

PROPOSAL

Presented to:

Pacific Rim de Venezuela

For

EPC Balance Of Plant



By



Proposal No. EPC08-1337

June 12, 2008

<p>This document is privileged and contains confidential information intended for use only by Pacific Rim de Venezuela.</p>

1.0 Introduction

ProEnergy EPC Services (ProEnergy) proposes to provide engineering, design, procurement, transportation of equipment and material including (6) Pratt & Whitney FT-4 Gas Turbine Generators complete with Balance of Plant equipment delivered from the United States to the local Venezuelan port.

The attached Technical Proposal is in response with your request. It describes what will be supplied by ProEnergy. Our overall objective of is to provide equipment and associated engineering for our equipment provided and to optimize the use of available local Venezuelan labor, material and construction equipment. ProEnergy will also provide Technical Proposal drawings, Process Flow Diagrams and Electrical One Lines, will also provide guidance in the required mechanical pipe, valves and fittings and electrical wire, cable and cable tray required for the project.

ProEnergy has the ability to deliver the major equipment to the Venezuelan Port within (4) months from date of contract and receipt of down payment. During this time we can perform engineering and prepare the site and foundations for the equipment once it arrives. The facility should be operational within four months after delivery to site.

2.0 Work scope

The proposed "EPC" Balance of Plant Scope of Work for the installation of the above project in Venezuela is outlined.

2.1 Civil, Foundations, and Structural

- Site preparation assuming the site is level and soil of 1500 to 2000 psf
- Concrete foundations for 6 ea Gas Turbines with associated ancillaries
- Gravel on site
- Paved roads and removal areas for turbine and generators
- Plant fencing with gates

2.2 Buildings

- Modular Control Building to house the FT-4, TCP, GCP, MCC, Batteries, and chargers.
- Plant office/control and maintenance prefabricated insulated building
- Liquid fuel unloading shed
- Liquid fuel centrifuge shed

2.3 Mechanical

- Dual fuel provisions for gas turbines (Option)
- Fuel gas regulators – adequate gas pressure to be furnished
- Liquid with raw fuel storage, pumping, cleaning, with day tank

- Instrument air compressor
- Oily water separator
- Small water treatment system with storage tanks for fuel treatment
- Plant instrumentation
- Plant pipe, valves, fittings etc.

2.4 Electrical

- 13.8 KV Generator Breakers, aux breaker to feed aux transformers
- Aux transformers
- BOP electrical including DP Panels, MCC's, Lighting Panels, etc.
- Area Lighting
- Plant ground grid, cathodic protection, and lightning protection
- Cable, conduit, and cable tray

2.5 Instrumentation

- Plant instrumentation to augment the GTG's instrumentation and Plant DCS

2.6 Plant DCS System

- PLC based DCS system to interface with the GTG's and BOP

2.7 Engineering

2.8 Plant Project Management

- Scheduling, Construction Management, O&M Manuals, Commissioning and Start UP, As Built drawings, etc.

2.9 Transportation to Venezuelan Port

3.0 Assumptions & Clarifications

Items not included in Proposal:

- Main Generator Step Up Transformers or substation
- Fire Water System
- Fuel Gas Compressors
- Water Injection into gas turbines
- Import duties, taxes, VAT, etc.
- In-country Transportation to Site
- Permits including Building, Environmental, Sound, etc.
- Dual Fuel system US \$ 1,000,000 per unit

4.0 Pricing

ProEnergy's price including six (6) refurbished FT-4 Pratt & Whitney Gas Turbine Generators is as follows:

EQUIPMENT	PRICE
(6) FT-4 (single fuel) P&W Gas Turbine price	\$72,000,000.00
Balance of Plant Equipment CIF Venezuelan Port Construction, Installation & Commissioning	\$55,800,000.00

Our price includes a (12) month warranty on all equipment supplied by ProEnergy as well as an experienced technical representative on call in Venezuela during the warranty period.

Our pricing is valid for 30 days and the major equipment offered in this proposal is subject to prior sale

5.0 Terms & Conditions

This proposal shall expire within thirty (30) days; provided, however, the terms of this Section and the obligation to treat this proposal as confidential and that it cannot be shared with any third party without the prior written consent of ProEnergy shall survive.

Invoices shall be generated upon mutually agreed upon milestones.

