

**BPSCL's replies to Queries (Mechanical) raised by various parties for the work of "Renovation & Modernization of Boiler # 1"**

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1.	General				IBR steaming documents to be provided to bidder for a better understanding of the existing pressure parts arrangement.	Not available
2.	Vol-2, Sec-B	8/114	1.0, 1.1	The content of referred clause.	<p>Since the unit was commissioned well over 30 years ago, it necessary to evaluate the condition of the different subsystems. This will enable bidder to make a realistic assessment on requirement of replacement or repair / modification in order to achieve most optimized output and reliability and sustainability in general over the next 20 years.</p> <p>Bidder needs to make site visit to assess the condition of the boiler and do necessary checks and inspection of the boiler including cold survey. Bidder may be permitted to do so including access to available assessment report, energy audit report, etc. prior to submission of his offer.</p> <p>Bidder understands that scope of supply indicated in Tender Document captures the basic minimum requirement of replacement. There may be further addition to scope based on actual findings of site visit and study of aforesaid reports.</p> <p>It is bidders understanding that such additional scope (if any) will be discussed &amp; finalized during the post bid techno-commercial discussions and a revised &amp; uniform scope common to all bidders shall be made available prior submission of price bid.</p> <p>Please confirm.</p>	All bidders shall be evaluated on a common platform.
3.	Vol-2, Sec-B	26/114	3.0, 3.1.2 (p)	The contents of referred clauses.	<p>As per Tender Document requirement, bidder needs to provide the CFD model of the boiler for dynamic operating conditions. The exact scope of work against the same is not clear to bidder. Further elaboration of exact scope involving the area where CFD modeling is to be done, is required. Please provide the same as well as intimate the purpose of such study.</p>	CFD Analysis has to be performed based on new design of burner & furnace.

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4.	Vol-2, Sec-B	13/114	2.0, 2.1	Content of referred clause.	<p>Bidder presumes that the boiler design is to be upgraded by replacing existing burners with separate / coaxial burners for coal and gas, with a view to achieve APH outlet flue gas temperature of 135 (+/-) 5 deg. C (not under guarantee). The renovated boiler shall be capable of feeding steam not less than 176 TPH (firing only coal of GCV 3800 kcal/kg) &amp; minimum 210 TPH at rated steaming parameter when firing both coal and gas.</p> <p>In order to carry out appropriate design audit, Bidder needs complete general arrangement drawings, detail drawings and contract datasheets, actual boiler performance records of complete Boiler before confirming the anticipated APH outlet flue gas temperature as desired by you.</p> <p>Bidder understands that flue gas temperature at air-preheater inlet is under guarantee for 384 deg. C to 395 deg. C &amp; there is no scope of work in APH. Please confirm.</p>	<p>All available drawings shall be made available to the Bidder.</p> <p>Flue Gas temperature at Air Pre Heater inlet shall be between 384 °C &amp; 400 °C.</p>
5.	Vol-2, Sec-B	28/114	3.1.5	BF Gas Characteristics & CO Gas Characteristics	<p>The Gas analysis does not sum up to 100%. Customer is requested to please check, revise and intimate.</p> <p>Please provide design COG Analysis and GCV for performance computation.</p> <p>Please also provide fuel gas pressures at respective terminal points.</p>	<p>BFG &amp; COG characteristics are given in TS (page no. 17 &amp; 18 of 114 volume-2 section-B).</p> <p>BPSCL agrees to furnish analysis of design parameters for both BFG and CO gas</p> <p>BF Gas pressure normally 100 to 600 mmWC.</p>
6.	Vol-2, Sec-B	19/114	2.0, 2.7, 2.9	Contents of referred clauses.	<p>The Fan &amp; ESP parameters show that flue gas temperature for Induced Draft Fan is 200 Deg C and that of ESP 220 Deg C maximum and these are much on the higher side.</p> <p>To ensure appropriate design audit, please check and reconfirm all Fans &amp; ESP design parameters.</p>	Data are correct.
7.	Vol-2, Sec-B	22/114	2.0, 2.12 (d)	Content of 'Deviations in operating parameters of BOILER Unit # 1 to 5.	Request please check and intimate actual feed water temperature at economizer inlet as the same will serve the basis of design audit for subsequent performance of the unit.	215 °C
8.	Vol-2, Sec-B	25/114	3.0, 3.1.1 (a)	Content of referred clause.	Please explain what kind of test Customer is expecting the bidder to carry out during pre-bid visit.	N.A

