Two 2 New/Never Installed Twin Boiler & Twin Steam Turbine Generating Power Plants
(2) @ 660MW Each (1320Mw Total) 50HZ Plus Balance of Plant
Tri Fueled / Liquid / Natural Gas /Coal Fired Plants

DELIVERY
Immediate. Power plants are dismantled and stored in a warehouse, packed & ready for shipment.
Location: (To be provided).

CONDITION OF THE EQUIPMENT

Excellent. Power plants were manufactured in the 1980's, placed in long term storage properly maintained in storage facility (To be provided) and were never used.

This equipment is for sale on a first come, first served basis
It may be purchased AS IS WHERE IS
OR
with optional warranty and full technical support
tailored to the purchaser's requirements.

Introduction

This 50 Hz. 1,320 Mw Power Plant consists of two supercritical TRI-FUELED boilers designed to provide steam to the two matching 660 Mw rated steam turbines and ancillary plant equipment. This equipment was manufactured to the highest standards in the 80's, placed in long-term storage and never used or installed.

The plant is designed for high flexibility and economic profitability during operation. It can fire three fuels as required, all grades of fuel oil and or natural gas plus coal.

Automation functions (control, protection and supervision) are performed by microprocessor based systems.

This power plant is presently in long term storage. It is available for immediate purchase, removal from storage, shipping and installation at a new site.

This power plant is offered AS IS WHERE IS or with full technical support and a warranty tailored to the purchaser's requirements is available as an option.

SCOPE OF SUPPLY

1,320 MW POWER PLANT CONSISTING OF TWO (2) GENERATING TRAINS.

EACH TRAIN GENERALY CONSISTS OF:

ONE (1) COMBINED-CIRCULATION, SUPERCRITICAL, TRI-FUELED, (COAL–OIL NATURAL GAS) BOILER RATED AT 2,090 TONS PER HOUR.

ONE (1) 660 MW 50 HZ STEAM TURBINE GENERATOR

AND

BALANCE OF PLANT THROUGH TO THE LOAD TRANSFORMERS.

1. PLANT DESCRIPTION AND MAIN EQUIPMENT CHARACTERISTICS

1.1 PLANT SYSTEMS AND COMPONENTS

The main systems and components of the proposed plant are the following:

a) For each unit:

- Boiler complete with auxiliaries including electrostatic precipitators and ash-handling system;
- Steam turbine and auxiliary equipment;
- Thermal cycle including condenser, feed water heaters, pumps, condensate polishing, HP, MP, LP pipe work, etc;
- Control and instrumentation equipment;
- Main transformers, unit transformers.

b) Common equipment:

- Cooling water system;
- Auxiliary boiler;
- Auxiliary common systems (compressed air, emergency diesel generators, etc.).

1.2 MAIN EQUIPMENT CHARACTERISTICS

1 .2.1 Boiler

The boiler is-of the once through supercritical pressure combined-circulation, balanced type; it uses (To be provided) technology, and is manufactured by (To be provided).

The main operating characteristics at nominal continuous rate conditions are:

- Superheated steam flow 2.090 t/h
- Steam temperature/pressure at superheater outlet: 540°C / 260 ate
- Reheated -steam flow 1.674 t/h
- Steam temperature / pressure at reheater outlet 540°C / 40 Ate
- Feedwater temperature at economizer inlet: 290°C
- Coal consumption: 240 t/h
- Number of mills (HP 1003 bowl type): (7) Seven.

The boiler is designed for a superheated steam production of 2,160 t/h in continuous operation, equal to a 4% increase of the nominal continuous rate steam flow; this corresponds to the steam flow required for operation with turbine valves wide open.

The boiler design allows the utilization of a wide range of coals; the characteristics of these coals are summarized in the following Table 1.