Notwithstanding any term in this proposal or any resulting purchase order/contract to the contrary, in no event shall ProEnergy be responsible for consequential or incidental damages resulting from the use of this proposal or the performance of any work by ProEnergy in relation to this proposal. This proposal shall be subject to the terms and conditions of the consulting agreement between ProEnergy Services and Pacific Rim Energy dated September 25, 2006 and shall be deemed incorporated in this proposal by this reference.

6.0 Follow Up

ProEnergy EPC Services appreciates the opportunity to submit this proposal and looks forward to the receipt of an expression of interest from you. Please feel free to contact me if you have questions in regard to this proposal or need more information.

Thank you for your consideration.

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Attachment A Equipment & Fuel

THE PWPS FT4C-1D TWIN PAC

GENERAL DESCRIPTION


The FT4C-1D Twin Pac is an outdoor, completely self-contained, automatic, gas turbine powered electric generating plant, nominally 60 HZ rated at 51 MW at 15* C. The unit contains all the equipment required for local unattended operation and provisions for inter-connection to a remote control panel. It has the capability to start-up in the event of loss of purchaser-provided AC electrical power when the unit is in a stand-by condition. This built-in starting capability, plus the ability of the unit to assume full load in less than four minutes after initiation of the start signal, provides excellent protection in the event of a “black-out”.

The FT4C-1D Twin Pac consists of five primary modules; two gas turbines, the electric generator, the control enclosure and a high voltage switchgear enclosure. Each gas turbine unit consists of a Pratt & Whitney aero-derivative FT4C-1D gas generator and a two stage free turbine. The gas turbines provide high energy gas to the free turbines, which in turn, convert this energy into useful work when mechanically coupled to a driven load through flexible couplings. The electric generator is an Electric Machinery air-cooled, two pole, turbine type generator with a brushless excitation system. The control enclosure contains the gas turbine control, generator control, motor control center, low voltage switchgear, batteries and charger, engine fuel controls, an upgraded digital PLC sequencing system, protective relays, auxiliary transformers and a master terminal board. The high voltage switchgear enclosure contains the main circuit breaker and high voltage transformers.

The gas generators and free turbines are provided with low pressure lubrication systems including oil storage tanks and filtration. The electric generator has a separate lubrication system with AC motor driven lube oil pump with a DC pump backup. All systems are air cooled.

The electric generator is an Electric Machinery synchronous generator nameplate rated at 74,500 kVA , 59°F, 0.9 power factor, 60 HZ, 3 phase, 2 pole 3600 RPM, open air cooled, two sleeve bearing bracket type. Generator excitation is provided by a 250 V, 150 kW, direct connected brushless exciter with permanent magnet generator pilot exciter.

The gas turbine inlet stacks are acoustically treated and are fitted with sound attenuating baffles. The exhaust stacks are constructed with “corrosion resistant” steel and sound attenuating baffles. The turbines, generator and controls enclosure are of painted steel construction.

 Pratt & Whitney A United Technologies Company Pratt & Whitney Power Systems, Inc.	PWPS SPECIFICATION	FR-1	REV D	SHEET 1 OF 6
		ISSUED BY : P. Lavendier		DATE: 8/18/95
		REVISE BY : D. Tougas		DATE: 7/8/03
	RELEASED	REFERENCE :		REV:

GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS

GENERAL

This document provides the requirements and general guidelines for light and medium hydrocarbon liquid distillate fuels which can be burned satisfactorily in PWPS/P&W aeroderivative industrial gas turbines.

Industrial gas turbines are capable of burning a variety of liquid fuels providing they have appropriate fuel delivery, injection and combustion systems for each class of fuel. Distillate liquid fuels are complex hydrocarbon mixtures processed from a wide variety of basic crude oil stocks, and have a broad range of property values. In some cases, such as gasoline, the hydrocarbon fraction may undergo further processing and acquire additives or, as with naphtha, may be offered for use in the as-distilled form.


