

VOLUME - VI

ADDENDUM - 1

ADDENDUM TO BOILER SPECIFICATION
(BOTTOM ASH HOPPER)

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.
(A wholly owned subsidiary of STEAG Group, Germany)
A-29, Sector-16, NOIDA - 201301, India

MAY, 2024

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	VOLUME - VI
	KORADI THERMAL POWER STATION 2X660 MW UNITS - 11 & 12 PROJECT	-
	RFx No. 3000046202 (BTG Package)	ADDENDUM - 1
	ADDENDUM TO BOILER SPECIFICATION (BOTTOM ASH HOPPER)	REV. - 0

7.00.00 BOTTOM ASH HOPPER

7.01.00 System Description

- 7.01.01 Bottom ash will be collected continuously in a 3V-shaped water impounded, self supported bottom ash hopper. Bottom ash hopper will have hold up volume to store bottom ash in 8 hours (in dry ash BMCR condition with worst coal firing, with standard water level maintained above ash level).
- 7.01.02 Bottom ash hopper will have three outlets, each outlet will be provided with two (2) nos. Feed gates and clinker grinder assembly. Feed gates and clinker grinder assembly shall be supplied by BOP contractor, however provision in bottom ash hopper for installation of Feed gate and clinker grinder assembly shall be provided by BTG vendor.
- 7.01.03 Over flow from bottom ash hopper shall be sent to seal box and from seal box the overflow water will be collected in bottom ash over flow tank. The bottom ash overflow tank shall be supplied by BOP vendor
- 7.01.04 Above system description is for one unit and the similar system is to be provided for other unit.

7.02.00 Scope of Work

- 7.02.01 One (01) No. mild steel fabricated, refractory lined,'3-V' type, water impounded storage type bottom ash hopper along with refractory lining, refractory cooling arrangement, hopper overflow arrangement, seal box, seal trough with overflow and drain arrangement, return air vent arrangement, hopper make-up arrangement, access door, observation and inspection windows, poke holes, supporting steel structures, platforms, stairs and other accessories for collection of bottom ash generated in steam generator for each unit.
- 7.02.02 Foundation for Bottom ash hoppers
- 7.02.03 Provision in bottom ash hoppers for installation of Feed gates. Feed gates shall be supplied and installed by BOP contractor
- 7.02.04 Provision in bottom ash hopper for installation of seal trough jetting nozzles. Seal trough jetting nozzles shall be supplied and installed by BOP contractor
- 7.02.05 Provision in bottom ash hopper for installation of flushing nozzles. Flushing nozzles shall be supplied and installed by BOP contractor
- 7.02.06 One (01) No. overflow weir box with necessary sealing arrangement for each unit.

7.03.00 Design Criteria

S. No.	Particulars	Unit	Design Data
1.	Total Ash Generation at BMCR with worst coal firing	TPH	By Bidder
2.	Bottom Ash	%	20% of total ash

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3.	Density for Bottom Ash for Volumetric Sizing	kg/m ³	650
4.	Density for Bottom Ash for Structural Sizing	kg/m ³	1600
5.	Particle Density of Ash	kg/m ³	2000

7.04.00 Mechanical Equipment Description

- 7.04.01 Triple V-type bottom ash hopper shall be located directly beneath each boiler furnace and shall have an effective storage capacity to collect 8 hrs of bottom ash generated.
- 7.04.02 Bottom Ash Hopper shall be completely above ground level. Bottom ash hopper shall have three sections.
- 7.04.03 The hopper shall be constructed of minimum 10mm thick carbon steel plate to IS: 2062 Grade B suitably stiffened with rolled steel section and shall have minimum 4 mm thick SS 316 type stainless steel anchors to hold monolithic castable refractory of 230 mm minimum thickness on sides and sloping bottom. Also SS wire meshing (3 mm dia rod at 50 mm spacing) shall be provided to avoid frequent cracking of refractory.
- 7.04.04 The top 1100 mm of the hopper including seal trough shall be constructed of 10mm thick SS:316.
- 7.04.05 A water seal trough shall be located around the top periphery of the hopper and shall have sufficient provision for bi-axial expansion of boiler bottom water wall headers.
- 7.04.06 All required set stops and set stop supports shall be provided by the contractor constructed out of seamless carbon steel tubes to A-106-Gr.B. Flushing nozzles shall be provided in the seal trough for occasional flushing of the trough.
- 7.04.07 Each hopper section shall include a hinged access door. Circular doors shall have a diameter or not less than 750 mm, while rectangular access doors shall have dimensions of at least 900 x 600 mm.
- 7.04.08 Each hopper section shall be provided with two (2) nos. 150 mm size inspection windows for viewing both the slopes. Inspection windows shall be provided with water flushing connection for cleaning of windows
- 7.04.09 Thermal shock of exposed refractory to be prevented. A cooling water distribution header with deflection shield shall be provided all round the top of ash hopper, for cooling the portion of refractory all round the top of ash hopper.
- 7.04.10 To assist in the hopper emptying process, flushing nozzles shall be provided in the inclined section of the hopper walls. BTG contractor shall provide provision in bottom ash hoppers for installation of these flushing nozzles. These flushing nozzles shall be supplied and installed by BOP contractor.

