours GENSET unit downtime per event. Detailed list of spares supplied will be provided prior to shipment.

Project Engineering & Installation crew

Following initial payment, the customer will be provided with design drawings that will provide sufficient details of systems, equipment, auxiliaries and site preparations required to make the projects functional. NOVOsol installation crew is estimated per unit as follows: est. 8 – 12 laborers, 4 skilled mechanics, 2 high voltage electricians and 2 relay technicians. All site excavation labor and preparation equipment at customer cost.

Schedule & Delivery

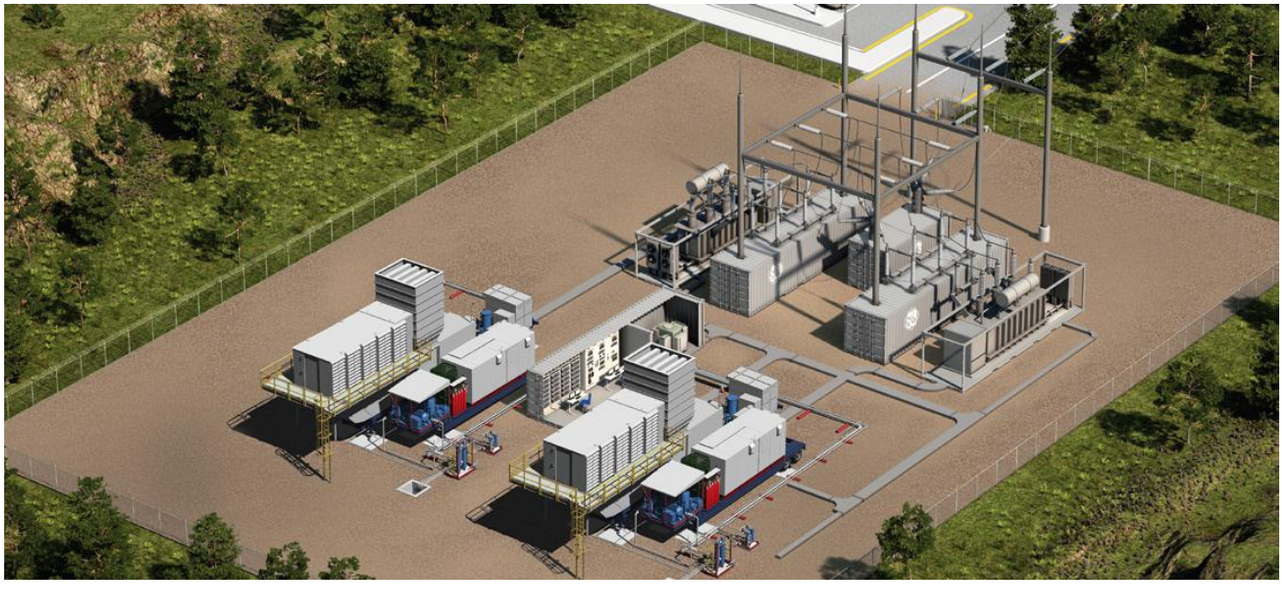
Delivery time will be ten to twelve weeks counted from firm Purchase order, Financing arrangements and Down Payment to the delivery confirmation. Products are delivered FOB port of entry PNG. Current earliest commissioning date given 2015 contract on equipment: June - August 2015

Training:

Product Training of the customer technicians for four (4) operations and maintenance is included, for two (2) weeks following commissioning of the GENSET. Training will be by GE TM 2500 trainers, on-site with cost of travel and lodging to be supplied by the customer.

INSTALLATION EXAMPLES

TM 2500 PACKAGED TURBINE, GENERATOR, 13.8 KV TRANSFORMER AND INTEGRATED CONTROL ROOM.



TM 2500 WITH BOP ELECTRICAL PACKAGES DISTRIBUTION, SWITCHGEAR, BREAKERS AND AVR FOR TWO (2) UNITS

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ANNEX B: MOBILE LM/TM2500 SCOPE OF SUPPLY & SYSTEM CONFIGURATION

THE FOLLOWING EQUIPMENT AND SERVICES ARE INCLUDED IN THE SCOPE OF SUPPLY:

MAIN TRAILER

THIS IS A MODULAR SYSTEM THAT CONSISTS OF A MAIN TRAILER, AIR FILTER TRAILER, EXHAUST SILENCER TRAILER, AND AN AUXILIARY TRAILER. THE MAIN TRAILER CONTAINS A GENERAL ELECTRIC TURBINE ENGINE (MODEL LM2500), SWITCHGEAR, AND AN AIR-COOLED GENERATOR CONNECTED THROUGH AN ENGINE-GENERATOR COUPLING. THE TURBINE ENGINE IS EQUIPPED TO OPERATE ON NATURAL GAS OR LIQUID FUEL (DUAL FUEL UNIT).

AUXILIARY EQUIPMENT TRAILERS

SUPPLIED WITH THE TRAILER MOUNTED LM2500 SET ARE THREE SUPPORT TRAILERS THAT CONTAIN THE AIR FILTRATION AND EXHAUST EQUIPMENT, FUEL SYSTEMS, LUBRICATING SYSTEMS, FIRE PROTECTION EQUIPMENT, WATER WASH, WATER INJECTION, AND FOGGING SYSTEMS. ALL INTERCONNECTIONS BETWEEN INDIVIDUAL TRAILERS ARE INCLUDED. THESE TRAILERS ARE CONFIGURED AS FOLLOWS:

AIR INLET FILTER TRAILER

CONTAINS THE COMBUSTION AND VENTILATION AIR FILTRATION EQUIPMENT. INCLUDES HIGH-EFFICIENCY BAG FILTERS, VENTILATION FANS AND INTAKE SILENCERS. INLET DUCTING WILL HAVE EXPANSION CAPABILITY TO ALLOW FOR ADDITIONAL SILENCING.

EXHAUST SILENCER TRAILER

CONTAINS THE COMBUSTION EXHAUST SILENCER EQUIPMENT, INCLUDING AN EXPANSION JOINT, TRANSITION, SILENCER ELBOW, AND STACK WITH STANDARD EMISSION MEASUREMENT PORTS.