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9.	Vol-2, Sec-B	25 & 40/114	3.0, 3.1.2, 3.2.15.1	Contents of referred clauses.	It is bidders understanding that structural steel more than 200 MT if required shall be extra to the Contract and shall be determined during detail engineering stage on unit rate basis. Please confirm that this understanding is correct.	Bidder's understanding is correct. Tentative breakup of 200 MT structural items will be made available by BPSCL. BPSCL further confirms that requirement of Buckstay specified under clause 3.2.8 will be over and above this 200 MT.
10.	Vol-2, Sec-B	25/114	3.0, 3.1.2 (f)	Content of referred clause.	Please clarify whether BFG & CO gas also be treated as primary fuel.	Yes.
11.	Vol-2, Sec-B	26/114	3.0, 3.1.2	Content of referred clause.	Please refer below clause: "Owner intends to retain the unit output .....to achieve balance of flue gas and steam temperatures." Does this mean that there is an unbalance in steam temperature in left and right side of boiler? Please clarify?	BPSCL confirms that there is no considerable unbalance in steam temperature at the final S/H outlet.
12.	Vol-2, Sec-B	26/114	3.0, 3.1.2	Content of referred clause.	Bidder is required to retain the existing second pass of the boiler and to match the first pass of the boiler with the second pass with the available technology ensuring gas tightness and thermal expansion at dynamic load condition. Requirement is not clearly understood & bidder wants further clarification regarding ensuring gas tightness retaining existing second pass.	Bidder to design as per the best technology available
13.	Vol-2, Sec-B	43/114	4.0	Scope of supply within Terminal points	Please provide us all the P&ID associated for the systems mentioned in this section for understanding complete scope of work & preparation of bid.	All available drawings / documents shall be made available to the Bidder.
14.	Vol-2, Sec-B	27/114	3.0, 3.1.3	The portion 'For maintaining Furnace exit gas temperature (at furnace exit plane) less than Initial ash deformation temperature (IDT) minus 60°C mentioned in table titled 'Ash fusion Range' under clause no...3.1.4'	"Ash fusion Range" may please be advised.	Initial Ash Deformation Temperature: 1100 °C Ash Fusion Temperature: 1300 °C
15.	Vol-2, Sec-B	27/114	3.0, 3.1.3	The portion 'The Bidder shall have to carry out the detailed analysis of the existing design of the steam generator for assessment of the requirement specified elaborately in this specification with the	Please clarify the scope of furnace design. Bidder's understanding is that due to change of spaced tube to membrane tube, furnace thermal analysis to be done and the same is in bidder's scope.  However, bidder wants to know the shortfall in performance	Bidder's understanding is correct.

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				range of coals and other inputs made by the owner. If, needed, bidder shall also work out the complete thermal redesign of the steam generator for making suitable adjustments in the heat transfer surfaces as mentioned above to satisfy all requirements with the specified design criteria. Bidder has to furnish the design parameters in the data sheet.	parameters, if any, for last 30 years of operating regime against which complete thermal analysis of heat transfer surfaces has been requested by you.  Please provide appropriate details to support design audit.	
16.	Vol-2, Sec-B	28/114	3.0, 3.2.1	The portion 'The design of pressure parts which are to be replaced (tubes, headers, etc.) shall be supplied by the Contractor as per Indian Boiler Regulations (IBR) or other acceptable international codes whichever is superior.'	Bidder is not clear about how to determine which international code is superior or inferior than IBR and then proceed for design work. It is our understanding that IBR Code shall be followed for Pressure parts design and if IBR is not clear in any specific area, then other International code shall be used in consultation with IBR. Please confirm that this understanding is correct.	Bidder's understanding is correct.
17.	Vol-2, Sec-B	28/114	3.0, 3.1.5	Content in table under 'Furnace Oil Analysis:	Sulphur (Max.) – 4.5% by weight is indicated in the table. Request please check the Sulphur content and advice as it may require special attention for back end acid corrosion and SOx Emission limit.	Data is correct.
18.	Vol-2, Sec-B	31/114	3.0, 3.2.5.3 (f), 3.2.5.3 (g)	Contents of referred clauses.	Thinning allowance shall be provided as per IBR. Please confirm	Bidder's understanding is correct.
19.	Vol-2, Sec-B	30/114	3.0, 3.2.5.2 (b)	The content of referred clause.	Bidder needs better clarity for proper understanding of the scope of work. Please provide. Otherwise, Bidder is prepared to discuss further on this matter in detail during the pre-bid meeting. Please confirm.	As per Bidder's design standard.
20.	Vol-2, Sec-B	31 & 32/114	3.0, 3.2.6.1	The portion 'Overhauling scope of work and material for execution shall be provided by the owner. However, if any minor modification is envisaged by the bidder to accommodate their proposed design, the same shall be in bidder's scope.	Bidders understanding is that Customer will provide materials for overhauling on "Free Issue basis" based on existing design of equipment to ensure interchangeability with the existing components. Hence, bidder could not understand the additional scope mentioned herein.	BPSCL will provide materials for areas outside terminal points of R&M for overhauling jobs. However, materials required for any modification required to accommodate the new design under R&M has to be supplied by the Bidder without any extra cost.

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					However, if any extra scope minor or major in nature appears during execution stage the same shall be mutually discussed and agreed against extra cost & time schedule. Please confirm that this understanding is correct.	
21.	Vol-2, Sec-B	33/114	3.0, 3.2.7 (g)	The content of referred clause.	Bidder's understanding is that this is applicable for new supply of headers. Please confirm.	Bidder's understanding is correct.
22.	Vol-2, Sec-B	35/114	3.0, 3.2.12.3 (e)	The content of referred clause.	Bidder's understanding is that pipe thickness shall be calculated as per IBR or other international code where IBR guidelines are not available. Please confirm. Please also confirm the requirement of corrosion allowance of 1.0 mm for pipe is as per IBR or equivalent International code in absence of IBR.	As per IBR.
23.	Vol-2, Sec-B	36/114	3.0, 3.2.13.1 (a)	The content of referred clause.	Please indicate NO <sub>x</sub> requirement for various fuel firing combinations.	NO <sub>x</sub> at 210 TPH with Coal & Gas firing may be as per latest recommendations of MoEF.
24.	Vol-2, Sec-B	36 to 38/114	3.0 3.2.13.2 (b)	Reference areas: The burner shall be designed to cater to 50% BMCR condition and shall also be capable for being fired along with coal burners. .....Ignition system shall be complete with igniters suitable for ignition of fuel directly. .....The system shall be designed for burning gas even when the furnace is under cold condition (i.e., capable of cold start up with gas).....  The turndown ratio should be about 6:1  .....Automatic and manual Shut off valves for gas atomizing and clearing media.	Bidders understanding is that new burners shall be designed for 50% BMCR Gas and 50% Coal firing simultaneously. Please confirm.  Bidders understanding is that Ignitor shall Ignite COG directly and not furnace oil. Please confirm.  The turn down of BFG burner (6:1) is very high. Please check and re-confirm.	BPSCL informed that max BFG firing capacity should be 96,000 Nm <sup>3</sup> /Hr and max COG firing capacity should be 18,000 Nm <sup>3</sup> /Hr. Minimum 176 TPH steaming is to be achieved with coal firing only. However the burner should be designed to be capable of burning the different combinations of these fuels as per availability.  BPSCL clarified that HEA igniter should be capable of firing HFO directly. Requirement of separate igniter for COG shall be as per Bidder's design requirements.  Turndown ratio shall be as per TS.

