

PROPOSAL

Presented To:

CVG / SIDOR

Pto Ordaz, Venezuela

**2 ea. LM 6000 – 1 Frame 7EA
Power Plant “A”**

By

DERWICK

DERWICK ASSOCIATES CORP.



Proposal No. T-1001A

January 23, 2010

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CVG / SIDOR**

Table of Contents

Section 1.0	Introduction
Section 2.0	Scope of Work and Equipment Supply Matrix
Section 3.0	Design Basis and Interconnect Points
Section 4.0	Plant Performance
Section 5.0	Drawings (Plot Plans, Electric One Line's, PFD's)
Section 6.0	Schedule

Section 1.0 Introduction

This Technical Scope Document includes the details of a nominal 175 MW power plant to be constructed adjacent to the SIDOR R2 and R3 Substations. The plant will utilize (2) GE LM6000PC Sprint and (1) GE Frame 7EA gas turbine generators with an output voltage of 13.8 Kv. The plant will be connected to the 13.8 KV bus in Substations R2 & R3.

These machines are currently configured for natural gas fuel only. However during the construction of the plant, the gas turbines will be reconfigured for Dual Fuel operation. Note: the Dual Fuel Conversion of the gas turbines is not included in the scope of this TSD.

The plant will be configured for operation on both natural gas and #2 diesel fuel. The Owner will provide natural gas supply through a pipeline to the plant boundary at a pressure of 16 bar (235 psig). Contractor will provide compressors to raise the gas pressure to meet the requirements of the gas turbines.

The Owner will provide clean diesel fuel to the plant boundary which meets the GE liquid fuel specifications. The Contractor will provide storage tanks, filtration and handling equipment to meet the requirements of the gas turbines.

The Owner will provide a sufficient supply of industrial grade water to the plant boundary. Contractor will provide a water treatment facility in the plant to insure that the water injected into the gas turbines meets the GE water specifications.

The Owner will supply all concrete and re-bar for the construction of the plant. Contractor will provide all civil designs and labor required to construct the plant.

The Contractor will provide all plant design engineering required for the civil work, mechanical, electrical and plant control.

Contractor will provide technicians to provide startup and commissioning of the plant.

Section 2.0 Equipment List - Detailed Division of Responsibility between Owner and Contractor: It is mutually understood that the 2 ea LM 6000 GTGs will have priority for installation, start-up, commissioning and operation.

Note: The Owner has purchased two (2) GE LM 6000 PC Sprint GTGs and one (1) Frame 7EA GTG for this project. These units and associated equipment are identified in the Table Below:

Material/Responsibility	Qty	Description
OWNER Provide /CONTRACTOR Install Electrical	1	<u>GE Model 7121 Frame 7EA (60Hz) Gas Turbine Generator</u> with Associated Equipment as Coming From Southaven Including:
	1	Electrical PDC Building
	1	13.8 KV 5000 amp Gas Turbine Generator Breaker NEMA 3R
	1	13.8 KV / 480 V 3000 KVA Station Service Transformer
	1	13.8 KV / 4160 V 3380 KVA Station Service Transformer
	1	4160V 800 HP Starting Motors
	1	480 V GTG MCC
	1	480 V Distribution board
		Mechanical
	1	L.O. Cooler w/cooling water fin-fans (3-50hp) & water pumps (2- 75Hp)
	1	Fuel Gas Metering
	1	Fuel Gas Module/Purge Air
	1	Fuel Gas Heaters
	1	Fuel Gas Filter/Coalescer
	1	Demin Water Inject Pump 100 hp
	1	Demin Water Filters
	1	Fogging Pump Skids
	1	Inlet Air Fogging Systems
OWNER Provide /CONTRACTOR Install	2	<u>GE LM 6000 PC Sprint (60Hz) Gas Turbine Generators</u> with Associated Equipment
	2	13.8KV 3000 Amp Gas Turbine Generator Breaker NEMA 3R
	2	-Turbine Control Panels
	2	-Generator Control Panel and Protection Panel
	2	- 24 VDC Batteries and Chargers
	sets	
	2	-125 VDC Batteries and Chargers
	sets	
		OWNER Will Provide
	1 Lot	Project Site free and clear of rock and ground water
	1 Lot	Natural Gas Fuel Tie in Point at Plant Boundary with measurement
	1 Lot	13.8 KV Utility connection immediately adjacent to Site Boundary
	1 Lot	#2 Diesel Fuel Supply Tie in Point at Plant Boundary with measurement
	1 Lot	Firewater supply (w/pumps) and feeder to site boundary
	1 Lot	Water for Commissioning and Startup
	1 Lot	Fuel Gas for Commissioning and Startup
	1 Lot	DFO for Commissioning and Startup
	1 Lot	Electrical Back Feed for Commissioning and Startup
	1 Lot	Waste Water Disposal
	1 Lot	Eight (8) Telephone Circuits to Project Site
	1 Lot	Permits for Environmental, Transportation, Building, Construction, Operations, etc.
	1 Lot	Construction & Commissioning Water and 480V three phase power