EXHAUST DUCTING WILL HAVE EXPANSION CAPABILITY FOR ADDITIONAL SILENCING AND HAVE A FLANGE DESIGNED FOR DEFLECTOR ASSEMBLY. AUXILIARY TRAILER CONTAINS THE CONTROL HOUSE, LUBE OIL COOLER, HYDRAULIC SYSTEM, WATER WASH SYSTEM, WATER INJECTION SYSTEM, NATURAL GAS FILTER AND FIRE PROTECTION SYSTEM.

Trailer	Main	Auxiliary	Inlet	Exhaust
Dimensions (LWH)	60'0" x 10'6" x 13'8"	48'0" x 10'6" x 13'6"	48'0" x 8'6" x 13'6"	48'0" x 8'6" x 13'6"
Weight (lbs.)	135,000	50,000	50,000	40,000
Profile	Gas Turbine, Generator, Lube Oil Systems	Control System, MCC, Switchgear, Circuit Breaker, Back-up Batteries	Breaker, Back up Batteries Filtration System, Inlet Fogging System	Exhaust Stack and Silencer

Support System Equipment

The packaging of the Trailer mounted LM2500 set includes a turbine generator control panel, digital generator protection relay system, 400-V motor control center and a 24 and 125-VDC battery system including battery racks and chargers. This equipment is contained in the control house located on the auxiliary trailer.

Turbine Generator Control System

The turbine generator control and monitoring system regulate the lubrication, fuel supply, ventilation, cooling, fire safety and maintenance functions. Fuel supply is regulated by a computerized fuel control and sequencer system. The control system monitors all operating conditions and initiates alarms and shutdowns. Manual shutdown can be initiated.

ENGINE/GENERATOR MOUNTING

MAIN TRAILER

THE TURBINE ENGINE IS MOUNTED TO A WELDED SUPPORT PLATFORM THAT IN TURN, IS INDEPENDENTLY MOUNTED TO THE FORWARD HALF OF THE MAIN TRAILER. DRY COUPLED TO THE ENGINE, THE GENERATOR IS MOUNTED DIRECTLY TO THE REAR HALF OF THE TRAILER. THIS ARRANGEMENT ENABLES ENGINE/GENERATOR SHAFT ALIGNMENT TO BE ADJUSTED AT THE ENGINE PLATFORM, WHILE THE GENERATOR REMAINS FIXED. A WEATHERPROOF, SOUND-DEADENING ENCLOSURE HOUSES THE ENGINE, WHICH CAN BE REMOVED FOR ENGINE REMOVAL. THE AIR-COOLED GENERATOR IS ENCLOSED, AND ITS VENTILATION AIR FILTER BOX IS MOUNTED ON TOP OF THE HOUSING. THE LM2500 GAS TURBINE ENGINE IS THE PRIME MOVER IN THE TRAILER MOUNTED LM2500 GENERATOR SET. THIS ENGINE IS A TWO-SHAFT DESIGN WITH THE GAS GENERATOR SEPARATE FROM THE POWER TURBINE STAGE. THIS DECOUPLED DESIGN ALLOWS THE POWER TURBINE TO OPERATE AT A CONTINUOUS SPEED OF 3,600 RPM, REGARDLESS OF THE GAS GENERATOR SPEED. THE TORQUE DEVELOPED IN THE AERODYNAMICALLY COUPLED POWER TURBINE IS DIRECTLY TRANSFERRED TO THE ROTOR OF THE ALTERNATING CURRENT (AC) GENERATOR THROUGH A FLEXIBLE DIAPHRAGM COUPLING. THE AC GENERATOR OPERATES AT A SYNCHRONOUS SPEED OF 3,600 RPM, ELIMINATING THE NEED FOR A SPEED-REDUCING GEARBOX DURING SIMPLE-CYCLE OPERATION.

AC GENERATOR

THE TRAILER MOUNTED LM2500 SET FEATURES A GENERATOR, WHICH IS A TWO BEARING MACHINE EQUIPPED WITH A BRUSHLESS ROTATING EXCITER AND A PERMANENT MAGNET GENERATOR (PMG) ON THE NON-DRIVE END. THE AC GENERATOR OPERATES AT A SYNCHRONOUS SPEED OF 3,600 RPM AND CONTINUOUSLY SUPPLIES AN OUTPUT VOLTAGE OF 13.8 KV AT A FREQUENCY OF 60HZ AND AN 85% POWER FACTOR (PF). INCLUDES A GENERATOR BREAKER WITH 40,000 AMP INTERRUPTING CAPACITY. THE GENERATOR IS DESIGNED FOR OUTDOOR USE.

COUPLING

THE POWER TURBINE FLANGE OF THE LM2500 TURBINE ENGINE IS DIRECTLY COUPLED TO THE GENERATOR ROTOR SHAFT WITH A DISK-TYPE, DRY-DIAPHRAGM COUPLING. THE COUPLING CONSISTS OF A HOLLOW CENTER SHAFT, WHICH CONNECTS TO

THE TURBINE SHAFT HUB AND THE GENERATOR ROTOR SHAFT HUB BY MEANS OF DIAPHRAGM PACKS MADE FROM THIN METAL DISKS THAT HAVE BEEN STACKED AND RIVETED TO A GUARD PLATE. THE ENTIRE ASSEMBLY HAS BEEN DRILLED AROUND THE OUTER DIAMETER TO ACCEPT THE COUPLING HUB BOLTS. THE INNER DIAMETER OF THE DIAPHRAGM PACK HAS BEEN CLAMPED TO THE COUPLING CENTER SECTION BY BACKING RINGS.
THE DIAPHRAGM PACKS FLEX SLIGHTLY TO ABSORB VIBRATION AND SOME OF THE STRESSES ASSOCIATED WITH A VARYING LOAD. THE COUPLING HUBS AND CENTER SECTION HAVE BEEN DYNAMICALLY BALANCED AT THE FACTORY TO ELIMINATE VIBRATION AND THEN MATCH MARKED TO ENSURE PROPER ASSEMBLY.