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25.	Vol-2, Sec-B	40/114	3.0, 3.2.15.2	Reference areas: For all full strength butt welding of plates and sections thicker than or equal to 10mm, edge preparation will be done and got approved by the Owner / Consultant.	Please review the requirement of drawing approval for weld preparation and re-confirm.	To be reviewed during Contract execution.
26.	Vol-2, Sec-B	42/114	3.0, 3.2.15.3 (c)	The content of referred clause.	Please review & re-confirm use of built-up section depending upon requirement.	Built-up section may be used where standard rolled sections are not available as per requirement.
27.	Vol-2, Sec-B	42 & 43 of	3.0, 3.2.16.2 (c)	The contents of referred clauses.	Request please review these requirements as this is small size fan and such stringent requirements are normally not required.	Noted & agreed
28.	Vol-2, Sec-B	43/114	3.0, 3.2.17	The portion 'In case of replacement, the new oil burners shall be wide range air/ steam atomized type (as per site conditions) having turn down ratio 4:1 for each.'	Please review the requirement of air atomization and advise.	Only Steam atomization will be used.
29.	General				Bidder understands that the civil works including preparation of finished floor, foundations and all required structures, supports, ladders, etc. are excluded in bidder's scope. Please confirm.	Civil work if required for accommodating any new design under R&M will be under the scope of the bidder.
30.	General				Please note that as per NFPA 85, furnace shall be designed so that the maximum head capability of induced draft fan system with ambient air does not exceed the design pressure of furnace ducts and associated equipment. The furnace enclosure shall have sufficient strength to sustain any inadvertent pressure extremity inside it.	Noted
31.	Vol-2, Sec-B	25 & 41/114	3.1.1 (g), 3.2.15.3 (a)	The contents of referred clauses.	Bidder understands the civil work under bidder scope is "Civil works of Scanner Fans (02 nos.) foundations only as per Clause no. 3.2.16.1, Page 42 of 114), Volume – 2, Section – B of Technical Specification and any civil works related to installation and cabling for new panels in the control room". Please confirm or clarify.	Civil work if required for accommodating any new design under R&M will be under the scope of the bidder.
32.	Vol-2,	26/114	3.1.2 (i)	The contents of referred clauses.	Bidder understands the R&M scope of dampers and expansion	Dampers, valves, expansion bellows, etc. of

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	Sec-B				bellows consists of only those present in the secondary air duct within the boundary limits defined in section "4.0 terminal points and exclusions". Please confirm our understanding.	Secondary Air within the terminal points is under R&M scope. BPSCL will share all available details of existing dampers & expansion joints.
33.	Vol-2, Sec-B	26/114	3.1.2 (o)	The contents of referred clauses.	Customer to explain the R&M scope and overhauling scope of insulation and refractory work distinctly as this job is appearing in both scope and there is lack of scope clarity for these items.	Supply & erection of insulation & refractory materials within the terminal points are under the scope of R&M. Beyond this; these materials will be supplied by BPSCL as per TS. BPSCL further clarified that insulation shall be designed considering ambient temp of 40 deg C.
34.	Vol-2, Sec-B	32/114	3.2.7 (l)	The contents of referred clauses.	Terminal point for N2 (supply of N2 in Customer's scope) shall be provided by Customer.	3 meter away from Blr#1 at 27 meter level. Bidder shall provide purging with both Steam & N <sub>2</sub>
35.	Vol-2, Sec-B	42/114	3.2.16.1 (l)	The contents of referred clauses.	Bidder understands scanner air duct, isolation damper at fan discharge is not in R&M scope. Please confirm.	BPSCL clarified that these are included in Bidder's scope.
36.	Vol-2, Sec-B	52/114	Sl. No. 5	The contents of referred clauses.	Please provide the physical tapping point location for spray water of attemperator.	At 8 meter from Feed Water header
37.	Vol-2, Sec-B	32 & 68/114	3.2.7 Sl. No. 4	The contents of referred clauses.	Bidder understands the ceiling superheaters' header is for retrofit and not for replacement. Please confirm.	Retrofit/replacement are allowed based on design.
38.	Vol-2, Sec-B	33 & 69/114	3.2.10.1 Sl. No. 12	The contents of referred clauses.	Bidder understands the scope of R&M of hangers and supports is within the terminal points defined by section 4.0. Please confirm.	Correct
39.	Vol-2, Sec-B	70/114	Sl. No. 16	The contents of referred clauses.	As per the said clause, please provide the quantity of impulse piping.	As per TS Volume-2, Section-C Annexure 2B page 105/113.
40.	Vol-2, Sec-B	33/114	3.2.9	The contents of referred clauses.	Bidder understands only safety valves are under R&M scope. All other valves including sampling line, blowdown line, vent & drain valves etc. are in Overhauling scope. Please confirm.	Valves that are installed within the terminal points are in the scope of the bidder.
41.	Vol-2, Sec-B	52/114	Point No. 11	Terminal point and exclusion	Bidder understands the terminal point of Fuel oil – between Outlet flange of the first isolating valve from common header for main line & first valve from recirculation header for recirculation line. Please confirm the complete scope of supply including fuel oil skid, control valves, MFT valves for appropriate understanding of bidder.	Mentioned items are included in Bidder's scope.
42.	General				Whether the entire firing system is required to be in compliance with	Confirmed

