

19/02/2021

**MINUTES OF TECHNICAL PRE-BID MEETING HELD ON FEBRUARY 17, 2021 AT MITCON OFFICE,  
PUNE FOR EPC OF 22 TPH, 44 ATA INCINERATION BOILER & AUXILIARIES WITH BALANCE OF  
COGEN PLANT FOR  
M/S. HPCL BIOFUELS LTD., SUGUALI & LAURIYA (BIHAR)  
(Prepared by MITCON Consultancy & Engineering Services Ltd.)**

**A) General Points:**

1. All bids to be submitted as per instructions provided in Commercial & Technical unpriced bid document on or before March 5, 2021 by 14:30 hrs at the address provided in the bid
2. Bidders to submit no deviation letter as per the format provided in the tender
3. HBL advised that any bid which does not adhere to the required procedure in the tender document or does not contain the documents required as per the tender will be rejected.
4. Technical bid opening will be informed shortly
5. Date of financial bid opening will be informed to all eligible bidders.
6. As per tender, soft copies of all data sheets to be provided in word / excel format to MITCON ([cpn@mitconindia.com](mailto:cpn@mitconindia.com)) and HBL ([AbhishekKumar.Singh2@hpcl.in](mailto:AbhishekKumar.Singh2@hpcl.in)). Soft copy of the data sheet is attached herewith
7. Autocad copy of plant layout for both Suguali & Lauriya site enclosed for reference only.

**B) Additional Technical Points required to be considered by the bidders:**

1. Replies to queries raised by bidders during and prior to the technical pre-bid meeting are provided in annexure enclosed herewith. These clarifications will be applicable to all bidder

**ANNEXURE**

<b>Description</b>	<b>Reply</b>
<b>Commercial Terms</b>	HBL informed all bidders to presently proceed as per commercial terms and conditions as per tender. Select bidder may raise request for minor revisions with justifications for the same for consideration.
<b>Support Fuel &amp; Slop turn down</b>	HBL / MITCON informed that the boiler should be capable of accepting 100% bagasse or 100% coal as support fuel. Boiler should be capable of 100% MCR with only 30% of the rated slop firing. Slop GCV for design to be considered as 1650 kcal/kg
<b>Bagasse &amp; Coal Handling System for Suguali &amp; Lauriya project</b>	For bagasse handling system, drive should be selected for carrying 10 TPH of bagasse for MBC-1 & RBC-2 conveyors  Entire coal handling system including all equipment should be designed for 6 TPH capacity as against 4 TPH specified in the tender
<b>Mass Flow meter</b>	Bidder to provide mass flow meter to record and monitor slop fired in boiler, interconnected to DCS.

Sl. No.	Volume no./ Clause no/Page no.	As per tender Doc no: HBL/TEN/PUB/20-21/226	Clarifications Sought	MITCON'S Reply
<b>A. MECHANICAL</b>				
1.	II/1.5.1/85	The boiler efficiency, firing 100 % coal, shall be about 80 % on GCV basis.	We have not designed the boiler for 100% Coal. However the boiler is designed for following fuel Combination: Slop + Indian coal Slop + Bagasse	HBL / MITCON informed that the boiler should be capable of accepting 100% bagasse or 100% coal as support fuel. Boiler should be capable of 100% MCR with only 30% of the rated slop firing. Slop GCV for design to be considered as 1650 kcal/kg
2.	II/1.5.5/87	MOC of conveyors shall be min SS304 or to be suitable for ash temperature discharged through boiler	We have considered Nylon belt with M24 Cover Grade for Ash handling System. The material of Trough for Submerged Conveyor is SS 304.	
3.	II/2.26/144	ASH HANDLING SYSTEM: MOC of conveyors shall be min SS304		As per tender.

4.	II/1.5.8/88	The air compressor shall be oil free two (2) stage reciprocating non-lubricating type with belt drive. The design of the reciprocating compressor will be opposed piston dynamically balanced according to the standard.	We are considered Oil injected Screw Compressor for instrument air requirement.	Required oil separators with one Operating and One standby to be provided.
5.	II/1.6/100	The Bidder is responsible for the entire scope of the cogeneration project between the given terminal points. This document elaborates on the specific requirements of this project and need not be considered comprehensive. All plant & equipment, services required to commission the cogeneration project are deemed in the scope of the Bidder.	The scope of supply, exclusion & terminal points will be as per the tender specification and subjected to deviations furnished in this Annexure. However if any other additional items are required, the same shall be mutually discussed and supplied with additional price implication.	As per terminal points of tender.
	II/2.1.1/104	All other auxiliaries and steam generator components required for safe, reliable and continuous year around steam generation		As per terminal points of tender.
	II/2.1.1/104	Any other item not listed but essential to complete the steam generation system		As per terminal points of tender.

6.	II/1.6/101	Obtaining all required statutory approvals for construction of cogeneration plant including electrical inspectorate approval, IBR approvals, labour commissioner, excise, factory inspector as applicable, electrical inspector for electrical works, registration & payment of all taxes & duties for bidders' staff & labour, as per all applicable laws, etc. Statutory fees, if any, will be paid by the Purchaser and applications required, if any will be made by the Purchaser.	IBR approval for manufacturing activities and erection activities (fees payable by purchaser) and electrical inspector for electrical works will be taken care by CBL. The other statutory approvals are in the scope of purchaser. However necessary technical assistance will be provided for the equipment's supplied by CBL.	Accepted.
7.	II/2.1.1/103	CBD & IBD with steel tanks. CBD & IBD valves to be at FFL. Isolating valves to be provided at drums	We have considered common BD tank for CBD & IBD. Considering the Criticality, we don't recommend to extend the Pipe line to mount IBD and CBD at FFL. It should be mounted on the nearest approach platform.	Accepted, blow down tanks at FFL.

8.	II/2.1.1/104	Silencers to be provided for first safety valve, air vent valve, blow off vents, exhaust steam line vent, deaerator vent all continuously operating steam vents and FD suction.	We have not considered silencer for drum safety valve, air vent valve, blow off vents and Deaerator vent. However we have considered silencer for superheater safety valve, startup vent, FD & SA fan suction and exhaust steam line.	Also consider for deareator vent as per tender.
9.	II/2.1.1/104	Valves including specified motorized valves	<p>We have considered the following motorized valves in CBL scope.</p> <ul style="list-style-type: none"> <li>- MSSV with integral bypass</li> <li>- Startup vent (Pneumatic)</li> <li>- CBD &amp; IBD</li> <li>- Feed pump discharge</li> <li>- Turbine inlet</li> <li>- Warm up vent</li> <li>- Blow off valve in exhaust line</li> </ul>	As per tender.

10.	II/2.6/106	The bank tubes shall be expanded into both the top and the bottom drums, and the tubes after expansion shall be bell mouthed.	As the proposed Boiler is Single Drum Design, therefore, we have considered modular type evaporator. Evaporator shall be located separately in third pass of the water wall.	Accepted.
11.	II/2.6/106	Pre-ash collector zone to be provided after evaporator section.	Not applicable considering safe and trouble free operation of boiler.	Required as per tender.
12.	II/2.10/110	Economiser Evaporator will be provided with 150 mm transverse pitch.	Considering design parameters transverse pitch for economiser will be 100 mm.	As per tender.
13.	II/2.10/110	The flue gas velocity over the economiser tubes shall be limited to a maximum of 1 meter/sec.	Flue gas velocity over the economiser tubes shall be 8 – 11 m/sec. However, the water side velocity in Economiser Tubes shall be limited to Max. 1 m/sec	Typing error in tender is regretted. The same should be 10m/sec.

14.	II/2.6/106	The evaporator bank to be provided with ash hopper with refractory.	As temperature at evaporator & economizer are less than 350 deg, we have not considered refractory lining for evaporator & eco ash hopper.	Presently, please consider appropriate application of minimum 50mm refractory lining and the same can be also discussed during KOM.
	II/2.7/107	The external super heater will be provided with ash hoppers with refractory.	And for furnace Second pass and secondary super heater ash hoppers we have considered MOC of hoppers as SS 304.	Accepted.
	II/2.8/108	The bottom of the second pass in the furnace will have bottom ash hoppers with refractory.		Accepted.
	II/2.10/111	Ash hoppers will be provided at bottom of economiser with refractory lining.		Accepted.
15.	II/2.7 (a)/107	Attemperator shall be to control the final steam temperature at 400 +/- 5°C between 60% to 100% MCR load.	We have considered steam temperature control range as 60-100% for Slop + Bagasse combination firing condition and 70-100% for Slop + Indian Coal	As per tender.



			combination firing condition.	
16.	II/2.9.2/109	Firing system / Travel Grate System	Considering the fuel characteristics of support fuel being fired along with slop, we have considered the Travelling grate furnace for proposed boiler.	Accepted.
17.	II/2.11/111	Air Pre-heater	As per our Engineering Standard Practice for Spent wash fired boiler, we have not considered the Air heater in Boiler Gas circuit.	

			We have considered steam coil air pre heater for combustion air pre heating for the proposed boiler.	Accepted, as per tender.
18.	II/2.12/111	Electro Static Precipitator (ESP) / Bag Filter	Considering ODC of 50 mg/Nm <sup>3</sup> we have considered ESP as dust collecting equipment for the proposed boiler.	Accepted, as per tender.
19.	II/2.13/112	Outlet damper for maintenance isolation to be provided.	For single fan arrangement outlet damper is not required as isolation can be provided from inlet damper only. If we provide damper at outlet it may create back pressure.	Accepted
			Outlet damper is only provided in case of two fans arrangement.	
20.	II/2.14/113	The minimum thickness of the aerofoil blades used ...	As we have offered backward curved blades, aerofoil blades are not applicable.	As per tender.

21.	II/2.14/114	FD fan to have multi louver dampers	We have considered Inlet guide vane type dampers for FD fan & SA fan. Hence multi louver damper is not required and not considered.	Pneumatically operated		
	II/2.16/115	Multi louver damper control to be provided for SA fans				
22.	II/2.19/116	Feed water control station will consist of 1 x 100% pneumatic control valve, 1 x 100% motorised control valve and 1 x 30% manual bypass.	We have considered 1 x 100% pneumatic control valve with motorized bypass valve.	As per tender.		
			1 x 30% bypass is not applicable considering the capacity of the boiler.			
23.	II/2.23.13/129	Interconnecting steel platform from boiler operating floor to the control room operating floor in the power house to be provided with handrails and steps.	For estimation purpose, we have considered connecting platform of 1 m wide and 5 m length between boiler building to TG building at one level (operating floor) only.	You may consider 10 m length minimum		
			Rest to be discussed during			

			detail engineering stage.			
24.	II/2.23.14/129	Motorised valves will include air vent	We have considered motorized start up air vent valve.	Accepted.		
25.	II/2.27/145	Civil:	As grouting is part civil work, we have not considered supply of grouting cement and its application in CBL scope.	Accepted.		
		Supply of all embedment, foundation bolts, fasteners, shim plates & grouting material, etc, as required for the equipment foundation.				
26.	II/2.28.7/159	All HP valves to be 1500 class (or as per IBR)	The rating of HP valves will be 800 class upto 50 NB size and 600 class > 50 NB as per Pressure Temperature rating of ASME B 16.34.	Accepted as per ASME.		
27.	II/2.29/160	PAINTING				
		All metal scrubbers shall be chemically cleaned, degreased and pickled in acid to produce a smooth surface, free of scale, grease and rusts.	We have considered Two coats of red oxide at our shop & 2 coats of enamel paint for the components at site for components supplied by CBL.	As per appendix - V of tender.		

		After cleaning, phosphating and passivation treatment, the surface shall be given two(2) coats of zinc rich epoxy primer and backing in the oven.				
		Sufficient quality of touch up paint shall be furnished for application at site.				
		All parts which are subjected to wetting and drying alternatively shall be painted with three water proof coats as detailed below :				
		a) First coating Bronze 75% coal tar 25%				
		b) Second coating Bronze 50% coal tar 50%				
		c) Third coating Bronze 25% coal tar 75%				
		All exposed steel and cast iron surface shall be given one coat of red oxide anti corrosive primer and 2 coats of enamel paint of approved colour.				
28.	APPENDIX – V / 4 / 262	Paint Materials				

29.	II/2.35.1/206	Training to purchaser's project and O & M teams	Kindly note that we have considered training for two weeks at site during commissioning period.	As per tender.		
30.	II/3.1/207	MAJOR CIVIL WORKS	We have not considered the same in CBL scope of work.	Accepted.		
31.	II/4.1.2/208	De-aerator : Thermax / BHEL / L&T	The same will be discussed during forthcoming meeting.	Presently as per tender. May discuss during KOM with select bidder based on references & feedback		
	II/4.1.2/208	ESP : Thermax / BHEL / Alstom	May please note that, we have considered our own make for the products which falls in our product range such as ESP, fans, deaerator cum storage tank, metallic expansion bellows, air & flue gas dampers, dosing tank,	Own makes may be accepted during KOM based on references and feedback.		

			silencer, orifice plates etc.			
	II/4.1.2/209	HP & LP Dosing system : Asia LMI / Enpro		Presently as per tender. Additional makes may be considered during KOM with justifiable technical reasons.		
	II/4.1.2/209	ID, FD and SA Fans : AYL / ABB / BHEL / Batliboi / Reitz		Presently as per tender. Additional makes may be considered during KOM with justifiable technical reasons.		
32.	II/4.3/217	LIST OF DRAWINGS & DOCUMENTS	Shall be discussed during project kick off meeting.	Generally as per tender.		