TURBINE LUBE OIL SYSTEM

THE LM2500 TURBINE IS LUBRICATED BY A 150-GALLON INTERNAL PUMP AND LUBRICATION SYSTEM. AN EXTERNAL LUBE OIL SYSTEM IS PROVIDED TO FILTER, COOL, AND DE-AERATE THE LUBE OIL DISCHARGED FROM THE INTERNAL SYSTEM. THE EXTERNAL SYSTEM IS FED BY A SCAVENGE PUMP, WHICH IS DRIVEN BY THE TURBINE ACCESSORY GEARBOX WHENEVER THE TURBINE GAS GENERATOR IS ROTATING. INSTRUMENTS AND CONTROLS LUBE OIL PRESSURES AND TEMPERATURES AT CRITICAL POINTS ARE DISPLAYED ON EXTERNALLY MOUNTED INSTRUMENTS THAT PERMIT BOTH LOCAL AND REMOTE OBSERVATIONS. GAUGES AND PRESSURE SWITCHES IN THE SYSTEM HAVE BEEN INSTALLED WITH A NEEDLE VALVE IN THE INSTRUMENT SENSING LINE TO PERMIT REPLACEMENT AND CALIBRATION WITHOUT DISTURBING THE LUBE OIL FLOW. THE SYSTEM PIPING HAS BEEN PROVIDED WITH MANUALLY OPERATED BALL VALVES TO ISOLATE COMPONENTS FOR REPAIRS AND MAINTENANCE.

GENERATOR LUBE OIL SYSTEM

THE LUBE OIL SYSTEM PROVIDES PRESSURIZED LUBRICATION TO THE GENERATOR BEARINGS. THE MAJOR COMPONENTS OF THE LUBRICATION SYSTEM ARE AS FOLLOWS:

- LUBE OIL STORAGE RESERVOIR, 150 GALLON CAPACITY
- GENERATOR-DRIVEN LUBE OIL PUMP
- DC MOTOR-DRIVEN AUXILIARY LUBE OIL PUMP
- GENERATOR LUBE OIL HEAT EXCHANGER
- LUBE OIL FILTER ASSEMBLY

GENERATOR-DRIVEN LUBE OIL PUMP

THE GENERATOR ROTOR SHAFT DIRECTLY DRIVES THIS PUMP, MOUNTED TO THE EXCITER END OF THE GENERATOR HOUSING, AND SUPPLIES LUBE OIL TO THE BEARINGS AT THE NORMAL OPERATIONAL SHAFT SPEED (3,600 OR 3,000 RPM). BECAUSE ITS EFFICIENCY DECREASES AT LOWER SHAFT SPEEDS, AN AUXILIARY PUMP TO ENSURE ADEQUATE LUBRICATING OIL FLOW DURING STARTUPS AND SHUTDOWNS MUST SUPPLEMENT THE PUMP. THE AUXILIARY LUBE OIL PUMP SUPPLIES OIL TO THE GENERATOR BEARINGS FOR THE FIRST 5 MINUTES OF STARTUP, DURING SHUTDOWNS, AND IN CASE OF GENERATOR-DRIVEN PUMP FAILURE. THIS PUMP IS DRIVEN BY A 2-HP, 125VDC, MOTOR, AND IS CONTROLLED BY THE TURBINE SEQUENCER IN THE TCP. THE SEQUENCER MONITORS THE LUBE OIL SYSTEM PRESSURE AND GENERATOR SHAFT SPEED, AND ACTIVATES THE AUXILIARY PUMP DURING GENERATOR STARTUPS, SHUTDOWNS, AND ANY OTHER TIME THAT THE LUBE OIL PRESSURE DROPS TO 12 PSIG. AN ALARM SOUNDS SHOULD THE AUXILIARY PUMP ACTIVATE WITH THE GENERATOR TURNING AT NORMAL OPERATING SPEED. INSTRUMENTS AND CONTROLS EACH GAUGE AND PRESSURE SWITCH HAS BEEN INSTALLED WITH A NEEDLE VALVE IN THE SENSING LINE TO PERMIT REPLACEMENT AND CALIBRATION WITHOUT DISRUPTING OIL FLOW. MANUALLY OPERATED BALL VALVES HAVE BEEN PROVIDED TO ISOLATE COMPONENTS FOR REPAIRS AND MAINTENANCE.

FUEL INJECTION SYSTEM

SYSTEM CONFIGURATION AND SYSTEM COMPONENTS

THE TRAILER MOUNTED LM2500 GENERATOR SET OPERATES ON GASEOUS OR LIQUID FUEL. THE SUPPLY SYSTEMS INCLUDE ENGINE COMPONENTS AND OFF-ENGINE COMPONENTS AND PIPING. IN THE GASEOUS FUELS SYSTEM, BALL VALVES HAVE BEEN INSTALLED TO ISOLATE THE PRESSURE CONTROL AND PRESSURE MONITORING COMPONENTS FOR REPAIR AND REPLACEMENT. THE TURBINE GENERATOR ELECTRONIC-CONTROL SYSTEM CONTROLS THE VALVES THAT REGULATE THE SUPPLY OF GASEOUS FUEL. UNDER CONTROL OF THE FUEL SEQUENCER SOFTWARE AND HARDWARE, ELECTRICALLY ACTUATED FLOW CONTROL VALVES METER GAS FUEL INTO THE COMBUSTOR VIA THE GAS MANIFOLD. THE GAS FUEL SYSTEM CONTROLS CUSTOMER SUPPLIED GAS FUEL FOR APPLICATION TO THE TURBINE COMBUSTOR VIA THE PRIMARY GAS MANIFOLD CONNECTED TO THE FUEL NOZZLES. GAS FUEL MUST MEET FUEL QUALITY REQUIREMENTS. THIS SYSTEM RECEIVES CUSTOMER PROVIDED GASEOUS FUEL AT THE MAXIMUM RATE OF 250 MMBTU PER HOUR, AT PRESSURES BETWEEN 365 AND 405 PSIG, AND TEMPERATURES NOT EXCEEDING 250 F. THE GAS IS PRE-FILTERED TO 3 MICRON. THE FUEL-METERING VALVE IS INSTALLED WITH AN ELECTRICALLY CONTROLLED, PROPORTIONAL ACTUATOR THAT IS CONTROLLED BY SIGNALS FROM THE TCP. THE FUEL-METERING VALVE IS A ROTARY SLEEVE-AND-SHOE THROTTLING VALVE. THE METERING PORT AREA IS DETERMINED BY INPUT SHAFT POSITIONING FROM THE ACTUATOR. THE VALVE IS SPRING-LOADED TO THE MINIMUM FUEL DIRECTION, SO THAT LOSS OF