TABLE 1
COAL CHARACTERISTICS

Moisture (inherent and free):	5 – 12%
Ash:	10 – 16%
Volatile matter:	22 – 35%
Fixed carbon:	50%
High heating value:	5.900 kcal/kg
Hard grove grindability index:	45
Ash fusion temperature (oxidizing atm.):	1.280°C

Special care has been taken as far as pollution in coal combustion is concerned; for this reason emissions of NOx from the boiler and dust from the electrostatic precipitation are expected to be within the following values:

- NOx: 400 mg/Nm3
- Dust: 50 mg/Nm3

The above values refer to dry gas under normal conditions with a 6% oxygen excess during coal combustion.

1.2.2 Steam turbine

The steam turbine is tandem compound, single shaft, with four casings (1 HP- 1 MP- 2 LP double flow type), and intermediate reheating.
It uses G.E. technology and is manufactured by (To be provided).
The turbine is designed with 6 un-regulated bleeds for feedwater heating purposes and with one un-regulated bleed to feed the steam turbine driving the 100% feedwater pump.
The steam turbine main characteristics are:

- Power output at nominal continuous rate: (at gen. Term.): 660 MW
- Admission superheated steam flow: 2.090 t/h
- Admission superheated steam temperature / pressure: 538°C / 248 ate
- Admission reheated steam temperature / pressure: 538°C / 37 ate °C
- Exhaust nominal pressure: 0.05 Ata
- Last LP blade height: 33.5 “
- Rotating speed: 3.000 rpm

The turbine is equipped with an electro hydraulic control system and all necessary instrumentation to grant operation monitoring and all cold or warm start-up or trip operations.

1.2.3 Generator

It is of the rotor hydrogen-cooled and stator water-cooled type, G.E. technology manufactured by (To be provided).
The generator is equipped with a static exciter and a hydrogen cooling system; the lubricating and the sealing oil systems were in common with the turbine oil system.

1.2.4 Transformers

Each unit is equipped with 2 main transformers, each with a 370 MVA rated power and a 20/400 kV ratio, and two unit transformers rated 70/35/35 MVA and a 20/6.3/6.3 kV ratio.

1.2.5 Thermal cycle equipment

The thermal cycle is shown in fig. 2. With reference to this figure, the condensate is pumped from the condenser to the deaerator (14) through the polishing system (10) and the LP feed-water heaters (11) (12) by means of centrifugal pumps (8); the condensate is then pumped the main boiler feed pump (15) through the HP feedwater heaters (16) (17) (18) into the boiler; the main boiler feed pump is designed for 100% feedwater flow and is driven by a steam condensing turbine.

Two electrical motor driven pumps, each designed for a 25% feedwater flow, operate as of the main feeding pump or during start-up operation.

1.2.6 Cooling water and raw water system

The units will be of the open or close-cycle type according to the plant site characteristics.

1.2.7 Electrical equipment

The electrical feeding system of the plant consists of separate (6.3 kV AC, 380 V AC, 220, 110 V D.C.) redundant networks; the electrical boards shall be the metal-clad type for kV and the power centre and motor control centre type for 380 v.
D.C. system is for essential and emergency power supply.

1.2.8 Automation system

The plant automation system is based on microprocessor technology using distributed architecture.
The distributed architecture permits all functions necessary for advanced process control to both functionally and physically, throughout a network of intercommunicating controller modules.
The controllers communicate with advanced CRT (Cathode Ray Tube) based, operator consoles which provide a window to the process, remote control, and documentation of process operation.

2. OPERATIONAL BEHAVIOUR OF THE PLANT

2.1 NORMAL OPERATING CONDITIONS

The 660 Mw coal-fired supercritical units are designed for the following operating conditions:

· Nominal load duty, at the nominal continuous rate conditions, i.e. the guaranteed continuous capacity with the nominal steam conditions, measured at the generator terminals (660 MW);

· Maximum continuous load duty, running continuously at the maximum rated capacity, with all the turbine inlet valves wide open (675 MW);

· Peak load duty, for a maximum of 500 hours per year and for periods not longer than 2 hours, with all the turbine inlet valves wide open and the last H.P. feedwater heater excluded (738 MW);