33.	APPENDIX- III/ 1.18 / 233	All pressure tappings for pressure applications above 40 Kg/Sq.Cm shall be of size NB 25 with two root valves. For pressures 40 Kg/Sq.Cm and less the size shall be NB 15 with one root valve.	Root valves are not applicable for the proposed boiler.	Required for HP drain lines.		
34.	APPENDIX- III / 1.21.6 / 235	For the safety valve exhaust piping, where the exhaust steam temperature is less than 400 Deg.C, the piping material shall be API 5L Gr.B.	All safety valve exhaust piping shall be as per SA 53/Eq. grade piping material.	As per IBR.		
35.	APPENDIX- III / 1.24.1 / 237	All globe valves of size NB 50 and below shall be of integral type.	All the globe valves shall be Bonnet type.	To be discussed during detailing.		
36.	APPENDIX- III / 1.24.1 / 238	Integral bypass valve shall be provided for valves of size NB 250 and above with pressure class rating 300, 400 and 600.	We have only considered Motorized main steam stop valve with integral motorized bypass valve.	Same to be considered for STG isolation valve.		
		Integral bypass valve shall be provided for valves of size NB 100 and above with pressure class rating 900 and above.				
		Bypass valves shall be motor operated, if the main valve is motor operated.				
37.		Insulating Materials		Accepted.		



	APPENDIX- VII / 1.4.1 / 273	Compressed Resin bonded mineral wool mattress	LRB insulation considered as per thickness chart provided in table-1 attached on Pg.278 of this tender document.			
38.	APPENDIX- VII / 1.4.2 / 274	<b>Insulation</b> The sheeting shall be protected internally with 2 coats of bitumastic paint.	The cladding sheet will be provided over insulation. Hence painting at the internal surface is not required.	Accepted.		
<b>B. INSTRUMENTATION</b>						
39.	-/1.5.14/ 99 of 277	<b>Instrumentation &amp; Control System</b> The DCS will include the DCS control station, related licensed software & hardware, instrument & control cabling from the marshalling cabinet receiving signals from junction boxes of all cogeneration equipment, all MCC's and software links with Turbo-visor panel, Woodward Governor and turbine temperature scanner.	Only Monitoring of Turbine will be provided in Plant DCS considering the IO Details provided for Turbine.	As per tender. STG start-up will be manually with critical controls in DCS.		

40.	II/ 2.21.1/120	The steam generator shall be provided with a three Elements Automatic Feed Regulator (through transmitter and controllers).	Field instruments required for three element drum level control shall be considered and the signal of the same shall be brought up to junction boxes separate controllers or control panels are not considered as the total plant control shall be performed in DCS only.	As per terminal points of tender.		
	II/2.21.2/120	De-aerator Automatic Level and Pressure Controller				
41.	II/2.21.5/121	Positions of all inching MOVs	We have considered electro-pneumatic type positioners for control valves only.	Accepted.		
42.	II/2.3/105	The necessary nozzle connections for the following, ....., remote level indicator at operating floor,	We have considered electronic type remote water level indicator.	Accepted.		
43.	II/2.21.3/120	Remote Water Level Indicator for steam generator to indicate the water level in the steam drum and visible at the operating floor.				

44.	II/2.21.5/121	Speed	As we have considered VFD for FD, ID fan & fuel feeder, We have not considered separate speed measurement devices (e.g. Rotameter). However speed indication can be taken from VFD panel to DCS.	VFD's to be provided as per tender. Speed to be realised in DCS by bidder.		
45.	II/2.21.5/121	CBD / IBD level control	Since we have envisaged one no. common blow down tank for both IBD & CBD. Hence same is not required & not considered in CBL scope.	Accepted.		
46.	II/2.21.8/124	Tapping to measure draft with manometer shall be provided.	We have considered draught gauges with draught transmitters for draught measurement.	Accepted.		
			Manometers are not suitable for such capacity of	Accepted.		

			boilers and not considered.			
47.	II/2.31.3/168	The entire cogeneration plant will be smoothly started, normally operated, provided with necessary interlocks & emergency trips, monitored, controlled and smooth shut down from the DCS.	We have considered control of boiler and STG in DCS and indication for fuel handling, ash handling, compressor, cooling tower and fire-fighting system.	Accepted.		
	II/1.5.14/99	The entire plant will be controlled by a centralized DCS with high redundancy level with inputs and controls of all loops, analyzers, control valves, motorized valves, motors, etc.				
48.	-/2.31.2.6/ 163 of 277	iv. Redundancy will be provided in the Central Processing unit, power supply (both at the	We envisage to provide 3-level Redundancy i.e at Central Processing unit, power supply (both at the	As per tender.		
		CPU & I/O), I/O modules and communication modules (both between the controller and	Power Supply, Processor & Communication. Redundancy at Critical IO's will be considered.			
		the operator station and between the I/O modules and the controller).				

		v. Redundancy will also be provided for the communication cables.				
		vi. Power supply used for interrogation with field devices shall also be redundant.				
		vii. The DCS shall be provided with processor, power supply, communication and I/O redundancy for the entire system.				
49.	II/2.36.2.6/167	ii. All field instruments used for sensing transmission and measuring shall be of electronic smart type with signal transmission in current mode of 4-20 mA.	We have considered the signals from temperature element inputs directly to DCS marshaling cabinet without converter mA.	As per tender and functional requirements.		
50.	-/2.32.23/ 186 of 277	<b>I/O Counts</b>	Kindly clarify if IO detail mentioned also includes Boiler & ESP IO's as the same is not where mentioned in the tender specification which if separately taken will increase the Total IO Count	Please note that tender clarifies that provided IO counts in tender are minimum and final I/O count will be derived based on profibus / modbus communications & as per all approved PID's ( whichever is higher & 25% spare I/Os above). Please consider as per tender.		
		I/O summary for Steam Generator & Auxiliaries: 580 IO's				
		I/O summary for Turbine & Auxiliaries: 178 IO's				

		I/O Summary for Balance of Plant: 228IO's	beyond the IO Count mentioned in the specification (580+178+228 = 986IO's excluding 25% spare IO's).			
<b>C. BOP</b>						
51.	II/2.27.1/152	One cell, cooling tower, 1000 m <sup>3</sup> /hr capacity with RCC basin.	Considering capacity of cooling tower we have considered two cells (Both working) with 500 m <sup>3</sup> /hr capacity of each.	Accepted.		
52.	II/5.2/227	Balance pumps	The material of construction for condensate pump will be CI.	As per tender.		
		Material of construction : SS 316				
<b>D. ELECTRICAL</b>						
53.	-/1.5.12/ 94 of 277	<b>Electrical System</b>	The same shall be as per the length engineered during detail engineering			
		C. Design Criteria In Equipment / Power Distribution:				
		Turbo-generator & Auxiliaries				
		- Length of MCC shall be limited to 10M.		As per tender.		

54.	-/1.5.12/ 94 of 277	<b>Electrical System</b>	Kindly specify the source of Power Input to second MCC Panel if load is beyond 500kW.			
		C. Design Criteria In Equipment / Power Distribution:				
		-Maximum operating load on MCC shall be limited to 500KW. In case the operating load is more than 500KW, separate MCC shall be considered.		3 Incomers will be provided as per tender.		
55.		<b>Electrical System</b>	We envisage to provide DOL Starter for Motor Feeder $\leq$ 15kW and Star Delta Starter for feeder $>$ 15kW			
		C. Design Criteria In Equipment / Power Distribution:				
		Squirrel Cage Motors up to & including 22 KW shall have automatic DOL Starter suitable for operating from MCC, DCS and PB Station near Motors. Selector Switch shall be provided in MCC for this purpose.				
		- Motor rating above & including 26 KW up to 160 KW shall be with Automatic Star Delta -Starter suitable for operating from MCC, DCS and PB Station near Motors.		Accepted.		
56.		<b>Electrical System</b>	w.r.t MCC we envisage to provide 1No. spare of each			
		C. Design Criteria In Equipment / Power Distribution:		Accepted.		

		- In PCC and MCC there shall be min. One spare feeder for each rating.	rating only for those feeders which do not have any standby feeder with them.			
57.	-/1.5.12/ 95 of 277	<b>Electrical System</b>	Kindly clarify the distance of Transformer form main PCC Panel. Since the drawing provided is not clear, hence we assumed that distance to be 25Mtrs including 2No. Bends and 2No. Cu Flexible Links each 400mm length.	Not required for this tender.		
		G. Design Criteria In Equipment / Power Distribution:				
		- Bus duct shall be with CRCA enclosure with color coded sleeved Aluminum bus bar. Short circuit rating shall be 50KA, 1 sec				
58.		<b>Electrical System</b>	The same shall be provided w.r.t. to CBL Scope of supply.			
		H. Grounding / Earthing System & Lighting Protection				
59.	-/1.5.12/ 97 of 277	<b>Electrical System</b>		Accepted.		
		K. Illumination System				
60.	-/1.7/ 101 of 277	<b>Terminal Point:</b>	Kindly clarify the following points:			
		<b>Power Distribution:</b>	a.If there is any Buscoupler required between the Incomers.			



		LT power will be supplied by purchaser at 3 incomers. All onward distribution in bidders scope.	b.Since one Incomer will get supply from the Distribution Transformer, need to know the Load and source from where the other two incomers are getting the load.	From purchasers proposed PCC.		
			c.The distance of the Incomer form the other two source of supply as asked above to the length of cable / Busduct required.	Not required for this tender.		
61.	-/2.30/ 162 of 277	<b>VFD Units</b>	VFD's Constructional Features states <b>"All</b>			
		Marshaling Compartments.	the Panels shall be single busbar arrangement type with bottom cable entries.....The front of the boards shall comprise of individually enclosed Drives, Starters, ACBs, MCCBs, and Switch	As per tender.		

			disconnectors” highlight individual VFD Panels.			
		- A common Marshaling Compartments / cabinets, as an extension, for the	We envisage to provide Individual Fan Feeders with VFD, Individual VFD Feed Pump Feeders, Single Fuel Feeder VFD Panel.	As per tender.		
		switchboards shall be provided, for connection of multicore cables from DCS racks. Marshaling compartments of adequate size shall be provided, 1 No. in each switchboard ( Common for all VFD feeder in a particular switchboard )	Kindly confirm.	As per tender.		

		to house the interposing relays, multiplying relays .	Also clarify if instead of Single Individual Panel for fans & Pumps as mentioned above, there is requirement of Single Panel for all Fan & Pumps with highest rating of common /spare feeder.	As per tender.		
62.	Appendix – I/ 229 of 277	<b>Plant Layout</b>	Need Auto-CAD file format drawing of the layout. Being scan copy the layout is not clear.	Will be provided.		
<b>S. No.</b>	<b>Clause no &amp; Page no</b>	<b>Details as per tender</b>	<b>Comments &amp; Clarifications</b>	<b>MITCON'S REPLY</b>		
1.	1.1 & 82	Proposed layout of the project is provided in <b>Appendix - I</b> .	The provided overall plot plan in PDF format is not clear. Kindly provide us the overall plot plan in AutoCAD format for better clarity Also please furnish the below length to	Will be provided.		

			consider piping and pipe rack for pricing			
			1. Boiler MSSV to turbine ESV piping length	Please see para 2.28.5 of tender		
			2. Turbine extraction to Distillery distance			
			3. Boiler one column to Control room one column distance.			
			4. Pipe rack height (Any specific requirement)			
2.	1.1 & 82	Feed water temperature, Deg.C 150	Considering the higher dew point temperature of flue gases, feed water temperature at economizer inlet should be 140°C to avoid sulphur dew point corrosion. Hence, deaerater to	Accepted as per tender.		
		· Feed water temperature to economiser 1350C-1500C				
	2.2 & 104	· Deaerator outlet temperature 1350C -1500C				

			be sized for 140 deg.C feed water temperature at economizer inlet. Accordingly will provide the required quantity of steam at rated pressure.			
3.	1.4 & 84	3 Steam consumption, TPH	The predicted internal steam for Deaerater, Scaph and slop heating and predicted net steam available for process is mentioned below.	Accepted, will be further discussed in KOM.		
		LP steam @ 5 kg/cm2 a	<ul style="list-style-type: none"> <li>Deaerater: 2.9 TPH (Considering process condensate return of 9.55 Tph at 80 Deg.C, &amp; SCAPH condensate return of 1.45 Tph at 153 Deg.C.</li> </ul>			
		Distillery - 16 to 18.5Tph	SCAPH and Slop Heating : 1.8 Tph			
			Distillery process : 17.3 Tph. Kindly confirm			
4.						

