THE ISLAMIC REPUBLIC OF PAKISTAN

DETAILED DESIGN STUDY
ON
WEST WHARF
THERMAL POWER PLANT PROJECT

FINAL REPORT-II

LOT I (VOLUME 2)

JANUARY 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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TENDERER'S DATA SHEET

(UNIT 1)

SECTION I

POWER PLANT UNIT

SECTION-I: POWER PLANT UNIT

Tenderer's Data Sheet

_____
(Tenderer's Name)

I. POWER PLANT UNIT

1. Guaranteed Plant Performance

1.1 Average net plant heat rate

(1) Guaranteed average net plant heat rate (kcal/kWh) (Weighted average of net plant heat rates) _____ or less

(2) Net plant heat rate (kcal/kWh)

at rated output (MW) _____

at 75% of rated output (MW) _____

at 50% of rated output (MW) _____

1.2 Maximum Continuous Load

Generator output (kW) _____

Main steam pressure at turbine throttle (kg/cm^2g) _____

Main steam temperature at turbine throttle (^oC) _____

Reheat steam temperature at reheat stop valve (^oC) _____

Condenser pressure (mmHg abs.) _____

Make-up water (%) _____

Power factor _____

1.3 Capability (4/4 load)

Generator output (kW) _____

Main steam pressure at turbine throttle (kg/cm^2g) _____

Main steam temperature at turbine throttle (^oC) _____

Reheat steam temperature at reheat stop valve (^oC) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Condenser pressure (mmHg abs.) _____

Make-up water (%) _____

Power factor _____

1.4 Minimum Load

Generator output (kW) _____

Main steam pressure at turbine throttle (kg/cm^2g) _____

Main steam temperature at turbine throttle (^oC) _____

Reheat steam temperature at reheat stop valve (^oC) _____

Condenser pressure (mmHg.abs) _____

Make-up water (%) _____

Power factor _____

1.5 Auxiliary Load (House Load)

At rated output (kW) _____

At 75% of rated output (kW) _____

At 50% of rated output (kW) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

2. Plant Starting Time

	Cold start	Start after 8 hour shutdown	Start directly after MFT
From light-off - Steam admission to turbine (min)	_____	_____	_____
Steam admission - Synchronizing to turbine (min)	_____	_____	_____
Synchronizing - Full load (min)	_____	_____	_____
Total time (min)	_____	_____	_____

SECTION II

STEAM GENERATOR AND AUXILIARY EQUIPMENT

SECTION-II: STEAM GENERATOR AND AUXILIARY EQUIPMENT

Tenderer's Data Sheet

_____
(Tenderer's Name)

II. STEAM GENERATOR AND AUXILIARY EQUIPMENT

Note: The Contractor shall guarantee the values with * marks.

1. STEAM GENERATOR

(1) Type _____

(2) Manufacturer _____

(3) Number _____

(4) Steam generating capacity at plant maximum load (kg/h) * _____

(5) Design pressure (bar) _____

(6) Design temperature (^{o}C) _____

Superheater outlet _____

Reheater outlet _____

(7) Furnace release rate at maximum load

Note: Use the definition of American Boiler Manufacturer's Association for the furnace release rate.

Heat available in the furnace (kcal/h) _____

Heat absorbing surface (m^2) _____

Furnace release rate (kcal/h/m^2) _____

(8) Total weight (t) approx. _____

Steam generator complete except steel structure (t) _____

Drum (t) _____

Boiler supporting steel structure (t) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(9) Holding water capacity

Normal operation (m^3) _____

Hydrostatic test (m^3) _____

(10) Maximum size for shipping (max. m) _____

Name of part _____

(11) Maximum weight for shipping
(tons) approx. _____

Name of part _____

Tenderer's Data Sheet

(Tenderer's Name)

(13) Performance data of steam generator

Load Items	Dimension	Minimum Load ( )MW	50% ( )MW	75% ( )MW	ECR ( )MW	Capability ( )MW	Maximum Load ( )MW
Steam generation	(kg/h)						
Drum pressure	(kg/cm^2g)						
SH outlet pressure	(kg/cm^2g)						
RH outlet pressure	(kg/cm^2g)						
Econ. inlet pressure	(kg/cm^2g)						
SH outlet temperature	(^oC)						
RH outlet temperature	(^oC)						
Steam generator efficiency	(%)						
Feedwater temperature at Econ. inlet	(^oC)						
Fuel oil consumption	(kg/h)						
High calorific value	(kcal/kg)						
Furnace liberation rate	($kcal/h/m^3$)						
Furnace release rate	($kcal/h/m^2$)						
Air flow at AH inlet	(kg/h)						
Air flow at AH outlet	(kg/h)						
Gas flow at AH inlet	(kg/h)						
Gas flow at AH outlet	(kg/h)						
Excess air	(%)						
CO_2 leaving steam generator	(%)						

Tenderer's Data Sheet

(Tenderer's Name)

Load Items	Dimension	Minimum Load ( )MW	50% ( )MW	75% ( )MW	ECR ( )MW	Capability ( )MW	Maximum Load ( )MW
Feedwater flow	(kg/h)						
SH spray water flow	(kg/h)						
RH spray water flow	(kg/h)						
Gas temp. at furnace outlet	(^{o}C)						
Gas temp. at RH inlet	(^{o}C)						
Gas temp. at RH outlet	(^{o}C)						
Gas temp. at Econ. inlet	(^{o}C)						
Gas temp. at Econ. outlet	(^{o}C)						
Gas temp. at AH outlet	(^{o}C)						
Air temp. at FDF outlet	(^{o}C)						
Air temp. at SCAH outlet	(^{o}C)						
Air temp. at AH outlet	(^{o}C)						
Number of burners in use							
Draft at FDF outlet	(mm H^2O)						
Draft at wind box	(mm H^2O)						
Draft at furnace	(mm H^2O)						
Draft at Econ. outlet	(mm H^2O)						
Draft at AH outlet	(mm H^2O)						
Draft at stack inlet	(mm H^2O)						
Solids in steam at SH outlet	(ppm)						

Note: Steam generation shall be met completely with the throttle steam flow of steam turbine.

Tenderer's Data Sheet

_____
(Tenderer's Name)

(14) Guaranteed performance data

(a) Steam generator efficiency at ECR * _____

Heat losses of steam generator at ECR (%)

Total _____

Heat loss due to heat in dry flue gas _____

Heat loss due to moisture in the fuel _____

Heat loss due to moisture from burning hydrogen _____

Heat loss due to moisture in the combustion air _____

Heat loss due to heat in atomizing steam _____

Heat loss due to the formation of carbon monoxide _____

Heat loss due to radiation and convection _____

Heat loss due to un-counting losses _____

(b) Steam generating capacity

Plant maximum load (Kg/h) * _____

MCR (Kg/h) * _____

(c) Steam pressure at H.P. turbine inlet

Maximum load *___ kg/cm^2g ± _____ kg/cm^2g

Capability *___ kg/cm^2g ± _____ kg/cm^2g

ECR *___ kg/cm^2g ± _____ kg/cm^2g

75% load *___ kg/cm^2g ± _____ kg/cm^2g

50% load	*___ kg/cm^2g ± _____ kg/cm^2g
Minimum load	*___ kg/cm^2g ± _____ kg/cm^2g

(d) Steam temperature at H.P. turbine inlet

Maximum load	* 538°C ± _____ °C
MCR	* 538°C ± _____ °C
ECR	* 538°C ± _____ °C
75% load	* 538°C ± _____ °C
50% load	* 538°C ± _____ °C
Minimum load	± _____ °C

(e) Steam pressure at I.P. turbine inlet

Maximum load	____ kg/cm^2g ± _____ kg/cm^2g
MCR	____ kg/cm^2g ± _____ kg/cm^2g
ECR	____ kg/cm^2g ± _____ kg/cm^2g
75% load	____ kg/cm^2g ± _____ kg/cm^2g
50% load	____ kg/cm^2g + _____ kg/cm^2g
Minimum load	____ kg/cm^2g ± _____ kg/cm^2g

(f) Steam temperature at I.P. turbine inlet

Maximum load	*___ °C ± ____ °C
MCR	*___ °C ± ____ °C
ECR	*___ °C ± ____ °C
75% load	*___ °C ± ____ °C
50% load	*___ °C ± ____ °C
Minimum load	____ °C ± ____ °C

Tenderer's Data Sheet

_____
(Tenderer's Name)

(15) Furnace and boiler

Furnace surface	(m^2)		
Furnace volume	(m^3)		
Tube		Furnace	Boiler
Diameter	(mm)		
Thickness	(mm)		
Material			
Header		Furnace	Boiler
Diameter	(mm)		
Thickness	(mm)		
Material			
Number			
Manhole number and size	(mm)	_____, _____ x _____	

(16) Data for steam generator at all high pressure feedwater heater bypass operation

Generator output	(MW)		
Steam generation	(T/h)		
Main steam temperature at turbine inlet	(^oC)		
Reheat steam temperature at turbine inlet	(^oC)		
Boiler metal temperature at the most highest parts and its name (area)	(^oC)		
Feedwater temperature at the economizer inlet	(^oC)		
Spray water flow	(T/h)	_____, (SH)	_____ (RH)

Tenderer's Data Sheet

_____
(Tenderer's Name)

(17) Drum (steam drum)

Internal diameter	(mm)	_____
Thickness	(mm)	_____
Length	(mm)	_____
Material		_____
Manhole size	(mm)	_____ x _____
Number of thermocouples for metal temperature		_____

(18) Economizer

Type (include supporting method)		_____
Heating surface	(m^2)	_____
Tube		
Distance between tube and tube	(mm)	_____
Diameter	(mm)	_____ OD
Thickness	(mm)	_____
Material		_____
Header		
Number		_____
Diameter	(mm)	_____ OD
Thickness	(mm)	_____
Length	(mm)	_____
Material		_____
Manhole number and size	(mm)	_____, _____ x _____
Bypass line of economizer		Yes No

Tenderer's Data Sheet

_____
(Tenderer's Name)

(19) Superheater and attemperator

		Primary	Secondary	Final
Type of superheater				
Heating surface	(m^2)			
Radiant				
Radiant & convection				
Convection				
Tube		Primary	Secondary	Final
Distance between tube and tube	(mm)			
Diameter	(mm OD)			
Thickness	(mm)			
Material				
Header				
Number				
Diameter	(mm)			
Thickness	(mm)			
Material				
Size of outlet connection nozzles (mm in nominal)				
Spacer material				
Number of thermocouples for metal temperature				
Steam temperature control range				
Attemperator				
Type				
Number				

Tenderer's Data Sheet

_____
(Tenderer's Name)

(20) Reheater and attemperator

		Primary	Secondary	Final
Type of reheater				
Heating surface	(m^2)			
Radiant				
Radiant and convection				
Convection				
Tube				
Distance between tube and tube	(mm)			
Diameter	(mm OD)			
Thickness	(mm)			
Material				
Header				
Number				
Diameter	(mm)			
Thickness	(mm)			
Material				
Size of outlet connection nozzle	(mm in nominal)			
Spacer material				
Number of thermocouples for metal temperature				
Steam temperature control range				
Attemperator				
Type				
Number				
Material				