This document recognizes three general categories of distillate fuels as defined by ANSI/ASME B 133.7M which may be employed in properly configured PWPS/P&W gas turbines. Category a is No. 0-GT fuels such as light naphtha, gasoline, and JP-4/ Jet B fuels which are highly volatile and require special handling and fuel system design. Categories b and c are No. 1-GT and No. 2-GT such as light to medium kerosene and diesel fuels which can be burned in the standard gas turbine, providing all fuel properties specified in the following Table 1 are met. Fuel treatment or conditioning, including heating, may be necessary to satisfy these requirements. Residual, ash bearing fuels, and blends of distillate and residual fuels are not suitable for aeroderivative gas turbines.

Industrial fuels may be obtained from a large number of producers with a broad range of properties. Contamination in transport and deterioration in storage are common problems. Poor and contaminated fuels greatly affect the performance and durability of gas turbines. Therefore, it is imperative for the gas turbine user to install a proper fuel system design and institute an effective fuel quality management program to insure and maintain clean, high quality fuels.

GUIDELINES FOR EFFECTIVE FUEL QUALITY MANAGEMENT

The fuel management system should be designed and in place prior to the site start-up. The following considerations should be addressed:

- 1) The fuel type is generally chosen on the basis of cost and availability, however, the effects of fuel on gas turbine operation and life cycle economics should be considered. Normally, high viscosity fuels such as heavy diesel are less expensive initially, but usually impact engine life and increase overall life cycle costs. Some fuels can be made usable through treatment and/or conditioning, and the cost of these processes should be factored into the overall economics. Possible treatment processes are water wash, heating, filtration, and centrifuge or cyclone separation.
- 2) The transport path between the fuel producing location and the customer's unloading/ storage area should be analyzed for possible contamination potential. Dedicated transport containers are highly

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GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS


recommended.

- 3) The fuel storage equipment should be properly designed and sized and should be free of any contaminating or corrosive materials. Fuel storage time versus tank capacity should be balanced. Sufficient time should be allowed for incoming fuel to settle. The fuel for the gas turbine should not be removed from the bottom of the tanks, so as to avoid picking up heavy bottom ends. Tanks should be regularly drained from the bottom to remove the sediment.
- 4) The on-site conditioning and treatment systems should clean the impurities from the fuel and maintain high quality as it forwards the fuel to the gas turbine. The design should consider the quantity, placement and filtration efficiency of the filters.
- 5) The requirement for fuel preheating, if necessary, should be considered. Preheating is required for viscosity enhancement of heavy fuels and wax removal from high cloud point (waxy) fuels.
- 6) Safety requirements should be considered in the initial design phase, particularly if the fuel is one of the highly volatile Category a type fuels.
- 7) Contaminants brought in with the incoming gas turbine airflow should be considered. Proper air filtration is required. It is the normal practice to subtract the incoming air contaminants from the allowable fuel contaminant limit through a formula given in Note 7 of Table 1.

The operators of PWPS/P&W equipment must comply with all aspects of this specification, and ensure compliance by regularly taking and analyzing liquid fuel samples. Contaminants not normally present in the fuel at the production site may be introduced as a result of contact with sea water, other fuels, or insufficiently cleaned equipment during the transportation, handling and storage phases. If the fuel arriving at the user location falls out of compliance with the specification, and can not be made compliant by treatment, then the fuel supplier should be contacted immediately for a corrective action. Even a short period of operation with fuel of excess contaminants (salts, trace metals, particulates, wax. etc.) could seriously impact the gas turbine life and performance.

To further insure high quality fuel and continuous compliance, a regular maintenance program must be adopted for all on-site fuel handling, storage, conditioning and treatment systems. Regular replacement of filter elements, periodic draining of water, removal of sediments from the tanks, lines and sumps, and replacement of treatment fluids, etc., should be planned for and implemented.

PWPS/P&W requests review of the customer's final overall fuel management system design. PWPS bulletin no. 97M01 entitled "Distillate Fuel System Recommendations" is available for further details on implementing a quality fuel system. Additional guidance can be obtained by contacting your PWPS/P&W Marketing representative.

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GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS


RECOMMENDED DISTILLATE FUELS

The following liquid distillate fuels can be used in the gas turbine, if the fuel property requirements listed in Table 1 are met for the fuel delivered to the inlet of gas turbine.

Category a (No. 0-GT): Naphtha Fuels, Unleaded gasoline types, wide-cut fuels of the JP-4 (MIL-T-5624), and Jet B (ASTM D 1655) types - SEE NOTE 3

Category b (No. 1-GT): Kerosene or other distillates of the JP-5 (MIL-T-5624); Jet A and A-1 (ASTM D1655); No. 1-D diesel fuel (ASTM D975); No. 1 fuel oil (ASTM D 396); and No. 1 GT gas turbine fuel oil (ASTM D2880) types.