SIGNAL AND LOSS OF POWER SITUATIONS WILL CAUSE A FUEL SHUTDOWN. THE VALVE IS CAPABLE OF METERING 50-40,000 PPH OF NATURAL GAS. THE FUEL-METERING VALVE ACTUATOR IS AN ELECTRICALLY CONTROLLED DEVICE. IN THE ACTUATOR, A TORQUE MOTOR SERVO VALVE IS ENERGIZED BY THE ELECTRIC CONTROL (FROM THE TCP) TO GENERATE A PRESSURE DIFFERENTIAL APPLIED TO OPERATE THE SPOOL VALVE. SUPPLY PRESSURE IS REGULATED BY THE SPOOL VALVE TO MOVE A DOUBLE ACTING SERVO PISTON AND PROVIDE TERMINAL SHAFT OUTPUT. INTERNAL MECHANICAL FEEDBACK IS STANDARD; THE SYSTEM ALSO USES THE ELECTRICAL POSITION FEEDBACK TRANSDUCER FOR FAIL-SAFE OPERATION.

WATER SYSTEMS

TURBINE WATER WASH SYSTEM OPTIMAL PERFORMANCE IS ACHIEVED BY PERIODICALLY CLEANING COMPRESSOR STAGES OF THE GAS TURBINE. THE WATER WASH SYSTEM PROVIDES FOR WASHING THE TURBINES WHEN THE TURBINE HAS BEEN SHUT DOWN FOR MAINTENANCE (OFF-LINE WATER WASHING). OFF-LINE WATER WASHING MAY NOT BE INITIATED UNTIL ENGINE SURFACE TEMPERATURE IS <200 F.

EXHAUST COLLECTOR DRAINS FLAMMABLE LIQUIDS AND WATER WASH SOLUTION THAT ACCUMULATE IN THE TURBINE EXHAUST COLLECTOR. THE EXHAUST COLLECTOR DRAIN SYSTEM ELIMINATES THESE ACCUMULATIONS TO ENSURE SAFE STARTS. A FLEXIBLE DRAIN LINE ROUTES ACCUMULATION FROM THE COLLECTOR TO THE FUEL DRAIN LINE THROUGH PNEUMATICALLY OPERATED DRAIN VALVE.

HYDRAULIC START SYSTEM

THE HYDRAULIC START SYSTEM TURNS THE ENGINE AND IS CAPABLE OF STARTING IT FOR FUEL PURGING, WATER WASHING, AND CONDUCTING MAINTENANCE. THE HYDRAULIC START UNIT IS LOCATED ON THE AUXILIARY TRAILER AND CONSISTS OF A RESERVOIR, FILTERS, HEAT EXCHANGER, CHARGE PUMP AND MOTOR, COOLER PUMP AND MOTOR, AND ELECTRICALLY OPERATED VALVE PROVIDING PRESSURIZED HYDRAULIC FLUID TO THE VARIABLE-DISPLACEMENT PUMP, AND A HYDRAULIC STARTER MOTOR MOUNTED ON THE STARTER DRIVE PAD OF THE TURBINE AUXILIARY GEARBOX. THIS HYDRAULIC STARTER MOTOR TURNS THE ENGINE. TWO OPERATING SPEEDS ARE PROVIDED: A LOW SPEED FOR WATER WASHING AND MAINTENANCE, AND A HIGH SPEED FOR TURBINE STARTING AND FUEL PURGING. ENGINE SPEED CAN BE CONTROLLED FROM THE TCP. LOCAL GAUGES ALLOW FOR MONITORING OF THE HYDRAULIC CHARGE PUMP AND MAIN SYSTEM PRESSURES, AND FLUID LEVELS. HYDRAULIC FLUID IS STORED IN A 40-GALLON STAINLESS STEEL TANK EQUIPPED WITH SIGHT LEVEL GAUGE AND THERMOMETER; LOW-TEMPERATURE SWITCH; FLUID LEVEL SWITCH; THERMOSTATICALLY CONTROLLED IMMERSION HEATERS; AND A 200-MESH, HYDRAULIC PUMP SUCTION STRAINER WITH AN INTEGRATED BYPASS VALVE. THE HYDRAULIC START CHARGE PUMP REPLENISHES LOST FLUIDS IN THE HYDRAULIC PUMP CASE AND IN THE MAIN PUMP, CLOSED-LOOP HYDRAULIC SYSTEM.