· Minimum load duty, at 20% of the nominal load duty (130 MW) if fuelled with coal only. For lower load values the flame support with fuel oil is needed; these values will be adjusted depending upon the volatile matter content of the specific coal to be burned. The minimum load duty can however be lowered to 10% of the nominal load duty by the utilization of fuel oil;

· Partial load duty, anywhere between the minimum and the maximum continuous load duty;

· Normal load variation, with a rate of 0.8% of the continuous nominal capacity per minute in the range between the minimum load and 60% of the maximum continuous load duty; with a 1.5% rate of the continuous nominal capacity per minute in the range between 60% and 100% of the maximum continuous load duty.

2.2 LOAD / FREQUENCY CONTROL

The nominal frequency is 50 Hz; the unit can however be serviced, without any power limitation, between 49.5 and 50.5 Hz; the frequency limit can be lowered to 48 Hz for a few hours and to 47 Hz for a few minutes until the intervention of the systems for the control of the network loads.
The load/frequency control system provides for:

· Primary frequency control of the network, in an operating range between the minimum and the maximum continuous load duty. This primary regulation consists of a proportion- al response to frequency variations made directly by the steam turbine governor; the governor drop can be varied in a range between 2% and 8%. Its effectiveness on frequency variations depends on the governor drop and deadband at the operating point; the electro-hydraulic control supplied with the proposed unit successfully meets the requirements with a 5% drop and a deadband of less than 0.01% (5 mHz).

· Secondary frequency control of the network, the operating range is included between 50% and 100% of the maximum continuous load duty, with a control band of 10% of the unit nominal load duty per minute. This secondary frequency control demand is per- formed by the regional dispatching centre.

Primary and "Secondary frequency control requirements are more severe than those required by normal load changes. Mill rangeability and pulverizer coal storage in the hill allows the coal-fired unit the same dynamic response as the oil-fired ones for the fulfilment of both primary and secondary load/frequency control.

2.3 UPSET CONDITIONS

The 660 MW coal-fired supercritical units will also operate under the following conditions resulting from disturbances on the network:

· Islanding: Requested transients are equal to a sudden load reduction or increase from the existing load to the network load requirements. The unit is capable of sustaining the islanding condition within a +5% / -15% range of the nominal load.

· Network separation: In case of an external fault which can be removed within 0.5 s., the main breaker stays closed and the unit remains connected to the network.

· House load runback: In case of load rejection due to external faults with the main breaker open, the boiler is shut down and the unit will automatically continue to supply power to its auxiliary

systems through the energy stored in the system. Typically a stand-by time of 20 / 30 minutes is achievable with these supercritical units; the boiler is operated through the start-up circuit. Re-firing of the boiler with a fuel other than coal is required and the house load can be maintained until the perturbed condition of the network has disappeared. An ad hoc dedicated control scheme is provided in order to perform the manoeuvre automatically.

· Short circuit: The unit will be able to maintain the short-circuit current for a maximum of 1 second. The main breaker remains closed and the unit will help to dampen the electro- mechanical oscillations. Afterwards the unit will shift to the house load runback.

In the case of trip from high load due to problems that can be solved in a few minutes, it will be possible to reach the previous load within 1 hour.
Unit shutdown is foreseen on a weekend basis.

3. SCOPE OF SUPPLY

3.1 GENERAL

The systems, components and services included in the scope of supply of the proposed plant are those listed in the following paragraphs:

· Boiler complete with auxiliaries including electrostatic precipitators and ash-handling system;
· Steam turbine and auxiliary equipment;
· Thermal cycle including condenser, feedwater heaters, pumps, condensate polishing, HP, MP, LP pipework, etc;
· Control and instrumentation equipment;
· Main transformers, unit transformers.
· Generator

3.2 BOILERS

Two 660 MW boilers built by (To be provided) using (To be provided) design.