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					NFPA. Please confirm.	
43.	Vol-2, Sec-B	28/114	3.1.5	Furnace oil Analysis	Please indicate the temperature at which furnace oil viscosity is mentioned.	At 50 °C
44.	General	71/114	Section 8.0 Sl. No. 17 (iv)		Based on our site visit during 6 <sup>th</sup> & 7 <sup>th</sup> April, 2017 & discussions with your engineers, we understand that the scope of Flame sensing camera needs to be deleted from R&M scope. Please confirm.	Flame Sensing Camera to be read as Flame sensing device for BMS interlock.
45.	Vol-2, Sec-B	105/114	Item No. 10, Point No. 1	The content of referred clause.	Tender calls for replacement of "existing sector gate system in BF & CO gas line with new modern technology hydraulic sealing system". The above replacement is however indicated in Annexure – III as part of Overhaul scope and the same needs to be changed for inclusion in the base R&M scope. Please confirm.	Design, Supply, Erection, Testing & Commissioning of new hydraulic sealing system shall be in the scope of the Bidder.
46.	Vol-2, Sec-B	35 & 93/114	3.2.13.1 (a), Point No. 8	The contents of referred clauses.	The NOx values indicated in the tender is 300mg/Nm <sup>3</sup> . This value however shall be as per latest MoEF & CC Guidelines. Please confirm.	NOx at 210 TPH with Coal & Gas firing may be as per latest recommendations of MoEF.
47.	Vol-2, Sec-B	32/114	3.2.6.5	Content of referred clause.	Based on our site visit during 6 <sup>th</sup> & 7 <sup>th</sup> April, 2017 & discussions with your engineers, we understand that additional two numbers of orifice type flow meters will have to be considered additionally in the spray water line desuperheater. Please confirm.	Confirmed
48.	Vol-2, Sec-B	25/114	3.1.2 (g)	Content of referred clause.	Based on our site visit during 6 <sup>th</sup> & 7 <sup>th</sup> April, 2017 & discussions with your engineers, we understand that the scope of service air distribution piping as included in tender scope needs to be deleted. Please confirm deletion.	Confirmed
49.	Vol-2, Sec-B	108/114	Item no. 15, Point no. 7	Contents of referred clauses.	The scope of replacement of thermal insulation on all headers at drum floor is shown under Annexure – III as part of Overhaul scope and the same needs to be shifted for inclusion in the base R&M scope. Please confirm.	Confirmed
50.	Vol-2, Sec-B	36/114	Part B, Point no.	Contents of referred clauses.	Based on our site visit during 6 <sup>th</sup> & 7 <sup>th</sup> April, 2017 & discussions with your engineers, we understand that the scope of replacement of	Confirmed

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			(g)		COG Ducts from Terminal Point up-to burner inlet shall also be included in bidder's scope. Please confirm.	
51.	General	36/114	Part B, Point no. (h)	Content of referred clause.	We understand that in order to meet NFPA requirements, additional Master Fuel Trip (MFT) Valves & associated Control Valves and auxiliaries shall also be required in the main supply lines of BFG & COG and same shall be supplied by Bidder. Please confirm.	Master Fuel Trip (MFT) Valves & associated Control Valves and auxiliaries within boundary limit have to be considered by the bidder.
52.	Vol-2, Sec-B	37/114	Part B, Point no. (m)	Content of referred clause.	We understand that as per this clause, the block and bleed valves shall be provided in BFG and COG lines as per NFPA Requirement, However As per the Terminal point (Page no 53 of 114 Point no 12 &13) these valves are beyond the present scope of the bidder. Bidder understands that BPSCL will take care of the same to fulfill NFPA requirement. Please confirm.	Block and Bleed valves for individual burners have to be provided by the bidder in BFG and COG lines as per NFPA Requirement.
53.	Vol-2, Sec-B	25/114	3.1.1 J	Provide all the necessary calculations, drawings & other related O&M documents for the equipment supplied.	O&M manuals having salient design data shall be provided for R&M works with required assembly drawings. Calculations and procedure are proprietary in nature and shall be not be divulged. Also BPSCL to furnish the original design calculations, drawings , P&IDs and O&M manuals for carrying out redesign activities envisaged in the R&M.	As per T.S.
54.	Vol-2, Sec-B	25/114	3.1.2 g	All internal piping for steam, service & instrument air, etc.	If BPSCL has identified the scope of internal piping, the same may be shared with BHEL, since it is difficult to identify the scope during pre-bid visit.	As per T.S.
55.	Vol-2, Sec-B	26/114	3.1.2 j	Attemperator system comprising of direct spray type (single or double stage as per the technology used, conforming the provenness of the system). The above condition should conform to meeting the design super heater inlet and outlet temperatures and pressure parameters at different loading conditions.	BPSCL is requested to furnish details about existing Spray control system & valves' details and P&ID. Spray system location details and floor area / structural detail where the same to be installed are also required.	All available drawings & documents shall be shared with Bidders.
56.	Vol-2, Sec-B	26/114	3.1.2 m	Vents up to safe elevation	List of vents required, schematic drawing for vent pipes to roof & arrangement and required structural for supporting the vents and	All available drawings & documents shall be shared with Bidders.