Category c (No. 2-GT): Distillates of the No. 2 diesel fuel (ASTM D975) No. 2 fuel oil (ASTM D 396), No. 2 GT gas turbine, and marine diesel (MIL-F-16884) types.

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GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS

TABLE 1: GAS TURBINE LIQUID FUEL PROPERTY REQUIREMENTS

Property	Limit	NOTE(S)	Test Method (Note 1)
Viscosity - cSt: Max. (for category a, b, and c)	6.0 max. for starting, 12.0 max. for operation	2	ASTM D445
Min. at 100 °F (37.8°C) (for category a)	0.5 min.	3	ASTM D445
Min. at 100 °F (37.8°C) (for category b&c)	1.0 min		ASTM D445
Combined Free Water and Sediment, vol. %	0.1 max.	4	ASTM D2709
Particle Contamination, mg/gal.	10.0 max.		ASTM D2276 or ASTM D5452
Particle Size - microns (micrometer)	20 max	13	
Hydrogen - % by weight	12.4 min	5	ASTM D1018
Metal Contaminants - ppm by wt. Vanadium (V)	0.2 max.	6 & 7	ASTM D3605
Sodium (Na) + Potassium (K)	0.2 max.	6 & 7	
Calcium (Ca)	2.0 max.	6 & 7	
Lead (Pb)	0.1 max.	6 & 7	
Copper (Cu)	0.02 max.	6 & 7	
Copper corrosion	No.1 max.	8	ASTM D130
Fuel Category a (only) Flash Point, °F (°C)	To be reported	9	ASTM D93 ASTM D323 ASTM D5191
Reid Vapor Pressure, psi or Vapor Pressure by Mini- method, psi	12.5 max. 12.5 max.		
Fuel Category b and c (only) Flash Point, °F (°C)	100 °F (37.7°C) or local regulatory limit	10	
Cloud Point, °F (°C)	25 °F (14°C) below GT inlet fuel temp.		ASTM D2500 ASTM D524
Carbon Residue (on 10% bottoms), %	0.25 max.		
Sulfur, % by mass	1.3	11, 12	ASTM D4294
Ash, % by mass	0.005 max.		ASTM D482
Net Heating Value, Btu/lb (kcal/kg)	To be reported		ASTM D4809
Specific Gravity	To be reported		ASTM D1298

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GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS

NOTES TO REQUIREMENTS (TABLE 1)

NOTE 1

The most recent revision of the ASTM test method should be used insofar as practicable. An equivalent test method may be used in lieu of ASTM test method, if approved by PWPS/P&W.

NOTE 2

Maximum fuel viscosity at gas turbine fuel pump inlet shall be 6.0 cSt for starting and 12.0 cSt during operation. Fuel may be heated, to a maximum of 160 deg F (71C), to meet this requirement.

NOTE 3

In order to operate FT8 with Category a fuels, such as naphtha, specially designed PWPS/P&W fuel system components are required.

NOTE 4

The fuel delivered to the inlet of the gas turbine is to have a sediment level less than 10 mg./gallon of fuel. However, for practical extended fuel filter life, the fuel should have lower sediment levels

NOTE 5

Minimum hydrogen percentage by weight is 12.4; however, for optimum combustion, higher hydrogen percentage is recommended.

NOTE 6

To achieve the level of sensitivity required for the detection of some of these metals, the furnace atomic absorption method may be necessary. Since some trace metals can have harmful effects on gas turbine operation, it is necessary to impose limitations. Higher levels of Table 1 metallic levels, even for short period, will increase the gas turbine maintenance costs.


NOTE 7

Limits of metal contaminants in Table 1 assume no contaminants in the inlet air or injected water. For operation with contaminants in the inlet air or injected water, the maximum allowable limit of any particular contaminant in the fuel must be reduced according to the following formula:

$$Af = Lf - [C_{air} \times (\text{air/fuel weight ratio})] - [C_{water} \times (\text{water/fuel weight ratio})]$$

where,

Af	= Maximum allowable contaminant in the fuel, ppm by wt.
Lf	= Contaminant Limit as called out in Table 1, for example 0.2 for (Na+K)
C _{air}	= Contaminant in inlet air, ppm by wt.
C _{water}	= Contaminant in injection and/or evaporative cooling water, ppm by wt.