Material/Responsibility	Qty	Description
Contractor – ProEnergy EPC Responsibility	1 Lot	Concrete and Rebar for foundations
	1 Lot	Access Roads to site
	1 Lot	Import Duties and Taxes
	1 Lot	Construction lay down area (3 acres) within or adjacent to project site
	1 Lot	Transportation of Owner Equipment from the US to Site
	1 Lot	Removal of all unused building foundations, underground piping, etc. on the proposed project site
		Site will be designed by ProEnergy to be expandable to add an additional Frame 7EA and to add combined cycle to the 7EA's in the future
Civil / Structural		
	1 Lot	Site Preparation, Rough Grading, Excavation, and final grading
	1 Lot	Plant Concrete Foundations (Owner to provide concrete and rebar)
	1 Lot	Plant Paving, Gravel and Pads for Turbine and Generator
	1 Lot	Basic Architectural Treatment and landscaping
Buildings		
	1	Climitized Control Room and Office Building with attached Maintenance / Warehouse Building
	1	LM 6000 Utility Building to House 2ea TCPs, 2ea GCPs, 2ea MCCs, 2ea 24v and 125v DC Batteries and Chargers, Pumps, Sprint Pumps, Filters, etc.
	1	Fuel Gas Compressor Shed
	1	Water Treatment – Pump Building
	1	Fuel Treatment, pumps Shed and MCC Room
	1	Guard House
Mechanical		
	1	Raw water Storage Tank 500,000 gallon
	1	Demin Water Treatment System to supply Water Injection and Wash for LM 6000s and Fr 7EA
	2	100% Demin Water Forwarding Pumps
	1	Demineralized Gallon Water Storage Tanks, 350,000 Gallon each
	2	100% Demineralized Water Forwarding Pumps for Turbine Wash
	2	LM 6000 Sprint Pump Skids
	2	LM 6000 Nox Water Injection Skids
	2	LM 6000 DFO Injection Pump Skids
	2	LM 6000 DFO Filter Skids
	2	LM 6000 Demin Water Filter Skids
	1	Fr 7EA DFO Injection Pump Skid
	1	Fr 7EA Demin Water Pump Skid
	1	Oily Water Separator
	1	Waste Oil Tank, 10,000 Gallon.
	1	Waste Oil Delivery Pump
	1	Waste Water Tank, 10,000 Gallon
	1	Waste Water Delivery Pump
	1	Instrument Air Package with two compressors, receiver, filters and dryer
	1	Liquid fuel storage tank, (500,000 gallons each)
	2	Liquid Fuel forwarding Pumps
	1	Liquid Fuel Day Tank (1,000,000 gallons each)
	2	Liquid Fuel Forwarding Pumps
	1	Natural Gas ESD Valve
	2	Natural Gas Scrubbers
	2	Fuel Gas Regulator Skids
	4	350 HP 100% Capacity Fuel Gas Compressors for 2 LM 6000's
	2	800 HP 100% Capacity Fuel Gas Compressors for Fr. 7EA
	1 Lot	Firewater Distribution System, Monitors and Controls
	3	Centrifuges for Plant Liquid Fuel Treatment