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					silencers are required from BPSCCL.	
57.	Vol-2, Sec-B	26/114	3.1.2 p	Bidders to provide the CFD model of the boiler for dynamic operating conditions	CFD analysis is not required as the existing system is standard and operated all these years.	As per T.S.
58.	Vol-2, Sec-B	32/114	3.2.7 a	All headers shall be located outside the gas path. In case headers are located in the gas path, the same shall be protected by insulation to avoid direct exposure to gas. Down comers shall be in the totally unheated portions of the steam generator.	BPSCCL is requested to furnish boiler pressure part drawing & general arrangement drawings with columns locations & bracing details for first and second pass of boiler. Measurement at site and developing drawing is a tedious process and may end up with problems during erection.	All available drawings & documents shall be shared with Bidders.
59.	Vol-2, Sec-B	33/1147	3.2.9.1	Bidder to retrofit / replace the existing impulse type drum safety valves within the existing arrangement.	BPSCCL to clarify the type of safety valve required for drum.	Impulse type safety valve.
60.	Vol-2, Sec-B	33/114	3.2.9.1	Bidder to replace the existing superheater impulse type safety valves with new spring loaded safety valves. Bidder to also provide silencers for the existing start-up vent valves.	BPSCCL is requested to furnish details of Existing safety valves (Size and Connections) and locations for silencers to be installed. Related structural details for supporting the heavy silencers are required from BPSCCL.	<ul style="list-style-type: none"> <li>• Impulse type safety valve having both side discharge.</li> <li>• Blowing capacity: 115 TPH</li> <li>• Silencer to be installed on startup vent pipes (OD 133 x 4)</li> </ul>
61.	Vol-2, Sec-B	33/114	3.2.10.1	All the boiler hangars and supports shall be replaced with new ones within the scope boundary based on the existing stress and new values in case an additional load change is considered in the design.	Existing hangers schedule with loading details and supports arrangement are required from BPSCCL. The above details are required to calculate the existing stress.	All available drawings & documents shall be shared with Bidders.
62.	Vol-2, Sec-B	34/114	3.2.11.1 a	Ceiling tubes hanger's replacement. Modified spring type sealing arrangement with better refractory system having plastic refractory material to avoid ash ingress in to the pent house	BPSCCL to clarify whether all ceiling hangers are to be replaced or damaged hangers are to be replaced.	All ceiling hangers are to be replaced.
63.	Vol-2, Sec-B	34/114	3.2.11.2 a	The hangers inside the penthouse are to be repaired / replaced and restored as per requirement of the new furnace design.	List of hangers inside the pent house and the structural support and loading details are required from BPSCCL.	All available drawings & documents shall be shared with Bidders.
64.	Vol-2,	34/114	3.2.11.2 d	The boiler roof is also to be repaired with	BHEL Practice is to give corrugated Metapoly sheets for roof.	Noted

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	Sec-B			new powder coated sheets. The most common polymers used are polyester, polyester-epoxy (known as hybrid), straight epoxy (Fusion bonded epoxy) and acrylics		
65.	Vol-2, Sec-B	34/114	3.2.12.2	The Bidder can reroute/replace the integral piping like uprisers, downcomers, etc., to accommodate their proposed design or keep the existing system to complete the circulation circuit. In case of keeping the existing system, the Bidder has to replace complete upriser pipes and all downcomer bends (approximately 500 nos. of dimension 133 mm x 7 mm).	BPSCL is requested to provide complete drawings/details regarding the upriser and downcomer pipes details like location, size, numbers of pipes and inside medium pressure and temperature.	<u>Upriser:</u> Number = 42 Size = OD 133x7 Location = W.W top headers to Drum Pressure = 100 kg/cm <sup>2</sup> Temp. = 310 °C <u>Downcomer:</u> Number = 48 Size = OD 133x7 Location = W.W bottom headers to Drum Pressure = 95 kg/cm <sup>2</sup> Temp. = 310 °C
66.	Vol-2, Sec-B	38/114	3.2.14.3	Replacement of metallic expansion joints with new metallic expansion joints within the new terminal points of R&M.	BPSCL is requested to furnish the list of existing expansion joint with details like sizes, location drawing etc. within the specified terminal points.	Site visit is recommended
67.	Vol-2, Sec-B	39/114	3.2.14.4 a	The ducting system shall be complete with all required expansion joints, mating flanges, dampers (interconnecting, isolating and control dampers), supports, access doors, platforms, insulations, etc. The top of the ducts and / or the outer cladding shall be cambered to facilitate drainage of water.	Complete ducting arrangement drawings are required with schedule of Gates / Dampers for verification and design during R&M.	All available drawings & documents shall be shared with Bidders.
68.	Vol-2, Sec-B	42/114	3.2.15.3 d	All gangways, passages, stair cases / ladders, working platforms and railing shall be provided A clear working platform of 1000 mm to 1500 mm width is to be provided for steam generator at all levels, as per space available at site.	As per BHEL practice, clear working platform of maximum 1000mm shall be provided wherever space is available.	Noted
69.	Vol-2,	42/114	3.2.15.3 e	<b>3.2.15.3 Technical requirement for</b>	Both the points are contradicting each other. BPSCL is requested to	Two staircases are to be provided with suitable