COMBUSTION AND VENTILATION AIR SYSTEM

THE COMBUSTION AND VENTILATION AIR SYSTEM OF THE TRAILER MOUNTED LM2500 GENERATOR SET SUPPLIES FILTERED COMBUSTION AIR FOR TURBINE ENGINE OPERATION AND FILTERED VENTILATION AIR FOR THE TURBINE ENCLOSURE. THE TRAILER-MOUNTED AIR FILTER MODULE SUPPLIES COMBUSTION AIR TO THE GAS TURBINE AND VENTILATION AIR TO THE TURBINE ENCLOSURE. THE AIR FILTER TRAILER IS EQUIPPED WITH MOISTURE ELIMINATORS, PRE-FILTER PADS, BAG FILTERS, AND VENTILATION FANS. THE VENTILATION FANS FORCE FILTERED AIR INTO THE TURBINE COMPARTMENT FOR VENTILATION AND COOLING PURPOSES. THE GAS TURBINE ENGINE DRAWS FILTERED AIR FROM THE AIR FILTER TRAILER FOR TURBINE COMBUSTION WHILE VENTILATION FANS IN THE AIR FILTER TRAILER FORCE VENTILATION AIR INTO THE TURBINE ENCLOSURE. THE AIRFLOW IS PROVIDED AS TWO DISCRETE STREAMS: ONE STREAM PROVIDES 120,000-SCFM AIRFLOW FOR THE COMBUSTION IN THE TURBINE ENGINE; THE OTHER PROVIDES 30,000-SCFM AIRFLOW FOR TURBINE COMPARTMENT VENTILATION. FIRE CONTROL SYSTEM, A CO2 ACTUATED DAMPER IN THE VENTILATION EXHAUST SILENCER ASSEMBLY HELPS TO EXTINGUISH FIRES AND PREVENT GAS EXPLOSIONS. SHOULD A FIRE OCCUR, THE DAMPER AUTOMATICALLY SEALS THE TURBINE ENCLOSURE, TERMINATING THE OXYGEN FLOW REQUIRED FOR COMBUSTION. THE FIRE SUPPRESSION AND GAS DETECTION SYSTEM FOR THE TRAILER MOUNTED LM2500 GENERATOR SET MONITORS THE TURBINE ENGINE ENCLOSURE FOR THE PRESENCE OF FIRE AND ACCUMULATION OF COMBUSTIBLE GAS. CARBON DIOXIDE (CO2) IS USED AS THE FIRE-EXTINGUISHING AGENT FOR THE MAIN TRAILER FIRE SUPPRESSION AND GAS DETECTION SYSTEM CONSISTING OF A PROGRAMMABLE MICROPROCESSOR CONTROLLED PANEL THAT RECEIVES INPUTS FROM THERMAL SPOT DETECTORS, COMBUSTIBLE GAS DETECTORS, AND MANUAL RELEASE STATIONS.

VIBRATION MONITORING SYSTEM

A VIBRATION MONITORING SYSTEM SHALL BE INSTALLED IN CUBICLE 2 OF THE TCP TO NOTIFY THE OPERATOR OF EXCESSIVE VIBRATION IN THE TURBINE ENGINE AND GENERATOR. THE SYSTEM COMPRISES OF SIX VIBRATION-

MONITORING ELEMENTS AND AN INSTRUMENT RACK WITH BUILT-IN POWER SUPPLY RELAYS, AND FOUR VIBRATION-MONITORING INSTRUMENTS.

GENERATOR EXCITATION AND REGULATION SYSTEM

THIS SYSTEM PROVIDES THE POWER REQUIRED TO RAISE THE GENERATOR OUTPUT VOLTAGE TO RATED LEVEL DURING STARTUPS AND TO MAINTAIN THIS OUTPUT DURING FLUCTUATING LOAD CONDITIONS IN THE UNIT. THE GENERATOR EXCITATION SYSTEM CONTAINS THE FOLLOWING COMPONENTS:

- BRUSHLESS ROTARY EXCITER – MOUNTED ON THE GENERATOR
- ROTATING RECTIFIER ASSEMBLY – MOUNTED ON THE GENERATOR ROTOR
- PERMANENT MAGNET GENERATOR (PMG) – MOUNTED ON THE GENERATOR
- MODULAR AUTOMATIC VOLTAGE REGULATOR (MAVR)
- EXCITATION MODE SWITCH

MOTOR CONTROL CENTER (MCC) - THE MCC DISTRIBUTES 400-VAC POWER TO MOTORS, HEATERS, AND LIGHTING CIRCUITS. THE MCC IS DESIGNED TO ALLOW AUTOMATIC OR MANUAL CONTROL OF HIGH POWER CIRCUITS USING LOW-VOLTAGE CONTROL CIRCUITS. DURING MANUAL CONTROL, POWER IS SWITCHED TO THE LOAD IMMEDIATELY. WHEN THE CIRCUIT IS UNDER AUTOMATIC CONTROL, TCP-CONTROL CIRCUITS WILL SWITCH POWER TO, OR REMOVE POWER FROM, THE LOAD WHEN SENSORS DETECT THE NEED.

ELECTRONIC CONTROL SYSTEM

THE TRAILER MOUNTED LM2500 GENERATOR SET IS OPERATED THROUGH USE OF AN ELECTRONIC-CONTROL SYSTEM. THIS SYSTEM COMPRISES COMPUTERIZED-CONTROL SUBSYSTEMS INSTALLED IN THE TCP. THE MICROPROCESSORS AND DIGITAL LOGIC CIRCUITRY IN THESE SUBSYSTEMS PROVIDE THE SPEED AND AUTONOMY OF OPERATION REQUIRED FOR SAGE, EFFICIENT OPERATIONAL CONTROL. TWO MAJOR SYSTEM COMPONENTS ARE AS FOLLOWS:
1 – SEQUENCER CONTROLS THE ORDER AND TIMING OF CRITICAL EVENTS IN THE OPERATION OF THE TRAILER MOUNTED LM2500 GENERATOR SET. IT ISSUES OPERATING COMMANDS TO THE CONTROL SUBSYSTEMS IN RESPONSE TO DATA RECEIVED FROM THE SENSORS AND DETECTORS IN THE EQUIPMENT AND TRAILER MOUNTED LM2500 SUBSYSTEMS.
2 – FUEL SUPPLY MANAGER CONTROLS THE OPERATION OF THE TURBINE FUEL SYSTEMS. THE PURPOSE OF THE FUEL MANAGER IS TO MAINTAIN A CONSTANT GENERATOR OUTPUT FREQUENCY. THE FUEL MANAGER ACHIEVES THIS GOAL BY REGULATING FUEL FLOW TO HOLD GENERATOR SPEED AT A CONSTANT 3,000 RPM UNDER ALL LOAD CONDITIONS, INCLUDING NO-LOAD, FULL-LOAD, AND LOAD-FLUCTUATING OPERATION. THE FUEL MANAGER ALSO:

- MANAGES THE MATCHING OF GENERATOR OUTPUT FREQUENCY TO THE FREQUENCY OF UTILITY POWER FOR AUTOMATIC SYNCHRONIZATION AND PARALLELING;
- CONTROLS THE ACCELERATION AND DECELERATION OF THE GAS TURBINE ENGINE BY VARYING THE FUEL FLOW; AND
- INITIATES, REGULATES, AND TERMINATES FUEL FLOWS INTO THE GAS TURBINE ENGINE.