Tenderer's Date Sheet

_____
(Tenderer's Name)

		Inner	Outer
(21)	Casing		
	Material	_____	_____
	Thickness (mm)	_____	_____
	Total number of inspection hole (peep hole) for steam generator	_____	
(22)	Total number of valve		
	Safety valve number and type		
	Drum	_____	
	Superheater including PCV	_____	
	Reheater	_____	
(23)	Gas air preheater		
	Type	_____	
	Manufacturer	_____	
	Number	_____	
	Total heating surface of gas side per set (m^2)	_____	
	Speed (rpm)	_____	
	Material and thickness (mm)	_____	
	Hot end	_____,	_____ mm
	Intermediate	_____,	_____ mm
	Cold end	_____,	_____ mm
	Housing	_____,	_____ mm
	Weight complete (t/each)	_____	

Tenderer's Data Sheet

_____
(Tenderer's Name)

(24) Steam coil air preheater

Type _____

Manufacturer _____

Number _____

Heating surface (each coil) (m^2) _____

Number of heating section _____

Tube

Material _____

Diameter (mm OD) _____

Thickness (mm) _____

(25) Oil burners and igniters

(a) Burner

Type _____

Manufacturer _____

Number _____

Capacity (kg/h each)
(Nm^3/h each)

Heavy fuel oil _____

Warm-up gas _____

Pressure (kg/cm^2g)

Heavy fuel oil _____

Warm-up gas _____

Atomizing steam

Pressure (kg/cm^2g) _____

Capacity (kg/h each) _____

(Tenderer's Name)

Available viscosity of heavy fuel oil at burner inlet _____

Turn down ratio, each burner _____

Minimum number of burner in service at MCR

(b) Igniter

Type _____

Manufacturer _____

Number _____

Capacity (Nm^3/h each) _____

Gas pressure (kg/cm^2g) _____

(c) Flame detector

Type _____

Manufacturer _____

Number _____

(d) Burner valve

Type _____

Manufacturer _____

Number _____

(26) Soot blower

Type _____

Manufacturer _____

Number

Superheater _____

Reheater _____

Economizer _____

Air preheater _____

(Tenderer's Name) _____

Other _____

Steam requirement for retractable soot blower

Steam flow (kg/h) _____

Steam pressure (kg/cm^2g) _____

Steam temperature (^oC) _____

Control method _____

(27) Blow down tank

Type _____

Number _____

Tank capacity (m^3) _____

Design pressure (kg/cm^2g) _____

Design temperature (^oC) _____

(28) Air and flue gas duct

(a) Air duct

Material _____

Thickness (mm) _____

(b) Flue gas duct _____

Material _____

Thickness (mm) _____

Measures against corrosion _____

(c) Soot hopper

Material _____

Thickness (mm) _____

(29) Forced draft fan

	FDF	IDF
Type and Model No.	_____	_____

Tenderer's Data Sheet

(Tenderer's Name)

Manufacturer			
Number			
Operating speed	(rpm)		
Capacity per set	(m^3/min)		
Static pressure	(mmH_2O)		
Air temperature	(^oC)	/	
Shaft horse power	(kW)	/	
Efficiency	(%)	/	
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.	
Noise at 1m distance;	dB(A)		
Weight			
Rotor	(t/each)		
Motor	(t/each)		
Complete	(t/each)		

(30) Gas recirculation fan or gas injection fan

Type and Model No.		
Manufacturer		
Number		
Operating speed	(rpm)	
Capacity	(m^3/min)	
Static pressure	(mmH_2O)	
Gas temperature	(^oC)	
Shaft horse power	(kW)	
Efficiency	(%)	

_____
(Tenderer's Name)

Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Noise	(dB)	_____
Weight		
Rotor	(kg/set)	_____
Motor	(kg/set)	_____
Complete	(kg/set)	_____

(31) Boiler water circulating pump (If necessary)

Type		_____
Manufacturer		_____
Number		_____
Operating speed	(rpm)	_____
Capacity per set	(m^3/min)	_____
Total head	(m)	_____
Boiler water pressure	(kg/cm^2g)	_____
Boiler water temperature	(^oC)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Type of shaft seal		_____
Material of seal		_____
Seal water from		_____
Material		
Casing		_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Impeller _____

Shaft _____

(32) Heavy fuel oil facilities

(a) Heavy fuel oil service tank

Type _____

Number _____

Capacity (kl) _____

Diameter (mm) _____

Height (mm) _____

Thickness

Bottom plate (mm) _____

Shell plate (mm) _____

Roof plate (mm) _____

Material

Number of courses _____

Painting material _____

Weight complete (kg) approx. _____

Material and size of heating coils (mm) _____

Heating area per unit volume of the tank (m^2/m^3) _____

(b) Heavy fuel oil pump

Type _____

Manufacturer _____

Number _____

Capacity (kg/h) _____

Suction pressure (m) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Discharge pressure	(kg/cm^2g)	_____
Viscosity range	(cst)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Speed	(rpm)	_____
Type of shaft seal		_____

(c) Heavy fuel oil heater

Type		_____
Manufacturer		_____
Number		_____
Heating surface	(m^2)	_____
Oil flow	(kg/h)	_____
Oil pressure	(kg/cm^2g)	_____
Steam flow	(kg/h)	_____
Steam pressure	(kg/cm^2g)	_____
Inlet oil temperature	(^oC)	_____
Outlet oil temperature	(^oC)	_____
Temperature of condensate	(^oC)	_____
Material		
Tube		_____
Shell		_____
Diameter x Thickness		
Tube	(mm)	_____ x _____
Shell	(mm)	_____ x _____

Fluid in tubes _____

Heat transfer coefficient (Kcal/m^2h^oC) _____

(d) Heavy fuel oil flow meter with Strainer

Type _____

Manufacturer _____

Number _____

Available flow range (Kl/h) _____

Accuracy (%) _____

Screen material and mesh _____

(33) Seal air booster fan

Type _____

Manufacturer _____

Number _____

Capaciy (m^3/min) _____

Static pressure (mmH_2O) _____

Design temperature (^oC) _____

Shaft horse power (kW) _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

(34) Flame detector and television camera cooling air fan

Type _____

Manufacturer _____

Number _____

Capacity (m^3/min) _____

Static pressure (mmH_2O) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Design temperature	(^{o}C)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

(35) Steam generator supporting steel structure

Type		_____	
Manufacturer		_____	
Total weight	(kg) approx.	_____	
Size of steel structure		Boiler area	AH area
Height	(m)	_____	_____
Width	(m)	_____	_____
Depth	(m)	_____	_____

Tenderer's Data Sheet ______________________ (Tenderer's Name)

2. STEAM CONVERTER SYSTEM

(1) Steam converter with deaerator

Type		______
Manufacturer		______
Number		______
Heating surface	(m^2)	______
Heating steam flow	(kg/h)	______
Maximum heating pressure	(kg/cm^2g)	______
Maximum heating temperature	(^oC)	______
Heating steam drain outlet temp.	(^oC)	______
Secondary steam flow	(kg/h)	* ______
Secondary steam pressure	(kg/cm2g)	* ______
Feed water inlet temperature	(^oC)	______
Weight complete	(in dry) approx.	______
Weight complete	(in service) approx.	______

(2) Steam converter drain cooler

Type		______
Manufacturer		______
Number of set		______
Heating surface	(m^2)	______
Heating drain flow	(kg/h)	______
Heating drain inlet temp.	(^oC)	______

Heating drain outlet temp.	(^{o}C)	
Heating drain outlet pressure	(kg/cm^{2}g)	
Feed water flow	(m^{3}/h)	
Feed water inlet temp.	(^{o}C)	
Feed water outlet temp.	(^{o}C)	
Fluid in tubes		
Weight complete (in dry) approx.		
Weight complete (in service) approx.		

(3) Steam converter condensate drain tank

Type		
Number of set		
Size - Wide(m) x Length(m) x Height(m)		_____ x _____ x _____
Capacity in normal operation	(m^{3})	

(4) Steam converter feed water pump

Type		
Manufacturer		
Number of set		
Capacity	(m^{3}/h)	
Suction head	(m)	
Discharge head	(kg/cm^{2}g)	
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

(Tenderer's Name)

Feed water maximum temp. (^{o}C) _____

Material

Casing _____

Impeller _____

Shaft _____

Type of gland seal _____

Material of gland seal _____

(5) Pressure control valve and level control valve

	Heating steam P.C. valve	Steam drain L.C. valve	Feed water L.C. valve
Type			
Manufacturer			
Number of set			
Maximum flow (m^3/h)			
Minimum controlable flow (m^3/h)			
Material			
Body			
Disc			
Seat			
Stem			

(6) Control panel

Type _____

Height x Width x Depth (m) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

3. INSTRUMENT AIR SYSTEM

(1) Air compressor

Type		_____
Manufacturer		_____
Number		_____
Cylinder number x cylinder diameter	(mm)	_____ x _____
Stroke	(mm)	_____
Speed	(rpm)	_____
Capacity (m^3/min at free air)		* _____
Suction pressure	(mm bar)	_____
Discharge pressure	(kg/cm^2g)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Material

Frame and cylinder	_____
Cross head	_____
Piston	_____
Piston ring	_____
Connecting rod	_____
Crank shaft	_____
Valve seat	_____
Valve plate	_____
Valve spring	_____

7-32

Tenderer's Data Sheet

_____
(Tenderer's Name)

Weight approximate

Compressor	(kg/each)	_____
Motor	(kg/each)	_____
Complete set	(kg/each)	_____

(2) After cooler

Type		_____
Number		_____
Capacity (m^3/min at free air)		_____
Material		
Tube		_____
Shell		_____
Diameter		
Tube	(mm OD)	_____
Shell	(mm OD)	_____
Thickness		
Tube	(mm)	_____
Shell	(mm)	_____
Length	(mm)	_____
Outlet air temp.	(^oC)	_____
Outlet cooling water temp.	(^oC)	_____
Weight complete (kg/each) approx.		_____

(3) Air receiver

Type		_____
Number		_____
Capacity	(m^3)	_____
Diameter	(mm)	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Height (mm) _____

Design pressure (kg/cm^2g) _____

Material _____

Shell thickness (mm) _____

Weight complete (kg) approx. _____

(4) Air dryer

Type _____

Manufacturer _____

Number _____

Capacity (m^3/min at free air) _____

Air pressure (kg/cm^2g) _____

Dimension

Height (mm) _____

Width (mm) _____

Depth (mm) _____

Number of gas compressor _____

Dew point of discharge air (^oC) _____

Discharge air temp. (^oC) _____

Weight (kg/each) approx. _____

(5) Pressure regulator and air filter set

Type _____

Manufacturer _____

Air filter

Type _____

Manufacturer _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(6) Control panel

Type		_____
Height	(mm)	_____
Width	(mm)	_____
Depth	(mm)	_____
Weight complete	(kg) approx.	_____