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7.04.11 The areas of hopper subjected to severe abrasion & erosion shall be suitably protected by wear plates. The protection is mandatory requirement for outlet opening of BA hopper.

7.04.12 All the outlet flanges (Hopper make- up flanges, hopper overflow flanges, seal trough filling, overflow and drain flange tc.) shall be projected outside the Hopper wall

7.04.13 Two (02) Nos. of stairs having minimum 1200mm width shall be provided

7.05.00 Data Sheet - A

S. No.	Description	Data
1	Number required	One (1) no. for each unit
2	Type of Hopper	Water Impounded, Refractory Lined- Triple V TYPE
3	Number of opening	Three (03)
4	Required storage capacity of ash hopper 500 mm below operating Water level	To store eight hours ash generation of Bottom ash
5	Density of bottom ash to be taken for Calculating Volume of hopper	650 kg/m ³
6	Density of bottom Ash to be taken For structural & Support design	1600 kg/m ³
7	Distance between Top of hopper and Operating water Level in hopper	500 mm
8	Maximum allowable ash level in bottom ash hopper	600 mm below the maximum water level
9	Minimum thickness of hopper plate	10 mm
10	Type of lining	Monolithic Castable Refractory 230 mm thk
11	Material of construction of Wear resistant feed plates	25 mm thick NI-Hard / alloy cast iron (minimum 400 BHN)
12	Type of gates at the outlets	Cylinder Operated Water Tight Gates Vertically Lifting
13	Refractory cooling Arrangement	Yes


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S. No.	Description	Data
14	Seal trough Make up and flushing arrangement	Yes
15	Flushing nozzles in the bottom Ash hopper	Yes
16	Seal trough material and thickness	SS-316 minimum 10 mm thk.
17	Refractory holding anchor	SS-316, minimum 4 mm thk.
18	Minimum angle between hopper wall and horizontal	45 degree
20	Cooling water header	Stainless steel

7.06.00 Terminal Points

- 7.06.01 Outlet flange of overflow Seal outlet
- 7.06.02 Outlet flange of bottom ash hopper make-up arrangement
- 7.06.03 Outlet flange of bottom ash hopper overflow arrangement
- 7.06.04 Outlet flange of seal trough make-up
- 7.06.05 Outlet flange of seal trough overflow
- 7.06.06 Outlet flange of seal trough Drain
- 7.06.07 Outlet flange of inspection window water inlet connection

7.07.00 Exclusions

- 7.07.01 Seal trough jetting nozzles
- 7.07.02 Flushing nozzle at inclined portion of hopper
- 7.07.03 Feed Gate and clinker grinder assembly
- 7.07.04 Piping beyond the terminal point

7.08.00 Drawing and Documents to be submitted

- 7.08.01 Drawing and Documents submitted along with the Bid
 - i) Filled in Data sheet – B
- 7.08.02 Drawing and Documents submitted after Award of contract
 - i) GA Drawing of Bottom Ash hoppers
 - ii) Volume calculation of Bottom Ash hoppers
 - iii) Structural Details along with structural drawings of Bottom ash hoppers

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- iv) Foundation design, criteria including loading details and foundation drawing of Bottom ash hoppers

7.09.00 Data Sheet – B

S. No.	Description	Data
1	Number required	
2	Type of Hopper	
3	Number of outlet opening	
4	Required storage capacity of ash hopper	
5	Density of bottom ash to be taken for Calculating Volume of hopper	
6	Density of bottom Ash to be taken For structural & Support design	
7	Distance between Top of hopper and Operating water Level in hopper	
8	Distance between maximum ash level from maximum water level in bottom ash hopper	
9	Minimum thickness of hopper plate	
10	Type of lining	
11	Material of construction of Wear resistant feed plates	
12	Refractory cooling Arrangement	
13	Seal trough Make up and flushing arrangement	
14	Seal trough material and thickness	
15	Refractory holding anchor	

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ADDENDUM TO CHIMNEY SPECIFICATION

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4.03.00 PAINTING

4.03.01 SHELL OUTSIDE PAINTING

- i) Primer - Two components transparent polyamide cured epoxy sealer coating (solid by volume minimum 40% $\pm$ 2%) – DFT 50 micron.
- ii) Intermediate coat - epoxy phenolic coating (solid by volume minimum 63%) This coat shall be applied after an interval of minimum 24 hours (from application of primer coat) by airless spray technique – DFT 100 micron.
- iii) Finish coat - Two pack aliphatic Isocyanate cured acrylic (solid by volume minimum 55% $\pm$ 2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and color change less than 2.0 Δ E) This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from completion of intermediate coat), Color and shade shall be as approved by employer – DFT 70 micron.
- iv) As per safety norms alternate bands of 'Signal Red' and 'Bright White' color.