	1.5.1 & 85	The tolerance on the super-heater outlet temperature shall be a + 10 Deg. C.		Accepted.		
		· Steam temp. at boiler MSSV				
	2.2 & 104	400oC ±100C	We have considered 400 +/- 10 Deg.C at Boiler MSSV and the control range of 60% to 100%			
			MCR load for combination firing.			
		Attemperator System		Accepted.		
		Attemperator shall be to control the final steam temperature at 400 +/- 5°C between 60% to 100%				
		MCR load.				
	2.7 & 107					
5.	1.5.3 & 85	<b>Fuel &amp; Ash Handling</b>	Kindly provide us the Bagasse supply conveyor to MBC details or if any existing line, kindly provide us the existing Bagasse supply conveyor details.	No interconnection with existing systems.		
6.	1.5.3 & 85	<b>Fuel &amp; Ash Handling</b>		AS per tender.		

		RBC -2 Chain conveyor	Please explain elaborately			
7.	1.5.4 & 86	<b>Coal handling system</b> Bulk Density Kg/ cm3 600	As considering the various installation and vast experiences, we will consider bulk density of coal 800 Kg/m <sup>3</sup> . Please confirm	As per tender.		
8.	1.5.4 & 86	<b>Coal handling system</b> 1 No Chain conveyor (DCC-3) of 650 mm wide x 21 Mtr. C/C	1 No return belt conveyor from crusher house to belt conveyor CC - 1 is considered and DCC – 3 will be considered as belt type conveyor instead of chain conveyor. Please confirm	Accepted.		
9.	1.5.5 & 87	<b>Ash handling system:</b>	We have considered submerged ash handling for front ash, riddling, 2 <sup>nd</sup> pass, super heaters hopper. The conveyor will be terminated at an elevation of + 2.5 mtrs. Further	Either mechanical or pneumatic system to be provided. Both type of systems should not be interconnected.		

			disposal through trolley.			
			Other ash hoppers will be provided with dense phase ash handling system. Hence RAVs are not applicable.	Accepted.		
10.	1.5.6 & 88	<b>Cooling Tower &amp; Pumps</b>	As per the terminal point mentioned in the specifications, please provide us the length to consider the Cooling water piping from cooling tower pumps to condenser.	AS per tender.		
11.	1.7 & 102	<b>TERMINAL POINTS</b>	Please confirm the cooling tower in whose scope of supply.	In Bidders scope. As per tender.		



		Cooling water piping - From cooling tower pumps to condenser and turbine auxiliary CW headers and return, to all other equipment including BFW pumps in bidders scope ( C.W. Pumps, piping and C.W. headers is in bidder's scope)				
12.	2.27 & 153	<b>Cooling Tower, CW pumps and CW piping</b>	RCC will be in client scope (wherever required)	Accepted.		
13.	2.27.2 & 153	<b>RCC Basin</b>				
14.	1.5.9 & 90	<b>Service water or raw water</b>	Kindly provide us the raw water analysis, to consider the clarifier. Presently we have not considered the same. Please confirm	Not required for this tender.		
15.	1.5.9 & 90	Manholes where provided on tanks and pressure vessels shall be of size NB 500	We have considered circular manholes with 410 mm inner diameter.	Accepted.		

		All tanks shall be provided with interconnection platforms and staircase. The saddles and reinforcement pads welded on to the vessels and tanks shall be of the same material as that of the vessel/tank shell or head.				
			Interconnecting platforms and staircases are not applicable for boiler tanks. Hence, not considered.	Proper access for O&M to be provided.		
			Saddles or other support arrangement shall be provided as per Isgec standard without compromising on safety and boiler performance.	AS per tender.		
16.	1.5.10 & 91	The line should be insulated to suit weather conditions and preferably of LRB mattress with multilayer mineral wool and aluminium cladding (22 g),	We have considered plain aluminum cladding of 24 SWG thicknesses for boiler proper, ESP, ducting, piping, deaerater and auxiliaries.	As per tender.		

17.	1.5.10 & 91	All blow off or vent lines to be provided with silencers.	We have considered silencers in Superheater Safety valve and start up vent valve.	All silencers as per tender.		
		Silencers to be provided for first safety valve, air vent valve, extraction steam line vent, deaerator vent, all continuously operating steam vents and FD suction.				
	2.1 & 104					
			For all other valves, we do not envisage the requirement of silencers and hence, not considered.			
18.	1.5.14 & 100	The DCS will include the DCS control station, related licensed software & hardware, instrument &	Kindly provide the TG IO's and any client IO's for addition in DCS.	Please refer tender, para 2.31.23.		
		control cabling from the marshalling cabinet receiving signals from junction boxes of all cogeneration				

		equipment, all MCC's and software links with Turbo-visory panel, Woodward Governor and turbine				
		temperature scanner.				
19.	1.5.14 & 100	Bidder shall supply Turbine Supervisory panel comprising of Woodard 505 E governor, Vibration	Turbine in others scope	Accepted, requirement of interconnection to DCS in bidders scope is explained.		
		Monitoring System (2 nos. radial vibration at each bearing of turbine, generator & gearbox, one axial				
		probe) and Electronic Overspeed. Trip device (with 2 out of 3 voting). A 16 Channel temperature				
		scanner shall be provided for TG bearing RTD's.				
20.	1.7 & 101	<b>Terminal point</b>	We have	AS per tender.		
		Slop - At the slop receiving tank (80 m3) with agitator,	considered slop tank size of 35 m <sup>3</sup> to minimize the steam required heating.			
21.	1.7 & 101	<b>Terminal point</b>	Submerged Ash: At the outlet of ash conveyor at an elevation of +2.5 meters.	AS per tender.		

		Ash	Fly ash from Economizer, Air heater and ESP ash hopper : At the outlet of fly ash silo			
22.	1.7 & 101	<b>Terminal point</b>				
		Lighting and Plant Utility Supplies	Will be provided for the isgec scope of supply	Accepted.		
		Illumination System				
23.	2.1 & 103	Slop will be transferred to boiler by choke-less screw pumps with VFD	We consider Electrical tracing in the steam line to maintain the viscosity.	Accepted.		
		drives. Steam tracing to be provided for the slop line to maintain viscosity.				
24.	2.1 & 103	Ash hoppers with RAV (except furnace)	We have considered submerged Ash handling and dense phase handling, Hence RALV is not required.	Accepted		
25.	2.1 & 103	ID, FD, SA fans and VFD for all fans.	We have considered constant speed drive for SA fan.	VFD as per tender.		
	2.16 of 114	The Secondary fans shall be of constant speed, horizontal, radial, backward curved or aerofoil bladed				

		and electric motor (squirrel Cage TEFC) driven. The fan flow control shall be with VFD. The fan shall				
		be direct driven, with speed not exceeding 1440 RPM and shall be supplied complete with motor,				
		coupling.				
26.	2.1 & 103	CBD & IBD with steel tanks. CBD & IBD valves to be at FFL. Isolating valves to be provided	Considering the boiler capacity, the blow down steam generation will be negligible. Hence we are considered 1 no common tank for both CBD & IBD.	Accepted.		
		at drums.				
27.	2.1 & 104	Any other item not listed but essential to complete the steam generation system	The scope of supply would be as per technical offer.	AS per tender.		
28.	2.2 & 104	Purchaser will provide only RCC footings and entire boiler will be on own steel structure.	We have considered steel structure for boiler from finished floor level (+300 mm).	Accepted.		
			The foundation up to 300 mm shall be in purchaser's scope.			

29.	2.3 & 105	The steam generators shall be provided with one steam drum and one mud drum, if applicable	We propose single drum boiler, hence boiler bank and water drum is not applicable.	Accepted.		
		Evaporator Bank				
	2.6 & 106					
30.	2.3 & 105	The water distribution system in the steam drum will be through a distribution header below low water	The water distribution system will be controlled through Flow control valve to maintain the water level.	Reference is to equal distribution of water in drum.		
		level, to facilitate equal distribution through the drum.				
31.	2.5 & 106	No header shall be placed in the flue gas path.	The headers exposed to gas, will be refractory lined.	AS per tender.		
32.	2.7 & 107	Steam generator shall be provided with external super heater.	Superheater is an integral part of the boiler and is located in third pass not facing direct radiation.	Accepted.		
33.	2.7 & 107	The external super heater will be provided with ash hoppers with refractory. The hoppers will have RAV of minimum 400 mm.	We will consider SS MOC Ash hoppers for 2 <sup>nd</sup> pass and Super heaters. Other hoppers will be Carbon steel	Presently, CS hoppers with appropriate 50 mm refractory to be considered.		

34.	2.7 & 107	The SH inlet header, shall be connected to the steam drum by means of suitable number size of tubes which will be of carbon steel.	The super heater header material shall be selected based on IBR code.	Accepted.		
35.	2.7 & 107	To avoid erosion from incoming flue gas, the super heater will be provided suitable cascade baffles or / and sacrificial empty coils or / and SS cladding on first array of coils.	We have provided sufficient gap at the inlet of Superheater, which will proper distributor flow & heavier particle will be collected in the hopper which will avoid erosion in the Superheater. Hence baffle for Superheater is not required.	Accepted.		
36.	2.7 & 108	The attemperator system will be of spray type. The spray water will be obtained from the boiler feed	The attemperation piping will be considered from boiler feed pump delivery line. Header is not required considering 2 no of boiler feed pumps.			
		pump header.				
37.	2.8 & 108	The firing floor will be of 8 mm thick minimum,	The firing floor shall be 6 mm thick MS fabricated grating.	AS per tender.		



38. .	2.8 & 108	Ash hoppers are to be provided below each furnaces and the steam generator height to be adjusted such that belt can be placed below ash hopper for quick removal of ash and shall be at the elevation of + 2500 mm. or more. By pass arrangement to be provided with ash discharge hopper.	Ash hopper elevation shall be around 1500mm for riddling hopper & Superheater hoppers and 2500 mm for fly ash hoppers.	No underground conveyors. Detailing to be done later.		
39. .	2.9.1 & 108	Coal firing system to be provided. This will include coal sizing and handling system from coal yard, bunker sized for 12 hours storage with 80% filling factor and density of 600 kg/m <sup>3</sup> , appropriate feeder system regulated by VFD, mechanical spreading system for grate boiler, fuel feeders to be N+1 sized. The coal feeding system should have round cross section for all pipes / chutes and same to be in SS construction.	We have provided two no's fuel feeder for feeding the fuel in to furnace.	N + 1 feeders as per tender.		
	Accepted.					
The coal chute will be provided with carbon steel.	Please provide SS 409.					

40.	2.9.2 & 109	Traveling Grate System components specifications / requirements.	As per our standard proven design. We propose to have EN 8 material for these components, which is working satisfactorily in all ISGEC installations. The grate bar support shall be casted T type of IS 210 Gr. 150 material as per our standard design. However grate bar material shall be alloy cast iron.	Accepted.		
41.	2.9.2 & 109	Hydraulic / Planetary Gear box with VFD: Low Horse Powered, self-contained and mounted directly to the stoker drive shaft at the stoker front. Should be capable of regulating to control the grate output from 0 to 48 feet per hour. Should also have necessary oil cooling arrangement.	Oil cooling for stoker drives is not required and not envisaged.	Accepted.		
42.	2.9.2 & 110	The total combustion air form by the FD fan, heated in the steam air pre-heater to a temperature of about 200DegC.	We have considered cold FD & SA fans for the proposed boiler.	Accepted.		

			FD & SA fans will take suction from atmosphere. The secondary air will be heated in Steam coil air preheater (SCAPH) (Fin tube) and Flue gas air pre heater (No fins) from ambient to 150 to 170 Deg.C then fed to furnace. Tapping will be taken from Main steam outlet to SCAPH.			
		Air pre heater will be steam heated to raise the combustion air temperature to 200 Deg C. Steam for APH will be taken from steam drum or tapping prior to external super heater.				
	2.11 & 111					
43.	2.9.2 & 110	Indication to measure the chain sagging has to be provided	As per ISGEC stoker design, traveling grate chain is covered with skid ramp on front side and with return chain roller on rear side and no possibility of sagging of chain is anticipated. So chain sagging indication is not required and hence not envisaged.	Accepted.		

