Specifications
&
Summary of Requirements

CHAPTER-1

SPECIFIC REQUIREMENT OF THE PROJECT, HBPL at HMRBPL Haldia

A) SUMMARY OF REQUIREMENT FOR SUPPLY OF BOOSTER PUMPING UNIT:

SN	Item Description	Pump Operating Parameters	Qty	Location
1	Vertical Turbine type Centrifugal Pumping Unit complete with Pump (VS6 of API 610), Coupling, Base plate, counter-flange and reducer/expander to match 10" 150# inlet piping, 8" 150# discharge piping, Y strainer, flameproof and weatherproof squirrel cage induction Motor, motor soft starter, Instrumentation and with all accessories as per specifications.	Q = 330 m^3/h H = 60 MCL (Guaranteed duty point)	2 No.	HMRBPL, Haldia

Note:

1. The minimum acceptable pump efficiency shall be 75% for rated duty point condition specified under unless otherwise specified.
2. Heads and flow rates shown above are based on Petroleum product with parameters mentioned in Annexure-2.
3. Design specific gravity of 0.85 and viscosity of 5 cSt shall be considered.
4. Supply shall include commissioning spares and Two years O&M spares as furnished in **Annexure-2**.
5. Vendor shall include the cost of commissioning spares in the cost of pump itself. Two years O&M spares cost shall be quoted by vendor separately as indicated in BOQ.
6. Vendor shall include the cost of counter flanges, eccentric reducer, concentric reducer and Y-strainer in the cost of pump itself.
7. Rate of power for loading as per evaluation and penalty criteria shall be Rs. 9.04 per KWh.
8. IOCL hurdle rate loading as per evaluation and penalty criteria shall be 13%.
9. Utility water connection is not available for cooling purpose.

B) VENDOR'S SCOPE OF SUPPLY (FOR EACH PUMP):

Sl. No.	Item Description	Unit	Qty	Remarks
1.	Vertical turbine type centrifugal pump (VS6)	Complete Unit	1	As per IOCL technical specification
2.	Squirrel cage induction Motor	Complete Unit	1	As per IOCL technical specification
3.	Motor soft start Panel	Each	1	As per IOCL technical specification
4.	Coupling	Each	1	As per IOCL technical specification
5.	Counter flanges for suction and discharge nozzles	Each	2	Suitable size and rating for mating with pump nozzles. Dimensions of flanges shall be as per ASME B 16.5.
6.	Eccentric Reducer as applicable	Each	1	Suitable for suction pipe size as specified in Annexure-I. Schedule/ rating shall be as per suction

Sl. No.	Item Description	Unit	Qty	Remarks
				pipe/flange.
7.	Concentric Reducer as applicable	Each	1	Suitable for discharge pipe size as specified in Annexure-I. Schedule/ rating shall be as per discharge pipe/flange.
8.	Y-Type Strainer	Each	1	• As per IOCL technical specification. • Suitable for installation in pump suction arm. Strainer with flange ends shall have nozzle size same as suction pipe size specified in Annexure-I. End flanges shall be as per ASME B 16.5 of ANSI 150 class. • Maximum Pressure drop in strainer shall be 0.2 kg/cm^2 at 100% clean condition and 0.5 kg/cm2 for 50% clogged condition. Mesh size of Y Strainer shall be 20 mesh.

C) BIDDER'S QUALIFICATION CRITERIA:

i) Offered pumps shall meet the latest edition of API 610 (unless otherwise specified) and requirements of this specification.

ii) The offered pump model shall be from the existing model series and shall be from the regular manufacturing range of pump manufacturer under same plant.

iii) The offered pump shall be geometrically similar and from the same family curve to already supplied/shop tested pump from the same manufacturing plant.

iv) Bidder must have supplied at least one pump conforming to API 610 in the last ten years for petroleum industries, whose flow as well as head are at least 75% of rated flow and head of the pump as indicated in **specific requirement of project-Sl. No A unless otherwise specified**. Such supplied pumps must also be from the same proposed manufacturing plant. Further, the power rating of such supplied pumps shall be at least equal, or superior to that of the offered pumps.

v) The supply record of pumps submitted as per Sl. No. iv above shall be of same model series and same pump type (VS6) as that of the offered pump.