4.03.02 SHELL INSIDE PAINTING

- i) Chimney all concrete surfaces (The inside surface of chimney shell above roof, horizontal surface of shell at top, underside of concrete roof slab, & etc.):
 - a) Primer - Two components transparent polyamide cured epoxy sealer coating (solid by volume minimum 40% $\pm$ 2%) – DFT 50 micron.
 - b) Intermediate coat - epoxy phenolic coating (solid by volume minimum 63%) This coat shall be applied after an interval of minimum 24 hours (from application of primer coat) by airless spray technique – DFT 100 micron.
 - c) Finish coat - Two pack aliphatic Isocyanate cured acrylic (solid by volume minimum 55% $\pm$ 2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and color change less than 2.0 Δ E) This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from completion of intermediate coat), Color and shade shall be as approved by employer. Color and shade shall be RAL 9002. – DFT 70 micron.
 - d) As per safety norms alternate bands of 'Signal Red' and 'Bright White' color.

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ADDENDUM TO PIPE COATING

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4.03.00 PU COATING FOR INTERNAL LINING OF STEEL PIPES

4.03.01 This specification governs the minimum requirements for materials, equipment, application, inspection, repair and handling aspects associated with the internal lining of steel pipes using 100% Solids (Solvent less) Two Component, Fast Curing, Rigid, Direct to Metal (DTM) Polyurethane Coating.

4.03.02 It is envisaged that the Polyurethane internal lining will provide a hard, inert, impermeable barrier with outstanding adhesion; corrosion, impact and abrasion resistance to protect the surface from corrosion and abrasion in the operating conditions.

4.03.03 The steel surface preparation, prior to actual commencement of coating, to conform to SSPC-SP 10/ NACE No.2 (Joint Surface Preparation Standard from Society for Protective Coatings, USA and NACE International, USA dated September 15, 1994) near white blast cleaning, included in the scope of cleaning.

Sr. No.		
1.	SSPC SP – 1	Solvent Cleaning
2.	SSPC SP – 10 /NACE No.2	Near – White Blast Cleaning
3.	SSPC – SP COM	Surface Preparation Commentary
4.	SSPC PA2	Measurement of Dry Paint Thickness with Magnetic Gauges
5.	ASTM D 4541	Method for Pull Off Strength of Coatings Using Portable Adhesion Testers
6.	NACE RP 0188	Discontinuity (Holiday) Testing of New Protective Coatings On Conductive Substrates
7.	ANSI / AWWA C 222 (latest)	Polyurethane Coating for The Interior & Exterior of Steel Water Pipe Fittings
8.	ISO 12944	Paints and varnishes — Corrosion protection of steel structures by protective paint systems

4.03.04 The materials shall be applied by international standard Plural Component Airless Spray System such as Graco, Gusmer, Wiwa etc. as per the requirements specified by the coating material manufacturer. No make shift/ nonstandard spray equipment shall be used.

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4.03.05 100% Solids Polyurethane systems are solvent free eliminating solvent health hazards and flammability concerns All safety precautions warranted by good industrial hygiene practices and regulated by local, state or central laws must be taken into consideration while applying these coatings.

4.03.06 PU COATING MATERIAL SPECIFICATION

- i) Spray applied, 100% Solids (Solvent less) Two Component, Fast Curing, Rigid, Direct to Metal (DTM) Polyurethane Coating shall meet the following performance requirements:

<u>Production Quality Control Tests</u>		
NOMINAL THICKNESS as per SSPC PA 2	Raw/Treated Sewage Water	750 Microns
ADHESION as per ASTM D-4541 (Elcometer Pull Off)	10 N / mm ² Min.	
SURFACE HARDNESS as per ASTM D 2240 (Cured Film - Shore D) Test @ 25°C.	> 65 Shore D	
ELECTRICAL INSPECTION as per (NACE RP-0188)	0 (Nil) Holidays	
<u>Type Test – Short Duration</u>		
IMPACT RESISTANCE as per ASTM G-14, Test @ 25°C.	75 Inch – Lb. Min.	
ABRASION RESISTANCE as per ASTM D 4060-10 Taber Abraser CS-17 Wheel 1,000 gms/ arm. 1,000 cycles. Test @ 25°C. (Wheels dressed at 0 and 500 cycles using P 150 abrasive paper disc)	Weight Loss < (100 + R) mgs. Where R = Reproducibility Limit as per Table 1 of ASTM D 4060-10	

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FLEXIBILITY - 180° Bend -1.0 mm thick ASTM D 1737/ D 522. Test @ 25°C.	Pass over 77 mm Mandrel without cracking or delamination.
DIELECTRIC STRENGTH as per ASTM D 149 Test @ 25°C.	400 Volts/ Mil (Min.)
CATHODIC DISBONDMENT (3% NaCl, -1.5 V, 70-75°F, 30 days) ASTM G-8 or G-95, 1.00 mm Coating	Average radius 12 mm (Max) Report to include number of layers tested by microscopic examination to exclude use of primer.
<u>Type Test – Long Duration – Water Absorption</u>	
WATER ABSORPTION as per ASTM D570-98, Procedure 7.4 (Long Term Immersion) Test @ 25°C.	< 2.00 %

- ii) In order to establish conformance of the coating product (with product identification number), with the requirements of this specification test reports from internationally reputed test agencies such as KTA Tator Inc., USA/ Element Inc., USA or equal international laboratory will be provided by the bidder for properties listed above.