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GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS

NOTE 8

Copper corrosion test conditions are 2 hours at 212 deg F (100 deg C).

NOTE 9

No flash point limitation is specified; however, local regulatory limits and safety regulations must be met.

NOTE 10

The cloud point shall be at least 25 degrees F below the anticipated gas turbine fuel inlet temperature. To meet this requirement, additional fuel heating, to a maximum of 160 degrees F (71C), may be needed.

NOTE 11

Sulfur content limits Below 1.3% WT. are imposed when:


- a) The local regulatory limits of sulfur oxides exhaust emissions are exceeded; then the fuel sulfur content must be reduced until the local regulatory limits are satisfied. For instance, the USA EPA limits fuel Sulphur content to 0.8% for SO₂ emissions control, but local codes vary widely.
- b) If exhaust heat recovery equipment is employed; then the equipment manufacturer's limit may apply.

NOTE 12

High sulfur fuels will impact hot section repair interval dependent on the amount of alkalai metals present. The combination of high sulfur and high alkalais must be avoided.

NOTE 13

Maximum particle size to be controlled by filtration with a β_{20} ratio of 200.

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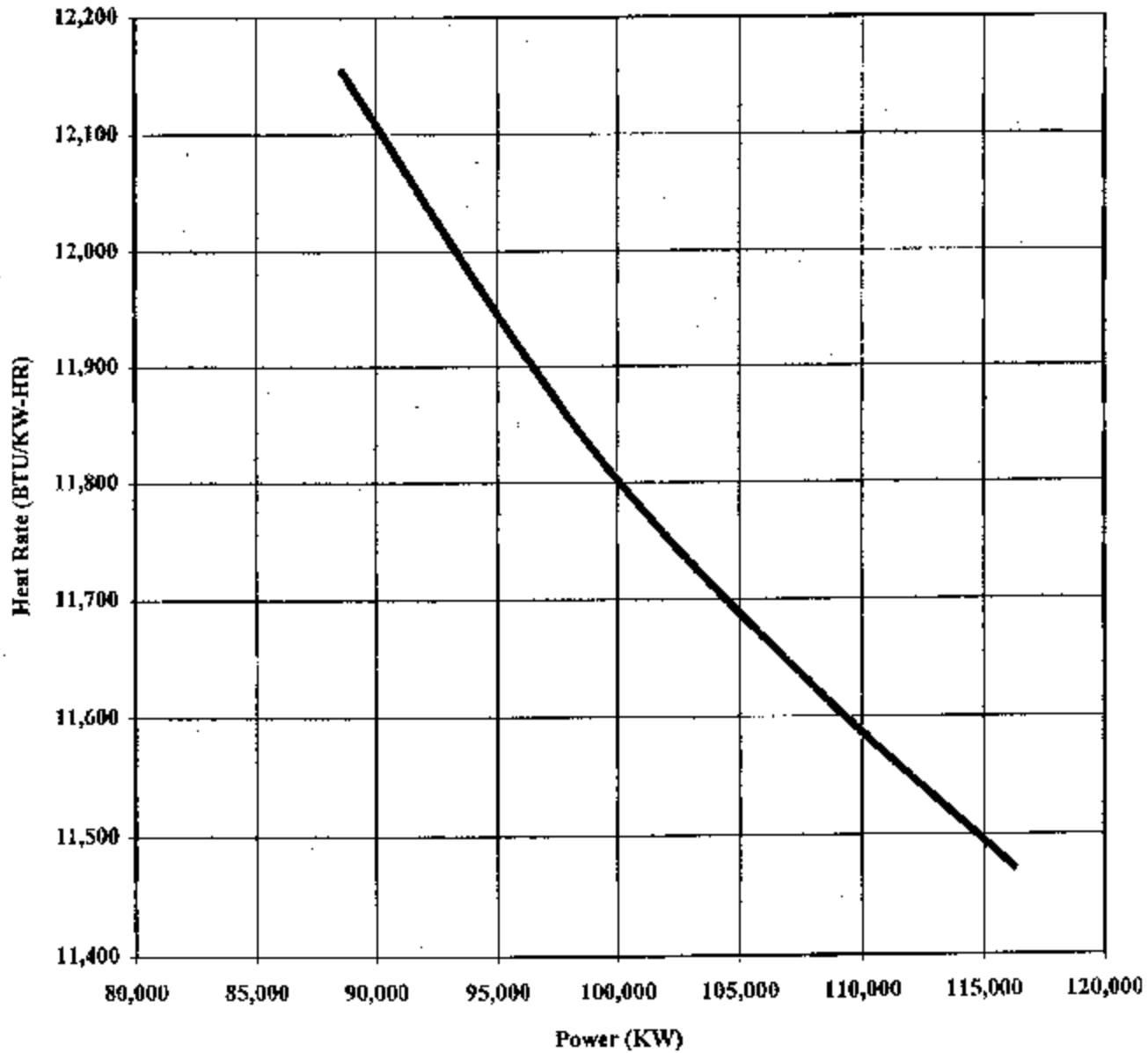
GAS TURBINE LIQUID DISTILLATE FUEL REQUIREMENTS