3.3 THERMOMECHANICAL SYSTEMS

3.3.1 Main systems (for each unit)

Including:

3.3.1.1 Air and gas system, consisting of the following components:

· Two primary air centrifugal fans;
· Two forced draft fans;
· Two induced draft fans;
· Two flue gas recirculation fans;
· Two Ljungstrom air heaters;
· Two steam air heaters with drains and drain tank;
· Two Ljungstrom by-pass ducts;
· Two electrostatic precipitators;
· Ducts, piping and fittings (until the induced draft fans).

3.3.1.2 Water-steam system

Including:

The start-up system, consisting of the following components:

· Two Boiler Extraction (BE) valves;
· Two Boiler Throttle (BT) valves;
· Two Boiler Throttling Bypass (BTB) valves;
· One Water Drain (WD) valve;
· One Spillover (SP) valve;
· One check stop Steam Admission (SA) valve;
· One Steam Drain (SD) manual valve;
· One Feed Water Bypass (FWB) ;
· One flash tank;
· Two boiler water circulation pumps;
· Related piping and fittings.

Main steam system, consisting of the following components:
· Superheated steam lines;
· Reheated steam lines;
· One main steam turbine;
· Integration steam lines to the auxiliary turbine drive of the main feedwater pump.

The condensate circuit, consisting of the following components:
· One condenser;
· Three condensate pumps;
· Condensate polishing (demineralizer filter and mixed bed);
· Deaerator;
· Piping and fittings.

Boiler feedwater circuit, consisting of the following components:
· Two lines of three HP feedwater heaters each in parallel;
· One auxiliary steam turbine driven main feedwater pump with booster pump;
· Two electric motor driven auxiliary feedwater pumps with booster pumps;
· Feedwater by pass lines to deaerator;
· Feedwater heaters bypass line;
· Connections to the boiler circulation pumps, superheater and reheater and superheating circuit;
· Related valves and fittings.

Low Pressure (LP) bleeds and drains, consisting of the following components:
· Two lines of two LP feedwater heaters in parallel;
· Valves, piping and fittings;
· Four bleed lines from the LP section of the main steam turbine;
· By pass lines from feedwater heaters to the condenser.

High Pressure (HP) bleeds and drains, consisting of the following components:
· Two bleeds from the HP section of the main steam turbine;
· Two bleeds from the MP section of the main steam turbine;
· One bleed from the LP section of the main steam turbine;
· Lines to HP boiler feedwater, deaerator, auxiliary steam turbine driving the main feedwater pump, the auxiliary steam collector and the expansion drums of the condenser and start up circuit.

3.3.2 Fuel system
Including:
3.3.2.1 Liquid fuels system (for each unit), consisting of the following components:
· Piping inside the turbine hall and the boiler building until the burners flanges.

3.3.2.2 Solid fuel system (for each unit), consisting of the following components:
· Seven (7) HP 1003 bowl mills, coal silos and solid fuel handling system from silos to burners.

3.3.2.3 Ash handling system (for each unit), consisting of the following components:
· (To be provided) ash conveyor consisting of the transition hopper, the (To be provided) belt, the sealed enclosure, the coarse crusher and the fine crusher.
· The automatic discharge system of pyrite for each coal mill until the transferable pyrite containers (included in the scope of supply).
· The mixed pressure -depression system until the transfer silos (included).

3.3.3 Cooling water system, consisting of the following components:
· Butterfly valves and actuators;
· Four (4) sea (two each unit) water pumps of the open-cycle cooling water system and service water cooling system;

3.3.4 Common auxiliary systems

Including:
3.3.4.1 Service water system, consisting of the following components:
· Piping and other equipment inside the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building.

3.3.4.2 Demineralized water system, consisting of the following components:
· Piping and other equipment inside the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building. The three pumping sets.

3.3.4.3 Closed cycle service water system, consisting of the following components:
· Piping and other equipment inside the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building.

3.3.4.4 Fire protection system, consisting of the following components:
· The distribution network and related equipment in the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building.

3.3.4.5 Compressed air system, consisting of the following components:
· The distribution network and related equipment in the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building.