44.	2.9.2 (h) & 110	The hydraulic drive system for traveling grate with spare hydraulic drive.	We propose to offer the Traveling grate with planetary gear box with VFD. Hence hydraulic drive is not required.	Accepted.		
45.	2.9.2 (i) & 110	Lubrication system for grate assembly	We have considered graphite bearing which are self-lubricating. Hence, lubrication system is not considered.	Accepted.		
46.	2.10 & 110	The flue gas velocity over the economizer tubes shall be limited to a maximum of 1 meter/sec.	We have considered max. 10 to 12 m/s. flue gas velocity as per proven design for slop fired boilers.	Accepted.		
47.	2.10 & 110	The economiser shall be complete with seamless inlet / outlet / intermediate headers with drains	As per Isgec design, there is no intermediate header in the economizer.	Accepted.		
48.	2.10 & 111	To avoid erosion from incoming flue gas, the economizers will be provided suitable cascade baffles or / and sacrificial empty coils or / and SS cladding on first array of coils.	We have considered half sleeve at flue gas entry side to avoid erosion.	Accepted.		

49.	2.10 & 111	Ash hoppers will be provided at bottom of economizer with refractory lining.	Considering the flue gas temperature at this zone, we have considered carbon steel as hoppers without refractory lining.	Presently, CS hoppers with appropriate 50 mm refractory to be considered.		
50.	2.11 & 111	Refractory and SS lined ash hopper with RAV to be provided.	Considering the flue gas temperature at this zone, we have considered carbon steel as hoppers without SS lining. We have considered ash hoppers under furnace I (Carbon steel) & II Pass (SS), Superheater (SS), Channel separator (Carbon steel), economizer (Carbon steel), air heater (Carbon steel) and Pollution control equipment (Carbon steel).	Presently, CS hoppers with appropriate 50 mm refractory to be considered, SS liners to be provided for ESP / bag filter hoppers as per tender.		

51.	2.11 & 111	ESP will be preceded by an ash collection chamber with refractory walls. Hoppers with SS lining and RAV will be provided. RAV to be minimum 400 mm.	As per our proven design, we have considered PDC and ESP to meet the desired outlet dust concentration. Considering the flue gas temperature at this zone, we have considered carbon steel as hoppers without SS lining.	With SS lining as per tender.		
52.	2.12 & 112	All electricals including MCC, rectifiers, panels, electricals & control cables, earthing etc.	We have considered above ground level earthing only.	Accepted. As per terminal points of tender.		
53.	2.13 & 112	Fan material design as per IS: 1570 - 1979.	Fan material will be as per approved sub vendor's standard. We have envisaged replaceable wear liners / hard facing for ID fan blades. After hard facing, the thickness of blades will be 8 mm.	AS per tender.		
		Renewable hard faced ...not be less than 10 mm thick M.S. Plate.	Also we have considered 8 mm thick end plates for ID fan rotor.	AS per tender.		

54.	2.13 & 112	The rotor of the ID fan shall be dynamically balanced and tested for its parameters at their works	For parameters test in shop at works is not possible due to limitations at manufacturer's facility. It can be done, provided manufacturer has a facility for the size of fan.	Suppliers as per tender.		
55.	2.14 & 113	The F.D. fan material.....I.S.-1570, 1979.	Fan material will be provided as per approved vendor's standards and proven practice. Also, we have considered 6 mm thick end plates for FD fan rotor.	AS per tender.		
		The end plates....8 mm thick MS plate.				
56.	2.14 & 113	Inlet guide control for the fan to be provided	We have considered multi louver dampers for FD Fans flow control.	Operation through DCS.		
		FD fan to have multi louver dampers				
57.	2.16 & 114	<b>Secondary Air Fans</b>	There is ambiguity in SA fan drive motor specification However, Inline with clause no.2.1.1, Page No. 24, we have	VFD to be provided. Normally SA fan will run at a constant speed.		

			considered constant speed SA fan.			
		The Secondary fans shall be of constant speed	Fan design / material shall be as per approved vendor's standards and proven practice.	AS per tender.		
		The fan flow control shall be with VFD.				
		The SA fan shaft material...I.S.- 1570, 1979.				
58.	2.18 & 115	Additional soot blower (s) shall also be provided for the economizer.	We have considered required number of soot blowers for Superheater, economizer and air heater. The no. of soot blowers shall be as per the blowing radius.	100% blowing radius.		
59.	2.18 & 115	Where the gas temperature exceeds 400°C, the material shall be a minimum of stainless steel type 304.	Soot blower material shall be as per vendor recommendation.	AS per tender.		



60.	2.19 & 115	All spray nozzles of deaerator should be of stainless steel materials. The design inlet water temperature	We have considered deaerator capacity as 110% BMCR and deaerator outlet water temperature as 140°C as per system requirement	AS per tender.		
		to be 30°C. Level & pressure control valves to be provided, to sustain & maintain the design quality of				
		DA water. Deaerator to be sized for 125 % of MCR and storage tank for 20 minutes MCR. Deaerator	For startup conditions, steam for deaerator shall be taken from deaerator start up PRDS taking tapping from main steam line.	Preferred from before MSSV.		
		outlet temperature to be 150 deg C, with normal operation with extraction steam and start-up from primary super heater header.				
61.	2.19 & 117	Online pH and conductivity monitoring with alarms in DCS to be provided for return condensate.	We have considered only samples coolers in our scope supply	Please provide for process condensate as per tender.		

62.	2.23.13 of 131	<b>Sampling Facility.</b>				
63.	2.20 & 117	On the suction side, one operating and one isolation valve shall be provided.	The boiler feed water pumps shall have one no. manually operated suction side isolation valve.	AS per tender.		
64.	2.20 & 118	The pump and the drive (Electrical Motor) shall be placed on RCC foundation at a foundation level of +500 mm.	The foundation level will be at + 300 mm level	Accepted.		
65.	2.21 & 118	Instrumentation	As the environment is safe environment, so corrosive application instruments are not applicable, all the instruments shall be provided of safe environment with IP Protection.	IP 55.		
66.	2.21 & 118	All transmitters shall be provided with output meter/output gauge at the transmitters end. All	Hart Compatible instruments provided.	Accepted.		
		transmitters will be smart type, with Hart communication.	Hand held calibrator not provided	Accepted.		
67.	2.21.5 & 121	Operation of Motorized control.... Critical drives.	FD and ID fan inlet dampers will be	Preferrably from DCS.		

		ID, FD, SA fan inlet dampers	manual, the flow will be controlled through VFD (Speed of the motors)			
68. P	2.21.5 (3) & 121	3. Draft :	SA fan is a cold type hence draft gauges at fan inlet are not considered	All units to have DP transmitters.		
			Flue gas at evaporator outlet is not considered	Accepted.		
69.	2.21.5 (6) & 121	6.Positions:	We have considered position transmitter for inching type MOVs only.	Accepted.		
		➤ Positions of all MOVs				
70.	2.21.5 & 121	Draft transmitter and interconnected to plant DCS	We have considered Draft transmitter at economizer outlet instead of evaporator outlet.	All units to have DP transmitters.		
		Evaporator Outlet				
71.	2.21.9 & 125	All control valves power cylinders for dampers shall have airlock facility.	Air lock facility shall be provided for Stayput operation	Accepted.		
72.	2.22(b) & 125	Soot blow steam pressure reducing station.	We have considered only PRV for soot blowing system as PRDS is not required.	Accepted.		

73.	2.23.2 & 128	Maintenance tools consisting of tube expanders, mandrills, ratchets, two grease guns, a set of spanners, water gauge glass assembly with glasses, and chemical injection valves etc.	Please refer the Maintenance tools list in our offer.	As per tender, spare parts list.		
			We have not considered chemical injection valves	Accepted.		
74.	2.23.4 & 128	All the ash hoppers shall be provided with rotary air lock valves.	We have considered Pneumatic gate valves up to Superheater hoppers. The fly ash hopper will consider with pneumatic dense vessel.	Accepted.		
75.	2.23.11 & 129	Insulation	We have considered Lightly resin bonded (LRB) mineral wool insulation for the proposed boiler. (Insulation thickness shall be designed considering temperature differential of 20 deg. C between boiler surface temperature & ambient	As per appendix - VII of tender.		

			temperature with wind velocity of 1m/s).			
			We have considered plain aluminum cladding of 24 SWG thicknesses for boiler proper, ESP, ducting, piping, deaerator and auxiliaries.			
76.	2.23.13 & 130	The centre of the steam generator front steel supporting columns shall be minimum 2500 mm away from the centre line of fuel carrier	The center of the steam generator front steel supporting columns shall be at an adequate distance from the centre line of fuel carrier.	Generally as per tender.		

77.	2.23.13 & 130	The steam generator operating floor/working platform shall be minimum 10 meters wide from the steam generator front support columns in front of the steam generators and the control room. An approach ladder shall be provided from bagasse working platform to bagasse carrier working platforms at both sides.	Kindly provide us the layout in AutoCAD format to consider the distance from Boiler one column to TG one column.	Will be provided.		
78.	2.23.13 & 130	One staircase to be provided with suitable platform on either side of the drum.	We have considered one no staircases from ground level to steam drum operating floor level. Please confirm.	Both sides as per local requirement.		
79.	2.23.13 of 130	Minimum width of tread of staircase shall be 22 mm	Minimum width of tread of staircase shall be 200 mm	Accepted.		
80.	2.23.13 of 131	The spacing of vertical post shall not exceed 1.2 m.	The spacing of vertical post will be max of 1.5 m.	Accepted.		
81.	2.23.14 & 132	Complete soot blower piping from the tap off on the steam drum upto the individual soot blowers including all the pressure reducing station, valves and fittings.	Soot blower steam piping will be tapped off from secondary superheater outlet header.	Accepted.		

82.	2.23.14 & 132	Feed water delivery piping from steam generator feed pumps up to the economizer inlet header to the steam generating unit, via the HP feed water heater.	As per tender document, we have not considered HP feed water heater for the proposed boiler. Hence, feed water piping shall be connected from boiler feed pump discharge to economizer via feed control station. HP heaters are not envisaged.	Accepted.		
83.	2.23.14 & 134	<u>Valves</u>	Main steam stop valve is a motorized gate valve, it will be either in open or close position. Hence position indicator is not required however open (or) close position can be viewed from control room.	Accepted.		
		Main steam stop valve shall be fitted with indicators so that percentage of valve opening can be readily determined locally.				
84.	2.26 & 147	<b>Material Handling System</b>	Considering the various installation and vast experiences, we will consider bulk density of bottom	As per tender.		
		Bulk Density Coal Ash : 600 Kg/Cu M, Bagasse ash 160-180 Kg/Cu M				

			coal ash & Fly coal ash will be 700 & 650 Kg/m <sup>3</sup> and bottom Bagasse ash and Fly Bagasse ash will be 650 and 250 Kg/m <sup>3</sup> . Please confirm.			
85.	2.29 & 160	After cleaning, phosphating and passivation treatment, the surface shall be given two (2) coats of zinc rich epoxy primer and backing in the oven.	We have not considered baking in the oven	Only for welding electrodes.		
86.	4.1 & 160	Approved list of Vendors	Kindly note that list of additional sub vendors shall be furnished in along with our technical offer. The same can be mutually discussed and agreed.	Additional sub vendors if any will be discussed in KOM with justifiable technical reasons.		
87.	2.31.12 & 176	24 V DC power required for 2 wire transmitter powering shall be supplied from a separate redundant power pack, which will be in Contractor scope.	24 V DC power required for 2 wire transmitter powering shall be supplied from a separate redundant power pack, which will be in Contractor scope.	Accepted.		



88.	2.31.21 & 186	Critical AI/AO/DI/DO signals will be redundant while non-critical & DAS points will be non redundant.	Critical AI/AO/DI/DO signals are non redundant, as already redundancy is considered at field instrument level.	As per tender.		
		All controllers for critical controls will be redundant. The field inputs for critical inputs will be 1/2 logics.				
89.	2.31.23 & 187	Analog Inputs (RTD) : 64	Shall be provided as RTD and thermocouple cards instead of Analog inputs	As per tender and functional requirement.		
		Analog Inputs (Thermocouple, mV) : 16				
90.	2.32 & 194	<b>Fire Fighting System</b>	We have not considered firefighting system in our scope of supply	Extension as per tender.		
91.	4.2.1 & 213	Rotary Feeder	Applicable spares will be provided.	Accepted.		
		Set of bearings Set 1				
92.	4.2.6 & 1217	<b>List Of Spares for Fuel &amp; Ash Handling Plants</b>	Applicable spares will be provided.	Spare list as per tender.		
93.	General	<b>Crane</b>	We have not considered Crane is our scope of supply.	Accepted.		
94.	General	<b>Pipe rack</b>	We consider common pipe rack for Raw water piping and DM water piping	Accepted, to be finalised based on layout and detailing.		