BATTERY AND BATTERY CHARGER SYSTEMS

SEPARATE BATTERY AND BATTERY CHARGER SYSTEMS FURNISH DC POWER FOR TRAILER MOUNTED LM2500 GENSET OPERATION. TWO SEPARATE 24-VDC SYSTEMS PROVIDE BACKUP POWER FOR THE TURBINE CONTROL SYSTEM AND FIRE SUPPRESSION AND GAS DETECTION SYSTEM. A 125-VDC SYSTEM PROVIDES BACKUP POWER FOR THE DC LUBE OIL PUMPS. BATTERIES FOR THE 24-VDC SYSTEM ARE STORED ON BATTERY RACKS IN THE CONTROL HOUSE OF THE AUXILIARY TRAILER. THE BATTERIES ARE NI-CAD AND THE CONTROL HOUSE IS ADEQUATELY VENTILATED.

TESTING

THE GENERATOR IS TESTED AT THE FACTORY. UPON COMPLETION OF INSTALLATION AND START UP, THE UNIT SHALL BE TESTED TO DEMONSTRATE COMPLIANCE WITH THE PERFORMANCE, EMISSIONS, AND ACOUSTIC GUARANTEES LISTED IN THIS PROPOSAL. WE SHALL PREPARE PERFORMANCE TEST PROCEDURES AND SUBMIT THEM TO THE CUSTOMER FOR REVIEW AND APPROVAL WITH THE FINAL DESIGN DRAWINGS. THE PERFORMANCE TEST PROCEDURES SHALL INCLUDE CORRECTION CURVES AND TEST CALCULATION DETAILS. WE WILL BE RESPONSIBLE FOR PROVIDING TECHNICAL ASSISTANCE. CUSTOMER SHALL PROVIDE FUEL, OPERATIONS PERSONNEL, FIELD PERSONNEL, TESTING EQUIPMENT, AND ANY CONSUMABLES REQUIRED FOR THE PERFORMANCE TEST. CUSTOMER SHALL BE RESPONSIBLE FOR THE COST OF ALL EMISSIONS TESTING.

MANUALS

DRAWINGS, DATA AND MANUALS

The package is supplied with a customer drawing package that includes general arrangement drawings, flow and instrument diagrams, electrical one-line drawings and interconnection plan. Additional electrical schematic diagrams and logic drawings are provided for record. Operations & Maintenance manuals are provided, printed in the English language. The manuals cover operating concepts for power generating equipment, guides to troubleshooting, basic information on components, and equipment within the turbine generator set. Seven (7) hard copies and one electronic (.pdf) copy shall be provided of the Operations & Maintenance Manual. Training manuals and light-off procedures will be provided well in advance of generator set delivery to ensure adequate preparation for system checkout and light up. All data collected during component testing, system flushes, control testing and final performance testing report will be provided to the customer. The customer is welcome to witness any or all testing and development procedures during the assembly of the units. A full drawing set is included in each Operations & Maintenance Manual.

TRAINING

Standard Training includes classroom training for up to 10 customer's operators and supervisors per unit. Experienced instructors, using specially developed training materials, provide a firm groundwork of the basic theory, plus advanced concepts. Training includes Gas Turbine Familiarization plus System Design & Operations at site. Customer provides living and travel expenses for the trainers.

EXCLUSIONS / LOCAL DOMESTIC SERVICE SUPPLIER

Listed below are the limits/exclusions to the NOVOsol standard Scope of Supply, to be provided by the customer:
All piping, wiring, cables, ducts, etc. connecting to these points will be furnished by customer (others) unless modified by specification agreement. All piping, including Fuel Gas, Fuel Oil, Steam, De-mineralized water Inlet Air to filter Turbine Package Ventilation / Cooling Air Customer installed instrument wiring in Turbine Control Panel High Voltage Connections Generator Ground Connection Flanged or threaded connection on base plate at auxiliary trailer Atmosphere – non-standard duct by others Terminal Box on Baseplate Bus Bar in Line side Cubicle Neutral Cubicle Battery Terminals to Baseplates (if supplied loose) Material and Labor Furnished by Others Civil engineering design of any kind Building & civil works Site facilities All inlet, exhaust, and ventilation ducting other than included in the general scope of supply Drains and/or vent piping from the gas turbine package to a remote point Fuel storage, treatment and forwarding system. Site grounding Lighting protection Power system study Sensing and metering voltage transformers Machine power transformers, and associated protection Grid failure detection equipment Service Agreement - Per Customer Requirement Off-trailer cabling, and design of off-trailer cable routing Customer witness testing Balance of plant and energy optimization controls Anchor bolts, embedment, and grouting

Customers BOP and Field systems - Per Customer Requirement any High voltage transformer(s), cables, and associated equipment Interconnecting piping, conduit, and wiring between equipment modules Plant utilities, including compressed air supply and off-trailer piping Battery containment Lube oil measurement other than that defined in the scope of supply Additional lube oil breather ducting other than that defined in the scope of supply Fuel transfer pump Fuel for gas turbine Off-trailer fuel block and vent valves Fuel supply pipe work beyond the scope of supply Generator controls other than that defined in the scope of supply Load sharing control Balance of plant control Site labor (beyond the scope of supply) Ladders, stairs, and platforms (beyond scope of supply) Water supply and treatment by others All Permits and permitting as required No taxes or insurance No legal fees included Finance options.