3.3.4.6 Auxiliary steam system, consisting of the following components:
· The distribution network and related equipment in the turbine hall, the boiler building, the electrostatic precipitators and auxiliary building.

3.4 CHEMICAL AND POLLUTION CONTROL SYSTEMS
Including:
3.4.1 Condensate polishing system
3.4.2 Chemicals injection system
3.4.3 Sampling system and sampling room

3.5 ELECTRICAL SYSTEMS
Including:
3.5.1 Unit auxiliaries transformers
3.5.2 6.0/0.4 kV transformers for the components of systems included in the scope of supply;
3.5.3 6 kV motors for the components of systems included in the scope of supply;
3.5.4 380 V motors for the components of systems included in the scope of supply;
3.5.5 20 kV bus bars (until the terminals of main transformers);
3.5.6 6 kV switchboards: all the facilities for the units supply (boiler building, turbine hall, common auxiliaries building, electrostatic precipitators) and interface for connections with for other facilities;
3.5.7 380 V power centres
3.5.8 Motor control centres inside the boiler building, turbine hall, common auxiliaries building, electrostatic precipitators and for the systems included in the scope of supply;
3.5.9 Rectifiers
3.5.10 Inverters
3.5.11 Batteries
3.5.12 Electrical Protection System inside the boiler building, turbine hall, common auxiliaries building, electrostatic precipitators and for the systems included in the scope of supply.

3.6 AUTOMATION SYSTEMS
Including:
3.6.1 Burner Management System
3.6.2 Steam Turbine Speed Governor
3.6.3 Plant Protection System
3.6.4 Plant Control/Monitoring System including:

· Boiler-Turbine Co-ordinated Control
· Balance of Plant (BOP) Control and Miscellaneous Controls
· Plant Operative Monitoring

3.6.5 Plant Management/Maintenance System
3.6.6 Control Room, Man-Machine Interface
3.6.7 Automation Systems Diagnostics/Configuration Tools
3.6.8 Instrumentation and Actuators inside the boiler building, turbine hall, common auxiliaries building, electrostatic precipitators and for the systems included in the scope of supply.
3.6.9 Auxiliary systems automation systems.

3.7 SERVICES

For the whole Plant, the following services will be supplied:

3.7.1 Basic engineering;
3.7.2 Detailed engineering;
3.7.3 Assistance for procurement of equipment different from boiler, turbine and generator;
3.7.4 Assistance for site erection;
3.7.5 Assistance for commissioning;
3.7.6 Training of operating and maintenance staff.

4. LIMITS OF SUPPLY

The scope of supply is limited to the points or components specified in the following paragraphs, which are still included and mark the battery limits for scope of supply, described at paragraph. 3.

4.1 THERMOMECHANICAL SYSTEMS

4.1.1 Main systems

4.1.1.1 Air and gas system
· Forced draft inlet. Induced fan outlet.

4.1.1.2 Water-steam system
· Condenser flanges-outlet.

4.1.2 Fuel system

4.1.2.1 Liquid fuels system
· The piping flanges outside the boiler building.

4.1.2.2 Solid fuel system
The boiler coal silos inlet (the coal silos is included in the boiler scope of supply).

4.1.2.3 Ash handling system
· The outlet flange of the hopper of the second grinder of (To be provided) ash conveyor.
· Pyrite containers (included in the scope of supply).
· The transfer silos (included).

4.1.3 Cooling water system

4.1.3.1 Open-cycle cooling water system and service water cooling system
· The scope of supply is limited to the cooling water pumps and related butterfly valves and actuators.

4.1.4 Common auxiliary systems

4.1.4.1 Service water system
· Inlet / outlet piping flanges of the distribution system in the turbine hall, boiler building, service building, electrostatic precipitators.

4.1.4.2 Demineralised water system
· Inlet / outlet piping flanges of the distribution system in the turbine hall, boiler building, service building, electrostatic precipitators.