4.03.07 Primer shall not be required

4.03.08 SURFACE PREPARATION

- i) Before blast cleaning, visible deposits of oil and grease shall be removed in accordance with SSPC SP-1. Any surface imperfections remaining (after fabrication) such as sharp fins, weld spatter, or burning, slag shall be removed from the surface.
- ii) The steel surface shall be blast cleaned to SSPC SP-10 / NACE No.2 Near White Blast Cleaning.
- iii) A near - white blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter, except for staining as noted below.

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- iv) Random staining shall be limited to no more than 5 percent of each unit area of surface as defined below and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale or stains of previously applied coating.
- v) Unit area for determining staining shall be approximately 6,400 mm²
- vi) The following methods of surface preparation will be used to achieve a near white blast cleaned surface:
 - a) Main Pipe Sections
 - 1) Centrifugal Wheel Blast Using Steel Grit Abrasive: Dry abrasive blasting using a dosed cycle, re-circulating abrasive system with centrifugal wheels and steel grit abrasive. The cleanliness and size of steel grit abrasive shall be maintained by the re-cycling system using jet air wash to ensure compliance with this standard. Non-standard or makeshift steel grit recovery and cleaning equipment will not be permitted.
 - b) Cut Back Sections/ Weld Joints/ Bends & Fittings At Site
 - 1) Air Abrasive Blast Using Disposable Abrasive: Dry abrasive blasting using compressed air, blast nozzles and disposable abrasive Granulated Copper Slag. Abrasive will be disposed of after single used and shall not be re-used under any circumstances. Compressed air used for air abrasive blast cleaning shall be dean, dry and free of moisture and oil. Moisture separators, oil separators, traps or other equipment may be necessary to achieve dean, dry air.
 - 2) Air Abrasive Blast Using Steel Grit/ Garnet Abrasive: Dry abrasive blasting using a dosed cycle, re-circulating abrasive system, with compressed air, blast nozzle, and abrasive, with vacuum for dust and abrasive recovery.
 - 3) In locations where field blast cleaning is prohibited or impractical, the steel surface at cutback location shall be ground to bare shiny metal using steel grinder. The resultant surface shall be rough and not smooth. A width of approx. 50 mm on the adjacent intact pipe coating shall be roughened during the grinding process.
- vii) Blast cleaning shall not be conducted during times when the surface will become wet after blast cleaning or when ambient conditions are such that visible rusting occurs before coating, If any rust forms after blast cleaning, the surface shall be re-blasted before coating.
- viii) Blast cleaning operations shall be done in such a manner that no damage is done to partially or entirely completed portions of the work.
- ix) Wet abrasive blasting shall not be permitted.
- x) Dust and residues shall be removed from prepared surface by brushing, blowing off with dean, dry air or vacuum cleaning.
- xi) SALT CONTAMINATION

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- a) The level of soluble salts shall be measured in accordance with the requirements of ISO 8502-6 or ISO 8502-9 and shall be ≤ 50 mg/m².
- b) In case levels higher than ≤ 50 mg/m² are found after blast cleaning, soluble salt removal measures will be adopted to ensure levels below the threshold. Under no circumstances, the coating shall be applied at higher levels of salt contamination.
- c) The abrasive will also be tested as per ISO 11127-6 and should be ≤ 250 μ S/cm (microSiemen/centimeter).

4.03.09 COATING

- i) The coating shall be applied in a single coat using multiple passes of the spray gun. The finished coating shall be generally smooth and free of sharp protuberances, blistering, bubbling, cracks, de-lamination or other visible defects. A minor amount of sags, dimpling and "curtaining" or overspray spots which otherwise meets specification requirements shall not be considered cause for rejection. The coating will be dense, free of foam/ porosity and of uniform consistency in its entire thickness.
- ii) Before beginning coating, measure the humidity using a digital psychrometer or sling psychrometer and calculate the dew point. Measure surface temperature using an Infra-Red non-contact thermometer. Temperature of surface must be at least 3°C higher than the dew point.
- iii) The materials shall be applied by international standard Plural Component Airless Spray System such as Graco, Wiwa, Cosmostar etc. as per the requirements specified by the coating material manufacturer. No makeshift/ nonstandard spray equipment shall be used. Equipment shall consist of connected Material Tanks/ Feed Pumps, Purge Pump, Proportioning Pump, Mix Manifold, Static Mixer, Interconnecting Hoses etc. System shall normally be capable of 1500-3000 Psi fluid pressure (at tip) and a material supply rate of 4-10 Litres / Minute.