Material/Responsibility	Qty	Description
Electrical		
	1	13.8KV/480V 1500 KVA Transformer (Compressors)
	1	13.8/4.16 KV 2.5 MVA Transformer (Compressors)
	1	4.16 KV MCC Compressors
	2	480 V BOP MCC
	3	480 V Distribution Board
	1 Lot	BOP 480 V / 120 V Transformers, Lights, Panels etc.
	1	UPS System for Control Room
	4	Welding Receptacles
	1	Plant Grounding Grid
	1 Lot	Lightning Protection
	1 Lot	Cathodic Protection for underground steel piping
	1 Lot	Area Lighting
I&C		
	1 Lot	Plant Instrumentation
	1	Plant DCS System
INLET AIR CHILLER OPTION (To Be Quoted Later)		
	2	Packaged Inlet Air Chiller Systems 2500 Ton Chillers with Cooling Tower for LM 6000 GTGs
	2	Inlet Air Filter Chilling Coils
	2	13.8KV / 480V 500 KVA Transformers (Chillers)
	2	13.8KV/4.160 KV 2 MVA Transformers (Chillers)
Construction		
	1 Lot	Construction Tools, Rental Equipment & Rental Cranes
	1 Lot	Temporary Power Distribution
	1 Lot	Local Subcontractor(s) Electrical & Mechanical Craft Labor
	1 Lot	Transportation of all Contractor supplied BOP equipment
	1 Lot	Construction Offices, Storage, Temporary Facilities and Utilities
	1 Lot	Lubricants, Chemicals, Filters, etc. for Plant Commissioning
	1 Lot	Balance of Plant Start up and Commissioning Spare Parts
Engineering		
	1 Lot	Conceptual and Detail Design Engineering (Total Plant)
Project Management		
	1 Lot	Project Management with Scheduling, QA/QC, safety, and training
	1 Lot	Plant Start-up, Commissioning and Testing
	1 Lot	Overall Plant Training

Section 3.0 Design Basis and Interconnect Points

3.1 Design Basis

Design Conditions

Site Elevation	Simple Cycle 2 x LM 6000 PC (Chilling Option) + 1 x Frame 7EA (Fogged) 100 ft. (30.5 m)
Air Temperature, High	95°F (35°C)
Air Temperature, Low	60°F (15°C)
Design Temperature	85°F (29.4°C)
Design Relative Humidity	75%
Wind Speed (Max)	80 mph (53 km/hr)
Gas Turbine Power	170 MW (ISO)
GTG Fuel Consumption Rate	44,170 MCFD Natural Gas
GTG Liquid Fuel Consumption Rate	217 gpm
High Voltage Interconnect	13.8 KV
Demin Water Storage	500,000 Gallon SS Tank by Contractor
Instrument Air System	185 SCFM by Contractor
Waste Oil Storage	10,000 Gallons by Contractor
Waste Water Storage	10,000 Gallons by Contractor
Raw Water Storage	500,000 Gallon CS Tank by Contractor
Raw DFO Storage	500,000 Gallon CS Tank by Contractor
Treated Fuel Storage	500,000 Gallon SS Tank by Contractor

3.2 Interconnect Points

Natural Gas at min. 235 psig	Owner to provide interconnection point to the Plant Battery Limits.
Liquid Fuel	Owner to provide pipeline and measurement at Plant Battery limits
Plant Waste Water	Plant Battery Limits.
Plant Waste Oil	Plant Waste Oil Tank.
13.8 KV	Contractors Dead End Towers from GTG Breakers near site boundary
Telephone	Plant Battery Limits.
Raw Water Supply	Plant Battery Limits.
Sanitary Sewer	Plant Septic System
Raw/Firewater Supply	Plant Battery Limits by Owner