4.1.4.3 Closed cycle service water system
· Inlet / outlet piping flanges or the distribution system in the turbine hall, boiler building, service building, electrostatic precipitators.

4.1.4.4 Fire protection system

· The connecting flange with the distribution system or one section.

4.1.4.5 Compressed air system

· Inlet / outlet piping flanges of the distribution system in the turbine hall, boiler building, service building, electrostatic precipitators.

4.1.4.6 Auxiliary steam system

· Inlet / outlet piping flanges of the distribution system in the turbine hall, boiler building, service building, electrostatic precipitators.

4.2 ELECTRICAL SYSTEMS

4.2.1 Alternate current systems

4.2.1.1 20 kV bus bars: the main transformer terminals;

4.2.1.2 Electrical protection system: the turbine hall, the boiler building, the service building, and the electrostatic precipitators battery limits.

4.3 AUTOMATION SYSTEMS

4.3.1 Marshalling interface for the cabling of field instruments and actuators.

5. EXCLUSIONS FROM SUPPLY

The items mentioned in the following paragraphs are excluded from the scope or supply.

5.1 SITE ASSEMBLY AND ERECTION of all systems.

5.3 CIVIL WORKS for all systems.

5.4 STEEL FRAMES IN THE TURBINE HALL

5.5 THE PROCUREMENT, ACCORDING TO SPECIFICATIONS, ERECTION AND COMMISSIONING OF THE FOLLOWING SYSTEMS:

5.5.1 Main systems

5.5.1.1 Air and gas system

· Ducts and equipment to forced draft fans.

· Ducts from the induced fans outlet to stack and stack.

5.5.2 Fuel system

5.5.2.1 For all the different kind of fuels, any transport and unloading system.

5.5.2.2 Liquid fuels system

· The whole system out and until the flanges at the boiler building inlet (e.g.: piping, heaters, pumps , filters, valves, storage tanks), i.e. H.F.O. and diesel oil handling and storage system.

5.5.2.3 Solid fuels system

· The whole system until the boiler coal silos inlet (e.g.: coal handling control room, coal handling and storage system, coal belt conveyor).

5.5.2.4 Ash handling system

· The ash removal from the collector under the fine crusher of (To be provided) ash conveyor.

· The pyrite containers removal system

· The transfer carriers from the transfer silos to the storage silos; the storage silos and the unloading and removal system.

5.5.3 The open cycle cooling water system and service water cooling system, from the condenser inlet / outlet flanges with the exception of the cooling water pumps and related butterfly valves and actuators which are included in the scope of supply.

5.5.4 Common auxiliary systems

5.5.4.1 Service water system

· Inlet / outlet piping, valves and fittings outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; storage tanks, piezometric tank and pump sets.

5.5.4.2 Demineralised water system

· Inlet / outlet piping, valves, fittings and components outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; storage tanks.

5.5.4.3 Closed cycle service water cooling system

· Inlet / outlet piping, valves, fittings and components outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; piezometric tank and pumps.

5.5.4.4 Fire protection system

· Inlet / outlet piping, valves, fittings and components outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; autoclave, pumps, storage tanks and compressors.

5.5.4.5 Compressed air system

· Inlet / outlet piping, valves, fittings and components outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; three rotary air compressors; a diesel driven compressor; six air storage tanks; two coolers; two driers; piping, valves, fittings and filters; two centrifugal air compressors; two buffer air storage tanks.

5.5.4.6 Auxiliary steam system

· Inlet / outlet piping, valves, fittings and components outside the turbine hall, boiler building, auxiliaries building, electrostatic precipitators; the auxiliary steam boilers.

5.5.4.7 Water and Air conditioning and ventilation system

· The entire system.

5.5.4.8 Waste water collection system

· The entire system.

5.5.5 Chemical and pollution control systems

5.5.5.1 The entire raw water and make up water production and storage.

5.5.5.2 The entire waste water treatment

5.5.6 Automation systems

5.5.6.1 The cables and the related cable trays, the installation of cables and cable trays from the automation systems to instrumentation.