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	Sec-B			<p><b>Staging, Galleries and Ladders</b> Two staircases on either side of the steam drum to be provided with suitable platform on the drum.</p> <p><b>3.2.15.5 Technical requirement for Stairs and Ladders</b> Scope of work related to existing staircase, ladders and handrails is not included in R&amp;M scope.</p>	kindly clarify the requirement.	<p>platform as per clause no. 3.2.15.3</p> <p>Existing staircase, ladders and handrail are not included in scope of work of R&amp;M</p>
70.	Vol-2, Sec-B	43/114	3.2.17	Fuel oil system should be compatible with the new PLC / DDCMIS based system and new burner system.	Existing fuel oil and gas system schemes and P&IDs are required for modification job.	All available drawings & documents shall be shared with Bidders.
71.	Vol-2, Sec-A	05/28	3.0	Contractor shall furnish final as built drawings after completion of the project.	To prepare as built drawings, existing arrangement drawings are required. Since Measurement at site and developing drawing is a tedious process and may end up with problems during erection.	All available drawings & documents shall be shared with Bidders.
72.	Vol-2, Sec-B	27/114	3.1.4	<p>Design Coal</p> <p><b>Proximate Analysis:</b> As fired basis <b>Volatile Matter %:</b> 10-25 <b>Fixed Carbon %:</b> 30-45</p> <p><b>Ultimate Analysis:</b> Air Dry basis <math>3+36.05+45.98+2.81+0.91+0.44+3.81 = 90</math></p>	<p>BPSCL is requested to furnish <b>Proximate Analysis of Coal as point value in addition to range.</b></p> <p><b>Ultimate Coal Analysis summation is arriving 90%. It has to be 100%.</b> <math>3+36.05+45.98+2.81+0.91+0.44+3.81 = 90</math></p> <p><b>BPSCL shall correct both Proximate and Ultimate Analysis either to Air Dried basis or As Fired basis along with total moisture.</b></p>	<p>Ultimate analysis of coal (As fired basis) is</p> <p>Moisture : 10% Ash : 36.05% Carbon : 45.98% Hydrogen : 2.81 % Oxygen : 3.81% Sulphur : 0.44% Nitrogen : 0.91%</p>
73.	Vol-2, Sec-B	75/114	9.0	Data sheet 1.1.8 Excess Air at APH inlet (20% maximum)	Normally these boilers are designed for 25% Excess air for better combustion. BPSCL to confirm excess air level.	As per TS
74.	Vol-2, Sec-B	15/114	2.4	Tubular APH	<b>Original design data</b> viz., tube OD, ST & SL, no. of tubes wide, total no. of tubes in block, no. of tubes deep, TAPH block height, surface area per block, etc., shall be furnished by BPSCL. <b>Refer Annexure II in this regard.</b>	Shall be shared

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75.				Pressure part arrangement details: <b>SH Blocks and Economizer blocks</b>	<b>Original design data</b> viz, Tube OD, ST & SL , no. of tubes wide, No. of assemblies, no. of tubes deep, Flue gas path width & depth, surface area per block, overall block dimensions etc. shall be furnished. <b>Refer Annexure I, II &amp; III in this regard.</b>	Shall be shared
				<b>Superheater sequence (with respect to steam flow)</b>	Steam flow sequence describing each pressure part section (starting from Drum up to Main Steam Outlet pipe) shall be furnished by BPSCL.	Shall be shared
76.	Vol-2, Sec-B	28/114	3.1.3	General requirement	BPSCL has to provide the CO Gas analysis to be considered for R&M.	Mentioned in page no. 18/114 of vol-2 section-B
77.	Vol-2, Sec-B	56/114	5.4	<p><b>5.4.1 Steam Generator Output</b> Following parameters are to be ensured and the same is to be declared in the Bid / data sheets.</p> <p>1. Steaming capacity of minimum 210 TPH with firing design coal &amp; gas (with minimum 50,000 Nm<sup>3</sup>/hr BFG &amp; 3,000 Nm<sup>3</sup>/hr COG) and minimum 176 TPH by firing only design coal subject to the condition that</p> <p>i) Main Steam pressure of 100 ± 1 ata after approximately two meters from the Stop Valve at the existing tapping point at 100% BMCR when firing coal and combination of coal &amp; gas (BFG/COG) and</p> <p>ii) Main Steam temperature of 540±5 °C after approximately two meters from the Stop Valve at the existing tapping point at 100% BMCR when firing coal and combination of coal and gas (BFG/COG).</p>	BHEL presumes that with 100% Coal firing the guarantee is only for steam generation of 176 TPH and not for MS pressure and MS temperature.	As per T.S. clause no. 5.4 (page-55 & 56 of 114)
78.				The bidder should estimate the quantum of work that has to be done on integral piping during the pre-bid site visit except upriser	We understood that there is no requirement of replacing piping outside boiler. Please confirm.	Already mentioned in TS. To assess the volume of replacement of internal pipes the bidder is suggested to visit the site.

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				pipes which have to be replaced completely. Based on the above estimation Bidder to finalize the actual scope of work.		
79.				Boiler Blow down system	As per scope of work, CBD and IBD tanks shall be replaced with new ones but requirement of the same has not been included in the BOQ. Please confirm.	Not in R&M scope
80.				Since OEM is <b>Krasny Kotelshik</b> from Russia, BPSCL shall furnish the following drawings and documents for better understanding of boiler and for submitting the proposal at the earliest possible time. i) Original Boiler Predicted Performance shall be furnished by BPSCL. ii) Fan Performance Curves (For FD, ID and other fans as applicable). iii) Steam & Water Circuit Scheme with instrumentation. iv) Air & Flue Gas Path Scheme with instrumentation. v) Soot blower scheme with instrumentation. vi) Pulverizer Scheme with instrumentation. vii) Fuel Oil System and Fuel Gas System Schemes with instrumentation. viii) Fuel oil pump house schemes. ix) Physical Arrangement Sketches / Drawings for various SH Blocks, Eco. Blocks & AH Blocks. Refer Annexure I, II & III. x) Parameters for Air for Mills at various locations from FD Fan outlet to Coal Burner Inlet (pressures, flows and temperatures). xi) Pulverized Coal System - Type of mill, Performance Data / Parameters (pressures, flows and temperatures). xii) Steam flow sequence from Drum up to Main Steam Outlet Header. xiii) Maximum firing percentages for Coal, BFG, Oil & COG. xiv) Maximum quantities to be fired for each fuel. xv) ESP design parameters & emission level (flue gas flow, temperature & draft loss in ESP); please indicate the corresponding fuels fired for these parameters.		All available drawings & documents shall be shared with Bidders.
81.	Vol-2, Sec-B	34	3.2.12.2	All the boiler hangars and supports shall be replaced with new ones within the scope boundary based on the new ones within the scope boundary based on the change in considered in the design.	As per Technical specification, critical piping hangers and supports are not covered in Scope of supply. Where as in BOQ 100% replacement of Critical piping hangers has been mentioned. Please clarify.	100% replacement of Hangers & Supports within the boundary limit of R&M, along with supply, is in the Bidder's scope.
82.	Vol-2, Sec-B	68	Sl. No. 12	100% replacement of hangers and supports of the critical piping & furnace (Feed water & MS piping)		
83.	Vol-2,	7 &	1.1		As specified in the tender documents, after boiler R&M work, the	Confirmed