Section 4: Plant Performance

Puerto Ordaz

A

Simple Cycle

Site Elevation

100 Feet

Design Temperature

85 F

Relative Humidity

75%

ID GTPRO

330

104

Average

	*(2) LM6000 PC SPT		(1) 7EA Fogging		Total	
	Gas Fuel	Liquid Fuel	Gas Fuel	Liquid Fuel	Gas Fuel	Liquid Fuel
Gross Power KW	89138	84897	79596	80465	168734	165362
Net Power KW	86807	83386	77423	79063	164230	162449
Aux & Losses KW	2331.4	1510.8	1173.5	1401	3504.9	2911.8
LHV Gross Heat Rate (BTU/kWh)	8695	8872	10612	11089	9653.5	9980.5
LHV Net Heat Rate (BTU/kWh)	8929	9033	10772	11286	9850.5	10159.5
LHV Gross Electric Eff %	39.24	38.46	32.16	30.77	35.7	34.615
LHV Net Electric Eff %	38.22	37.78	31.68	30.24	34.95	34.01
LHV Fuel (kBTU/h)	775087	753196	834030	892304	1609117	1645500
HHV Fuel (kBTU/h)	858105	802256	923361	950424	1781466	1752680
Fuel Gas (KPPH)	38.95	0	41.92	0	80.87	0
Fuel Gas (MMSCFD)	20.00	0.00	21.52	0.00	41.52	0.00
Liquid Fuel (KPPH)	0	41.16	0	48.77	0	89.93
Liquid Fuel (GPM)	0	95.16	0.00	112.76	0.00	207.92
Water for Nox (KPPH)	34.83	36.01	0	39.01	34.83	75.02
Water for Nox (GPM)	69.69	71.96	0.00	77.96	69.60	149.92
SPT Water (KPPH)	17.806	17.806	0.00	0.00	17.806	17.806
SPT Water (GPM)	35.58	35.58	0.0	0.0	35.58	35.58
Foggy (KPPH)	0.00	0.00	3.47	3.47	3.47	3.47
Foggy (GPM)	0	0	6.934	6.934	6.93	6.93