			(Assumed both are in same location)			
			We consider common pipe rack for Distillery steam piping from turbine and condensate return piping from distillery to feed water tank.	Accepted, to be finalised based on layout and detailing.		
95.	HBL/TEN/PUB/20-21/223, page 94 of 278	LT power will be supplied at 3 incomers of MCC's in bidders scope.	We understand the three incomers in which the customer shall be providing power are :	Confirmed.		
			Boiler MCC			
			Boiler ESP			
			VFD line up panel			
			Please confirm.			
96.	HBL/TEN/PUB/20-21/223, page 95 of 278	LT power will be supplied at 3 incomers of MCC's in bidders scope.	We understand the three incomers in which the customer shall be providing power are :	Confirmed.		
			Boiler MCC			
			Boiler ESP			

			VFD line up panel Please confirm.			
97.	HBL/TEN/PUB/20-21/223, page 95 of 278	In PCC and MCC there shall be min. One spare feeder for each rating.	Spares shall be one of each type	Accepted.		
98.	HBL/TEN/PUB/20-21/223, page 99 of 278	VFD shall be provided as per the functional requirement. In VFDs input choke & other devices	Normal 6 pulse VFD are considered. THD compliance should be done at point of common coupling as per IEEE-519, hence not in our scope	Accepted.		
		shall be provided to achieve current and voltage harmonics (THD) within IEC permissible				
		limits				
99.	Please provide layout drawings for Fuel handling to estimate lengths of cables			Will be provided.		
						<b>Mitcon's Reply</b>
1.		Boiler specification	No. of boilers – 1			1 per site.
2.			Boiler capacity –22 TPH			Yes
3.			Temp. at MSSV O/L – 400 +/- 10 0C			Yes
4.			Pressure at MSSV O/L – 44 kg/cm2 g			Yes
5.			Feed water temp. at economiser inlet – 135 0C			Yes as per tender.
6.			Feed water temp. at deaeerator outlet – 135 0C			Yes as per tender.

7.			Performance fuel – Spent wash (9.25 TPH @ 55% Brix) + Indian Coal (3800 GCV). As discussed during pre bid meeting dated 17/2/21 we are considering Spent Wash GCV as & 1604 Kcal/kg GCV and below is analysis for the same	Accepted, upto 1650 kcal/kg.			
				<b>Unit</b>	<b>Spent Wash</b>		
			<b>C</b>	%	20.37		
			<b>H</b>	%	1.97		
			<b>O</b>	%	13.29		
			<b>N</b>	%	1.7		
			<b>S</b>	%	0.57		
			<b>Moisture</b>	%	45		
			<b>ASH</b>	%	17.11		
			<b>GCV</b>	kCal/kg	1604		
			Secondary fuel firing cases-			Fuel & turn down on spent wash as per beginning of this replies.	
			Spent Wash + Indian Coal + Bagasse				
			70% MCR on solo coal				
8.			Steam temperature control range 70% - 100% for performance fuel.			As per tender.	
9.			Boiler performance test shall be as per ASME PTC 4.0			Accepted.	

10.			Boiler structure shall be from + 300 mm level	Accepted.
11.	1.4	SCAPH	Not Applicable in our design	Accepted.
12.	1.4	Condenser & STG	Not in TBWES scope	Accepted.
13.	1.5.1	Travelling grate	We are offering AFBC Spent Wash Boiler	Subject to earlier clarifications on support fuel.
14.	1.5.2	Turbo-generator & Auxiliaries	It shall be in Purchasers scope & interconnections shall be as per TBWES scope & battery limits	Accepted
15.	1.5.5	Ash handling system	We shall be providing mechanical ash handling system. Type of conveyors, jacketing requirement, number of conveyors shall be based on TBWES engineering. Ash handling system shall be provided only for fly ash. Bed ash shall be manually drained on ground. We are providing Two fly ash silo of 50 m3 capacity each.	Ash silos as per tender.
16.	1.5.7	Water Treatment System	DM water will be tapped from discharge header of existing transfer pumps.	Terminal points as per tender.
17.	1.5.8	Compressed Air System	Reciprocating compressors are used for intermittent duty application. However our requirement for instrument & service is of continuous duty nature. Reciprocating compressor would not be suitable for the same, hence we propose Oil injected screw compressor.	Clarification not accepted. We are utilising reciprocating oil free compressors

				at sites for more than 15 years.
18.	1.5.8	Compressed Air System	We are considering compressor capacity as 150 m3/hr as per tender, if not then please specify instrument air requirements for items other than our scope.	Accepted.
19.	1.5.9	Manholes where provided on tanks and pressure vessels shall be of size NB 500.	Manholes on tanks shall be of minimum NB 400. Manholes provided on steam drum shall be of oblong shape (310mm x 405mm).	Accepted.
20.	1.5.9	HP piping to be sized for highest safety valve pressure at 110% MCR with maximum pr. drop of 2 kg/cm <sup>2</sup> for the entire piping.	HP piping from MSSV to turbine ESV shall be sized for 100%MCR with max. pressure drop of 2 kg/cm <sup>2</sup> . We have considered max. 80 m piping length with 6 elbows.	Accepted.
21.	1.5.9	All drain lines on main steam piping to be minimum 50 NB.	We have considered all drains of 25 NB.	As per tender.
22.	1.5.9	All blow off or vent lines to be provided with silencers.	Silencers are provided only for startup vent and superheater safety valves. All other blowoffs & vents are without silencers.	As per tender.
23.	1.5.9	Flow velocities in pipes	Velocity in pipe is calculated for 100%MCR.	As per tender.
			Velocity limits for pipe sizing shall be as below –	

			Pump suction $\leq 1$ m/s	
			Pump discharge $\leq 3$ m/s	
			SH steam $\leq 50$ m/s	
			Saturated steam $\leq 50$ m/s	
24.	1.5.12	VFDs	Lineup VFD panel shall be provided for Boiler feed water pumps, FD Fan & ID Fan & SA Fan, Cooling tower recirculation pumps only. DM water transfer pumps, raw water transfer pumps, condensate transfer pumps shall be constant speed driven.	Accepted.
25.	1.5.12	GROUNDING / EARTHING SYSTEM) & LIGHTENING PROTECTION	TBWES shall provide above & below ground earthing & lightening protection for TBWES scope of supply items only. Grouting application, earth pit, its civil shall be in purchaser scope.	Accepted.
26.	1.5.12	Illumination system	TBWES shall provide illumination for TBWES scope of supply items only. Illumination for CCR, roads, streets, plant road and outside battery limit shall be in purchaser scope.	Accepted.
27.	1.6 l)	Statutory approvals	Approval from CEIG, IBR, Factory inspector etc & its fees shall be by customer. Documental support if required shall be provided by TBWES	Accepted.
28.	1.7	Lighting & plant utility supplies	TBWES shall provide illumination / lighting for TBWES scope of supply items only. Illumination for CCR, roads, streets, plant road and outside battery limit shall be in purchaser scope.	Accepted, all lighting for all equipments in scope.
29.	1.7	Civil works	TBWES to provide only civil load data / drawings for its scope of supply items only.	Accepted.

30.	2.1.1	choke-less screw pumps for spent wash	Centrifugal pumps shall be supplied for spent wash. This are supplied at all of our installations.	As per tender.
31.	2.1.1	Travelling grate	We are offering AFBC spent Wash Boiler	Subject to earlier clarifications on support fuel.
32.	2.1.1	Air pre heater	Not Applicable in our design	Accepted.
33.	2.1.1	Economizer on Separate axis	Economizer shall be located in horizontal 3rd pass as per TBWES design. Separate axis for economizer is not applicable.	Accepted.
34.	2.1.1	CBD & IBD tanks	As boiler capacity is small, so its blow down and flash steam, hence we shall provide common blow down tank, with flash steam vented to atmosphere	Accepted.
35.	2.1.1	Pegging steam line from steam generator to deaerator for start up.	pegging steam line from steam generator is not envisaged. It shall be from turbine extraction steam line to deaeerator.	Start up steam for deareator will be from boiler as turbine will not be operating.
36.	2.1.1	Silencers to be provided for first safety valve, air vent valve, extraction steam line vent, deareator vent all continuously operating steam vents and FD suction.	Silencers are provided for startup vent and superheater safety valve. All other safety & relief valves and vents are without silencers.	As per tender.
			FD & SA fan are provided with silencers at suction.	Accepted.
37.	2.1.1	Deareator & DA storage tank	Deareator and Condensate storage tank shall be located on same structure adjacent to boiler main structure	Accepted.



38.	2.2	Feed water temperature of 135 – 150 0C	We have considered 135 deg C feed water temperature at deaerator outlet and economiser inlet considering constant pressure deaerator.	Accepted
39.	2.3	Mud Drum	Boiler shall be single drum with steam drum. Mud drum is not applicable.	Accepted
40.	2.3	The final drum internals shall be of stainless steel and	We have not envisaged stainless steel final drum internals. They will be of CRCA material as per TBWES engineering practice.	Accepted
41.	2.3	cyclones, primary and secondary scrubbers		Accepted
42.	2.6	Bank tubes expanded into top & bottom drums	Not applicable for single drum boiler.	Accepted
43.	2.6	evaporator bank to be provided with ash hopper with refractory and SS lining	We are providing CS hopper for evaporator bank considering flue gas temperature. No refractory lining is provided for hopper.	Minimum 50 mm refractory.
44.	2.6	cascade baffles or / and sacrificial empty coils or / and SS cladding on first array of coils for evaporator bank	Cascade baffles/empty coils/SS cladding for evaporator tubes are not required considering low velocity of flue gas.	PDC required.
45.	2.6	Pre-ash collector zone to be provided after evaporator section.	Pre-ash collector shall be provided after economiser.	Accepted.
46.	2.7	Steam temp. control range of 60 to 100% MCR.	Steam temp. control range shall be 70 to 100% MCR.	As per tender.
47.	2.7	alloy steel header for secondary superheater	Secondary superheater header shall be of Carbon steel / Alloy steel based on design temperature.	As per IBR.
48.	2.7	External Super heater	Not Applicable	Accepted.

49.	2.7	cascade baffles or / and sacrificial empty coils or / and SS cladding on first array of coils for superheater tubes	Cascade baffles/empty coils/SS cladding for superheater tubes are not required considering low velocity of flue gas.	Empty area required for dust removal.
50.	2.8	The firing floor will be of 8 mm thick minimum	We are providing grating for firing floor.	During detailing.
51.	2.8	The steam generator shall be provided with provision for future Pneumatic Spreader for bagasse and	No applicable as we are providing fluidised bed boiler.	Accepted.
		Spreader stoker for grate boiler.		
52.	2.9.1	SS material for coal chutes	We have considered CS chutes considering low moisture in coal and free flowing property.	Bagasse and biomass will also be used.
53.	2.9.2	Firing system / Travelling grate system	We are providing AFBC Boiler Hence this clause is not applicable.	Accepted.
54.	2.9.2	Fuel feeders	For coal feeding we shall provide screw feeders. Pneumatic / mechanical distributors are not applicable.	Accepted.
			Spent wash feeding shall be through spent wash guns/nozzles.	
			Bagaase feeding shall be by means of rotary feeder.	
55.	2.9.2	Bagasse silo of 7 minutes storage	Bagasse Silo shall be provided with 7 minutes storage on Spent Wash + Indian Coal + bagasse firing condition	As per tender.
56.	2.1	Transverse pitch of 150 mm for economiser tubes	Transverse pitch of economiser tubes shall be 120 mm	During detailing.