MOBILE POWER INTERFACE & SPECS

- Control House / MCC / Breaker requires 480/450 V, 60 Hz, 190 kW of auxiliary power Generator output is 13.8 kV @ 60Hz, switchgear is located on Auxiliary Trailer
- Each Trailer has grounding pads
- Gaseous Fuel Supply - 395 psig @ 12,000 pph
- Liquid Fuel Supply - 30 psig @ 40 gpm

- Water Injection Supply - 15 psig @ 28 gprn (maximum) Inlet Fogging Supply - 15 psig @ 60 gpm (maximum) Inlet Air- 150,000 CFM
- Exhaust Flow - 490,000 to 550,000 lbs/hr @ 980 deg. F - dry operations
- Trailer Mounted LM2500 may be installed on crushed gravel with steel support plates or 4" concrete foundation with steel support plates. Site grade must be no greater than 6" per 100'. Emissions - 42 ppm NOx (liquid fuel with water injection), 25 ppm NOx (gaseous fuel with water injection)
- Noise - 85dba @ 3ft

INCLUDED

A. Black Start System

Includes a 600 kW diesel generator set and battery cranking system for black starts. The diesel generator provides 480 VAC power for ventilation fans, accessories and starter motor. A larger diesel generator set may be required if a natural gas fuel compressor or other special auxiliaries must be operated during the starting sequence. The black start diesel generator set is furnished in accordance with Manufacturer Diesel Generator Set Specifications.

B. Remote telemetry and Control System

Includes full access to control and monitoring equipment to allow for remote operation, maintenance and performance support. Two (redundant) systems of communications will be supported, cellular and land line.

Typical Package Specifications

This section lists the general descriptions, capacities, and capabilities for the MGTG set, including associated support systems. Specifications are subject to design review meeting and OEM availability.

Gas Turbine Engine

- Manufacturer: General Electric (GE)
- Model No. LM2500 PE
- Serial No. .See nameplate
- Type Gas turbine
- Engine Weight (Complete) 11,500 lb.
- Start System: Hydraulic, variable speed
- Normal Power Turbine Speed: 3600 rpm
- Gas Generator Speed, Maximum Rated: 9500 rpm
- AC Generator
- Manufacturer. .Brush or equiv. (BEM)
- Model No.: BDAX62-170ER
- Type: Air Cooled
- Power Factor: 85
- Voltage: 13.8 kV 60hz
- Frequency. 60 Hz 3Ø

Turbine Hydraulic Starter System

- Hydraulic Pump Manufacturer. Sauer Sundstrand
- Hydraulic Pump Model No. 905075KXINN80P45IC03GBA361024A-00-40-16575
- Hydraulic Pump Capacity: 65 gpm @ 5200 psig
- Hydraulic Starter Motor Manufacturer: Marathon
- Hydraulic Starter Motor Model No: 7K445TSTFN6520 BAW
- Hydraulic Reservoir Capacity: 40 gal
- Hydraulic Filters: 10-m _element with bypass
- Cooler Pump Manufacturer. Sundstrand
- Cooler Pump Model: SNP2/08
- Hydraulic Fluid Specification: MIL-H-17672 / ISO-VG46
- Heat Exchanger Manufacturer: Hayden
- Heat Exchanger Model. 020671

Ventilation and Combustion Air System

- Total Airflow: 150,000 scfm
- Turbine Intake; 20,000 scfm
- Turbine Compartment: 30,000 scfm

Air Inlet Filtration System

- Manufacturer: GE
- Ventilation Fan Manufacturer: TCF Aerovent
- Ventilation Fan Model No.: FTFA –06-056-3-1-42
- Pre-Filters P/N. SNP/L1127
- Bag Filters P/N SN7S/L1127

Exhaust Silencer Trailer

- Manufacturer: McGuffy
- Model No.: J04550

Gaseous Fuel System

- Input Required. 250 MMBtu/hr natural gas, filtered to 3 m _
- Supply Pressure: 365–405 psig
- Supply Temperature. 250 °F, maximum
- Filter Manufacturer: Indufil
- Filter Model No: IDGL3-7103ANSI-300IBS.RF

Gas Fuel Flow-Control Valve

- Manufacturer. Woodward
- Model No.: 8915-953

Generator Lube Oil System

- Reservoir Capacity. 150 gal
- Supply Filter Rating: 6 m, abs
- Supply Filter: Hilliard, 01518-0150-1001
- Cooling. Fin/Fan
- Heat Exchanger Manufacturer/Model: Honeywell/TT-530
- DC Lube Oil Pump Manufacturer/Model: Whitton/8005-1190
- Mechanical Pump Manufacturer/Model: IMO/ACE038N2NVBP-A101

Turbine Lube Oil System

- Reservoir Capacity: 150 gal
- Supply Filter Rating: 6 m, abs
- Supply Filter: Hilco, 01414-521401002
- Scavenge Filter Rating: 6 m, abs
- Scavenge Filter: Hilco, 01414-5211401002
- Cooling: Fin/Fan
- Heat Exchanger Manufacturer/Model No: Honeywell/TT530
- Lube Oil Specification. MIL-L-23699 or MIL-L-7808

Fire Suppression and Gas Detection System

- Manufacturer: Terra/ Wilson Fire
- Model No: WFCP8001I1RAFM20
- Fire Suppressant. CO2 system
- Thermal Spot Detectors: Two, 450 °F plus rate of rise
- Combustible Gas Detector: Three, analog, methane-detecting

Turbine Water Wash System

- Water Supply Pressure: 15–65 psig
- Tank Capacity: 40 gal
- Filter: 40 m, abs
- Detergent. Added in solution with water wash in proportions as specified by manufacturer of detergent