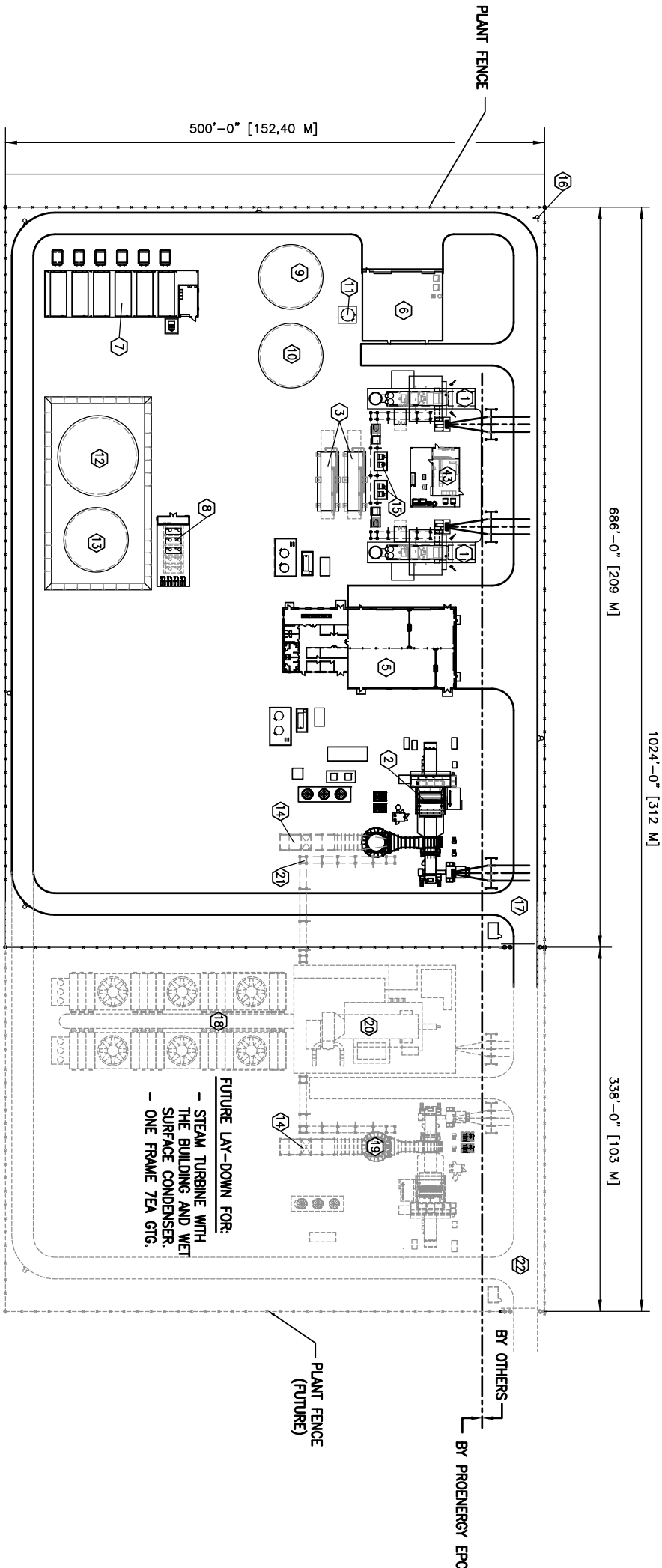
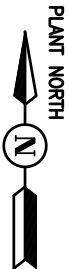
* Inlet Chilling Not Included

	GPM	GPD	3 Day	5 Day
RAW Water Total	246	354701	1064103	1773505
Liquid Fuel Total	208	299401	898204	1497007
GAS Fuel Total (MMCFD)	N/A	44.17		

Section 5: Plant Drawings

Plot Plan	1001-10-001 Sh 1
Process Flow Diagram	1001-50-001 Sh 1
Process Flow Diagram	1001-50-001 Sh 2
Process Flow Diagram	1001-50-001 Sh 3
Process Flow Diagram	1001-50-001 Sh 4
One Line Diagram	1001-60-001 Sh 1
One Line Diagram	1001-60-001 Sh 2