vi) Bidder shall submit documentary evidence which includes purchase order along with approved GA drawing, datasheet, performance curve, inspection reports, Inspection release note or any other documentary proof which establishes successful delivery and commissioning of pump.

vii) Bidder shall provide certificate/letter/reports from end user or any other documentary evidence to establish satisfactory operation for a minimum period of one year at site as on bid due date for at least one of the supplied pumps, which meet the criteria in Sl. No.(iv & v)

D) GENERAL REQUIREMENTS:

SN.	Item Description	Data		Remarks
1.	Environment	Temperature Range	$+5^0$ C. (Min.) $+50^0$ C. (Max)	
		Precipitation	Heavy rain during monsoon	
		Relative Humidity	98%	
		Storage condition	(-) 5^0 C to $+55^0$ C with relative humidity at dew point	

SN.	Item Description	Data	Remarks
2.	Pump Data Sheet	In addition to clause 6.0 of technical specifications, vendor to provide the details.	As per Annexure-1.
3.	Handling Liquid	Petroleum Product	As per Annexure-2.
4.	Spares	For commissioning and 2 years operation and Maintenance.	As per Annexure-3
5.	Check List		As per Annexure-4
6.	Installation & Commissioning services	Supplier shall depute Engineer/technician to the Owner's place for assisting in pre commissioning / commissioning of the pumping unit	As per Annexure-5
7.	Evaluation and Penalty criteria		As per Annexure-6
8.	Booster Pump	Vertical turbine type pump	As per standard specification no IOCL-MECH-BP-003 Rev.02
9.	Prime mover	Motor	As per attached specification no IOCL-PL-ELEC-MOTOR-LV-15
10.	Motor Start Panel	Motor is suitable for soft starting and DOL.	As per attached Specification
11.	Instrumentation	Instrumentation & control for protection of pumping unit	As per attached specification format no QAF/BP/HT/01
12.	Strainer	Y type strainer before booster	As per attached specifications no IOCL- MECH–STR–Y–085 REV 01
13.	Exceptions & Deviations for pump.	Bidder to stipulate exceptions and deviations to Bidding Document, if any, separately for technical clauses in respect of the specifications	As per Annexure-7
14.	Power Supply	Necessary power supply from Owner's MCC shall be provided by the Owner for the electric motors.	The power supply shall be of 415V ±10 ± 10%, 50 Hz, 3 phase. The motor is suitable for soft starting and DOL.

E) SPECIFIC REQUIREMENT FOR MOTOR AND INSTRUMENTATIONS:

Sl.	Description
1.	Deviations if any shall be brought down only under the Attachment 2 of motor specifications. Mentioning of deviation at any other place either directly or indirectly shall not be considered by the Owner. Any deviation with regard to instrumentation to be mentioned clearly in Annexure- INST-10 of Chapter -3 (Instrumentation).
2.	If the bidder wants to include any alternative for certain equipment, auxiliaries/ instruments etc. the bidder shall furnish all the technical details, literature, catalogue, drawing, supply record, recent performance credentials from end users etc. of the alternative. Change of make / model & country of origin shall not be entertained once technical evaluation is concluded.
3.	Bidders are advised to firm up only one make along with country of origin of motor while submitting their offer out of the approved makes given in Attachment 3 of motor specifications. Bidder to specify the soft starter make and model while submitting their offer.
4	Original equipment manufacturer's representative to be present during installation/ commissioning.

F) AMENDMENT TO PUMP SPECIFICATION (IOCL-MECH-BP-003):

Existing Clause	Existing provision	Amended Clause
Clause 3.0 (v)	NPSHR in the complete flow range (MCSF to 120% of rated flow/guaranteed duty condition)/other duty condition shall be at least 1m below the NPSHA specified	NPSHR in the complete flow range (MCSF to rated flow/guaranteed duty condition)/other duty condition shall be at least 1m below the NPSHA specified
STRAINER SPECIFICATION (IOCL-MECH-STR-Y-085)		
Clause 5.0 (3.)	Strainer shall be of fabricated body only and cover blind flange shall be ASTM A 105.	Strainer shall be of fabricated or cast body and cover blind flange shall be ASTM A 105.