Resin and Activator pressures should rise (upstroke) and fall (down-stroke) together. In case there is any contrary movement, coating should be stopped. There should not be a difference in pressure of > 300 Psi between the Resin and Activator gauges.
- iv) Partially used and unused material drums must be tightly sealed and contain a blanket of nitrogen to prevent moisture contamination when not in use.
- v) Before application on the substrate apply a test patch for runs or drips and gel time as well as tack free time.
- vi) The proportioning pump shall be fitted with a numeric counter to keep track of the volume of materials being used while spraying. Volume of materials used shall be recorded in daily log sheets as per FQP.

4.03.10 COATING REPAIRS / WELD SEAM COATING

- i) *Defects - Blisters, Cracks Bubbles, De-Lamination Other Visible Defects; Adhesion and Holiday Points*

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- a) Remove the dis-bonded coating by cutting till edge of well adhered coating. Adhesion test points will already have exposed steel. For holiday defects coating removal is not required and only coating surface may be spot ground as per para c).
- b) Wipe clean the marked area with a clean cloth. Use solvent in case of oil / grease deposits. Allow to dry.
- c) Using steel grinder, grind the exposed area till there is no evidence of rust and surface is new metallic. The steel surface should not be smooth. At the same time roughen slight the surface of approx. 1/2" of the adjacent intact coating. Blast cleaning may also be used instead of steel grinder if available.
- d) Wipe clean the marked area with a clean cloth.
- e) Mix small amounts (< 50 ml) of Polyurethane coating in correct volumetric ratio. Scrape side and bottom of container while mixing so there is no unmixed material. When the coating is well mixed, the coating will be of even color with no streaks. Apply using brush or putty knife to the discontinuity and required overlap, taking care to coat within the abraded area only (including overlap).
- f) Do not apply under rainy conditions or when rain is imminent. Check surface temperature with noncontact infrared gauge and dew point with Humidity meter. The surface temperature should be at least 3 deg C more than the dew point. If required heat the surface using hot air gun.
- g) Coating Thickness Less Than Specified Thickness
 - 1) Record the DFT of the areas marked for repairs.
 - 2) Lightly abrade using brush off blast cleaning or power sanding. Wipe with clean cloth and compressed air.
 - 3) Estimate materials requirement for additional coat and spray apply the same Polyurethane to obtain required thickness making WFT checks.
 - 4) Test the coating in the same manner as outlined in inspection.

ii) **WELD SEAMS – COATING OF CUTBACK SECTIONS**

- a) A cutback of 150 mm from ends of pipe shall be left uncoated to prevent damage during seam welding at site. The cutback area may be blast cleaned and may contain primer to reduce corrosion during the installation period. Due care shall be taken during welding to ensure no damage to adjacent intact coating by mechanical damage or weld spatter. Bare steel exposed at the weld seam area shall be blast cleaned using the same procedure as the main pipe.
- b) An overlap of 50 mm (but not more than 100 mm) on the adjacent intact pipe coating shall be roughened during the blast cleaning process. These areas (including overlap) shall be coated and tested using the same procedure as the mainline pipe.
- c) Bristle Blasting/ Manual Scarification

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- 1) In locations where field blast cleaning is prohibited or impractical, the steel surface at cutback location shall be prepared using bristle blaster to 75+ Microns profile or using steel grinder to bare shiny metal. In case of the latter, resultant surface shall be rough and not smooth. A width of approx. 50 mm on the adjacent intact pipe coating shall be roughened during the grinding process.
- d) The same coating material as the mainline pipe shall be used for coating the cutback section to ensure chemical compatibility and adhesion. The coating materials shall be spray applied at site. Hand mix kits with slower pot life may also be used.
- e) The ditch will be fully dewatered by bidder prior to any coating operations since water in the ditch will cause ambient humidity to rise making it unsuitable for coating.

4.03.11 SITE FABRICATED PIPES

- i) For site fabricated pipes, as far as possible the coating shall be done in a manner so as to minimize joints. Wherever possible, long lengths of fabricated & tested pipe shall be provided to coating vendor for lining in the ditch; after grinding of weld seam and removal of weld spatter by bidder. Entry/ access of 2.5 m (plate) width shall be provided at 100 meter intervals for entry of equipment, manpower and materials.
- ii) Bends, T's and similar fabricated items will be coated after complete fabrication. Once lining application has been done, there will be no welding, cutting or other fabrication activities.
- iii) In the event it is not feasible to provide fabricated pipe lengths for lining operations, the individual pipes shall be lined outside the ditch and joints carried out inside the ditch.
- iv) Due care shall be taken during post lining fabrication activities such as welding to ensure no damage to adjacent intact coating by mechanical damage or weld spatter. This is very critical as any residual pinhole or defect created by such activities shall be the location for accelerated corrosion in service. Measures shall include protection of lined areas using burlap or similar protective materials.
- v) The ditch will be fully dewatered by bidder prior to any coating operations since water in the ditch will cause ambient humidity to rise making it unsuitable for coating.