REV LET	SHEETS AFFECTED	SHEETS ADDED	DESCRIPTION	REV BY & DATE	APPVD & DATE
A	1-4		1) Added 1.7 cs lower limit of viscosity 2) Changed NA + K limit to 0.2 ppm 3) Added sulfur limit to 1.3% max. 4) Changed format to FrameMaker 5) Revised verbiage to put more stringent requirements for fuel management 6) Updated test procedures to current standard	P. Lavendier 8/18/95 EC#8352	
B			Completely re-written and updated to allow the use of Naptha Fuels, lower min viscosities. Max allowable fuel viscosities were changed to be based on actual operating temperatures, rather than a fixed temperature.	EC#9025 T. Fox/D. Dalal 2/11/98	
C	All		Updated Logo to new PWPS Logo. Updated all TPM references to PWPS references.	EC#9925 L. DiSalvo 7/23/01	
D	4		1) Changed Free Water to Combined Free water and sediment. changed limit to 0.1% max by volume. Changed Test Method to ASTM D2709. 2) Changed sediment to Particulate Contamination. Removed metric unit (mg/l) (2.7) from Limit. Changed test method to ASTM D2276 or D5452.	EC#10620 D. Tougas 7/8/03	
	4		3) Added Note 13 to Particle size		
	5 & 6		4) Removed Test Method IP288. 5) Added Test Method ASTM 4809 to Net Heating Valve. 6) Made various typographical changes. Added Note 13 regarding filtering.		

Attachment B Performance FT-4

Two FT4C-1 Twin Pacs
Estimated Performance
Heat Rate Vs. Power

Altitude: 385'ASL
Relative Humidity: 60%
Installed Losses: 4" w.g inlet & 1" w.g. exhaust
Water Injection to 75 ppm NOx
60 HZ



TURBO POWER AND MARINE SYSTEMS, INC.