5.5.6.2 The connections from instrumentation to process.

5.5.7 Electric systems

5.5.7.1 Main transformers

5.5.7.2 6.0 / 0.4 kV transformers for systems and areas not included in the scope of supply.

5.5.7.3 6 kV motors and 380 V motors for equipment of systems and areas not included in the scope of supply.

5.5.7.4 Emergency diesel generation

5.5.7.5 6 kV switchboards: all the connections with facilities other than those for the units supply (i.e. other than boiler building, turbine hall, common auxiliaries building, electrostatic precipitators).

5.5.7.6 Motor control centres outside the boiler building, turbine hall, common auxiliaries building, electrostatic precipitators and for systems not included in the scope of supply.

5.5.7.7 Cables and cable trays far 6 kV and 380 V AC current systems, 110 V and 220 V systems and logics supply systems.

5.5.7.8 Electrical Protection System outside the boiler building, turbine hall, common auxiliaries building, electrostatic precipitators and for systems not included in the scope of supply.

5.6 THE DESIGN, PROCUREMENT, ERECTION AND COMMISSIONING OF FOLLOWING AREAS AND RELATED SYSTEMS:

· Canteen;
· Reception and dressing room;
· Stack and gas ducts from electrostatic precipitators;
· Switchyard;
· Acid or alkaline water settlement basin;
· Administration and service building;
· Shared auxiliary building and shared auxiliaries;
· Waste treatment equipment;
· Heavy material warehouse;

· Circulating water treatment.

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EXHIBIT B

Electrical Equipment

Generator Transformers

MVA rating:	776
N/L ratio kV:	432/23.6
Type of cooling:	OFW
Tap change %:	-17.6/+2.22

Unit Transformers

MVA rating:	50
N/L ratio kV:	23.5/11.7
Type of cooling:	ONAN
Tap change %:	+5/-5

Auxiliary Transformers

MVA rating:	10
N/L ratio kV:	11/3.45
Type of cooling:	ONAN
Tap change %:	+5/-5

Services Transformer

MVA rating:	1.5
N/L ratio kV:	9.3/0.433
Type of cooling:	ONAN or AN
Tap change %:	+5/-5

Switchgear

11kV fault rating:	750 MVA
3.5kV fault rating:	150 MVA
415V fault rating:	31 MVA

Motors

11kV motors:	932 kW and above
3.5kV motors:	149 kW and above
415V motors:	Up to 149 kW

Generator Load Switch

Load switch voltage:	23.5 kV
Rated current:	24 kA
Rated without cooling:	12 kA
Operating air pressure:	27.9 bar
Lock out close pressure:	26.9 bar
Lock out open pressure:	21.6 bar

L.P. safety valve settings:	31.4 bar
28.4 bar	
Standby pump start:	27.5 bar (pump discharge)
H.R.F. pressure trip:	30.0 bar (system)
Main filter bank differential:	2.4 bar
Alarm	
Main filter bank differential:	4.1 bar

Protection

Armed	Deload	Trip
Vacuum	840 mbar	748 mbar
Steam pressure	137.8 bar	127.5 bar
Lubricating oil	275 mbar	

Generator

Generated output:	795 MVA
Power factor:	0.85
Terminal voltage:	22.5 kV
Phase current:	19,538 A
Speed:	3,000 RPM
Total losses:	9.93 MW
H2 Pressure:	4.65 bar
Generator heaters (4 off):	2 kW
Heater operating range:	22 - 25 degrees C.
Main exciter speed:	3,000 rev/min
Exciter line voltage:	63 v
Exciter line current:	41 000A
Ceiling line voltage:	1000V
Number of phases:	3 of 100 Hz
p.m. generator speed:	3,000 rev/min
Generator output voltage:	210V
Generator output current:	3.0A
Number of phases:	1 at 300 Hz
Main rectifier:	600V at 4550A
Main rectifier ceiling:	920V at 6900A

Serious inquiries only. No tire kickers accepted.