4.03.12 INSPECTION

- i) **Blast surface profile** using Elcometer 123 or equivalent surface profile gauge. The average of readings from five randomly selected areas shall constitute the average surface profile. In case pipe curvature causes error in readings, the blast profile will be tested on reference flat steel coupons.
- ii) **Soluble Salt Contamination** - The level of soluble salts shall be measured in accordance with the requirements of ISO 8502-6 (Bresle) or ISO 8502-9 (Conductometric) and shall be ≤ 50 mg/m².
- iii) **Hardness** shall be tested with a portable Shore D Durometer (with a maximum indicator) as per ISO 868 on free films of the coating (not adhered coating). The

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thickness of the test specimen shall be at least 4mm. A test specimen may be composed of thinner layers to obtain the necessary thickness. The test shall be conducted indoors at 25°C.

Place the test specimen on a hard, horizontal, plane surface. Hold the durometer in a vertical position with the point of the indenter at least 9 mm from any edge of the test specimen. Apply the presser foot to the test specimen as rapidly as possible, without shock, keeping the foot parallel to the surface of the test specimen. Apply just enough pressure to obtain firm contact between presser foot and test specimen and take the maximum reading. Make five measurements of hardness at different positions on the test specimen at least 6mm apart and determine the mean value.

- iv) **The dry film thickness** shall be checked with a Magnetic Mil Gauge (Positest by DeFelsko or equivalent) in accordance with SSPC PA 2. The average of readings from five randomly selected areas shall constitute the film thickness. No single spot measurement shall be less than 80% of specified thickness. Frequency shall be as per SSPC PA 2.

DFT checks over weld seams shall not be included in the above readings.

- v) **Holidays testing** using high voltage holiday detector (Tinker Razor or equivalent) as per NACE International RP 0188-90 "Holiday Testing". Coating to have cured at least 24 Hours prior to holiday test. The location of the holidays shall be noted on the coated surface for repair as per 8.02.02. Final coating shall be holiday free.

Holiday testing shall not be done more than two times on the surface as repeated testing can lead to creation of holidays due to the testing process. Holiday testing after repairs shall be pinpointed and restricted only to the repaired area.

- vi) **Pull off Adhesion** to steel shall be measured as per ASTM D 4541 using an Aluminum dolly attached to the coating & a perpendicular force applied to the dolly.

Lightly abrade the surface of the dried coating and the surface of the test dolly with fine sandpaper before application of the adhesive. Prepare and apply the adhesive in accordance with the manufacturer's instructions. Use the minimum quantity of adhesive required to produce a firm, continuous and even bond between the surface and the test dolly. Remove any excess adhesive immediately if possible. Adhesives which give the highest results, which means the most coating-substrate adhesive failure, are preferred. In most cases, cyanoacrylate, two-component solvent-less epoxide and peroxide-catalysed polyester adhesives have been found suitable. Use a cutting device, such as a sharp knife or core cutter for cutting through cured adhesive and the paint coating to the substrate, round the circumference of the dolly.

- vii) Adhesion test shall be carried on fully cured coating at 20-30°C temperature. Use standard 20mm dolly to obtain direct reading from the analog dial gauge of the self-aligning, Type V adhesion tester. For the 20mm dolly the pressure reacted by the dolly is the same as pressure in the actuator and is transmitted directly to the pressure gauge. When using digital version of the tester, enter the correct dolly size being used e.g. 20mm.

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- viii) If the surface curvature causes error in readings, the adhesion will be tested on reference flat steel coupons. Average reading from three (3) randomly selected spots shall constitute one test and shall be at least 10.0 (Ten) MPa. The following protocol shall be used for determining adhesion test failure / success.

Gauge Reading	Type of Failure		Result / Conclusion
> 10 N/mm ²	T1	90% or more of break at coating – steel surface interface	Coating meets adhesion criteria. Take actual reading of bond strength.
	T2	90% or more of break at coating – dolly interface	Coating meets adhesion criteria. Glue Failure.
<10 N/mm ²	T1	90% or more of break at coating – steel surface interface	Coating does not meet adhesion criteria. Repeat test after 7 days (full cure) of coating application. If adhesion still fails, remove and re-coat.
	T2	90% or more of break at coating – dolly interface	Glue Failure. Allow more curing of glue / replace glue and re-test.

4.03.13 VENDORS

- i) Amchem Products Pvt. Ltd
- ii) Carboline India Pvt. Ltd
- iii) PPG Asian Paints Private Limited
- iv) TIB Chemicals AG

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ADDENDUM - 4

ADDENDUM TO C&I SPECIFICATION

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.