(7) Divided package number for shipping _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

4. SERVICE AIR SYSTEM

(1) Air compressor

Type		_____
Manufacturer		_____
Number		_____
Cylinder number x cylinder diameter	(mm)	_____ x _____
Stroke	(mm)	_____
Speed	(rpm)	_____
Capacity	(m^3/min at free air)	_____
Suction pressure	(mm bar)	_____
Discharge pressure	(kg/cm^2g)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Complete weight	(kg/set)	_____

(2) Inter cooler

Type		_____
Number		_____
Capacity	(m^3/min at free air)	_____
Material		
Tube		_____
Shell		_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Diameter x Thickness

Tube	(mm)	_____ x _____
Shell	(mm)	_____ x _____
Outlet air temp.	(^{o}C)	_____
Outlet cooling water temp.	(^{o}C)	_____

(3) After cooler

Type		_____
Number		_____
Capacity	(m^3/min at free air)	_____

Material

Tube		_____
Shell		_____

Diameter x Thickness

Tube	(mm)	_____ x _____
Shell	(mm)	_____ x _____
Outlet air temp.	(^{o}C)	_____

(4) Air receiver

Type		_____
Number		_____
Capacity	(m^3)	_____
Diameter	(mm)	_____
Height	(mm)	_____
Design pressure	(kg/cm^2g)	_____
Shell thickness	(mm)	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(5) Control panel

Type _____

Number _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

5. CHEMICAL FEED SYSTEM

(1) Hydrazine solution pump

Type _____

Manufacturer _____

Number _____

Capacity (max. l/min) _____

Type of stroke adjustment _____

Range of adjustment (%) _____ to _____

Discharge pressure (max. kg/cm^2g) _____

Connection size

Suction (mm) _____

Discharge (mm) _____

Material

Cylinder _____

Ball check _____

Ball seat _____

Plunger _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg/each) approx. _____

(2) Hydrazine solution tank

	Diluted	Concentrated
Type	_____	_____
Manufacturer	_____	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

		Diluted	Concentrated
Number			
Capacity	(l)		
Size			
Inside diameter	(mm)		
Height	(mm)		
Thickness	(mm)		
Material			
Measuring tank			
Capacity	(l)		
Size (W x D x H)	(mm)		
Material			
Number			

		Diluted	Concentrated
Hand pump			
Number			
Capacity	(l/min)		
Weight complete (kg/each) approx.			

(3) Phosphate solution pump

Type	
Manufacturer	
Number	
Capacity (max. l/min)	
Capacity adjustment variable	
Type of adjustment provided	
Discharge pressure (max. kg/cm^2g)	

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Connection size

Suction (mm) _____

Discharge (mm) _____

Material

Cylinder _____

Ball check _____

Ball seat _____

Plunger _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg/each) approx. _____

(4) Phosphate solution tank

Type _____

Manufacturer _____

Number _____

Capacity (l) _____

Size

Inside diameter (mm) _____

Height (mm) _____

Thickness (mm) _____

Material _____

_____
(Tenderer's Name)

Dissolving screen material		_____
Agitator		_____
Type		_____
Number		_____
Speed	(rpm)	_____
Material		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight complete (kg/each) approx.		_____

(5) Ammonium solution tank

Type		_____
Manufacturer		_____
Number		_____
Capacity	(l)	_____
Size		_____
Inside diameter	(mm)	_____
Height	(mm)	_____
Thickness	(mm)	_____
Material		_____

(6) Ammonium dissolving equipment

Dissolving method		_____
Conductivity meter		
Manufacturer		_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Number _____

Range _____

Type _____

Pressure reducing valve

Type _____

Reducing range _____

Number _____

Piping material _____

(7) Ammonium solution pump

Type _____

Manufacturer _____

Number _____

Capacity (max. l/min) _____

Capacity adjustment variable _____

Type of adjustment provided _____

Discharge pressure (max. kg/cm^2g) _____

Motor

The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Connection size

Suction (mm) _____

Discharge (mm) _____

Material

Cylinder _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight complete	(kg) approx.	_____

(8) Control panel

Type		_____
Height	(mm)	_____
Width	(mm)	_____
Depth	(mm)	_____
Weight	(kg) approx.	_____

(9) Chemical feed pump stroke controller at CCR

Type	_____
Manufacturer	_____
Range	_____
Number	_____
Control System block diagram by No.	_____

(10) Electric power source

kW	_____
Voltage	_____
Phase	_____

(11) Divided package number for shipping _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

6. SAMPLING RACK SYSTEM

(1) Sampling rack

Type _____

Manufacturer _____

Number _____

Analyzer

pH

Type _____

Manufacturer _____

Number _____

Range _____

Conductivity

Type _____

Manufacturer _____

Number _____

Range _____

Dissolved oxygen

Type _____

Manufacturer _____

Number _____

Range _____

Hydrazine

Type _____

Manufacturer _____

Number _____

Range _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Pressure reducing valve

Type _____

Material _____

Size of sampling rack

Length (mm) _____

Width (mm) _____

Height (mm) _____

Weight complete (kg) approx. _____

(2) Recorder and indicator

	Recorder (Control room)	Indicator (Local)
(a) pH		
Type	_____	_____
Manufacturer	_____	_____
Number	_____	_____
Number of pen	_____	_____
Range	_____	_____
(b) Conductivity		
Type	_____	_____
Manufacturer	_____	_____
Number	_____	_____
Number of pen	_____	_____
Range	_____	_____

Tenderer's Data Sheet

(Tenderer's Name)

	Recorder (Control room)	Indicator (Local)
(c) Oxygen and hydrazine		
Type		
Manufacturer		
Number		
Number of pen		
Range		
(3) Uni-sampler		
Type		
Number		
Manufacturer		
Weight (kg) approx.		
(4) Electric power source		
kW		
Voltage		
Phase		
(5) Divided package number for shipping		
(6) Aut flow control valve		
Type		
Number		
Manufacturer		
Power souce		

Tenderer's Data Sheet _____
(Tenderer's Name)

7. PIPING FOR STEAM GENERATOR AND AUXILIARY EQUIPMENT

		Material	Size (mm)
(1)	Auxiliary steam piping		
	From secondary superheater inlet - HP auxiliary steam control valve	_____	_____
	HP auxiliary steam control valve - HP auxiliary steam header	_____	_____
	From cold reheat pipe to HP auxiliary steam header	_____	_____

(2) Motor operating valves

	Soot blowing steam line	Burner atomizing steam line	H.P. aux. steam line
Type of valve	_____	_____	_____
Manufacturer	_____	_____	_____
Pressure rating	_____	_____	_____
Material	_____	_____	_____
Number of valve	_____	_____	_____

(3) Main steam piping

Material and size	(mm)	_____	_____
Design pressure	(kg/cm^2g)	_____	
Design temperature	(^oC)	_____	
Schedule (thickness)	(mm)	_____	
Calculation thickness	(mm)	_____	

(4) Reheater inlet steam piping

Material and size	(mm)	_____	_____
Design pressure	(kg/cm^2g)	_____	
Design temperature	(^oC)	_____	
Schedule (thickness)	(mm)	_____	
Calculation thickness	(mm)	_____	

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Tenderer's Data Sheet

_____
(Tenderer's Name)

(5) Reheater outlet steam piping

Material and size	(mm)	_____	_____
Design pressure	(kg/cm^2g)	_____	
Design temperature	(^oC)	_____	
Schedule (thickness)	(mm)	_____	
Calculation thickness	(mm)	_____	

(6) Turbine by-pass piping

	Thickness (mm)	Material	Size (mm)
(a) Main steam to pressure control valve	_____	_____	_____
(b) Pressure control valve to attemperator	_____	_____	_____
(c) Attemperator to reheat inlet pipe	_____	_____	_____

(7) Automatic control valves on H.P. turbine by-pass line

		On-off valve	Pressure control valve
Type		_____	_____
Manufacturer		_____	_____
Number of set		_____	_____
Size	(mm)	_____	_____
Maximum flow	(kg/h)	_____	_____
Pressure control	(kg/cm^2g)	_____	_____
Material			
Body		_____	_____
Disc		_____	_____
Seat		_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

		On-off valve	Pressure control valve
	Stem		
	Noise (As a complete set) (dB (A))		
	Weight (kg) approx.		
(8)	Feedwater piping		
	Material and size (mm)		
	Design pressure (kg/cm^2g)		
	Schedule (thickness) (mm)		
(9)	Chemical feed piping	Material	Size (mm)
	Diluted water pipe		
	Chemical feed pipe		
	For drum		
	For deaerator		
	For condensate pump outlet		
(10)	Sampling piping	Material	Size (mm)
	Sampling pipe		

Tenderer's Data Sheet

_____
(Tenderer's Name)

8. INSULATION FOR STEAM GENERATOR AND AUXILIARY EQUIPMENT

		Heat transfer coefficient (kcal/mh^{o}C)	Maximum allowable temperature (^{o}C)
(1)	Heat insulation material		
	Calcium silicate		
	Rock wool		
	Hard cement		
	Calcium silicate paste		
	Other materials ( )		
(2)	Insulation material		
	Boiler drum		
	Header		
	Wall tube (Furnace)		
	Wall tube (Convection)		
	Ceiling		
	Bottom		
	Air duct and wind box		
	Flue gas duct and soot hoppers		
	Steam coil air preheater		
	Air preheater		
	Residual oil heater		

Tenderer's Data Sheet

_____
(Tenderer's Name)

Blow down tank _____

_____

Piping

Main steam _____

Turbine by-pass _____

Reheater inlet steam _____

Reheater outlet steam _____

Feedwater _____

Spray water _____

Residual oil _____

Auxiliary steam _____

Drain vent and vent _____

Wash water _____

(3) Description of safety insulation _____

_____

_____

_____

_____

(4) Lagging and jacketing

Material _____

Thickness (mm) _____

(5) Total weight of the insulation materials (ton) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

9. PAINTING FOR STEAM GENERATOR AND AUXILIARY EQUIPMENT

		Kind of paint	
		Primary painting	Finished painting
(1)	Steam generator		
(2)	Drum		
(3)	Header		
(4)	Tube		
(5)	Casing (inner)		
(6)	Casing (outer)		
(7)	Air duct		
(8)	Gas duct		
(9)	Forced draft fan		
(10)	Steam coil air preheater		
(11)	Air preheater		
(12)	Steel structure		
(13)	Heavy fuel oil and diesel oil service tank		
(14)	Heavy fuel oil pump		
(15)	Diesel oil pump		
(16)	Heavy fuel oil heater		
(17)	Blow down tank		
(18)	Steam converter		
(19)	Steam converter drain tank		
(20)	Steam converter drain cooler		
(21)	Steam converter feedwater tank		
(22)	Steam converter feed water pump		

Tenderer's Data Sheet

_____
(Tenderer's Name)

		Kind of paint	
		Primary painting	Finished painting
(23)	GRF or GIF	_____	_____
(24)	Boiler water circulating pump (if necessary)	_____	_____
(25)	Insulated piping	_____	_____
		_____	_____
(26)	Uninsulated piping	_____	_____