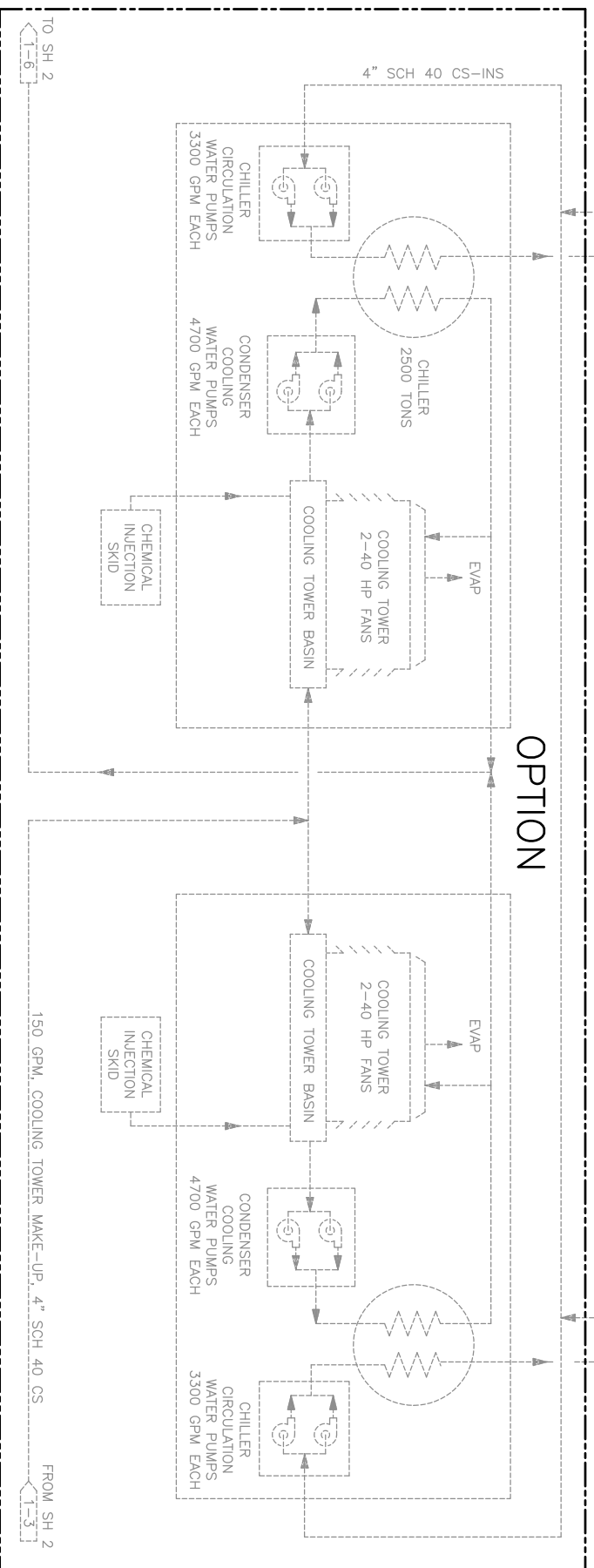
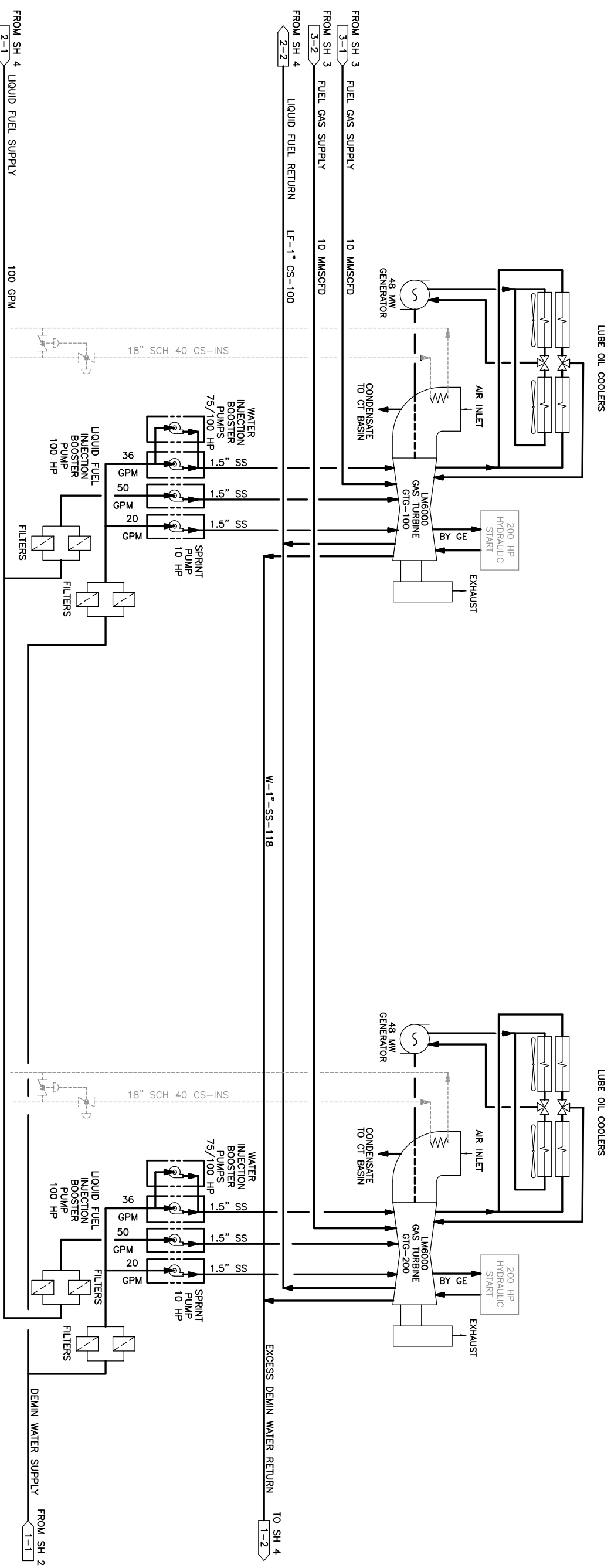