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	Sec-B	8/114			boiler can be used for another 20 years. Hereby we want to clarify that we can only make this guarantee for the components/parts which are changed by our company, for the components/parts which are not changed by our side will not be guaranteed by our side. Please confirm	
84.	Vol-2, Sec-B	20/114	2.10.2		For the Non-pressure parts materials, whether we can follow China Standard. Please confirm.	All material specifications should be as per T.S.
85.	Vol-2, Sec-B	35/114	3.2.13.1		NO <sub>x</sub> emission maximum 300mg / Nm <sup>3</sup> mentioned the tender. Kindly please also confirm the required SO <sub>x</sub> emission standard.	NO <sub>x</sub> & SO <sub>x</sub> should be as per latest recommendation of MOEF.
86.	As specified in the tender documents, after boiler R&M work, the boiler can be used for another 20 years. Hereby we want to clarify that we can only make this guarantee for the components/parts which are changed by our company, for the components/parts which are not changed by our side will not be guaranteed by our side. Please confirm.					Confirmed
87.	For the Non-pressure parts materials, whether we can follow China Standard? Please confirm.					All material specifications should be as per T.S.
88.	Vol-2, Sec-A	8, 14 & 15/28	8.5.1	The contractor shall co-operate with all other contractor or tradesman or owner who may be performing other work on behalf of the owner..... If the works of the contractor delays because of any acts or omission of another contractors, contract shall have no claim on that account other than extension of time or completing work	As the meaning of all these three clauses are same, these clause are accepted only if it is for a limited period. The cost of idle labour has to be considered beyond a certain period, which has to be mutually discussed and agreed.	Noted
89.	Vol-2, Sec-A	10/28	8.15.1	Issuing of Security Gate Pass is as per BSL rules and Regulations..... The contractor needs to make their own arrangement for issuing of gate pass.	The mentioned wordings are contrary to each other. Need clarification.	The Contractor shall arrange for Gate Passes for their personnel by themselves but as per Rules & Regulations of BSL.
90.	Vol-2, Sec-A	11/28	8.17.4	To the extent possible, unskilled labour shall be engaged from Local area of site	Is there any understanding between the owner and the local authority with respect to engaging the local personnel? If it is so, what will be the ratio of it?	No.
91.	Vol-2, Sec-A	19/28	8.32.2	Any person unsuitable or unacceptable to the Owner.....	The need of the foreign personnel or any personnel at site is with the purview of the contractor. Request to allow them to decide on it.	As per T.S.

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92.	Vol-2, Sec-A	20/28	8.36.1 (d)	The electricity shall be free for construction purpose only.....	Propose to include Electricity free for other purpose also including Office, storage/ Quarters as well.  Propose owner to pay the Government duties and taxes for Electricity	As per T.S.
93.	Vol-2, Sec-A	20/28	8.36.2	Water	Propose owner to pay the Government duties and taxes for Water	As per T.S.
94.	Vol-2, Sec-A	20/28	8.36.3 (a)	Storage space - Reasonable storage space shall be provided to the contractor.....	Required storage space shall be provided to the contractor .....	As per T.S.
95.	Vol-2, Sec-A	20/28	8.36.3 (c)	The contractor shall provide the covered storage.....	Request owner to provide the Covered storage space also at free of cost	As per T.S.
96.	Vol-2, Sec-A	20/28	8.36.4	Open space for Site office	Space requirement is sought for the Labour and staff colony, but at the last line, No space for the labour colony shall be provided is mentioned, which is contradictory. Request owner to provide space for the Labour colony also.	As per T.S.
97.	Vol-2, Sec-A	24/28	9.6	Performance Guarantee Test	Since Boiler drum, APH, ESP are excluded from the scope of service and further no modification in the second pass, above goose neck etc., the performance guarantee commitment may not be possible to offer. Please clarify. In R & M, to offer performance guarantee of the Boiler, manufacturer should have access to modify the entire boiler area, wherever it is required.	As per T.S.
98.	Vol-2, Sec-A	26/28	9.6.16	Extended Performance Period	The clause is not clear. Need clarification further.	As per T.S.
99.	Vol-2, Sec-B	67/114	Chapter 8	Bill of Quantity	The price shall be given as a lump sum for this contract. However during the execution of contract, the Billing Breakup schedule shall be prepared and submitted for approval for the pro-rata dispatch purpose. Individual break-up pricing at the time of submitting the tender will not be considered.	<i>Will be replied in commercial section</i>
100.	Vol-2, Sec-B	8/114	1.1	The content of referred clause.	As the Unit was put into operation more than 30 years ago, it is required to evaluate the conditions of various subsystems. It will give us a chance to evaluate practically the requirement for replacement or repair/modification to achieve higher efficiency, reliability and	Agreed

