

Scope of Supply and Purchaser's Responsibilities						
						PRATT & WHITNEY
						INDUSTRIAL GAS TURBINE SERVICES
		FT4A-9 POWER PAC POWER ISLAND				
		EQUIPMENT ONLY				
		LIQUID FUEL	Qty: 1			
			Quantity	Design	Supply	Installation
Item		Description				Notes
I.		GAS TURBINE POWER ISLAND				
	1	GAS TURBINE PACKAGE	1		W	C
		Gas Generator (GG4A-9 Core Engine)			W	C
		Power Turbine			W	C
		Exhaust Elbow			W	C
		Exhaust Transition			W	C
		Fabricated gas turbine base and mount			W	C
		Coupling connecting power turbine and			W	C
		Hydraulic Starter			W	C
		Ignition System			W	C
		GG & FT Lube Oil Systems			W	C
		* Oil-to-air Coolers			W	C
		* Motor Driven Pumps			W	C
		* Carbon Steel Piping			W	C
		* Enclosure			W	C
		Fuel Supply System			W	C
		* Liquid Fuel Filter			W	C
		* Liquid Fuel Fire Valve			W	C
		Gas Turbine Enclosure			W	C
		* Secondary cooling air system with louvers			W	C
		* Vents and Drains			W	C
		* Interior AC/DC Lighting			W	C
		* CO ₂ Fire Suppression System			W	C
		* Sound Attenuation Estimate			W	C
		Air Inlet Vandal Hood			W	C
		Inlet Silencing			W	C
		Exhaust Stack			W	C
		Hydraulic Start Pac			W	C
	2	GENERATOR PACKAGE	1		W	C
		EM Open Ventilated Air Cooled Synchronous Generator			W	C
		Static Exciter Assembly			W	C
		Stator Heaters			W	C
		Neutral Ground Transformer/resistor			W	C
		Current Transformers			W	C
		Stator Temperature Detection			W	C
		Bearing Temperature Detection			W	C
		Generator and exciter air temperature detection			W	C
		Rotor Ground Detection			W	C
		Lube Oil System			W	C
		* Oil Filter			W	C
		* Motor Driven Pumps			W	C
		Enclosure			W	C
		* Inlet Air Filter			W	C
		* Inlet and Exhaust Silencing			W	C

W=PW
C = Customer

		Quantity	Design	Supply	Installation	
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	* Interior AC/DC Lighting			W	C	
	* Sound attenuation to 85 dBA) @ 3 ft			W	C	Inlet and Exhaust silencing
	* Fire Detection System			W	C	
3	CONTROL PACKAGE	1		W	C	
	Prefabricated Steel Enclosure			W	C	
	* HVAC			W	C	
	* Fluorescent Lighting			W	C	
	* DC Emergency Lighting			W	C	
	* AC Power Outlets			W	C	
	* Smoke Detector			W	C	
	Operator Control Cabinet			W	C	
	* Starting and Operating Controls			W	C	Manual and automatic
	* Speed Indication			W	C	
	* Voltmeters and Frequency Meters			W	C	Bus and generator
	* Ammeter			W	C	
	* Watt Meter			W	C	
	* VAR Meter			W	C	
	* Synchroscope			W	C	
	Instrument Cabinet			W	C	
	* Automatic Voltage Regulator			W	C	
	* Synchronizer			W	C	
	* Vibration Monitor			W	C	Gas turbine
	* Fire protection system power supplies			W	C	
	Unit Control Cabinet			W	C	
	* PLC system for automatic starting, running, loading, unloading and shutdown of the unit.			W	C	Allen Bradley Controllogix
	* Fuel Controller with Woodward Fuel Valve			W	C	
	Generator Protective Relay Panel			W	C	
	* Generator Protective Relays			W	C	
	* Lockout Relays			W	C	
	* Watt hour Meter			W	C	
	Motor Control Center			W	C	
	* AC and DC Distribution Panels			W	C	
	* Motor Starters			W	C	
	* AC Distribution Transformer			W	C	
	* Breakers as required			W	C	
	* Automatic Transfer Switch			W	C	
	* Field Termination Blocks			W	C	
	* Power Supplies			W	C	
	Ventilated cubicle with rack mounted lead acid batteries			W	C	125 VDC
	Battery Charger			W	C	
	Switchgear Module 15 kV Class			W	C	
	* Metal Clad Switchgear Compartment			W	C	Mounted in control enclosure
	* Circuit Breaker			W	C	1200 Amp/ 750 MVA, 15kV class totally enclosed
	* Non-segregated Insulated 3 Phase Bus Duct			W	C	
	* Lightning Arresters and Surge Capacitors			W	C	
	* Current Transformers and Potential Transformers			W	C	
	* 3 Phase Station Auxiliary Transformer			W	C	
4	INSTALLATION HARDWARE					
	Site interconnecting piping		C	C	C	