10. INSTRUMENTATION

10.1 BOILER CONTROL SYSTEM

(1) Type _____

(2) Signal range (From/to another system) Analog _____ Degital _____

(3) Manufacturer, Model No. _____

(4) Number _____

(5) System cabinet

Dimension (mm) W x D x H _____ x _____ x _____

Grounding wire _____

Anti-vibration rubber Yes _____ No _____

(6) Transmitter & actuator type _____

_____

(7) Control system block diagram with main interlock system by No. _____

(8) Power supply system block diagram by No. _____

(9) Outline arrangement of unit master man-machine communication device by No. _____

(10) Operating condition of digital control system

Temp. _____ °C ~ _____ °C

Humidity _____ % ~ _____ %

(11) Power source and consumption

DC _____ V _____ W

AC _____ V _____ VA W

Air _____ Nm^3/min

(12) Control ability

Automatic control range Yes _____ No _____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

	Control accuracy		
	Pressure (less than ± 2 kg/cm^2)	Yes	No
	Temperature (less than $\pm 5^{o}$C)	Yes	No
	Drum level (less than ± 50 mm) or one-third of alarm range)	Yes	No
(13)	MTBF more than 10^4 hours	Yes	No
(14)	Troubleshooting equipment		
	Console	Yes	No
	CRT	Yes	No
	Hard copy	Yes	No
	Printer	Yes	No
	Manual stand by operating modules	Yes	No
	Online, off line maintenance	Yes	No

Tenderer's Data Sheet

(Tenderer's Name)

10.2 BURNER CONTROL SYSTEM

(1)	Type		
	Wired Ry on Degital		
(2)	Signal range (From/to another system)		
(3)	Manufacturer, Model No.		
(4)	Number		
(5)	System cabinet		
	Dimension (mm) W x D x H	x	x
	Grounding wire		
	Unti-vibration rubbers	Yes	No
(6)	Function		
	Boiler safety interlock system	Yes	No
	Burner management system	Yes	No
	Remote/Local light off	Yes	No
	Each burner control system	Yes	No
	Self diagnosis		
(7)	Applied standard, code, regulation	NFPA or	
(8)	MFT circuit power source		
(9)	Outline block diagram of each function by No.		
(10)	Outline composition of backup system for digital control system by No.		
(11)	Flame detector		
	Type, manufacturer		
	Ignition burner		
	Main oil burner		
	Main gas burner		

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Tenderer's Data Sheet

(Tenderer's Name)

(12) Fuel trip valve type (oil) _____

Ditto (gas) _____

(13) Outline arrangement of central control console by No. _____

(14) Power supply system block diagram by No. _____

(15) Operating condition of digital control system

Temp. _____ °C - _____ °C

Humidity _____ % - _____ %

(16) Power source consumption

DC _____ V _____ W

AC _____ V _____ VA _____ W

Instrument air _____ Nl/min

Station air _____ Nl/min

(17) MTBF more than 10^4 hours Yes ____ No ____

(18) Troubleshooting equipment

Console	Yes ____	No ____
CRT	Yes ____	No ____
Hard copy	Yes ____	No ____
Printer	Yes ____	No ____
Manual stand by operating modules	Yes ____	No ____
Online-offline maintenance	Yes ____	No ____

Tenderer's Data Sheet

(Tenderer's Name)

10.3 SPECIAL INSTRUMENTS

(1) Heavy fuel oil flow meter (installed at FCV inlet)

Type		Positive displacement
Manufacturer, Model No.		
Flow range	(Kl/h)	
Accuracy	(%)	
Calibrated by (Institute, laboratory)		
Manual printer (for used normal and performance test)		Yes / No
Aut-temp compeusator		Yes / No

(2) Heavy fuel oil tank level meter (installed at service tank)

Type		
Manufacturer, Model No.		
Measuring range	(mm)	
Minimum measuring unit	(mm)	
Accuracy	(%)	
Calibrated by (Institute laboratory) (for used normal and performance test)		

(3) Natural gas flow meter

Type		
Manufacturer, Model No.		
Flow range Nm^3/h		
Accuracy	(%)	
Calibrated by (Institute, laboratory)		

Tenderer's Data Sheet

_____
(Tenderer's Name)

10.4 MISCELLANEOUS INSTRUMENTS AND CONTROL APPARATUS

	Manufacturer	Type and model
(1) Recorder		
Electric signal (V, mA etc.)	_____	_____
Temperature (for thermocouple, RTD)	_____	_____
(2) Indicator		
Dial type	_____	_____
Vertical type	_____	_____
(3) Transmitter		
Pressure (Draft)	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____
Analysis (conductivity, pH, etc. O_2, CO diss O_2/H_2 Hydrazin gas-chromatograph) (if required)	_____	_____
(4) Controller		
Pressure	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____
Analysis (conductivity, pH, etc.)	_____	_____
(5) Switch		
Pressure (Draft)	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

		Manufacturer	Type and model
	Limit switch		
(6)	Local indicator		
	Pressure gauge		
	Thermometer		
	Flow (positive displacement type)		
	Flow (other)		
	Level		
(7)	Sight glass		
	Sight flow		
	Level glass gauge		
(8)	Primary element		
	Thermocouple		
	RTD		
	Thermo-well		
	Flow orifice		
	Flow nozzle		
	pH		
	Hydrazin		
	Conductivity		
	Diss O_2/H_2, gas-chromatograph		
(9)	Wind direction and speed sensor with recorder		
(10)	Control valve		
(11)	Manometer		
(12)	Thermocouple extension wire		

Tenderer's Data Sheet

_____
(Tenderer's Name)

		Manufacturer	Type and model
(13)	Control tubing	_____	_____
(14)	Flame viewing Color TV system		
	Camera with cooling equipment controller	_____	_____
	CRT (14 inches)	_____	_____
	Power consumption	(VA)	_____
(15)	Electronic Boiler dram level gauge system		
	Transmiter Vessel with drain valves	_____	_____
	Electrodes	_____	_____
	Electronic Unit with integral display	_____	_____
	Remote display unit	_____	_____
	Power souce & Power consumption	(VA)	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

10.5 POWER CONSUMPTION

(1) Instrument air (Nm^3/min) _____

(2) Electric power

AC 110 V (VA) _____

DC 220 V (W) _____

SECTION III

STEAM TURBINE AND AUXILIARY EQUIPMENT

SECTION-III: STEAM TURBINE AND AUXILIARY EQUIPMENT

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Tenderer's Data Sheet

_____
(Tenderer's Name)

III. STEAM TURBINE AND AUXILIARY EQUIPMENT

The Contractor shall guarantee the items marked "*".

1. STEAM TURBINE

1.1 TURBINE

(1) Type _____

(2) Manufacturer _____

(3) Speed (rpm) _____

(4) Number of extraction _____

Tenderer's Data Sheet

(Tenderer's Name)

(5) Performance data

		Minimum load	50% of rated load	75% of rated load	ECR	MCR	Maximum load
Output	(MW)					*	
Turbine-generator heat rate	(kcal/KWh)				*		
Steam pressure Main steam	(kg/cm^2g)						
Steam pressure RH steam	(kg/cm^2g)						
Steam temperature Main steam	(^oC)						
Steam temperature RH steam	(^oC)						
Steam flow Main steam	(kg/h)						
Steam flow RH steam	(kg/h)						
Exhaust steam pressure	(mmHg abs)						
Exhaust steam flow	(kg/h)						
Make up water	(%)						
Feedwater temperature at HP final heater outlet	(^oC)						
Generator power factor							
Generator short circuit ratio							
Generator hydrogen pressure	(kg/cm^2g)						

Tenderer's Data Sheet

(Tenderer's Name)

(6) Extraction steam conditions at turbine connections (at VCR) (not install neck heater in condenser)

Extraction number	Flow (kg/h)	Pressure (kg/cm2g)	Temperature (oC)
No. 1 (to HP No. 7 heater)			
No. 2 (to HP No. 6 heater)			
No. 3 (to HP No. 5 heater)			
No. 4 (to deaerator)			
No. 5 (to LP No. 3 heater)			
No. 6 (to LP No. 2 heater)			
No. 7 (to LP No. 1 heater)			

(7) Approximate minimum load at unit can operate satisfactorily for continuous (KW) _____

(8) Time required for pick up from minimum load to maximum load (min) _____

(9) Critical speed (Composition and each rotor) (rpm) _____

(10) Dimension

Rotor length (each rotor) (mm) _____

Width (each turbine) (mm) _____

Turbine bearing span (each turbine) (mm) _____

Height of top above operating floor (mm) _____

(11) Weight (approx.)

Rotor (each rotor) (kg) _____

Upper casing (each casing) (kg) _____

Lower casing (each casing) (kg) _____

Assembled weight (each turbine) (kg) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(12) Length of last stage blade (mm) _____

(13) Annulus area of last stage blade _____

(14) Bearing

Type _____

Number _____

(15) Thrust bearing type _____

(16) Material

Turbine rotor (each rotor) _____

Casing (each casing) _____

Blade (each blade) _____

Casing bolt (each bolt) _____

Steam chest _____

Tender's Data Sheet

(Tenderer's Name)

1.2 SPEED, LOAD CONTROL AND PROTECTION SYSTEM

(1) EHC system type

(2) Control valve

Type

Number

Material

(3) Load limitter Yes , No

(4) Full-arc admission Yes , No

(5) Main stop valve

Number

Size (mm)

Material of body and stem

(6) Combined reheat valve

Number

Size (mm)

Material of body and stem

(7) HP turbine exhaust check valve (if provided)

Number

Size (mm)

Material of body and stem

(8) Emergency governor type

(9) Emergency trip device

Emergency governor

Thrust failure protection device Yes , No

Vacuum trip device Yes , No

Low bearing oil pressure trip device Yes , No

Tenderer's Data Sheet

(Tenderer's Name)

LP turbine exthoust temperature High trip device — Yes , No

(10) Vacuum breaker

Type and size

(11) Initial pressure regulator — Yes , No

(12) Atmospheric relief diaphragm

dia. x thickness (mm) — x

Material

(13) Turbine exhaust spray water flow (kg/h)

(14) Extraction steam reverse current valve size and rating

Extraction number	Size (mm)	Rating (kg/cm^2)
No. 1		
No. 2		
No. 3		
No. 4		
No. 5		
No. 6		
No. 7		

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Tenderer's Data Sheet

_____
(Tenderer's Name)

1.3 LUBRICATING AND HYDRAULIC OIL SYSTEM

(1) Brand of using oil _____

(2) Oil capacity of system (m^3) _____

(3) Bearing oil circulation rate (m^3/h) _____

(4) Bearing oil pressure (kg/cm^2g) _____

(5) Control oil pressure (kg/cm^2g) _____

(6) Main oil tank

Type _____

Manufacturer _____

Capacity (m^3) _____

Dimension (mm) _____ x _____ x _____

Material _____

Weight complete (kg) approx. _____

Flow back oil (m^3) _____

(7) Main oil pump

Type _____

Manufacturer _____

Capacity (m^3/h) _____

Discharge and suction pressure (kg/cm^2g) _____

Material

Casing _____

Shaft _____

Impeller _____

Weight complete (kg) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(8) Relay dump valve