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					long-term operation capability within the next 20 years.  We ask you to agree on a visit to the site by our specialists to evaluate the conditions of the boiler in cold condition, carry out the required inspections and visual examination of the boiler.	
101.	Vol-2, Sec-B	26/114	1.2, 3.1.2 (s)	Whole clause	As the tender documents require modification of the bottom ash handling system, please, clarify whether a new screw conveyor and other equipment should be included in the scope of supply by the bidder.	Yes
102.	Vol-2, Sec-B	55/114	5.4	Performance Requirements	According to TKZ initial design, the gas temperature upstream TAH is up to 410 °C. In result of reconstruction performed by third parties without TKZ involvement, it is our understanding that the allowable temperate has become lower by 15 °C. Please clarify.	As per documents the design temperature upstream TAH is 384 deg. C max .No major design changing has been done which could affect the design parameter of the boiler
103.	Vol-2, Sec-B	55/114	5.4.1	The parameters specified are subject to further condition that in case of change in input parameters, suitable correction curves shall be applicable. The correction curves shall be applicable for the following parameters: Steam generation: Collector pressure (80-90 at) and temperature corrected. Pressure: Main steam pressure shall be ensured by isolating the unit from the collector	i) Please confirm that the steam pressure at the boiler outlet is constant 100 at, while the steam pressure in the station steam pipeline is controlled up to 80-90 at.  ii) Please confirm that it is possible to discharge the steam to a third place (for example through pressure reducing desuperheating station) rather than to the station pipeline	i) Boilers, turbines are connected to a common collector extended up to turbo blower /turbo compressor of Bokaro Steel Plant. Hence pressure of the collector system is kept as per the requirement of different equipment. ii) We have PRDS
104.	Vol-2, Sec-B	17 to 18/114	2.6	Ultimate analysis of fuel	The sum of elements shall be 100%. The fuel analysis is not correct. The Customer to clarify.	Ultimate analysis of coal (As fired basis) is Moisture : 10% Ash : 36.05% Carbon : 45.98% Hydrogen : 2.81 % Oxygen : 3.81% Sulphur : 0.44% Nitrogen : 0.91%
105.	Vol-2,	112/114	Annex V		Please consider to extend the reconstruction and modernization	Not possible to extend

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	Sec-B				<p>period (Project Schedule from Zero date to Commissioning completion including Trial Run) up to 24 months.</p> <p>Please note that this is absolutely essential considering the nature of work &amp; complexities involved in this R&amp;M project since eighteen (18) months schedule is rather too challenging in the existing plant environment with limited space &amp; access.</p> <p>Please review &amp; confirm.</p>	
106.	Vol-2, Sec-B	17 to 18/114	2.6	Design fuel characteristics	The sum of elements shall be 100%. The fuel analysis is not correct. The Customer to clarify, please.	<p>Ultimate analysis of coal (As fired basis) is</p> <p>Moisture : 10%</p> <p>Ash : 36.05%</p> <p>Carbon : 45.98%</p> <p>Hydrogen : 2.81 %</p> <p>Oxygen : 3.81%</p> <p>Sulphur : 0.44%</p> <p>Nitrogen : 0.91%</p>
107.	Vol-2, Sec-B	55/114	5.4	Performance Requirements	Please consider a possibility of including in the conditions of meeting the performance guarantees in the part of providing the flue gas temperatures from 384 °C to 395 °C at inlet to the tubular air heater upper cubes the requirement that for providing the nominal steam capacity 210 t/h at coal firing the blast-furnace gas supply shall be limited with maximum 44,000 Nm <sup>3</sup> /h and the coke oven gas supply – with maximum 2,400 Nm <sup>3</sup> /h.	Flue Gas temperature at Air Pre Heater inlet shall be between 384 °C & 400 °C. Volume of BF & Co Gas shall be as per T.S.
108.	Vol-2, Sec-B	40/114	3.2.15	Scope of Work & Supply	Please inform about the presence of damages in the columns of the boiler frame during its operation.	<ul style="list-style-type: none"> <li>• Front &amp; rear central column damaged</li> <li>• Complete roof structure bend/sagged</li> </ul>
109.	Vol-2, Sec-B	55/114	5.4	Performance Requirements	<p>A. Question to the Client: TKZ's initial design provided for the gas temperature upstream of TAH up to 410 °C. In the result of the reconstructions made without TKZ's participation the allowable temperature became lower by 15 °C.</p> <p>To provide the nominal steam capacity of 210 t/h at firing coal and a mixture of blast-furnace and coke-oven gas we ask the Client to establish an upper value of the gas temperature</p>	Flue Gas temperature at Air Pre Heater inlet shall be between 384 °C & 400 °C.

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					<p>upstream of TAH equal to 399 °C.</p> <p>B. The new requirements for NOx emissions of 300 mg/nm<sup>3</sup> cannot be met even if inter-furnace environmental arrangements are provided. We confirm the old required value of 260g/MJ (approximately 711 mg/nm<sup>3</sup>). We ask the Client to delete the new requirements for the case when only coal is fired without mixture with metallurgical gases.</p>	NO <sub>x</sub> & SO <sub>x</sub> should be as per latest recommendation of MOEF.
110.	Vol-2, Sec-B	18/114	Table of CO Gas Charac.	H <sub>2</sub> S from 1200 to 1500 mg/nm <sup>3</sup>	Maximum SO <sub>2</sub> concentration will be 1600 mg/Nm <sup>3</sup> (on a dry-matter basis at oxygen concentration 6%) at coal firing.	NO <sub>x</sub> & SO <sub>x</sub> should be as per latest recommendation of MOEF.
	Vol-2, Sec-B	27/114	Table of design coal analysis	S=0.44%	At firing of mixtures (coal + BF gas + CO gas) the concentration will reduce.	

(N PATTANAYAK)  
DGM (Electrical)

(M PARAMSIVAN)  
DGM (Maintenance)

(A.K DAS)  
DGM (C&I)

(Y.K MISHRA)  
DGM (Operation)

(A.K SINGH)  
GM (Maintenance)