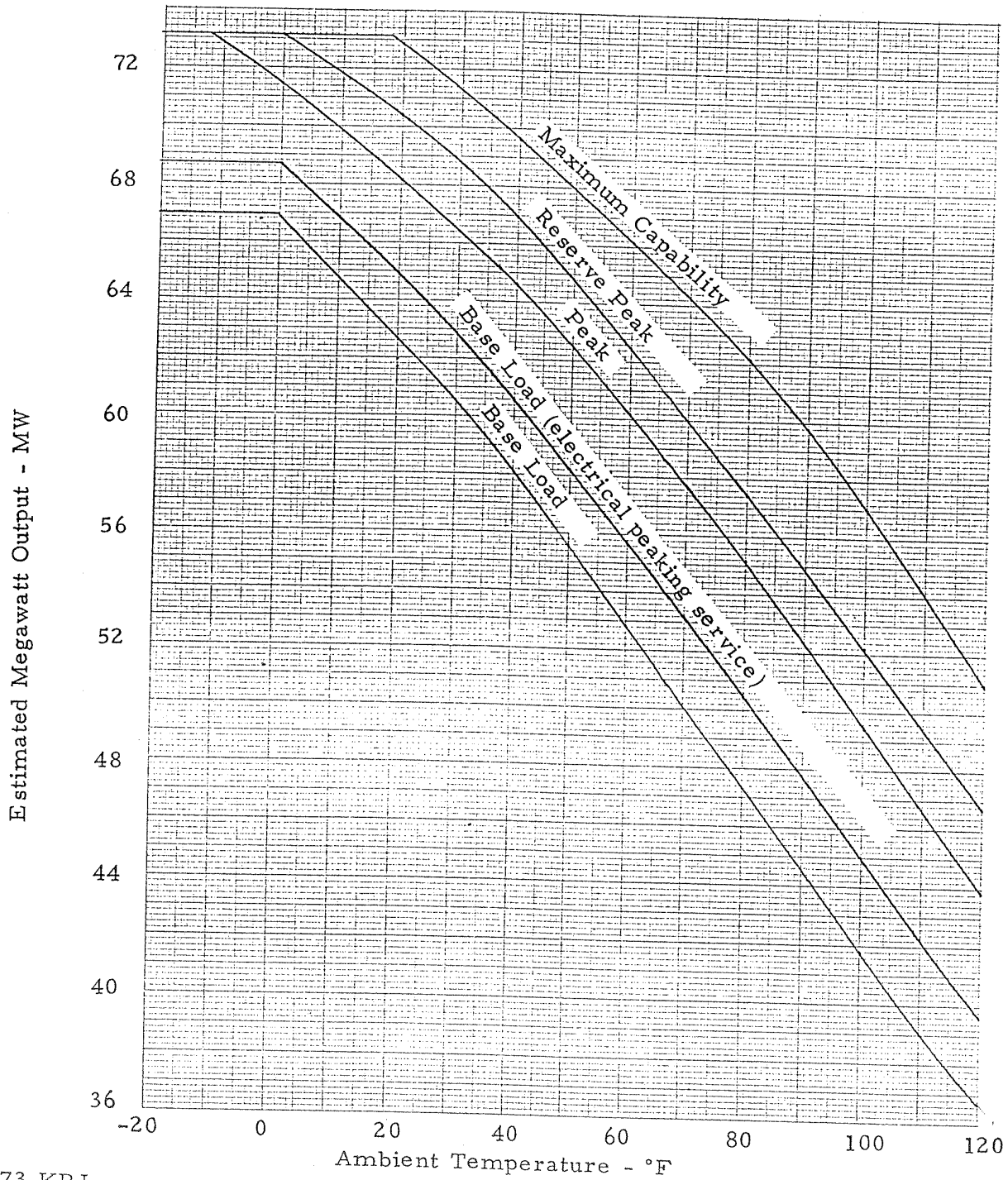
TP4-2 (FT4C-1D) Gas Turbine Twin Pac

Estimated Megawatt Output vs. Ambient Temperature

3" H₂O Inlet Duct Pressure Loss
1" H₂O Exhaust Duct Pressure Loss

Sea Level

N₃ = 3,600 RPM



TURBO POWER AND MARINE SYSTEMS, INC.