Type		_____
Valve size	(mm)	_____

(9) Oil cooler

Type		_____
Manufacturer		_____
Number		_____
Cooling surface area	(m^2)	_____
Cooling water inlet design temperature	(^oC)	_____
Oil outlet temperature	(^oC)	_____
Cooling water flow	(m^3/h)	_____
Oil flow	(m^3/h)	_____
Tube size (outside diameter x thickness)	(mm)	_____ x _____

Design pressure

Tube side	(kg/cm^2g)	_____
Shell side	(kg/cm^2g)	_____

Heat transfer coefficient
Kcal/h/m^2/^oC

Design temperature

Tube side	(^oC)	_____
Shell side	(^oC)	_____

Material

Tube	_____
Shell	_____
Water chamber	_____
Tube sheet (clad)	_____

(Tenderer's Name) _____

Dimension (mm) _____

Weight (each) (kg) approx. _____

(10) Auxiliary oil pump

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

Speed (rpm) _____

Material

Casing _____

Shaft _____

Impeller _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(11) Turning gear oil pump

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

Speed (rpm) _____

Material

Casing _____

Shaft _____

_____
(Tenderer's Name)

Impeller _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(12) Emergency oil pump

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

Speed (rpm) _____

Material

Casing _____

Shaft _____

Impeller _____
(Tenderer's Name)

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(13) Jacking oil pump (if provided)

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

(Tenderer's Name)

Discharge pressure	(kg/cm^2g)	
Speed	(rpm)	
Material		
Casing		
Shaft		
Plunger		
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight complete	(kg) approx.	

(14) Oil conditioner

Type		
Manufacturer		
Number		
Capacity	(m^3/h)	
Dimension	(mm)	
Weight complete	(kg) approx.	

(15) Oil filter pump

Type		
Manufacturer		
Number		
Capacity	(m^3/h)	
Discharge pressure	(kg/cm^2g)	
Speed	(rpm)	
Material		
Casing		

Tenderer's Data Sheet

_____
(Tenderer's Name)

Shaft _____

Impeller or gear _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(16) Vapor extractor for main oil tank

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(17) Vapor extractor for oil conditioner

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight complete (kg) approx. _____

(18) Turbine oil storage tank

Type _____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Manufacturer _____

Capacity (m^3) _____

Dimension (mm) _____

Material _____

Weight complete (kg) approx. _____

(19) Oil transfer pump

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

Speed (rpm) _____

Material

Casing _____

Shaft _____

Impeller or gear _____

Motor

The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight (kg) approx. _____

(20) Oil Driven booster pump

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

Speed (rpm) _____

Material

Casing _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Shaft _____

Impeller or gear _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

1.4 TURNING EQUIPMENT

(1) Type _____

(2) Turning speed (rpm) _____

(3) Motor

The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

18-C

_____
(Tenderer's Name)

1.5 GLAND STEAM SEAL SYSTEM

(1) Gland steam seal regulator

Type		_____
Size		_____
Regulating pressure	(kg/cm^2g)	_____

(2) Gland steam exhaust blower

Type		_____
Manufacturer		_____
Number		_____
Capacity	(m^3/h)	_____
Exhaust pressure	(mmHg)	_____
Speed	(rpm)	_____
Material		
Casing		_____
Shaft		_____
Impeller		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight complete	(kg) approx.	_____

(3) Gland steam condenser

Type		_____
Manufacturer		_____
Cooling surface area	(m^2)	_____
Cooling water flow	(m^3/h)	_____
Tube size and thickness	(mm)	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Number of tube _____

Heat transfer coefficient (kcal/h/m^2/^oC) _____

Friction loss through tubes (kg/cm^2) _____

Dimension

Total length (mm) _____

Shell diameter (mm) _____

Design pressure

Tube side (kg/cm^2g) _____

Shell side (kg/cm^2g) _____

Design temperature

Tube side (^oC) _____

Shell side (^oC) _____

Material

Tube _____

Shell _____

Water box _____

Tube sheet (clad type) _____

Weight (kg) approx. _____

(4) Steam seal diverting valve

Type _____

Manufacturer _____

Number _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

1.6 L.P TURBINE BYPASS SYSTEM

(1) Bypass valve (LP)

Type		_____
Number		_____
Manufacturer		_____
Size		_____
Capacity	(kg/h)	_____
Material		_____
Pressure control		Yes , No
Start up		use , no use
Actuater		_____
Noise (as a complete set)	(dB (A))	_____
Weight	(kg) approx.	_____

(2) Control panel

Type		_____
Dimension	(mm)	_____
Weight	(kg) approx.	_____

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Tenderer's Data Sheet

(Tenderer's Name)

2. SURFACE CONDENSER

(1) Condenser

Type

Manufacturer

Performance data

Design heat duty (at MCR)	(kcal/h)	
Design absolute pressure	(mmHg abs.)	
Heat transfer coefficient	(kcal/h/m^2/^oC)	
Circulating water quantity	(m^3/h)	
Circulating water inlet temperature	(^oC)	
Circulating water outlet tempeature	(^oC)	
Cleanliness factor	(%)	
Condensate oxygen content	(cc/liter)	
Water velocity in tube	(m/sec)	
Friction loss through tube	(kg/cm^2)	
Total effective tube surface	(m^2)	

Tube

Effective tube length	(mm)	
Overall tube length	(mm)	
Size and thickness	(mm)	

Tenderer's Data Sheet

_____
(Tenderer's Name)

Number of tube _____

Number of tube in air cooling zone _____

Material _____

Dimension

Overall length (mm) _____

Height (including neck) (mm) _____

Overall width (mm) _____

Material

Shell _____

Water box (with rubber lining) _____

Tube sheet (clad type) _____

Hot well _____

Tube support plate _____

Metal thickness

Shell (mm) _____

Water box (mm) _____

Tube sheet (mm) _____

Hot well (mm) _____

Hot well capacity (m^3) _____

Design pressure

Water box and tube (kg/cm^2g) _____

Shell (kg/cm^2g) _____

Weight

Empty (kg) approx. _____

Operating (kg) approx. _____

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(Tenderer's Name)

Flooded (kg) approx. _____

Divided package number of shipping _____

(2) Expansion joint for turbine exhaust connection

Material _____

Thickness (mm) _____

(3) Butterfly valve

Type _____

Manufacturer _____

Number _____

Size (mm) _____

Material (with rubber lining) _____

Motor

The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight (kg) approx. _____

(4) Expansion joints for circulating water piping inlet and outlet

Type _____

Number _____

Size (mm) _____ x _____

Material _____

Number of ply _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

3. AIR EXTRACTION EQUIPMENT

	Hogging operation	Holding operation
(1) Air extraction vacuum pump of condenser water box		
Type	_____	_____
Manufacturer	_____	
Number	_____	_____
Air suction capacity (kg/h)	_____	_____
Suction vacuum (mmHg abs.)	_____	_____
Speed (rpm)	_____	_____
Material		
Casing	_____	_____
Rotor	_____	_____
Shaft	_____	_____
Air ejector (if applicable)	_____	_____
Motor	The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.	
Water separation tank		
Capacity (m^3)	_____	_____
Material	_____	_____
Weight (assembly) (kg) approx.	_____	_____

(2) Starting air ejector (if applicable) of condenser water box

Type	_____
Manufacturer	_____
Number	_____
Air suction capacity (kg/h)	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Suction vacuum	(mmHg abs.)	_____
Operating steam pressure	(kg/cm^2g)	_____
Steam consumption	(kg/h)	_____
Material		
Suction chamber		_____
Steam nozzle		_____
Weight	(kg) approx.	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

3A (AIR EJECTOR)

(1) Steam jet air ejector with condenser

Type _____

Manufacturer _____

Number _____

Air suction capacity (kg/h) _____

Suction vacuum (mmHg abs.) _____

Operating steam pressure (kg/cm^2g) _____

Operating steam temperature (^oC) _____

Steam consumption (kg/h) _____

Condenser

Cooling surface area (m^2) _____
(intercondenser, aftercondenser)

Tube size and thickness (mm) _____

Tube length (mm) _____

Tube number _____

Heat transfer coefficient ($kcal/h/m^2/^oC$) _____

Design cooling water capacity (kg/h) _____

Minimum cooling water capacity (kg/h) _____

Friction loss through tube (kg/cm^2) _____

Design pressure

Tube side (kg/cm^2g) _____

Shell side (kg/cm^2g) _____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Dimension

Overall length (mm) _____

Shell diameter (mm) _____

Material

Tube _____

Shell _____

Water box _____

Tube sheet _____

Suction chamber _____

Steam nozzle _____

Weight (assembly) (kg) approx.) _____

(2) Starting air ejector

Type _____

Manufacturer _____

Number _____

Air suction capacity (kg/h) _____

Suction vacuum (mmHg abs.) _____

Operating steam pressure (kg/cm^2g) _____

Steam consumption (kg/h) _____

Material

Suction chamber _____

Steam nozzle _____

Weight (kg) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

4. CIRCULATING WATER PUMP

(1) Circulating water pump

Type		_____
Manufacturer		_____
Number		_____
Performance		
Capacity	(m^3/h)	_____
Total head	(m)	_____
Shut off head	(m)	_____
Pump efficiency	(%)	_____
Shaft horse power	(KW)	_____
NPSH required	(m)	_____
Speed	(rpm)	_____
Dimension		
Pump shaft length	(mm)	_____
Pump shaft diameter	(mm)	_____
Suction bell mouth diameter	(mm)	_____
Discharge connection diameter	(mm)	_____
Lubricating water system		
Water capacity	(m^3/h)	_____
Lubricating water pump		Yes , No
Material		
Impeller		_____
Suction bell mouth and discharge ball		_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Column and sicharge elbow		_____
Shaft		_____
Shaft enclosing tube		_____
Bearing		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Anode plate		Yes , No
Weight		
Pump	(kg) approx.	_____
Motor	(kg) approx.	_____
Assembly	(kg) approx.	_____

(2) Discharge valve

Type		_____
Manufacturer		_____
Number		_____
Size	(mm)	_____
Material (with rubber lining)		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight	(kg) approx.	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(3) Expansion joint of pump discharge

Type		_____
Number		_____
Size	(mm)	_____ x _____
Material		_____

(4) Inter connection valve

Type		_____
Manufacturer		_____
Number		_____
Size	(mm)	_____
Material (with rubber lining)		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight	(kg) approx.	_____

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Tenderer's Data Sheet

(Tenderer's Name)

5. CONDENSATE PUMP

(1) Condensate pump

Type		
Manufacturer		
Number		
Performance		
Capacity	(ton/h)	
Total head	(kg/cm^2g)	
Shut off head	(kg/cm^2g)	
Pump efficiency	(%)	
Shaft horse power	(KW)	
NPSH required	(m)	
Speed	(rpm)	
Number of stage		
Connection size		
Suction	(mm)	
Discharge	(mm)	
Dimension		
Pit can depth	(mm)	
Pit can diameter	(mm)	
Material		
Impeller		
Casing		
Shaft		
Outer barrel		