G) COMPLIANCE TO SPECIFICATION:

1. The bidder should comply to the specification in totality and in token of confirmation the bidder shall return a copy of specification duly signed & endorsed.
2. Any remark by the bidder in respect of specification shall be mentioned in Annexure-7 (Exception and Deviations statement) with proper reference to the clause and appropriate reason for the same.
3. Any other remark directly or indirectly on the specifications by the bidder made elsewhere in the offer shall not be considered for evaluation.

Annexure-1

PUMP DATA SHEET

Sl. No.	DETAIL	Parameters/ Remarks		Parameters of offered pumps (shall be filled-in by the vendor)
1	Pump Model & series offered	Vendor to specify		*
2	API model	VS6		
3	Nomenclature of pump model series#	Vendor to specify		*
4	No. of stages	Vendor to specify		*
5	Location of manufacturing, testing and unitization	Vendor to specify		*
6	Altitude in meters above Mean Sea Level of the location of installation			8m
7	Flow Rate	Duty point	m^3/h	330
8	Differential head	Duty point	m	60
9	NPSH (A) in meters at the suction nozzle of pump			0 MCL
10	NPSH (R) in meters	Vendor to specify		*
11	No. of units in operation + Stand-by			1 + 1
12	Mode of operation	Parallel		Parallel
13	Total no. of pumping units			2 no. (Bidder scope of supply : 2no)
14	Suction piping size and rating envisaged by owner			10" x 150#
15	Discharge piping size and rating envisaged by owner			8" x 150#
16	Size and rating of Suction nozzle offered	Vendor to specify		*
17	Size and rating of Discharge nozzle offered	Vendor to specify		*
18	Rated Speed RPM of motor	Vendor to specify		*
19	Guaranteed Efficiency %	(Minimum 75%), Vendor to specify		*
20	Best efficiency flow rate m^3/h	Vendor to specify.		*
21	Preferred operating range m^3/h	Vendor to specify.		*
22	Allowable operating range m^3/h	Vendor to specify.		*
23	Min. continuous flow m^3/h	Vendor to specify.		*
24	Power of Prime Mover (kW)	Vendor to specify.		*
25	Pump Rated Power (kW)	Vendor to specify.		*
26	Max. BKW at rated impeller diameter	Vendor to specify.		*
27	Max. Head at rated impeller (m)	Vendor to specify.		*
28	Head Rise to shut off (HRSO)	(Min 110% of rated head at duty point). Vendor to specify.		*
29	Flow ratio (rated/BEP)	Vendor to specify.		*
30	Rated impeller dia. (mm)	Vendor to specify.		*
31	Max. impeller dia. (mm)	Vendor to specify.		*
32	Min. impeller dia. (mm)	Vendor to specify.		*
33	Maximum allowable working pressure (MAWP) of casing (kg/cm^2)	Vendor to specify.		*

Sl. No.	DETAIL	Parameters/ Remarks	Parameters of offered pumps (shall be filled-in by the vendor)
34	Hydro test pressure of casing (kg/cm^2)	Min. 1.5 times of MAWP. Vendor to specify.	* API 610
35	Coupling Make	Vendor to specify.	*
36	Seal Make	Vendor to specify.	*
37	Seal Flushing Plan	14, 65A	
38	Static Pressure rating of Mechanical seal(Kg/cm^2)	Vendor to specify.	*
39	Dynamic Pressure rating of Mechanical seal(Kg/cm^2)	Vendor to specify.	*

Note: Supplier shall finalize and submit the above duly filled in pump data sheet along with the bid during bidding stage itself.