57.	2.1	The flue gas velocity over the economiser tubes shall be limited to a maximum of 1 meter/sec.	Flue gas velocity across economiser shall be $\leq 12$ m/s	10 m/sec.
58.	2.1	cascade baffles or / and sacrificial empty coils or / and SS cladding on first array of coils for superheater tubes	Cascade baffles/empty coils/SS cladding for economiser tubes are not required considering low velocity of flue gas.	Protection to be provided.
59.	2.1	Ash hoppers will be provided at bottom of economiser with refractory lining.	Ash hoppers below economizer shall be CS without refractory	50 mm refractory.
60.	2.11	APH & SCAPH	APH & SCAPH is not applicable in TBWES design	Accepted.
61.	2.12	Hoppers with	CS hopper with SS409 lining in 1/3rd Hopper bottom portion shall be provided for ESP	Accepted.
		refractory lining		
62.	2.12	All parts exposed to flue gas will be of corten steel or anti corrosive steel	ESP parts material shall be as per ESP vendor's recommendation	As per tender.
63.	2.13, 2.14, 2.16	Fan material design as per IS : 1570 -	Fan material & its thickness shall be selected by fan vendor.	As per tender.
		1979		
64.	2.15	Noise and vibration	The noise limit for fans will be 90 dBA @ distance of 3 meter from the equipment. The noise limit for start-up vent will be 110 dBA @ distance of 3 meter from the equipment. For boiler feed water pumps noise limit will be 92 dBA @ distance of 3 meter from the equipment	Accepted.
65.	2.16	S.A. Fan of 1440 rpm	S.A. fan shall be $< 1500$ rpm	Accepted.

66.	2.17	Flash steam recovery	As boiler capacity is small, flash steam recovery will be negligible. Hence it is not envisaged	Accepted.
67.	2.18	Pressure reducing station for soot blowers	Considering the steam pressure to soot blowers, pressure reducing station is not required in our design.	Accepted, no orifice accepted.
68.	2.18	Tapped from primary superheater	Soot blower line shall be tapped from main steam line	Accepted.
69.	2.19	Deaerator start-up from primary super heater header	Deaerator start-up PRDS is not envisaged. Cold start-up is considered for deaerator.	As per tender.
70.	2.19	Max. dissolved oxygen of 0.007 ppm. at 110° C after LP dosing	Max. dissolved oxygen of 0.007 ppm. at 150° C after LP dosing	As per deareator operating temperature.
71.	2.2	On the suction side of BFWP, one operating and one isolation valve shall be provided.	BFW pump shall have single isolation valve at pump suction	As per tender.
72.	2.21.5	CBD / IBD level control	It is not envisaged as common blow down valve shall be provided	Accepted.
73.	2.23.13	Structure made from rolled steel sections	Structure shall be of rolled steel as well as fabricated steel sections.	Accepted.
74.	2.23.13	The centre of the steam generator front steel supporting columns shall be minimum 2500 mm	It shall be decided during detail engineering as per GA drawing	Accepted.
		away from the centre line of fuel carrier.		
75.	2.23.13	The steam generator operating floor/working platform shall be minimum 10 meters wide	It shall be decided during detail engineering as per GA drawing	Accepted.

		from the steam generator front support columns in front of the steam generators and the		
		control room.		
76.	2.23.14	Full bore gate valves	Gate valves of all sizes shall be of reduced bore type.	Accepted.
77.	2.23.14	Complete soot blower piping from the tap off on the steam drum upto	Soot blower line tapping shall be from main steam line & Pressure reducing station is not applicable	Accepted.
		the individual soot blowers including all the pressure reducing station,		
		valves and fittings.		
78.	2.23.14	HP feed water heater	HP heater is not Applicable	Accepted.
79.	2.26	Bed ash & fly ash handling system	Refer Sr.No. 15 above	Refer reply as above
80.	2.27	Cooling Tower	We are considering single / double cell cooling tower with RCC basin of 1000 m3/hr capacity as mentioned in tender. All RCC /civil work shall be in Purchaser scope. TBWE shall provide cooling tower at one point near turbine building, further distribution & return piping upto cooling tower shall be in Purchasers scope.	Accepted.  C.W. pump ,piping , headers are in bidders scope, as per tender
81.	2.28.5	Yard piping	Please clarify on scope of condensate piping of condenser. Please clarify on downstream piping length of PRDS for GSC & STG Auxilliaries	As per tender.
82.	2.28.7	All HP valves to be 1500 Class	Valve class shall be based on design pressure and temperatures.	Accepted.
83.	3.1	Civil works	TBWES will only provide civil load data / drawings for boiler. All civil work,	Accepted.

			excavation, earth pits shall be in purchaser scope.	
84.	3.6	blasted cleaning	Not Applicable	Accepted.
85.	4.3	Drawings and documents list	Drawings and documents list to be mutually discussed and agreed during detail engineering.	Generally as per tender.
86.	1.13 / APPENDIX – III	Pipelines of NB 40 size and below are regarded as field run piping.	Pipelines of NB 50 size and below are regarded as field run piping.	As per tender.
87.	1.15 / APPENDIX – III	For class 900 and above the flanges shall be WNRTJ type.	All flanges shall be of RF type irrespective of class.	During detailing.
88.	1.20.3 / APPENDIX – III	Drain & vent sizes	We have considered 25 NB size for all drains and vents.	For main steam line, 50 NB.
89.	1.20.6 / APPENDIX – III	All pipes of size NB 50 & below shall be minimum Schedule 80 thickness	All pipes of size NB 50 & below shall be minimum Schedule 40 thickness	Accepted.
90.	1.21.2, 1.21.3 / APPENDIX – III	Temperature for material selection	We have considered CS pipes/tubes/plates for temperature upto 427 deg C. Above 427 deg C Alloy steel material shall be used.	As per IBR.
91.	1.21.6 / APPENDIX – III	API 5L Gr.B material for safety valve exhaust	We shall consider SA106 Gr.B material for safety valve exhaust where temperature is lower than 427 deg C.	As per IBR.
92.	1.24.1 / APPENDIX – III	Full bore gate valves	All gate valves shall be of reduced bore type.	Accepted.

93.	1.24.1 / APPENDIX – III	Integral valves of 25 NB	Integral valves size shall be 15/20/25 NB as per vendor standard design	Accepted.
94.	1.24.1 / APPENDIX – III	Locked open valve	Locked open valve shall be provided for BFW pump ARC valve bypass & soot blower steam tapoff.	Accepted.
95.	1.24.1 / APPENDIX – III	Manually operated bypass valves for blowdown valves	Not envisaged.	Accepted.
96.	1.1 / APPENDIX – VII	For HP piping preformed insulation to be used.	We have considered insulation mattress for all insulation.	As per tender.
97.	1.4.1 / APPENDIX – VII	Insulation sheeting material thickness	We have considered 24 SWG sheeting material for piping, ducting and boiler parts.	As per tender, 22 SWC
98.	1.2	Turbo-generator & Auxiliaries The same will be procured and installed by purchaser. However, all mechanical, electrical and C&I interconnections will be provided by bidder.	We understand system & equipment are supplied by TG vendor. We request purchaser to include the cables & interconnections of TG system in respective vendor scope. TBWES will only consider required IOs in Turbine. Please provide total DCS IOs to be considered.	All terminal points as per tender. For IOs, Please refer clause 2.31.23 of the tender
99.	1.5.8	The Compressor internal surface shall be galvanized.	It shall be as per vendor standard	Preferably.

100.	2.21	All instruments and equipments shall be suitable for use in a hot, humid	Area of clasification : Safe & Non-hazardous considered.	IP 55
		and tropical industrial climate in which corrosive gases and / or chemicals		
		may be present.		
101.	2.21	All instruments and enclosures in field shall be dust proof, weather proof to NEMA 4 (IP:55) and secure against the ingress of flue, dampness and vermin. All external surface shall be suitably treated to provide anti-corrosion protection.	All instruments and enclosures in field shall be dust proof, weather proof and secure against the ingress of flue, dampness and vermin. However instrument ingress protection rating will be confirmed as per IEC requirements. NEMA not applicable. We are offering IP55 CRCA painted enclosure.	Accepted.
102.	2.21.6	Local Instruments	TBWES is supplying electronic transmitter with integral output meters. Separate instruments at local not required & not considered. Local pressure gauges, temp gauges will be supplied as per P&ID.	As per tender.
103.	2.22	Soot blow steam pressure reducing station.	Not Applicable in TBWES design	No Orifice accepted.
104.	2.22	All field instruments should be covered with FRP or PVC covers to protect from rain, spillages from nearby equipments.	All field instruments will be IP 65 protections. So this is not required	Accepted.
105.	2.23.14	Main steam stop valve shall be fitted with indicators so that percentage of valve opening can be readily determined locally.	MSSV will be on-off valve. Open & Close(End) positions are marked on the actuators. Separate linear scale is not required.	Accepted.



106.	2.23.14	Two 100% control valves (one pneumatic & one manual) of cast steel /	Please clarify.	2 x 100%, motorised and pneumatic + 1 x 30% manual.
107.	2.23.14	The noise levels at a distance of one meter from the control stations shall be less than 85 dB.	For intermittent service noise level shall be 110 DBA at 1 m from the equipment	Accepted.
108.	2.26	Control air will be supplied to boiler and its auxiliaries, turbo generator and its auxiliaries and common plant auxiliaries like water treatment plant, fuel handling plant, ash, pump house etc	We are considering compressor capacity as 150 m3/hr as per tender, if not then please specify instrument air requirements for items other than our scope. Also provide distances / locations of items outside TBWES battery limits.	Accepted, as per tender.
109.	2.31	DCS Based Instrumentation & Control	We understand TG system & equipment are supplied by TG vendor. We request purchaser to include the cables & interconnections of TG system in respective vendor scope. TBWES will only consider required IOs in Turbine. Please provide total DCS IOs to be considered. As stated on Pg No. 100, redundancy at IO level is not envisaged. The redundancy at the DCS controller / communications & Power supply will be achieved.	Terminal points as per tender.
			For Critical signals from Field the redundancy will be achieved on the field with redundant transmitter	As per tender.
110.	1.5.14	Instrumentation & Control System	TBWES will considered redundant transmitters for the critical loops only.	As per tender.

			Please clarify the Integral type of SOE & total count of the SOE signal required.	During detailing.
			System & Field Control alarms page will be assigned in the DCS during detailed engineering. Please confirm the requirement of type Hooter on the DCS panel.	Accepted.
			TBWES will only consider only required IOs for turbine in DCS. All instrumentation, electrical and hook-up upto DCS shall be in Purchasers scope / TG vendor scope	Terminal points as per tender.
			Only one port will be consider Please confirm	As per tender.
			field Operated SOV IO will be weighted ( Control Voltage of the DCS & control system will be 230VAC Please confirm	During detailing.
111.	2.31.2.6	All the instruments shall have communication facility thro RS 485 interface.	Please Note that TBWES will considere the 2-wire hart compatible transmitters	During detailing.
112.	4.1.4	Control valves : MIL / ARCA / Fouress / IL / ABB / Dresser / Fisher	We request to add Inditech vendor for control valve.	Additional sub-vendors may be considered in KOM with justifiable technical reasons.
113.	4.1.4	Draft Gauges: Switzer / Bells / Levcon	We request to add Forbes marshall , Gauges Bourdon(GIC), WIKA Instruments, Baumer-WAREE, Goa Instruments & Goa Thermostatic for Draft Gauges.	
114.	4.1.4	Power cylinders : Bells control / IL / Chemtrols	We request to add Rotex, Festo, Schrader, Keltron vendor for Power cylinder .	
115.	4.1.4	Pressure gauges : H. Guru / GIC / Bells / Waree	We request to add Forbes marshall , WIKA Instruments, , Goa Instruments & Goa Thermostatic for Pressure gauges	

116.	4.1.4	Pressure switches : Switzer / Danfoss / Infoss / Verma	We request to add Forbes marshall , Pyro electricals for Pressure switches	
117.	4.1.4	Temperature Gauges : H. Guru / GIC / Bells / Wica / Waree	We request to add Forbes marshall , WIKA Instruments, , Goa Instruments & Goa Thermostatic for Temperature gauges	
118.	4.1.4	Thermocouples : General Instruments / Pyroelectric / Altop / Toshniwal	We request to add Goa Instruments , Thermal Instruments, Tempesen Instruments , Wika Instruments for Thermocouples	
119.	1.9.2	Local temperature gauges shall be generally mercury in steel filled type, weather proof, hermetically sealed with 1150 mm dial size.	As the Mercury is banned material, we will provide Bimetalic type Temperature gauges.Dial size will be 150 mm.	Accepted.
120.	1.9.2	Thermocouples shall be as per ANSI MC 96.1 and shall be of 14 AWG magnesium oxide insulated grounded type. These shall be selected as follows :	Thermocouple shall be 18 AWG magnesium oxide insulated ungrounded type. We will provide RTD up to & equal to 200 deg c. & K type thermocouple will provide above 200 deg c temperature as per our earlier executed project.	Accepted.
		a) Copper - constantan (ISA -TYPE T) for ranges:200 to 2000C.		
		b) Chromel - Constantan (ISA- TYPE E) for ranges:200 to 6000C.		
		c) Chromel - Alumel (ISA- TYPE K) for ranges:600 to 12000C.		
121.	1.9.3	Pressure Instruments : dial size of 1150 mm	Dial size will be 150 mm.	Accepted.