Tenderer's Data Sheet

_____
(Tenderer's Name)

Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight		
Pump	(kg) approx.	_____
Motor	(kg) approx.	_____
Assembly	(kg) approx.	_____

(2) Suction strainer

Type	_____
Manufacturer	_____
Number	_____
Mesh	_____
Material	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

6. FEEDWATER HEATER

(1) Low pressure feedwater heaters (not install neck heater in condenser)

		No. 1 Heater	No. 2 Heater
Type			
Manufacturer			
Tube surface area			
Condensing zone	(m^2)		
Drain cooling zone	(m^2)		
Total	(m^2)		
Water velocity in tube	(m/sec)		
Friction loss through tube	(kg/cm^2)		
Design water flow	(kg/h)		
Heat transfer coefficient	($kcal/h/m^2/^oC$)		
Tube			
Size and thickness	(mm)		
Number of tube			
Number of tube pass			
Dimension			
Overall length	(mm)		
Shell diameter	(mm)		
Shell thickness	(mm)		

Tenderer's Data Sheet

_____
(Tenderer's Name)

	No. 1 Heater	No. 2 Heater
Material		
Channel and channel cover		
Shell		
Tube		
Tube sheet		
Design pressure and temperature		
Tube side (kg/cm^2g, ^oC)		
Shell side (kg/cm^2g, ^oC)		
Design terminal temperature difference (^oC)		
Design drain cooler approach (^oC)		
Weight		
Empty (kg) approx.		
Operating (kg) approx.		
Flooded (kg) approx.		

	No. 3 Heater
Type	
Manufacturer	
Tube surface area	
Condensing zone (m^2)	
Drain cooling zone (m^2)	
Total (m^2)	
Water velocity in tube (m/sec)	
Friction loss through tube (kg/cm^2)	
Design water flow (kg/h)	

Tenderer's Data Sheet

_____
(Tenderer's Name)

No. 3 Heater

Heat transfer coefficient (kcal/h/m^2/^oC) _____

Tube

Size and thickness (mm) _____

Number of tube _____

Number of tube pass _____

Dimension

Overall length (mm) _____

Shell diameter (mm) _____

Shell thickness (mm) _____

Material

Channel and channel cover _____

Shell _____

Tube _____

Tube sheet _____

Design pressure and temperature

Tube side (kg/cm^2g, ^oC) _____

Shell side (kg/cm^2g, ^oC) _____

Design terminal temperature difference (^oC) _____

Design drain cooler approach (^oC) _____

Weight

Empty (kg) approx. _____

Operating (kg) approx. _____

Flooded (kg) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(2) High pressure feedwater heaters

		No. 5 Heater	No. 6 Heater
Type			
Manufacturer			
Tube surface area			
Desuperheater zone	(m^2)		
Condensing zone	(m^2)		
Drain cooling zone	(m^2)		
Total	(m^2)		
Water velocity in tube	(m/sec)		
Friction loss through tube	(kg/cm^2)		
Design feedwater flow	(kg/h)		
Heat transfer coefficient	(kcal/h/m^2/^oC)		
Tube			
Size and thickness	(mm)		
Number of tube			
Number of tube pass			
Dimension			
Overall length	(mm)		
Shell diameter	(mm)		
Shell thickness	(mm)		
Material			
Channel and channel cover			
Shell			
Tube			

Tenderer's Data Sheet

_____
(Tenderer's Name)

	No. 5 Heater	No. 6 Heater
Tube sheet		
Design pressure and temperature		
Tube side (kg/cm^2g, ^oC)		
Shell side (kg/cm^2g, ^oC)		
Design terminal temperature difference (^oC)		
Design drain cooler approach (^oC)		
Weight		
Empty (kg) approx.		
Operating (kg) approx.		
Flooded (kg) approx.		

	No. 7 Heater
Type	
Manufacturer	
Tube surface area	
Desuperheater zone (m^2)	
Condensing zone (m^2)	
Drain cooling zone (m^2)	
Total (m^2)	
Water velocity in tube (m/sec)	
Friction loss through tube (kg/cm^2)	
Design feedwater flow (kg/h)	
Heat transfer coefficient ($kcal/h/m^2/^oC$)	

Tenderer's Data Sheet

_____
(Tenderer's Name)

No. 7 Heater

Tube

Size and thickness	(mm)	_____
Number of tube		_____
Number of tube pass		_____

Dimension

Overall length	(mm)	_____
Shell diameter	(mm)	_____
Shell thickness	(mm)	_____

Material

Channel and channel cover	_____
Shell	_____
Tube	_____
Tube sheet	_____

Design pressure and temperature

Tube side	(kg/cm^2, ^oC)	_____
Shell side	(kg/cm^2, ^oC)	_____

Design terminal temperature difference	(^oC)	_____
Design drain cooler approach	(^oC)	_____

Weight

Empty	(kg) approx.	_____
Operating	(kg) approx.	_____
Flooded	(kg) approx.	_____

_____
(Tenderer's Name)

(3) Drain pump and drain tank

		Pump	Tank
Type		_____	_____
Manufacturer		_____	_____
Number		_____	_____
Capacity	(m^3/h, m^3)	_____	_____
Discharge pressure	(kg/cm^2g)	_____	_____
Pressure (Maximum)	(kg/cm^2g)		_____
Speed	(rpm)	_____	
Material			
Casing		_____	_____
Shaft		_____	
Impeller		_____	
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.	
Weight complete	(kg) approx.	_____	_____

Tenderer's Name _____
(Tenderer's Name)

7. DEAERATOR

(1) Deaerating heater

Type		_____
Manufacturer		_____
Design capacity	(ton/h)	_____
Oxygen content	(cc/liter)	* _____
Dimension		
Overall length	(mm)	_____
Diameter	(mm)	_____
Shell thickness	(mm)	_____
Material		
Shell		_____
Tray		_____
Spray valve		_____
Design pressure	(kg/cm^2g)	_____
Design temperature	(^oC)	_____
Weight		
Empty	(kg) approx.	_____
Operating	(kg) approx.	_____
Flooded	(kg) approx.	_____
Relief valve		
Type		_____
Manufacturer		_____

(2) Storage tank

Capacity at operating level	(m^3)	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Dimension

Overall length	(mm)	_____
Diameter	(mm)	_____
Shell thickness	(mm)	_____
Shell material		_____
Weight		
Empty	(kg) approx.	_____
Operating	(kg) approx.	_____
Flooded	(kg) approx.	_____

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_____
(Tenderer's Name)

8. BOILER FEED PUMPING EQUIPMENT

(1) Boiler feed pump (Motor driven BFP)

Type		_____
Manufacturer		_____
Number		_____
Capacity	(ton/h)	_____
Total head	(kg/cm^2g)	_____
Discharge head	(kg/cm^2g)	_____
Shut off pressure	(kg/cm^2g)	_____
Feed water temperature	(^oC)	_____
Minimum flow	(ton/h)	_____
Pump efficiency	(%)	_____
Shaft horse power	(kW)	_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
NPSH required	(m)	_____
Noise (at a complete set)	db(A)	_____
Number of stage		_____
Type of bearing		_____
Type of seal		_____
Type of coupling		_____
Connection size		
Suction	(mm)	_____
Discharge	(mm)	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Material

Outer casing _____

Inner casing _____

Shaft _____

Impeller _____

Sleeve _____

Foundation _____

Minimum flow orifice _____

Warm-up orifice _____

Weight

Pump (kg) approx. _____

Motor (kg) approx. _____

Speed increasing gear (kg) approx. _____

Booster pump (if necessary) (kg) approx. _____

Assembly (kg) approx. _____

(2) Speed increasing gear for motor driven BFP

Type _____

Manufacturer _____

Number of set _____

Type of bearing _____

Material

Casing _____

Drive gear _____

Driven gear _____

Bearing _____

Direct driven L.O. pump capacity

Type _____

Capacity (m^3/h) _____

Discharge pressure (kg/cm^2g) _____

(3) Booster pump for motor driven BFP

Type _____

Manufacturer _____

Number _____

Capacity (ton/h) _____

NPSH required (m) _____

Total pressure (kg/cm^2g) _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Connection bore of suction/discharge (mm) _____ / _____

Gland type _____

Material

Casing _____

Impeller _____

Shaft _____

NPSH design data

Vertical height between deaerator lowest water level and pump impeller center (m) _____

Piping head loss from deaerator outlet to boiler feed pump inlet (m) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Available NPSH (m) _____

Flow at feed pump inlet (m^3/h) _____

Pressure at feed pump inlet (kg/cm^2g) _____

Temperature at feed pump inlet (^oC) _____

Suction pipe

Nominal bore x thickness (mm) _____ x _____

Material _____

(4) Suction strainer

Type _____

Manufacturer _____

Number of set _____

Strainer mesh _____

Material

Casing and cover _____

Strainer _____

(5) Recirculation control valve

Type _____

Manufacturer _____

Number of set _____

Flow capacity (m^3/h) _____

Fluid temperature (^oC) _____

Fluid pressure (kg/cm^2g) _____

Material

Body _____

Bonnet _____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Disc _____

Seat _____

Stem _____

(6) Orifice

Type _____

Number of set _____

Flow (m^3/h) _____

Inlet/Outlet pressure (kg/cm^2g) _____

Material _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

9. CLOSED CYCLE COOLING WATER SYSTEM

(1) Bearing cooling water heat exchanger

Type _____

Manufacturer _____

Number _____

Tube surface area (m^2) _____

Water velocity in tube (m/sec) _____

Friction loss at design flow

Tube side (kg/cm^2) _____

Shell side (kg/cm^2) _____

Secondary cooling water flow (m^3/h) _____

Primary cooling water flow (from CWP) (m^3/h) _____

Heat transfer coefficient ($Kcal/h/m^2/^oC$) _____

Secondary cooling water temperature

Inlet (^oC) _____

Outlet (^{o}) _____

Primary cooling water design temperature (from CWP)

Inlet (^oC) _____

Outlet (^oC) _____

Tube

Size and thickness (mm) _____

Number of tube _____

Number of tube pass _____

Anode plate _____ Yes _____ No

Tenderer's Data Sheet

_____
(Tenderer's Name)

Dimension

Overall length (mm) _____

Shell diameter (mm) _____

Material

Water box and cover _____

Shell _____

Tube _____

Tube sheet (clad) _____

Design pressure

Tube side (kg/cm^2g) _____

Shell side (kg/cm^2g) _____

Weight

Empty (kg) approx. _____

Operating (kg) approx. _____

Flooded (kg) approx. _____

(2) Sea water auxiliary pump

Type _____

Manufacturer _____

Number _____

Performance

Capacity (m^3/h) _____

Total head (kg/cm^2g) _____

Shaft horse power (KW) _____

Speed (rpm) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Connection size		
Suction	(mm)	_____
Discharge	(mm)	_____
Material		
Casing		_____
Impeller		_____
Shaft		_____
Type of shaft seal		
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Dimension	(mm)	_____
Weight (assembly)	(kg) approx.	_____
Strainer		
Type		_____
Manufacturer		_____
Number		_____
Mesh		_____
Material		
Outer casing		_____
Inner parts		_____
Lifting equipment		Yes No

(Tenderer's Name)

(3) Bearing cooling water pump

Type		
Manufacturer		
Number		
Performance		
Capacity	(m^3/h)	
Total head	(kg/cm^2g)	
Shaft horse power	(KW)	
Speed	(rpm)	
Connection size		
Suction	(mm)	
Discharge	(mm)	
Material		
Casing		
Impeller		
Shaft		
Type of shaft seal		
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Dimension	(mm)	
Weight (assembly)	(kg) approx.	