(A wholly owned subsidiary of STEAG Group, Germany)

A-29, Sector-16, NOIDA - 201301, India

MAY, 2024

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The clause of Volume III, Part C, Clause 15.08.00, Note 2 calls for Safety Control Room. The detailed specification for Safety Control Room is as follows:

15.08.01 SAFETY CONTROL ROOM AND EQUIPMENT

- i) 24/7 Safety Control room is envisaged for monitoring safety in plant area. The Contractor shall provide all hardware and software including IP based CCTV camera, Drone, loudspeakers, Redundant Servers/PC workstations, network switches, furniture, power supply, cables, Joystick etc for meeting the above requirement. For quantity refer below in this sub section.
- ii) Contractor shall supply and install IP based CCTV system along with IP based announcement system which shall be used for monitoring safety during construction from Safety control room. It shall be possible to make announcements to alert the workers whenever required. These cameras shall be installed at all strategic locations in the plant area. These cameras can be wired or wireless as per suitability at site. Initially these installations will be temporary & locations will keep on changing depending upon the work in progress. After completion of last Unit these cameras are to be installed permanently at suitable locations in consultation with Owner.
- iii) Make of IP based CCTV camera and Video Management Software under scope of this package (CCTV system for O&M and CCTV system for safety control room) shall be same. All above CCTV systems shall be interconnected through L3 switch so that feed of any camera can be seen from any of the CCTV system or from Employers' system as per requirement. However, these CCTV systems shall work independently and failure of any of these system shall not affect the other CCTV system.
- iv) Drone based safety monitoring shall be done during day to monitor critical works at a close range. The images / Video feed from drone shall have sufficient resolution to identify the work under progress.
- v) Following quantity of items shall be provided by contractor as a minimum.

Sl. No.	Name of Item	Quantity common for the station
1	IP based PTZ dome camera (HD) (wired/ wireless)	20 no
2	CCTV camera database redundant server with Speaker (Shall work in redundant mode, one primary and another secondary server)	1 set
3	Drone	2 no
4	LED display panel based video wall (85 “)	2 no
5	Vehicle speed detection system with 5 no of IP based camera at road turning points	One set
6	IP based announcement system with 20 loudspeaker with sufficient power for the intent.	One set
7	Hardware & Software	On as required

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		basis
8	Power supply/ cables/ desk/ furniture/ network switches/ joy sticks etc.	On as required basis
The above quantity is minimum and any additional item or quantity required for meeting the intent of specification shall also be in the scope of this package		

- vi) Any over speeding of vehicle should also be warned through speakers automatically.
- vii) 24/7 safety control room shall be functional from initial stage of the project construction. Temporary safety control room for the same is to be made functional within three (3) months of LOA. Permanent safety control room shall be made functional within six (6) month from LOA
- viii) The specifications for IP camera for safety control room and its accessories shall be same as given elsewhere.

15.08.02 DRONE BASED SURVEILLANCE (DBS)

- i) a) Drone (UAEV) should be purchased on name of employer & necessary ID as mandated by GOI has to be taken. Employer will take necessary statutory clearance (if any) for use of the same for Drone based surveillance within Plant premise.
- ii) b) Drone should support 1 cm position accuracy.
- iii) c) Drone must have 4K or better resolution camera for high quality pictures & video taking. It must have 2 nos. of chargers & minimum Four(4) sets of battery.
- iv) d) Drone should support Self deployment and landing. User shall be able to define path of flight through Mobile/Drone control terminal & Drone should complete the path survey & return to its place of origin.
- v) e) Drone should be supplied with Remote Control module and Drone operation & control software which can be loaded in Android/iOs device (in employer scope).
- vi) f) Bidder to provide training from qualified personnel for Drone operation to employers personnel. Training man days shall be 10 nos.
- vii) g) Following features has to be supported by DBS Geofencing, return home, GPS redundancy, emergency landing parachute, Automatic payload and battery exchange, Multiple payloads
- viii) h) Drone has to be Industrial grade, Durable, corrosion resistant and weatherproof & should be suitable for continuous operation both in Scheduled mode as well as On demand mode.
- ix) i) Continuous flight time should be minimum 30 minutes.
- x) j) It should support multi payload configuration. Payload for Drone cameras must support up to 2 KGs.
- xi) k) Drone must have universal ports.

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- xii) l) It must support Forward Vision system for Obstacle Sensing of range 0.7 to 30 meters.
 - xiii) m) IP rating of Drone should be IP 43 or better.
 - xiv) n) Bidder to supply mobile (Android/iOS) based APP for entire control & operation of DBS.
 - xv) o) Operating Frequency Should be 2.4 -2.483 GHz & 5.725-5.85 GHz
- 15.08.03 Further, Specification of Drone will be decided during detail engineering in line with extant law (if any) specified by Government of India.

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ADDENDUM - 5

ADDENDUM TO C&I SPECIFICATION

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.