122.	1.9.3	Pressure transmitters with local indicator shall be electronic capacitance type	we will provide Piezo resistive with SS316 diaphragm	Accepted.
123.	1.9.7	Junction boxes : These shall be of die cast aluminium alloy body	Junction Box shall be of CRCA with weather proof protection.	Accepted.
124.	1.9.9	In general , bidder shall supply 1/2" x 0.065" thick ASTM A 269 TP 316 stainless steel as minimum seamless tubes for impulses ines	We will provide 1/2" NB ,Sch-80, Seamless .A106 Gr B(CS) for impulse lines	As per tender.
125.	1.9.11	Pneumatic Signal Tubes: Bidder shall supply 6 1/4" OD x 1 mm thick PVC converted fully annealed electrolytic grade copper tubes as per ASTM B 62.74 A CU.NO 122 ( DH ) for pneumatic signal tubes .	We will provide 1 / 4" O D x 0.0 4 9" THK 316 -STAINLESS STEEL A S T M - A 269	Accepted.
126.	-	-	Please provide control room layout, elevation and distance between boiler 1st column to control room to work out cabling BOM. Please provide plot plan and equipment layout in Autocad format.	During detailing.
127.	1.5.12	Length of MCC shall be limited to 10 M	Can we consider double front MCC Panel	As per tender.
128.	1.5.12	Perforated cable trays shall be used upto 300 mm size	For Electrical cable routing, ladder type cable trays shall be used.	Accepted.
129.	2.22	The motor ratings for all pumps and fans will be atleast 10 % higher than the maximum KW rating of the driven equipment.	On page 99, Clause No: 1.5.12 (L), it is mentioned motors rating have 15 % margin over the load requirement.	10 to 15%.

130.	1.5.14	Bidder shall supply Turbine Supervisory panel comprising of Woodard 505 E governor, Vibration	No Vibration monitoring system for the Boiler area Motors & equipments.	Accepted.
		Monitoring System (2 nos. radial vibration at each bearing of turbine, generator & gearbox, one axial		
		probe)		
131.			Instrument cables are FRLS considered	Accepted.
132.			Please confirm about the requirement of the HART compatibility in DCS panel ( For IO cards )	During detailing.
133.	2.31.2.6	The turbine shall be provided with an electro-hydraulic	As our scope is related to the only Boiler. This point to be referred by the Turbine Bidder.	
		governing system. The system shall be designed such that the		
		governing of the turbine shall be automatic and provides for safe operation.		Accepted
134.	2.31.2.6	Important plant parameters, that are required to assess the	Totalizers & trends will be generated in the DCS with inputs from the 2-wire Field mounted Transmitters Analog input.	During detailing.
		plant efficiency, must be serially communicated to the		
		operator station for the purpose of display / logging.		
135.	2.31.2.6	The turbine shall be provided with an electro-hydraulic	As our scope is related to the only Boiler. This point to be referred by the Turbine Bidder.	Accepted, provided for DCS scope.

		governing system. The system shall be designed such that the		
		governing of the turbine shall be automatic and provides for		
		safe operation.		
136.	2.31.3	software links with Turbo-visory panel, Woodward Governor and turbine temperature scanner.	We understand sytem & equipment are supplied by Turbine vendor. We request purchaser to include the mentioned supervisory panel, the cables & interconnections of TG system ,TG vendor scope of supply	Terminal points as per tender.
137.	2.31.4	Signals from thermocouples & RTD's will be converted to mA	We will provide the T/C & RTD cards in DCS. With 25% spares channels.	Accepted.
		signal by converter cards in Contractors marshalling cabinet.		
138.	2.31.4	There must be total integration of all intelligent devices	Please brief on the requirement	During detailing.
		including AVR, governor LGPG relays and the DCS system.		
139.	2.31.22	Sets of operator stations, TFT 22" color monitors, 1 color	Please Brief on the requirement (count) of the SOE signals.	As per tender.
		graphic laser printer and 1 A3 Dot matrix printer, required		
		consoles with chairs, required hardware for SOE recorder,		
		LED digital displays (150 x 250 mm) for power generation		

140.	2.31.23	I/O Counts	TBWES to consider IO count for items other than TBWES scope as stated in given section. Please confirm the IO counts.	As per tender.
141.			We will provide RTD for Temp below 300 degree C & above that we will consider the TC	Accepted.
142.			Please confirm about the material used for the Impulse Tubing. As per TBWES Standards we select the Impulse Tubing material as follows.	Accepted.
			For Higher Pressure - SS Pipe	
			For lower Pressure - SS Tube	
143.			For IO Philosophy Please confirm the following points :	
			a) Single Start & Stop DO is considered	During detailing.
			b) Remote selection will be from MCC / ACVFD Panel so Remote selection DI is considered	
144.	2.12	Even with one field of ESP out of service the ESPs must remain in operation. Manufacturer / bidder to specify the emission level with any one field out of service at 100% boiler MCR with Indian coal as fuel.	Emissions guarantees with all field in service. No guarantee with n-1 condition.	ODC with any field out of service to be informed.
145.	2.23.4	ESP / bag filter to be provided with flat ash hopper design having valley angle more than 70 deg C.	We shall consider hopper with valley 60 deg angle for this application.	Consider coal, bagasse, biomass.

146.		Cooling Tower Location	Cooling tower shall be placed at 20 meter from boiler first column. Please confirm / provide Auto cad layout for the same	Will be provided.
147.		Motors rating have 15% margin over the load requirement.	We shall consider 10% margin for all motors above 55 kW	Accepted.
148.	1.5.12	Voltage Drop at the Starting of Motor limited to 12% & 3% at Starting & Steady state up to motor terminals respectively	Voltage drop at starting will be limited to 15% for DOL started motors and 12% for Y-D started motors. For running or steady state drop 3% is complied	Accepted.
149.	1.5.12	Outgoing Feeders: MDO Type ACB above 800A rating & fixed type MCCB up to 630A rating	MDO type ACB of Incomer could be as high as 2500 A. Client to consider suitable feeder in their PCC	Accepted.
150.	2.22	Electrical The motor ratings for all pumps and fans will be at least 10 % higher than the maximum KW rating of the driven equipment	complied as mentioned in Sr. No. 147 above	See above reply.
151.		METHOD OF STARTING : ID, FD, SA / PA fan, BFW pumps motors shall have AC variable frequency drives & star delta bypass	Only VFD starting is considered for the ID, FD, SA fan, BFW pumps motors.	As per tender, slop pumps, fuel feeders.
152.		ARC valves	ARC vales are applicable only for boiler feed water pumps. All other pumps in TBWES shall be without ARC valves.	Accepted.



S.No.	Tender Reference	Tender specification/requirement	DEVIATIONS	MITCON's Reply		
<b>TECHNICAL</b>						
1	Page No. 84 Clause No. 1.4	<b>Plant Design Criteria:</b> Process Steam Requirement of Distillery 16 to 18.5 TPH.Boiler size & Configuration: 1 x 22 TPH, 44 kg/cm2, 400 Deg.C including internal steam requirements of deaerator and SCAPH	As per bid, process steam requirement shall be of 16 to 18.5 TPH. Also, as per the bid it was mentioned that the turbine shall be of Extraction cum Condensing STG Set. Hence there shall be minimum steam flow to condenser also. This requirements itself is coming to about 21 TPH. Apart from the above, there shall be steam required for Deaerator, FD SCAPH and Spentwash atomisation. Considering the internal steam requirements, process steam requirement and 55% process return @ 80 Deg.C the boiler capacity is coming to about 26 TPH. Please confirm.	As per tender		

2	Page No. 88 Clause No. 1.5.8	The air compressor shall be oil free two (2) stage reciprocating non-lubricating type with belt drive	The air compressor shall be of Oil injected, lubricated, single stage, air cooled rotary screw compressor	Accepted. Two appropriate oil filters to be provided		
3	Page No. 90 Clause No. 1.5.10	All DM water piping (MSRL).	All DM water piping (SS).	Accepted.		
4	Page No. 103 Clause No. 2.1.1	Any required preheating to be included in bidders scope. Preheating, if any will be by the exhaust steam and condensate will be returned by bidder to condensate transfer tank.	Our requirement of slop at inlet of slop tank will be 65-72 deg C @ 54-58 brix	Temperature will be difficult in winter. Appropriate heating arrangement as per tender.		
5	Page No. 103 Clause No. 2.1.1 Steam Generator & Auxiliaries	Economiser on separate axis.	Will be as per FC-KCP boiler pressure parts layout design	As per tender only.		

6	Page No. 104 Clause No. 2.1.1	Silencers to be provided for first safety valve, air vent valve, extraction steam line vent, deareator vent, all continuously operating steam vents and FD suction.	We have considered silencer for super heater safety valve, startup vent and FD fan suction	As per tender.		
7	Page No. 105 Clause No.2.3	The steam generators shall be provided with one steam drum and one mud drum	We propose single drum boiler, hence boiler bank and water drum is not applicable.	Accepted.		
8	Page No. 105 Clause No. 2.3 Steam Drums	The system of internals consisting of the primary and secondary separators shall ensure steam of highest purity with dissolved silica carry over limited to a maximum of 0.02 ppm.	We propose only steam dryer box with Chevron mesh and desmistifier pad as primary and secondary separators. With that we ensure the steam purity with dissolved silica of 0.02 PPM.	Accepted.		
9	Page No. 105 Clause No. 2.3 Steam Drums	The water distribution system in the steam drum will be through a distribution header below low water level, to facilitate equal distribution through the drum.	As per our design, the water distribution system will be well below the Normal water level, which will ensure the equal distribution.	Accepted.		

10	Page No. 105 Clause No. 2.4.1 Furnace Water Wall Tubes	The FEGT in all operating conditions should not exceed 700 Deg C.	The FEGT in all operating conditions should not exceed 800 Deg C.	Accepted.		
11	Page No. 106 Clause No. 2.4.1	Each of the headers shall have at least two numbers of stubs for inspection and cleaning	As per FC-KCP design, extra stubs shall not be provided. Instead of stubs, extra length shall be provided in header for cleaning and inspection after cutting end caps	Accepted.		
12	Page No. 106 Clause No. 2.5 Steam Generator Headers	All headers in the steam generator shall have flat end covers,	Headers will be with dish type end caps also.	Accepted.		
13	Page No. 106 Clause No. 2.6 Evaporator bank	Transverse pitch of 150 mm to be provided	Pitches for heat transfer areas shall be considered as per FC-KCP design for slop fired boilers.	As per tender.		

14	Page No. 107 Clause No. 2.7 Super Heaters & Superheated Steam Header	The steam generator shall be provided with external super heater	Superheater is an integral part of the boiler and is located in third pass not facing direct radiation.	Accepted.		
15	Page No. 108 Clause No. 2.8 Furnace	The firing floor will be of 8 mm thick minimum, MS fabricated grating with synthetic enamel painting.	The firing floor shall be 5 mm thick Chequered Plate	As per tender.		
16	Page No. 108 Clause No. 2.9.1	Appropriate feeder system regulated by VFD, mechanical spreading system for grate boiler,	The coal feeding system shall consist of drag chain feeders, chute, pneumatic distributors (common for Bagasse and Coal).	As per tender.		
17	Page No. 108 Clause No. 2.9.1	Fuel feeders to be N+1 sized.	Considered N+1 on Slop + coal firing and N condition for 100% coal firing	As per tender.		

18	Page No. 109 Clause No. 2.9.2 Travelling Grate	Travelling Grate  Grate bar MOC	Travelling Grate as per FC-KCP design.  ASTM A 319 Class - II Type - B	Accepted.		
19	Page No. 109 Clause No. 2.9.2	Thermocouples to be provided in the undergrate area to monitor the grate temperature.	Thermocouples not considered.	Accepted.		
20	Page No. 110 Clause No. 2.9.2	The total combustion air form by the FD fan, heated in the air pre-heater to a temperature of about 200°C.	The total combustion air by the FD fan, heated in the steam coil air pre-heater to a temperature of about 130°C Only.	Accepted.		
21	Page No. 110 Clause No. 2.9.2	The secondary air for distribution and for the over fire air (OFA) shall be supplied by the secondary air fan and the SA fan shall take suction from the air outlet of the air pre-heater for hot SA design	We have considered cold SA fans for the proposed boiler. SA fan will take suction from atmosphere	Accepted.		
22	Page No. 110 Clause No. 2.9.2	The drive will be by a continuously variable hydraulic pump system and not of ratchet & pinion type.	The drive will be by a continuously variable hydraulic pump system and of Ratchet and Pawl type	Accepted.		