(4) Chemical injection pump

Type	
Manufacturer	
Number	

Tenderer's Data Sheet

_____
(Tenderer's Name)

Capacity	(l/min)	_____
Discharge pressure	(kg/cm^2g)	_____
Material		
Cylinder casing		_____
Plunger		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight	(kg) approx.	_____

(5) Chemical solution tank

Type		_____
Number		_____
Capacity		_____
Material		_____
Mixer		
Type		_____
Material		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight	(kg) approx.	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

10. MAKE UP WATER TRANSFER PUMP AND TANK

(1) Make up water transfer pumps

Type		_____
Manufacturer		_____
Number		_____
Capacity	(m^3/h)	_____
Total head	(kg/cm^2g)	_____
Shaft horse power	(KW)	_____
Speed	(rpm)	_____
Connection		
Suction	(mm)	_____
Discharge	(mm)	_____
Material		
Casing		_____
Impeller		_____
Shaft		_____
Type of shaft seal		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Dimension	(mm)	_____
Weight	(kg) approx.	_____

(2) Make up water tank

Type	_____
Manufacturer	_____
Number	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

Capacity	(m^3)	* _____
Inside diameter	(mm)	_____
Shell height	(mm)	_____

Material and thickness	Material	Thickness (mm)
Wall plate	_____	_____
Bottom plate	_____	_____
Roof plate	_____	_____
Floating deck	_____	_____
Air tight seal	_____	_____
Vertical number of course	_____	_____

Painting material	
Inner surface	_____
External surface	_____
Weight (kg) approx.	_____
Divided package number for shipping	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

11. TUBE CLEANING EQUIPMENT

Type		_____
Manufacturer		_____
Number		_____
Automatic operation		_____
Ball		
Material		_____
Size	(mm)	_____
Number		_____
Material		
Recirculation pump		_____
Collector		_____
Ball injector nozzle		_____
Ball distributor		_____
Screen		_____
Casing		_____
Element		_____
Piping (within Strainer)		_____
Control panel		
Type		_____
Size	(mm) approx.	_____
Weight (assembly)	(kg) approx.	_____
Anode plate		Yes _____ No _____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

12. TURBINE CLEAN DRAIN TANK

(1) Drain tank

Type _____

Number _____

Manufacturer _____

Capacity (m^3) _____

Size

Length _____

Width _____

Height _____

Material _____

Weight empty (kg) approx. _____

flooded (kg) approx. _____

(2) Condensate return pump

Type _____

Number _____

Manufacturer _____

Performance

Capacity (ton/h) _____

Total head (mAq) _____

Pump efficiency (%) _____

Shaft horse power (kW) _____

NPSH required (m) _____

Speed (rpm) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Material

Impeller _____

Casing _____

Shaft _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight

Pump (kg) approx. _____

Motor (kg) approx. _____

Assembly (kg) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

13. DEBRIS FILTER (ALATERNATIVE)

Type		_____
Manufacturer		_____
Material		
Body		_____
Punched plate		_____
Expanded Arear (punched plate area)		_____
Number		_____
Dimention	(mm)	_____
Inlet/outlet pipe size	(mm)	_____
Washing Valve		
Type (Motor driven)		_____
Valve size	(mm)	_____
Anode plate		Yes ____ No ____

Tenderer's Data Sheet

_____
(Tenderer's Name)

14. PIPING FOR STEAM TURBINE AND AUXILIARY EQUIPMENT

(1) Steam turbine	Material	Size (mm)
Turbine lead piping	_____	_____
Lubricating oil piping	_____	_____
Gland steam seal piping	_____	_____
Turbine drain piping	_____	_____

(2) Steam turbine auxiliary equipment	Material	Size (mm)
Make up water piping system		
Supply	_____	_____
Return	_____	_____
Condensate piping system		
Condensate pump suction	_____	_____
Condensate pump - Deaerator	_____	_____
Boiler feed water piping system		
BFP Suction	_____	_____
BFP - Feed water control valve	_____	_____
Feedwater control valve - final HP heater outlet	_____	_____
BFP minimum flow	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

	Material	Size (mm)
Circulating water piping system		
Each circulating water pump discharge	_____	_____
Circulating water pump discharge common header	_____	_____
Underground installation	_____	_____
Condenser inlet and outlet	_____	_____
Priming vacuum piping system	_____	_____
Condenser air extraction piping system		
Condenser - air extraction pump	_____	_____
Starting air ejector exhaust pipe	_____	_____
Bearing cooling water piping system		
Main (supply, return)	_____	_____
Stand pipe	_____	_____
Circulating water pump motor cooling	_____	_____
Primary cooling water piping system		
Bearing cooling water heat exchanger supply	_____	_____
Return	_____	_____

Tenderer's Data Sheet

____
(Tenderer's Name)

	Material	Size (mm)
Extraction steam piping system		
No. 1 extraction	______	______
No. 2 extraction	______	______
No. 3 extraction	______	______
No. 4 extraction	______	______
No. 5 extraction	______	______
No. 6 extraction	______	______
No. 7 extraction	______	______
High pressure auxiliary steam piping system (from high pressure auxiliary steam header)	______	______
Air ejector supply	______	______
Steam seal supply	______	______
Deaerator supply	______	______
Feedwater heater drain and vent piping system		
No. 7 HP heater drain	______	______
No. 6 HP heater drain	______	______
No. 5 HP heater drain	______	______
No. 3 LP heater drain	______	______
No. 2 LP heater drain	______	______
No. 1 LP heater drain	______	______
HP heater vent	______	______
LP heater vent	______	______

Tenderer's Data Sheet

_____
(Tenderer's Name)

	Material	Size (mm)
Service air piping system	_____	_____
Instrument air piping system	_____	_____
N_2 gas injection piping system	_____	_____
Seal water piping system	_____	_____
Condenser tube cleaning water	_____	_____
Make up water piping	_____	_____
(3) Temporary piping		
For turbine lubricating oil flushing	_____	_____
For hydrostatic test	_____	_____
For water flushing	_____	_____
For trial operation of auxiliary equipment	_____	_____
(4) Total weight of piping for steam turbine and auxiliary equipment (ton) approx.	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

15. INSULATION AND LAGGING FOR STEAM TURBINE AND AUXILIARY EQUIPMENT

(1) Heat insulation material	Heat transfer coefficient (Kcal/mH^{o}C)	Maximum allowable (^{o}C)
Calcium silicate		
Rock wool		
Hard cement		
Calcium silicate paste		
Other material ( )		

(2) Insulation material

Turbine casing _____

Feedwater heater _____

Deaerator _____

Boiler feed pump _____

Piping

Turbine lead piping _____

Gland steam seal piping _____

Turbine drain piping _____

Reheat piping _____

Condensate piping _____

Turbine bypass system piping _____

Boiler feedwater piping _____

Extraction steam piping _____

High pressure auxiliary steam piping _____

Feedwater heater drain piping _____

Outer drain and vent piping _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Valve

(3) Description of safety insulation _____

_____

_____

_____

(4) Lagging

Material _____

Thickness (mm) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

16. PAINTING FOR STEAM TURBINE AND AUXILIARY EQUIPMENT

		Kind of paint	
		Primary painting	Finished painting
(1)	Turbine casing	_____	
(2)	Turbine metal lagging	_____	_____
(3)	Main oil tank	_____	_____
(4)	Turbine oil storage tank	_____	_____
(5)	Turbine lubricating oil equipment	_____	_____
(6)	Gland steam condenser and exhaust blower	_____	_____
(7)	Surface condenser	_____	_____
(8)	Air extraction equipment	_____	_____
(9)	Priming vacuum pump and motor	_____	_____
(10)	Circulating water pump and motor	_____	_____
(11)	Condensate pump and motor	_____	_____
(12)	Feedwater heater (including drain pump & tank)	_____	
(13)	Deaerator	_____	
(14)	Boiler feed pump and motor	_____	_____
(15)	Bearing cooling water heat exchanger	_____	_____
(16)	Bearing cooling water pump and motor (including booster pump)	_____	_____
(17)	Chemical injection equipment of bearing cooling water	_____	_____
(18)	Make up water transfer pump	_____	_____
(19)	Insulated piping	_____	_____
(20)	Uninsulated piping	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

	Kind of paint	
	Primary painting	Finished painting
(21) Panel	_____	_____
(22) Make up water tank	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

17. INSTRUMENTATION

17.1 ELECTRO-HYDRAULIC GOVERNOR CONTROL SYSTEM

(1) Type _____

(2) Signal range (From/to another system) _____

(3) Manufacturer, Model No. _____

(4) Number _____

(5) System cabinet

Dimension (mm) W x D x H _____ x _____ x _____

Grounding wire _____

Anti-vibration rubber _____ Yes _____ No

(6) Transmitter & actuator type _____

(7) Redundant or 2 out of 3 transmitter _____

(8) Control system block diagram with main interlock system by No. _____

(9) Power supply system block diagram by No. _____

(10) Outline arrangement of man-machine communication device by No. including maintenance tool _____

(11) Turbine trip circuit power source _____

(12) Outline composition of backup system for digital control system by No. _____

(13) Operating condition of control system

Temp. _____ °C - _____ °C

Humidity _____ % - _____ %

(14) Power source and consumption

DC _____ V _____ W

AC _____ V _____ VA _____ W

Air _____ Nl/min

Oil _____ kg/cm^{2}g

Tenderer's Data Sheet

_____
(Tenderer's Name)

(15) MTBF more than 10^5 hours

Yes _____ No _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

17.2 TURBINE SUPERVISORY INSTRUMENT (TSI)

(1) Type _____

(2) Manufacturer _____

(3) Number _____

(4) Items

Eccentricity	Yes ,	No
Control valve position	Yes ,	No
Speed	Yes ,	No
Vibration (on shaft)	Yes ,	No
Expansion	Yes ,	No
Acceleration	Yes ,	No
Differential expansion	Yes ,	No
Rotor Position	Yes ,	No
Bearing (metal, drain) temperature	Yes ,	No
Shell metal temperature	Yes ,	No
Others	_____	

(5) Vibration recorder

Manufacturer _____

Type and No. _____

(6) Digital indicator (Shaft, Speed, MW vibration) Yes , No

(7) Turbine/generator bearing temp. recorder

Manufacturer _____

Type and No. _____

(8) Turbine casing metal temp. recorder

Manufacturer _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Type and No. _____