Control Systems

Fuel Control System

- Manufacturer. Woodward
- Model No.: Netcon 5000

Modular Automatic Voltage Regulator

- Manufacturer: FKI Rotating Machines
- Model No.: 9650114305

Integrated Generator Protection

- Manufacturer: Beckwith
- Model No.: M-3420

Vibration Monitor

- Manufacturer. AB/Bently Nevada
- Model No.: 3300

Motor Control Center

- Manufacturer: General Electric
- Model No.: 8000

Switchgear

- Manufacturer: General Electric
- Model No.: E99014

Battery System

a) 24VDC Unit Control Panel Backup

- Cell Capacity (Nominal): 323 Ah
- Cell Voltage (Nominal): 1.2 VDC
- Electrolyte: Diluted Potassium Hydroxide
- Discharge Time (Typical): 3 hr @ 101A
- Cell Type: Nickel-Cadmium
- Battery Voltage: 24 VDC
- Charger: 24 VDC @ 150A

b) 24VDC Fire Suppression and Gas Detection System

- Cell Capacity (Nominal): 56 Ah
- Cell Voltage (Nominal): 1.2 VDC
- Electrolyte: Diluted Potassium Hydroxide
- Discharge Time (Typical): 24 hr @ 2.24A
- Cell Type. Nickel-Cadmium
- Battery Voltage: 24 VDC
- Charger: 24 VDC @ 25A

c) 125VDC Switchgear Control

- Cell Capacity (Nominal): 56 Ah
- Cell Voltage (Nominal). 1.2 VDC
- Electrolyte. Diluted Potassium Hydroxide
- Discharge Time (Typical): 3 hr @ 16.9A
- Cell Type: Nickel-Cadmium
- Battery Voltage: 125 VDC
- Charger: 120 VDC @ 12A

PROJECT DESIGN AND ENGINEERING

A. ENGINEERING STUDY:

AN ENGINEERING STUDY WILL BE PERFORMED BY RPCONNECT NOVOSOL TO DETERMINE HOW THE PROJECT WILL BE PERFORMED
TO MEET THE CLIENT NEEDS, PROJECT REQUIREMENTS, FINANCIAL PROJECTIONS, POWER REQUIREMENTS, CIVIL, STRUCTURAL, GEO TECHNICAL AND M.E.P. ENGINEERING REQUIREMENTS, ALONG WITH SERVICE AND MAINTENANCE REQUIREMENTS TO PERFORM AS PROPOSED. ALL ENGINEERING, INCLUDING DOCUMENTS AND STUDIES IS THE EXCLUSIVE OWNERSHIP OF SYSTEM.

A COMPLETE DESIGN SET WILL BE PUBLISHED BY RPCONNECT NOVOSOL FOR REVIEW BY THE OWNER ON THE APPLICABILITY TO THE CONDITIONS OF THE PROJECT AND ITS SITE LOCATION. UPON WRITTEN APPROVAL OF THE OWNER THIS PROCESS WILL BEGIN AND THE DESIGN ENGINEERS WILL COMMENCE TO PERFORM THE OUTLINED SCOPE OF WORK IN THE ENGINEERING STUDY PROPOSAL. THE STUDY WILL ALLOW US TO DETERMINE AND PROVIDE:

- PROJECT OVERVIEW AND OUTLINE
- PROCESS FLOW DIAGRAM FOR EACH MAIN PROCESS UNIT
- MAJOR EQUIPMENT LIST FOR EACH MAIN PROCESS UNIT
- A SCHEDULE FOR DELIVERY OF THE EQUIPMENT
- AN ESTIMATED SCHEDULE FOR THE TOTAL INSTALLATION OF THE PROJECT
- PRELIMINARY UTILITY PROCESS FLOW DIAGRAM
- ESTIMATE OF REQUIRED ADDITIONAL EQUIPMENT
- A SCHEDULE FOR DELIVERY OF THE EQUIPMENT
- A PRELIMINARY PLOT PLAN LAYOUT
- PROCESS FLOW DIAGRAM
- ELECTRICAL POWER PRODUCTION OF THE FACILITY
- ESTIMATED FACILITY OPERATION COST
- ESTIMATED FACILITY MAINTENANCE COST

B. PROJECT SITE DESIGN AND DEVELOPMENT

RPCONNECT NOVOSOL WILL PERFORM, PRODUCE, AND SUBMIT ALL PROJECT DOCUMENTS AND PLANS FOR THE COMPLETE PROJECT AS THE FINAL PROJECT DOCUMENT PLAN WHICH WILL BE THE BASIS FOR CODE COMPLIANCE, AND COORDINATION WITH THE LOCAL AUTHORITIES HAVING JURISDICTION.

C. PROJECT SITE ENGINEERING

1. SITE / CIVIL ENGINEERING:

PROVIDE ALL SERVICES, CONSTRUCTION DOCUMENTS AND PLANS FOR THE SITE DEVELOPMENT OF THE POWER PLANT PROJECT, INCLUDING:

- DEVELOP ALL CONSTRUCTION DOCUMENTS FOR SITE DEVELOPMENT OF PROJECT.
- MEET WITH AND PROVIDE DOCUMENTS TO ALL JURISDICTIONAL AGENCIES.
- MEET WITH ALL OWNERS, CONSULTANTS, CONTRACTORS, SUB-CONTRACTORS AND AGENCIES.
- TRAVEL TO MEETINGS, JOB SITE, AND JURISDICTIONAL AGENCIES AS NECESSARY.
- PROVIDE ALL DOCUMENTATION FOR PERMITTING.

2. Structural Engineering:

Provide all structural engineering services including:

- Structural calculations and loads.
- Steel fabrication data.
- Plans and documents.
- Project management as necessary.
- Field time, travel, meetings for project requirements, etc.
- Provide all documentation for permitting.

3. Mechanical, Electrical and Plumbing Engineering:

Provide all Mechanical, Electrical and Plumbing services inclusive of the following:

- Design of waste collection system.
- Design of new storm water collection system for all buildings.
- Design of any and all aux. piping as necessary for project.
- Design of installation of new equipment.
- New plant off-take, high-voltage power distribution system and all equipment.
- Fire alarm system design (If Required)
- Low voltage control wiring system.
- Telephone, data, raceway system design.
- Design of lighting systems.
- Design of security alarm system.
- Design of fire suppression system.