23	Page No. 110 Clause No. 2.10 Economiser	Evaporator will be provided with 150 mm transverse pitch.	Pitches for heat transfer areas shall be considered as per FC-KCP design for slop fired boilers.	As per tender or higher.		
24	Page No. 110 Clause No. 2.10	The flue gas velocity over the economizer tubes shall be limited to a maximum of 1 meter/sec.	Flue gas velocity in Econmiser tubes shall be in the range of 8 - 10 m/s,	Accepted.		
25	Page No. 110 Clause No. 2.10	Broadly the individual bank height could be maintained at about 2000 mm with the inter bank gap at about 600 mm	Economiser bank dimensions will be as per FC-KCP design.	Accepted.		
26	Page No. 111 Clause No. 2.11	Air Pre -Heater	Air preheater is not applicable as per our design we are providing SCAPH for FD Fan.	Accepted.		
27	Page No. 111 Clause No. 2.12	ESP / bag filter will be preceded by an ash collection chamber with refractory walls.	We will provide SS 304 liner (1.5 mm THK.) upto 1/3 rd height of hopper	Accepted.		
28	Page No. 112 Clause No. 2.13 Induced Draught Fan	Fan material design as per IS : 1570 - 1979.	Material selection shall be considering the fly ash dust concentration & resultant erosion	As per tender.		

29	Page No. 112 Clause No. 2.13	Renewable hard faced wear pads on blade shall be incorporated in the impeller. Alternatively, erosion resistance nickel chrome steel to be used.	100 % hard faced wear liner on blade & wear prone area of disc along the blade as per vendor std (i.e., 5 mm IS 2062 E250 + 3mm chromium carbide)	As per tender.		
30	Page No. 112 Clause No. 2.13	The blade of the fan rotor should be fabricated out of minimum 5 mm thick mild steel plate. After hard facing, the thickness should be minimum 14 mm	We will provide fan blade thickness as 6 mm and wear lining thickness as 6mm.	As per tender.		
31	Page No. 112 Clause No. 2.13	ID fan blade will be of backward vane type.  The end plates of the rotor shall not be less than 10 mm thick M.S Plate  Multi-louver damper to be provided for manual control	ID fan blade will be consider backward curved type  Back plate thickness as 8 mm with mild steel  MLD to be pneumatically controlled through DCS.	As per tender.		
32	Page No. 113 Clause No. 2.14 Forced Draught Fan	Bidder may consider separate base plate arrangement for fan & motor.	Fan casing placed on RCC foundation and motor placed on base frame.	Accepted.		



33	Page No. 114 Clause No. 2.14	FD fan to have multi louver dampers. The multi louver damper to be pneumatically controlled through DCS.	We will provide IGV which will be controlled through DCS.	Accepted.		
34	Page No. 114 Clause No. 2.16 SA Fan	20% margin on head	We will consider 15 % margine on head for SA fan.	Accepted.		
35	Page No. 114 Clause No. 2.16	The SA fan shaft material shall conform to C40 forged to I.S. - 1570, 1979	Certified material as per OEM standard.	As per tender.		
36	Page No. 115 Clause No. 2.16	Multi louver damper control to be provided for SA fans. The multi louver damper to be pneumatically controlled through DCS	We will provide IGV which will be controlled through DCS.	Accepted.		
37	Page No. 115 Clause No. 2.17	Blow Down Arrangements	Common Blow Down Tank shall be provided as per FCKCP design flash steam recovery system is not applicable.  Working pressure of deaerator shall be at 4.85 ata and it is not possible to recover 1 ata blowdown flash to deaerator. In general practice blowdown	Accepted.		

			flash is vent to atmosphere.			
38	Page No. 116 Clause No. 2.19	With normal operation with extraction steam and start-up from primary super heater header.	Start up will be not taken from PSH header	Before MSSV.		
39	Page No. 116 Clause No. 2.19	The de-aerator storage tank shall be installed as per requirement of NPSH and on its own structure.	Deaerator structure will be integral part of boiler structure.	As per tender.		
40	Page No. 116 Clause No.2.19	Level & pressure control valves to be provided, to sustain & maintain the design quality of DA water.	As per our standard practice Level control valve shall be provided. Pressure control is not required. Since Deaerator PRDS / turbine extraction shall be provided 5 ata which can be directly used for deaerator. Further pressure control equipment is not required.	Accepted.		

41	Page No. 116 Clause No. 2.19	Feed water control station will consist of 1 x 100% pneumatic control valve, 1 x 100% motorised control valve and 1 x 30% manual bypass. Control station to be at operating floor level.	Feed water control station will consist of 2 x 100% pneumatic control valve. Control station to be at operating floor level.	Include manual bypass.		
42	Page No. 117 Clause No. 2.19	The deareator, condensate storage tank, condensate transfer pumps and boiler feed pumps can be located on the same structure	Condensate storage tank support mat not be at the same structure.	Accepted.		
43	Page No. 117 Clause No. 2.20 Boiler Feed Water Pumps	ARC Make as schrodehal	We will provide ARC Make as KSB mill.	MIL		
44	Page No. 117 Clause No. 2.20 Boiler Feed Water Pumps	On the suction side, one operating and one isolation valve shall be provided.	The boiler feed water pumps shall have one no. suction side isolation valve.	As per tender.		

45	Page No. 119 Clause No. 2.21 Instrumentation	Isolation and bypass valves shall be installed with all control valves. Hand wheels and air lock valves shall be considered for all control valves.	Isolation and bypass valves shall be provided only for required control valves. Hand wheels shall be provided for all control valves. Air lock valves shall be provided only for control valves for which air failure condition is stayput.	Accepted		
46	Page No. 120 Clause No.2.21.2	De-aerator Automatic Level and Pressure Controller	As per our standard practice Level control valve shall be provided. Pressure control is not required. Since Deaerator PRDS / turbine extraction shall be provided 5 ata which can be directly used for deaerator. Further pressure control equipment is not required.	Accepted		
47	Page No. 120 Clause No.2.21.5	vi. Deaerator level and pressure control		Accepted		
48	Page No. 120 Clause No.2.21.5	Closed Loop Controls vii. CBD/IBD level control	Not applicable	Accepted		

49	Page No. 121 Clause No.2.21.5	Monitoring Process Parameters 3. Draft - iii SA fan inlet	Draft transmitter shall be provided at SA fan outlet	Accepted		
50	Page No. 122 Clause No.2.21.5	Monitoring Process Parameters 7. Level - iii. IBD , iv. CBD	7. Level iii. IBD & CBD not applicable	Accepted		
51	Page No. 132 Clause No. 2.23.14	Complete soot blower piping from the tap off on the steam drum ...valves and fittings.	Soot blower steam piping will be tapped off from primary superheater outlet to final superheater inlet steam line .	Accepted		
52	Page No. 133 Clause No. 2.23.14	PipingAll pressure tapping for pressure applications above 40 kg/sq.cm. shall be of size NB 20 with two root valves. For pressures 40 kg/cm2 and less the size shall be Nb 15 with one root valve.	All pressure tapping for pressure applications above 40 kg/sq.cm. shall be of size NB 25 with two root valves. For pressures 40 kg/cm2 and less the size shall be Nb 15 with one root valve.	Accepted		

53	Page No.133 Clause No.2.23.14	The design of the piping system shall be based on the ANSI B31.1 code. In addition the statutory requirements Flexibility analysis shall be made for all piping systems with operating temperatures above 100 deg C.	The design of the piping system shall be based on the ANSI B31.1 code. In addition the statutory requirements Flexibility analysis shall be made for all piping systems with operating temperatures above 200 deg C.	Accepted		
54	Page No. 135 Clause No.2.23.14	<b>Ducting</b> All ducting shall be rectangular in cross section	Ducts will be rectangular / circular in configuration.	Accepted		
55	Page No. 137 Clause No.2.23.14	<b>Safety Valves</b> The steam generator safety valves and all other safety valves shall be with butt welding end connection	For boiler safety valves welded end connection & for PRDS safety valves flanged end connection	Accepted.		
56	Pg.No : 146, 2.26 Fuel & Ash Handling System	1 No Over- band type magnetic separator suitable for 650 mm belt width	Permanent magnet separator shall be provide.	Accepted.		

57	Pg.No : 146, 2.26 Fuel & Ash Handling System	1 no crusher house in M S construction	RCC construction up to vibrating screen level	As per tender.		
58	Page.no.156, Flow quantities for the design of the piping connected with PRDSH	40 / 5 ata Deaerator steam start up or provide PRDSH from primary super hetaer	We have considered 40/5 ata PRDS for Deserator, SCAPH & slop system	For deareator, before MSSV.		
59	Page No. 166 Clause No.2.31.2.6	Redundancy will be provided in the Central Processing unit, power supply (both at the CPU & I/O), I/O modules and communication	Redundancy shall be provided in the Central Processing unit, power supply (both at the CPU & I/O) and communication	As per tender.		
60	Page No. 166 Clause No.2.31.2.6	xiii. On line replacement of modules shall be possible without affecting the process (Hot swappable).	Not applicable.	Applicable.		

61	1.15 Appendix III, Page No. 232	For class 900 and above the flanges shall be WNRTJ type.	As per our standard practice, WNRF flanges shall be provided for class 900.	During detailing.		
62	1.16 Appendix III, Page No. 232	a) For pipe size 50 NB and above shall be butt welded type.	a) For pipe size above 50NB shall be butt welded type.	As per tender		
		b) For 40 NB and below shall be socket welded type.	b) For 50 NB and below shall be socket welded type.	As per tender		
63	1.17 Appendix III, Page No. 232	Equal Branch:				
		a) NB 50 & Above - BW equal tee as per ASME B 16.9	a) For pipe size NB 65 & above, for equal branch, only butt welding straight tee as per ASTM A 234 and ASME B 16.9 shall be used.	As per ASME.		
		b) NB 40 & Below - SW equal tee as per ASME B 16.11	For pipe size NB 50 & below, the branches shall be only by socket welded straight tees or reducing tees as per ASTM A 234 / ASTM A 403 / ASME B 16.11. No branch welding shall be used.	As per ASME.		



64	1.18 Appendix III, Page No. 232	All pressure tappings for pressure applications above 40 Kg/Sq.Cm shall be of size NB 25 with two root valves.	Design pressure upto 60 kg/cm <sup>2</sup> (g) shall be provided with one root valve of size 25 NB. However two isolation valve shall be provided drum alone.	As per tender.		
65	1.9.2 Appendix IV, Page No. 254	Temperature gauge - 1150 mm dial size	Temperature gauge - 150 mm dial size	Accepted.		
66	1.9.3 Appendix IV, Page No. 255	Pressure gauges - 1150 mm dial size	Pressure gauges - 150 mm dial size	Accepted.		
67	1.9.7 Junction Boxes, Page No. 256	Junction boxes shall be provided wherever required. These shall be of die cast aluminium alloy body and shall be weather proof.	Junction boxes shall be provided wherever required. These shall be of CRCA and shall be weather proof.	Accepted		
68	1.9.9, Page No. 256	In general , bidder shall supply 1/2" x 0.065" thick ASTM A 269 TP 316 stainless steel as minimum seamless tubes for impulses kines	As per our standard practice, A 106 Gr.B carbon steel shall be provided	As per tender.		

69	General	Soot Blower Panel	Soot blower Panel shall be non-comPatmentalized type with one common MPCB for all LRSB's, one common MPCB for all RSB's and one common MPCB for all WB's.	Accepted.		
70	Page.no.208, 4.1 APPROVED LIST OF VENDORS		Shall be mutually discussed and finalized during order finalization.	During KOM with justifiable technical reasons for additional subvendors.		
71	Page.no.227, Performance guarantee	The cogeneration power plant as a complete system will undergo performance test for a period of 7 continuous days to prove reliability and capacity of all sub-systems. Within this period, individual PG tests of main power island will be carried for a minimum period of 8 hours, as per relevant code.	Performance test for boiler shall be as per ASME PTC 4.0 . Performance test for other auxiliaries shall be as per the relevant code.	Accepted.		
72	Page No. 159 Clause No. 2.28.7	All HP Valves to be 1500 Class (or as per IBR)	ALL HP Valves to be 600 Class (Or as per IBR) Upto 91.8 Kg/cm2	Accepted as per IBR.		

73	Page No. 132 Clause No. 2.23.14	Feed Water delivery piping from steam generator feed pumps upto the economiser inlet header to the steam generating unit, via the HP feed water heater	HP heater not applicable.	Accepted.		
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