- LEGEND:**
- 1 G.E. LM-6000 GAS TURBINE GENERATOR.
 - 2 G.E. FRAME 7EA GAS TURBINE GENERATOR.
 - 3 AIR INLET CHILLER PACKAGE.
 - 4 UTILITY BUILDING.
 - 5 CONTROL/OFFICES/WAREHOUSE BUILDING.
 - 6 WATER TREATMENT BUILDING.
 - 7 GAS COMPRESSORS WITH SHED, FIN FANS, AND MCC ROOM.
 - 8 CENTRIFUGE PACKAGE.
 - 9 RAW WATER TANK.
 - 10 DEMIN WATER TANKS.
 - 11 R.O. WATER TANK.
 - 12 RAW DIESEL FUEL TANK.
 - 13 TREATED FUEL TANK.
 - 14 HRS6 (FUTURE).
 - 15 AUXILIARY TRANSFORMERS.
 - 16 LIGHTING POLES.
 - 17 ROAD.
 - 18 WET SURFACE CONDENSER (FUTURE).
 - 19 G.E. FRAME 7EA (FUTURE).
 - 20 STEAM TURBINE GENERATOR WITH BUILDING (FUTURE).
 - 21 PIPE RACKS (FUTURE).
 - 22 ROAD (FUTURE).



GRAPHIC SCALE

REVISED		CUSTOMER INFORMATION				DERWICK ASSOCIATES S.A.			