TPA-2 (C-1D) GAS TURBINE TWIN PAC

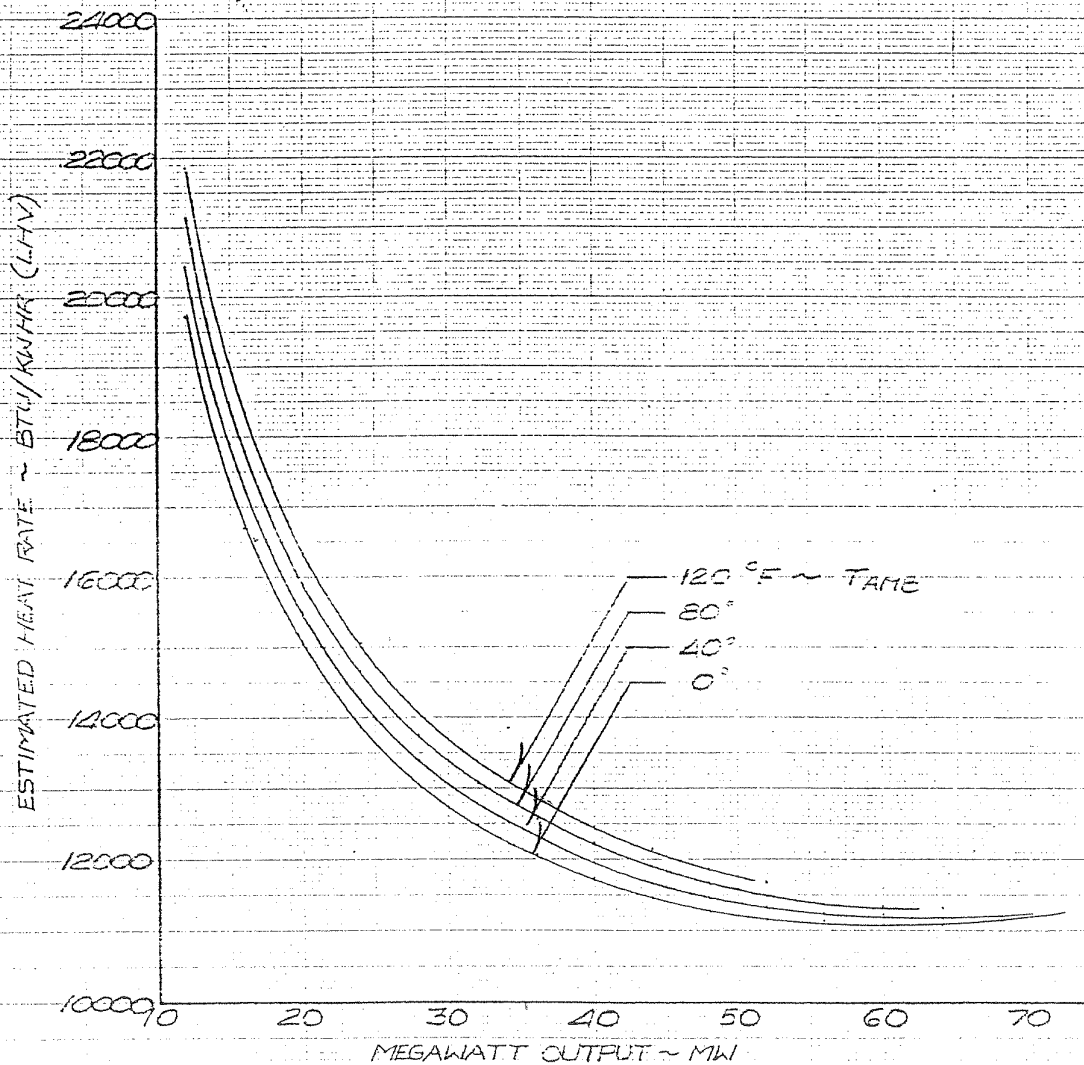
ESTIMATED HEAT RATE VS MEGAWATT OUTPUT

3" H₂O INLET DUCT PRESSURE LOSS

1" H₂O EXHAUST DUCT PRESSURE LOSS

SEA LEVEL

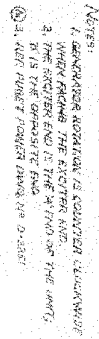
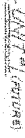
N₃ = 3600 RPM

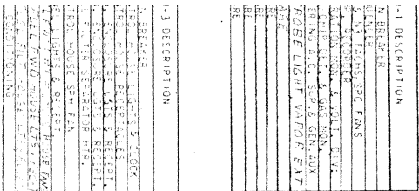


Attachment C

PW FT-4 Lay out (Typical)

DATE	BY	TIME	REMARKS
		7:15	1. DECONTAMINATED AIRPORT ROADS 2. 4:45 P - WEST DASH LINE WAS STILL IN ACCIDENT DRUM SECTION. (CLOCK) 3. 4:45 P - WEST DASH LINE WAS IN WHITE LINE AND WAS ALREADY IN 4. 4:45 P - WEST DASH LINE WAS IN


[illegible]



QCT	QCT DESCRIPTION
1	1.01. 0000-0000
2	1.02. 0000-0000
3	1.03. 0000-0000
4	1.04. 0000-0000
5	1.05. 0000-0000
6	1.06. 0000-0000
7	1.07. 0000-0000
8	1.08. 0000-0000
9	1.09. 0000-0000
10	1.10. 0000-0000
11	1.11. 0000-0000
12	1.12. 0000-0000

[illegible]

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 Electric Machines
MILWAUKEE, WIS.