(9) Turbine eccentricity, rotor Position CV position & expansion

Manufacturer _____

Type and No. _____

Tender's Data Sheet

(Tenderer's Name)

17.3 SPECIAL INSTRUMENTS

(1) Make up water flow meter

Type		Positive displacement
Manufacturer		
Flow range	(m^3/h)	
Accuracy	(%)	
Calibrated by (Institute, laboratory)		

(2) Condenser circulating water leak detector (if equired)

Type	
Sampling points (4 points or more)	
Manufacturer	
Outline arrangement of leak detector system	
Panel (H x W x D) mm	

Tenderer's Data Sheet

_____
(Tenderer's Name)

17.4 MISCELLANEOUS INSTRUMENTS AND CONTROL APPARATUS

	Manufacturer	Model No.
(1) Recorder		
Electric signal (V, mA etc.)	_____	_____
	_____	_____
Temperature (for thermocouple, RTD)	_____	_____
	_____	_____
(2) Indicator		
Dial type	_____	_____
Vertical type	_____	_____
(3) Transmitter		
Pressure (Draft)	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____
Analysis (conductivity, pH, etc.)	_____	_____
(4) Controller		
Pressure	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____
Analysis (conductivity, pH, etc.)	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

	Manufacturer	Model No.
(5) Switch		
Pressure (Draft)	_____	_____
Temperature	_____	_____
Flow	_____	_____
Level	_____	_____
Limit switch	_____	_____
(6) Local indicator		
Pressure gauge	_____	_____
Thermometer	_____	_____
Flow (positive displacement type)	_____	_____
Flow (other)	_____	_____
Level	_____	_____
(7) Sight glass		
Sight flow	_____	_____
Level glass gauge	_____	_____
(8) Primary element		
Thermocouple	_____	_____
RTD	_____	_____
Thermo-well	_____	_____
Flow orifice	_____	_____
Flow nozzle	_____	_____
pH	_____	_____
Conductivity	_____	_____

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Tenderer's Data Sheet

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(Tenderer's Name)

		Manufacturer	Model No.
(9)	Control valve	_____	_____
		_____	_____
(10)	Manometer	_____	_____
(11)	Thermocouple extension wire	_____	_____
(12)	Control tubing	_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

17.5 POWER CONSUMPTION

(1) Instrument air	(Nm^3/min)	_____	_____
(2) Electric power			
AC 110V	(KW)	_____	_____
AC 220V	(KW)	_____	_____
DC 220V	(VA)	_____	_____

SECTION IV

ANCILLARY SYSTEM AND COMMON AUXILIARY EQUIPMENT

(Unit 1)

SECTION-IV: ANCILLARY SYSTEM AND COMMON AUXILIARY EQUIPMENT

Tenderer's Data Sheet

_____
(Tenderer's Name)

IV. ANCILLARY SYSTEM AND COMMON AUXILIARY EQUIPMENT

1. HOUSE BOILER

(1) Type _____

(2) Manufacturer _____

(3) Number _____

(4) Capacity (kg/h) _____

(5) Design pressure (kg/cm^2g) _____

(6) Design temperature (^oC) _____

(7) Heat transfer surface (m^2) _____

(8) Efficiency at rated load (%) _____

(9) Gas temperature at boiler outlet (^oC) _____

(10) Steam outlet connection

Type of valve _____

Size (mm) _____

Material _____

(11) Gas firing equipment

Burner

Type _____

Number _____

Atomizing method _____

Forced draft fan (type, flow x press.) _____, _____

Fuel oil pump (type, flow x press.) _____, _____

Combustion control _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Fuel oil consumption at max. evaporation (kl/h) _____

Fuel oil tank (kl) _____

(12) Feed water equipment

Feed water pump (type, flow x press.) _____

Feed water control (type) _____

Feed water tank (kl) _____

Drain collecting tank (kl) _____

(13) Stack

Type _____

Material _____

Height (mm) _____

Diameter (mm) _____

(14) Control panel

Type _____

Dimension (mm) _____

ACC Control System Yes No

(15) Power source

Total KW _____

Voltage _____

Phase _____

(16) Total weight of house boiler (kg) _____

(17) Pressure control valve

Type _____

Number _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(18) Insulation material _____

_____

(19) Painting material _____

(20) Performance data for house boiler

load		50%	75%	100%
Steam generation	(T/h)			
Drum pressure	(kg/cm^2g)			
Boiler outlet steam pressure	(kg/cm^2g)			
Fuel oil consumption	(kg/h)			
Excess air	(%)			
Gas temp. at boiler outlet	(^oC)			
Number of burner				
Boiler efficiency	(%)			

Tenderer's Data Sheet

_____
(Tenderer's Name)

2. TURBINE ROOM OVERHEAD CRANE

(1)	Type		_____
(2)	Manufacturer		_____
(3)	Number		_____
(4)	Capacity		_____
	Main hoist	(ton)	*_____
	Auxiliary hoist	(ton)	*_____
(5)	Span (Center to center center rails)	(mm)	_____
(6)	Runway rail		
	Type		_____
	Length (total)	(mm)	_____
(7)	Full load speed		
	Main hoist	(m/min)	_____
	Auxiliary hoist	(m/min)	_____
	Trolley travel	(m/min)	_____
	Bridge travel	(m/min)	_____
(8)	Maximum life of hook		
	Main hoist	(mm)	_____
	Auxiliary hoist	(mm)	_____
(9)	Vertical control movement	(mm)	*_____
(10)	Top runway rail to low point of roof truss		_____
(11)	Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Tenderer's Data Sheet

_____
(Tenderer's Name)

	Type	Voltage	KW	rpm
Main hoist				
Auxiliary hoist				
Trolley travel				
Bridge travel				

(12) Brake

Main hoist _____

Auxiliary hoist _____

Trolley travel _____

Bridge travel _____

(13) Diameter of drum

Main hoist (mm) _____

Auxiliary hoist (mm) _____

(14) Bridge type

(15) Operation cab size _____

(16) Hoisting rope size

Main hoist (mm) _____

Auxiliary hoist (mm) _____

(17) Wheel

		Bridge	Trolley
Diameter	(mm)		
Number			
Maximum load (each wheel)	(kg)		

(18) Trolley wire size (mm^2) _____ _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(19) Material

Bridge	_____
Trolley	_____
Drum	_____
Hoisting rope	_____
Trolley wire	_____

(20) Weight

Bridge	(kg) approx.	_____
Trolley	(kg) approx.	_____
Assembly	(kg) approx.	_____

(21) Painting _____

(22) Divided package number for shipping _____

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Tenderer's Data Sheet

(Tenderer's Name)

3. PLANT WATER SYSTEM

3.1 Water pretreatment system

Quality of treated water at outlet of coagulation sedimentation tank

PH		*
Turbidity		
Suspended solid		*
Iron		
Treated capacity		* m^3/h)

Quality of treated water at outlet of filter equipment

PH		*
Suspended solid		*

(1) Raw water underground receiving tank

(a) City water boostor pump

Type		
Manufacturer		
Number		
Capacity	(m^3/h)	
Discharge head	(m)	
NPSH	(m)	
Speed	(rpm)	
Shaft horsepower	(KW)	
Connection size		
Suction	(mm)	
Discharge	(mm)	

Tenderer's Data Sheet

_____
(Tenderer's Name)

Material

Casing _____

Shaft _____

Impeller _____

Motor — The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight

Pump (kg) approx. _____

Complete (kg) approx. _____

(b) Raw water transfer pump

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Discharge head (m) _____

NPSH (m) _____

Speed (rpm) _____

Shaft horse power (KW) _____

Connection size

Suction (mm) _____

Discharge (mm) _____

Material

Casing _____

Shaft _____

Impeller _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Motor

The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

Weight

Pump (kg) approx. _____

Complete (kg) approx. _____

(c) Level indicator

Type _____

Manufacturer _____

Number _____

(d) Painting

	Material	Size
(e) Piping	_____	_____
	_____	_____
	_____	_____

(2) Filter equipment

(a) Filter

Type _____

Manufacturer _____

Number _____

Capacity (m^3/h) _____

Filters _____

Filtration rate (m/h) _____

Washing rate by back-washing (m/h) _____

Cleaning rate by air scrubbing ($m^3/m^2/h$) _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

Net washing and cleaning time per once		_____
Material and lining		_____
Diameter	(mmø)	_____
Height	(mm)	_____
Weight	(kg) approx.	_____

(b) Air scrubbing blower

Type		_____
Number		_____
Capacity	(m^3/h)	_____
Exhaust pressure	(mmHg)	_____
Speed	(rpm)	_____
Noise	(dB)	_____
Material		_____
Casing		_____
Shaft		_____
Blade		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.

(c) Painting

(d) Piping

Material	Size
_____	_____
_____	_____
_____	_____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(3) Treated water underground storage tank

Type _____

Capacity _____ m^3

(a) Filter backwashing pump

Type _____

Manufacture _____

Number _____

Capacity (m^3/h) _____

Discharge head (m) _____

NPSH (m) _____

Speed (rpm) _____

Shaft horse power (KW) _____

Connection size

Suction (mm) _____

Discharge (mm) _____

Material

Casing _____

Shaft _____

Impeller _____

Motor

The Tenderer shall indicate motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Bidder's Data Sheet.

Weight

Pump (kg) approx. _____

Complete (kg) approx. _____

Tenderer's Data Sheet

_____
(Tenderer's Name)

(c) Treated water transfer pump

Type		_____
Manufacturer		_____
Number		_____
Capacity	(m^3/h)	_____
Discharge head	(m)	_____
NPSH	(m)	_____
Speed	(rpm)	_____
Shaft horse power	(KW)	_____
Connection size		
Suction	(mm)	_____
Discharge	(mm)	_____
Material		
Casing		_____
Shaft		_____
Impeller		_____
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Weight		
Pump	(kg) approx.	_____
Complete	(kg) approx.	_____

(d) Level control

Type	_____
Manufacturer	_____
Number	_____

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Tenderer's Data Sheet

_____
(Tenderer's Name)

(e) Painting

	Material	Size
Treated water transfer pump - Service water tank	_____	_____
Filter back washing pump - Filter equipment	_____	_____

____
(Tenderer's Name)

(4) Chemical storage and injection equipment

(a) Coagulant tank

Type		____________
Manufacturer		____________
Number		____________
Capacity	(m^3)	____________
Diameter	(mmø)	____________
Height	(mm)	____________
Material and lining		____________
Weight	(kg) approx.	____________

(b) Coagulant dosing pump

Type		____________
Capacity	(l/h)	____________
Manufacturer		____________
Number		____________
Head	(m)	____________
Motor		The Tenderer shall indicate the motor specification in accordance with sub-clause 10 of "Electric Motor" in Clause V of Tenderer's Data Sheet.
Material and lining		____________
Weight	(kg) approx.	____________

(c) Coagulant tank level control

Type		____________
Manufacturer		____________
Number		____________

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