REVISED	CUSTOMER INFORMATION
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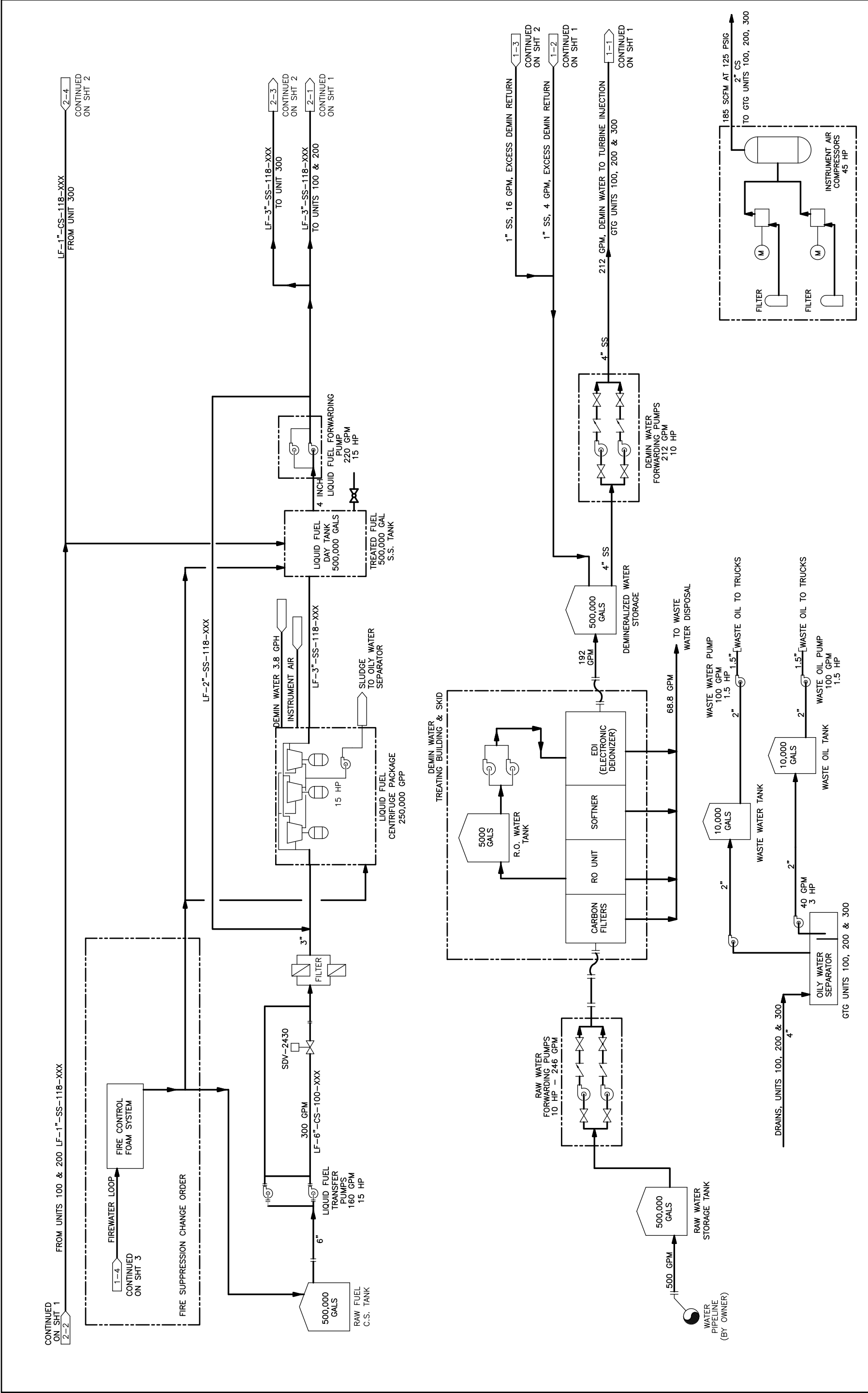
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ProEnergy EPC Services, LLC			
PROCESS FLOW DIAGRAM			
TWO LM-6000 & ONE FRAME 7EA			
CVG POWER PLANT A			
SICOR	DWG NO.	SH NO.	VENUEZUELA
JOB. NO.		REV	

SUDOK		VENEZUELA	
JOB. NO.	DWG. NO.	SH NO.	REV



REVISED										CUSTOMER INFORMATION										PROCESSED										PROENERGY EPC SERVICES, LLC																																																																																									
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ProEnergy EPC Services, LLC

PROCESS FLOW DIAGRAM

TWO LM-6000 & ONE FRAME 7EA GTG UNITS

CVG POWER PLANT A

SIDOR

JOB NO.

T1001

DWG NO.

1001-50-001

SH NO.

4

REV

A

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ProEnergy EPC Services, LLC

ONE LINE DIAGRAM
TWO LM-6000 & ONE FRAME 7EA GTG UNITS
CVG POWER PLANT A

JOB. NO.	DWG NO.	SH NO.	REV
T1001	1001-60-001	1	A

Section 6.0 Schedule

CVG Steel mill
T1001 Timeline for Plant "A"
1-Frame 7EA and 2-LM6000