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			Quantity	Design	Supply	Installation	
Item		Description					Notes
		Foundation embedded material		C	C	C	Including all anchor bolts, shims and plates, and grout for WGPW supplied equipment.
		Interconnecting electrical cables			W	C	Between PW supplied equipment
	5	STARTUP AND COMMISSIONING SPARE PARTS AND CONSUMABLES			W		For PW Scope of Supply
II.		ADDITIONAL RESPONSIBILITIES DURING CONSTRUCTION AND START-UP					
		Technical Representatives to advise Customer Supervisory Personnel during FT4 equipment erection checkout, and startup					Optional
		Instruction Manuals and Plant Documentation provided: Construction Manual, Commissioning Manual & Sign-off Sheets, TPM Drawing Package, Vendor Manuals & Drawings, FT4 Maintenance Manual, FT4 Illustrated Parts Catalog, FT4 Service Bulletins, Operating Instructions, Bill of Material, As Built Drawings, General arrangement drawing, Foundation interface drawing, Loading diagram			W		
		WGPW training					Optional, includes customer training on site. Training description can be found in the WGPW Customer Training Document version 21-0802. Travel and lodging for customer's personnel not included.
		Performance Testing			C		The customer is responsible for providing all necessary support to install, calibrate, and remove all temporary and plant instrumentation/equipment necessary for performing the acceptance test. WGPW provides technical support and manages the test plan for this work.
III.		PROJECT DEVELOPMENT AND OWNER'S RESPONSIBILITIES					Owner is responsible for compliance with WGPW operating, installation, and maintenance instructions.
	1	SITE DEVELOPMENT		C	C	C	Owner is responsible for all areas of site development and are not limited to the items listed in this document.
		Adequate Title and Interest, Permanent Facility Permits, Construction Permits and Licensing			C		To permit the installation of such units and their operation for at least the period contemplated by the contract. Provide WGPW representatives unrestricted access at all times as may be reasonably necessary in the performance of their duties.

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	Sub-Soil Investigation & Report			C	C	C	Minimum sub-foundation bearing capacity of 2500 psf (120 kPa) and limits differential settlement of the main foundations equal to or less than 0.0005 times the foundation length.
	Foundations for all Equipment			C	C	C	WGPW will provide Loading Diagrams for WGPW supplied equipment.
	Below Grade Electrical Raceway			C	C	C	Includes Conduit, Duct Bank, Trenches, etc.
	Provision of Secure Field Office . Furnished with electricity, Heating and Air Conditioning, Drinking Water, Desks, Chairs, Parking Area, Lockers and others which are necessary for Field Works, Services & Sanitary Facilities of Office Personnel.			C	C	C	Including 10' x 40' (3 m x 12 m) area for a field office. This field office needs to be able to accommodate 3-4 WGPW individuals.
	Provision of First Aid and Medical Services - OSHA Approved			C	C	C	
	Provisions of Local Communication Facilities			C	C	C	Including radio, telephone (local and long distance) with international direct dialing and fax machine. This should be a minimum of 3 lines in the WGPW field office. A separate dedicated phone line shall be provided to each turbine control system in the control house.
	Temporary Construction Staging & Secure Inventory Area				C		A minimum area of approximately 115' by 136' is recommended per Power Island. A minimum of two shelved conex boxes and one non shelved or enclosed equivalent per Power PAC prior to delivery of equipment.
	Access Roads), Interior Roads, and Parking Areas			C	C	C	All-weather and unobstructed
	Transmission System			C	C	C	
2	ENGINEERING AND CONSTRUCTION						
	Plant Engineering				C		
	All Labor for complete off-loading, Inventory, Inventory control, Storage, Erection, Installation, Checkout, Testing, and Start-up of all WGPW and non-WGPW supplied equipment and material.				C		
	Maintaining and Guarding all Facilities, Equipment, and Materials during construction				C		Including security fence
	Site Organization During Construction				C		Including Resident Field Construction Manager; Supervision & Manpower for Erection Works, Checkout, Trouble Shooting, Start-up & Commissioning, Test Operation & Trial Operation, Plant Start-Up Engineering
	Emissions and Acoustic Testing				C		
	Worker's Compensation, Employer's Liability, or any other Local Insurance Required				C		WGPW will cover all WGPW personnel.
	Consumable Material for Erection Works				C		As required