 # Pump Nomenclature shall be provided by the vendor during bid stage.

*** Vendor to specify.**

Annexure - 2

PETROLEUM PRODUCT CHARACTERISTICS

1) MOTOR SPIRIT (MS) / GASOLINE

PROPERTY	UNIT	LIMIT
Density @ 15 °C	Kg / m^3	720 - 775
Kinematic Viscosity @ 40 °C	cSt	0.7
Reid Vapour Pressure @ 38 °C	kg/cm^2	Max. 0.680
Total Sulphur, max.	mg / Kg	50
Lead Content (as Pb) , max.	g / L	0.005
Copper Strip Corrosion, 3h at 50 ^{0}C	--	Not worse than No.1

2) HIGH SPEED DIESEL (HSD)

PROPERTY	UNIT	LIMIT
Density @ 15 °C	Kg / m^3	820 - 845
Kinematic Viscosity @ 40 °C	cSt	2.0 – 4.5
Pour Point, max. (in summer)	°C	15
Flash Point (Abel), min.	°C	35
Total contamination, max.	mg / Kg	24
Total Sulphur, max.	mg / Kg	50
Total Water content, max	mg / Kg	200
Copper Strip Corrosion, 3h at 50 ^{0}C	--	Not worse than No.1

3) SUPERIOR KEROSENE OIL (SKO)

PROPERTY	UNIT	LIMIT
Density @ 15 °C	Kg / m^3	820 - 845
Kinematic Viscosity @ 40 °C	cSt	1.0 - 2.0
Flash Point (Abel), min.	°C	35
Total Sulphur, max. % by mass	%	0.25
Copper Strip Corrosion, 3h at 50 ^{0}C	--	Not worse than No.1

4) AVIATION TURBINE FUEL (ATF)

PROPERTY	UNIT	LIMIT
Density @ 15 °C	Kg / m^3	775 - 840
Kinematic Viscosity @ - 20 °C	cSt	8.0
Flash Point (Abel), min.	°C	38
Freezing point, max.	°C	-47
Copper Strip Corrosion, 3h at 50 ^{0}C	--	Not worse than No.1

5) NAPTHA

PROPERTY	UNIT	LIMIT
Density @ 15 °C	Kg / m^3	666.0 - 740
Kinematic Viscosity @ 40 °C	cSt	2.6
Reid Vapour Pressure @ 38 °C	kg/cm^2	0.700
Total Sulphur, max.	ppm	500.0
Copper Strip Corrosion, 3h at 50 ^{0}C	--	Not worse than No.1

Annexure-3

SUMMARY OF REQUIREMENT FOR SPARES

I. SPARES FOR TWO YEARS OF OPERATION OF BOOSTER PUMPING UNITS

SN	Item Description	Quantity: Haldia	Part No. (Vendor to furnish during bid stage)
A. MECHANICAL			
1.	Complete Mechanical Seal	2 set	Supplier to furnish along with the bid
2.	Pump Bearing	2 set	----do----
3.	Complete set of pump gasket / 'O' Ring	2 set	----do----
B. ELECTRICAL			
1.	Motor Bearing (DE+NDE)	2 set	----do----
2.	Cooling fan	2 no.	----do----
C. INSTRUMENTATION			
1.	Pump Bearing RTD	1 no.	----do----
2.	Pump Casing RTD	1 no.	----do----
3.	Vibration Switch for Pump	1 no.	----do----
4.	Pressure Switch (complete with Junction Box) for suction	1 no.	----do----
5.	Pressure Switch (complete with Junction Box) for discharge	1 no.	----do----
6.	Pressure Indicator for suction	1 no.	----do----
7.	Pressure Indicator for discharge		----do----
8.	Level Switch for seal leakage detector	1 no.	----do----
9.	Vibration Switch for Motor (if applicable)	1 no.	----do----

Note:

1. The switches shall be DPDT or (2 SPDT) and complete with a cable gland suitable for owner's 4 core armored copper control cable. Maximum outer diameter of cable shall be 13.14 mm. (nominal).
2. All electrical connections shall be NPT only.
3. All spare instruments shall be of same make & model as offered with motor/ pump.

II. COMMISSIONING SPARES

Sl. No.	Item Description	Quantity	Part No. (Vendor to furnish during bid stage)
1.	'O' Ring & gasket for Pump	2 set	
2.	'O' Ring & gasket for Mechanical Seal	2 set	
3.	Rotary & Stationary Faces for Mech. seal	2 set	
4.	Pump Bearings	2 set	
5.	Motor Bearings (DE+NDE)	1 set	

Note:

1. ***Cost of commissioning spares (as specified in Table II above) shall be included in the pump cost.***
2. ***Cost of spares for 2 years of Operation (as specified in Table I above) shall be quoted separately as indicated in the BOQ.***