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	Construction Equipment, Tools and Aids				C		Including but not limited to the following: Cement Mixers, Loaders, Trucks, Cranes of varying capacities, Power Generators, Air Compressors, Welders, Drilling Equipment, Pipe Working Facilities & all hand tools required for expeditiously and competently completing all phases of the work under the contract.
	Required Tests Prior to Startup: Including but not limited to:				C		
	* Resistance ratio and polarity tests				C		Generator and Transformer CTs and PTs
	* All high voltage dielectric tests				C		All WGPW supplied protective relays and circuits. The WGPW Commissioning and checkout manual further clarifies the Customers responsibilities.
	* Field check and calibration	*					
	Protective Relay Calibration						
	Phasing and Synchronizing the Generator to Purchaser's system				C		
3	POWER ISLAND INTERFACES						
	BOP Motor Control Centers				C		
	Control System Interface				C		Customer is responsible for all-interconnecting hardware, software and documentation for all BOP I/O communication and control.
	Natural Gas for Start-up, Testing and Operation 445 psig (30 bar), Approximately 4700 scfm (2.2 m3/sec) per gas turbine (Optional fuel)		N/A				Interface Point: Flange on WGPW Power Island. Per TPM Natural Gas Fuel Specification FR-2. Fuel to be tested by a certified lab and the results provided to WGPW prior to start-up.
	Liquid Fuel for Start-up, Testing and Operations						Interface Point: Flange on WGPW Power Island. Per TPM Liquid Fuel Specification FR-1. Fuel to be tested by a certified lab and the results provided to WGPW prior to start-up.
	Potable Water for Gas Turbine Off-line Water Wash 50 psig (3.4 bar) min., Approximately 300 gallons (1150 liters) per gas turbine water wash at 110 gpm (415 liters/m)				C		Interface Point: Flange on WGPW Power Island. Per TPM Potable Water Quality Specification
	Demin water for injection per AR-1				C		Required with optional water injection
	Vent and Drain. Maximum flow on Oily Waste drain is 35 GPM for water wash.				C		Interface Point: Connections on PW Power Island.
	High Voltage Power				C		Interface Point: Generator Terminals.
	Backfed Electrical Power Supply 75 kVA per Power Island, 13.8 kV, 60 Hz, 3 phase for lighting, heating and intermittent auxiliaries				C		Plus as required for BOP and optional equipment loads
	Construction Power-Including distribution to the WGPW supplied equipment				C		480 V, 3 phase, 24 hours per day to electric generator upon arrival of the generator. Reliable temporary 480 V, 100 amp power at the control house for checkout and start-up at least 21 days prior to the first fire date of the first unit to be commissioned.

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	4	OTHER OWNER RESPONSIBILITIES					The following list of items is provided for your convenience and gives examples of the types of equipment and/or services that are outside the PW Scope of work, and if required, are the sole responsibility of the Owner.
		Site Survey/Plot Plan		C	C	C	
		Excavation for Foundations, Pipes, Roads, Cabling & Grounding Grid		C	C	C	
		Site Leveling		C	C	C	
		Backfill		C	C	C	
		Finish Grading		C	C	C	
		Foundation embedded material		C	C	C	Including all anchor bolts, shims and plates, and grout for PW supplied equipment.
		Surface Drainage to and including any Collection Pond		C	C	C	
		Oily Water Separator		C	C	C	
		Sanitary Waste Disposal		C	C	C	
		BOP and Plant Fire Protection Systems- Hydrants Panels and Extinguishers		C	C		Including Fire Protection during construction
		Plant Lighting		C	C		
		Intra-communication system		C	C		
		Site Fencing and Gates		C	C		
		Construction Water			C		
		Builder's All Risk Insurance (BAR)			C		
IV.		OPTIONS					
	1.	Spares Parts and Consumables			W		
	2.	Long Term Maintenance Agreement			W		
	3	Off-line compressor internal water wash system			W	C	Includes piping system, nozzles, valves, etc internal to the Gas Turbine Enclosure. Excludes Water Wash Skid
	4	Gas turbine heating system			W	C	For condensation control
	5	60 to 50 HZ Conversion			W	W	
	6	Dual Fuel Conversion			W	W	
	7	Gas Fuel Conversion			W	W	
	8	Gas Fuel Filter			W	C	
	9	Gas Fuel Fire Valve			W	C	
	10	Gas Detection System			W	C	
	11	Water Injection System			W	C	
	12	Inlet Filtration			W	C	
	13	Construction & Startup Technical Supervision			W	C	
	14	Training			W	C	
	15	Liquid Fuel Forwarding Skid			W	C	
	16	Black Start Capability			W	C	Requires extra equipment