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A-29, Sector-16, NOIDA - 201301, India

JUNE, 2024

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1.01.00 CENTRAL CONTROL ROOM INTERIOR

Sr. No.	Minimum Specifications	Relevant Document / Remarks
1	Scope of Work: The scope of the project includes designing; engineering, supply & installation of 24X7 mission critical Control centre interiors. Being a project of national repute this state-of-the-art Control room interior facility & all its components like metal ceiling, acoustic flooring, metal panelling/partition, glass partitions, Control desks, ceiling light & luminaire's electrical etc. shall look integrated and therefore it shall be treated as a part of one single solution i.e., Control Room Interior Solution. Main bidder to submit MAF (Manufacturer's Authorization Form) from Professional Control Room Interior Solution Provider. System Integrator / Contractor to ensure that the control room interior solution provider has <u>all these certificates / reports and these certificates / test reports must be submitted during detail engg.</u>	PO/work orders with appreciation/ Experience/ completion letters
2	To ensure an integrated solution, to qualify as per the international control room design & safety norms; main bidder shall bring <u>one single professional control room interior solution provider on board with an experience of atleast ten Control rooms interiors along with Control desks</u> along with their corresponding purchase orders/work orders and their appreciation/completion letters.	Certificate as desired
3	The project demands for a contemporary, aesthetically appealing, ergonomically designed, safe and 24X7 working facility. Conventional wooden cladding, Aluminum composite panels, Laminates, Fabric, Paint, Plaster of Paris (for Control room area) are prone to damages & ageing. These components shall not be used to ensure maintenance free working environment. <u>Control room interior solution provider to submit an undertaking on letterhead to comply the same.</u>	Undertaking on OEM Letterhead
4.	The Control room interior shall be <u>Greenguard gold certified (Modular metal ceiling, acoustic flooring & Modular metal wall panelling) from UL / Intertek.</u>	Certificate as desired
5	<u>The EPD of the Acoustic Modular Designer Control Room Interiors shall be verified in accordance with ISO 14025:2006 and EN 15804:2012+A2: 2019 / AC:2021 (from UL/Intertek)</u> for impacts on environment by Acoustic Modular Designer Control Room Interiors with Modular Metal Panelling and Designer Metal Ceiling. The proposed "Acoustic Modular Designer Control Room Interiors with Modular Metal Paneling and Designer Metal Ceiling" should be assessed (from an authorized practitioner of LCA) for environmental impacts associated with all the stages of a product's life for cradle to gate with end of life.	Authorized practitioner of LCA

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Sr. No.	Minimum Specifications	Relevant Document / Remarks
5.	<u>The metal panelling and ceiling must sustain seismic vibrations as per design spectrum IS 1893 for zone 4 or better, and be RoHS certified/tested (from UL/Intertek). The metal panelling and partition system must have a fire rating of at least 60 minutes per BS 476 Part 20 & 22.</u>	Certificate as desired
6	<u>The proposed Control Desk shall be UL Listed. The proposed control desk shall be ANSI/BIFMA e3-2019 certified/tested at least for level 3 from UL/Intertek</u> as per Furniture Sustainability Standard to identify the sustainability level of the furniture with respect to the environmental, health & wellness, and social impacts applicable to product(s).	Certificate as desired
7	<u>The proposed Control Desk's life cycle should be assessed (from approved LCA consultant) for environmental impacts associated with all the stages of a product's life for cradle to grave analysis. The EPD (Environmental product declaration) of Control Desk shall be verified in accordance with ISO 14025 (from UL/Intertek) for Impacts on Environment by Control Desk. The proposed control desk/Workstation shall satisfy the dimensional requirements of BS EN ISO 11064: 2013; Ergonomic design of control centers – Layout and dimensions of workstations. Valid Ergonomic test certificate/Report from UL/Intertek /FIRA.</u>	Certificate as desired
8	<u>UL Audit certified design feature of modular PU Edge: High-density poly-urethane moulded on industrial grade aluminum core to form 50mm deep tapered edge to be installed on worktop. In case of damage or wear, the edge shall be mechanically replaceable within 30 minutes without opening or removing the worktop. Extruded PU edging/PVC T-beading shall be deemed unacceptable.</u>	Certificate as desired
9	<u>The Control Room Interior Solution Provider shall have experience of supplying below products in any one year out of last five financial years to qualify: -</u> a. <u>Minimum 200 Sq. Meter of Greenguard Gold & RoHS (from UL/Intertek) Modular rigid PVC Metal Wall Panelling/Partition system & Metal false ceiling system supplied with ASTM e84 (from UL/Intertek) certified tiles.</u> b. <u>Minimum 200 Sq. Meter of Greenguard Gold certified Acoustic laminate/carpet flooring.</u> c. <u>Minimum 50 Nos. of Greenguard Gold certified Control desk modules along with modular removable Polyurethane Edge.</u>	Certificate as desired

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Sr. No.	Minimum Specifications	Relevant Document / Remarks
10	<u>UL Audit certified design feature of Load bearing capacity on modular wall panelling:</u> The wall panelling shall be robust & strong enough to sustain the routine loads/minor impacts of typical Control room environment. The wall panelling/partition structure shall have UL audit certified feature of Load bearing capacity of 300 Kgs to hold any display unit on clamp having minimum length of 750mm.	Certificate as desired
11	<u>UL Audit certified design feature of integrated channel in ceiling for quick installation & replaceability of continuous linear light:</u> The ceiling system shall have an integrated inbuilt channel for installation of cove lights and shall permit quick and easy replacement of cove light without using any tools. Replacement to be carried out within 120 Seconds per meter.	Certificate as desired

Refer below for more details

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Visitor Gallery
View-2

Visitor Gallery View-1

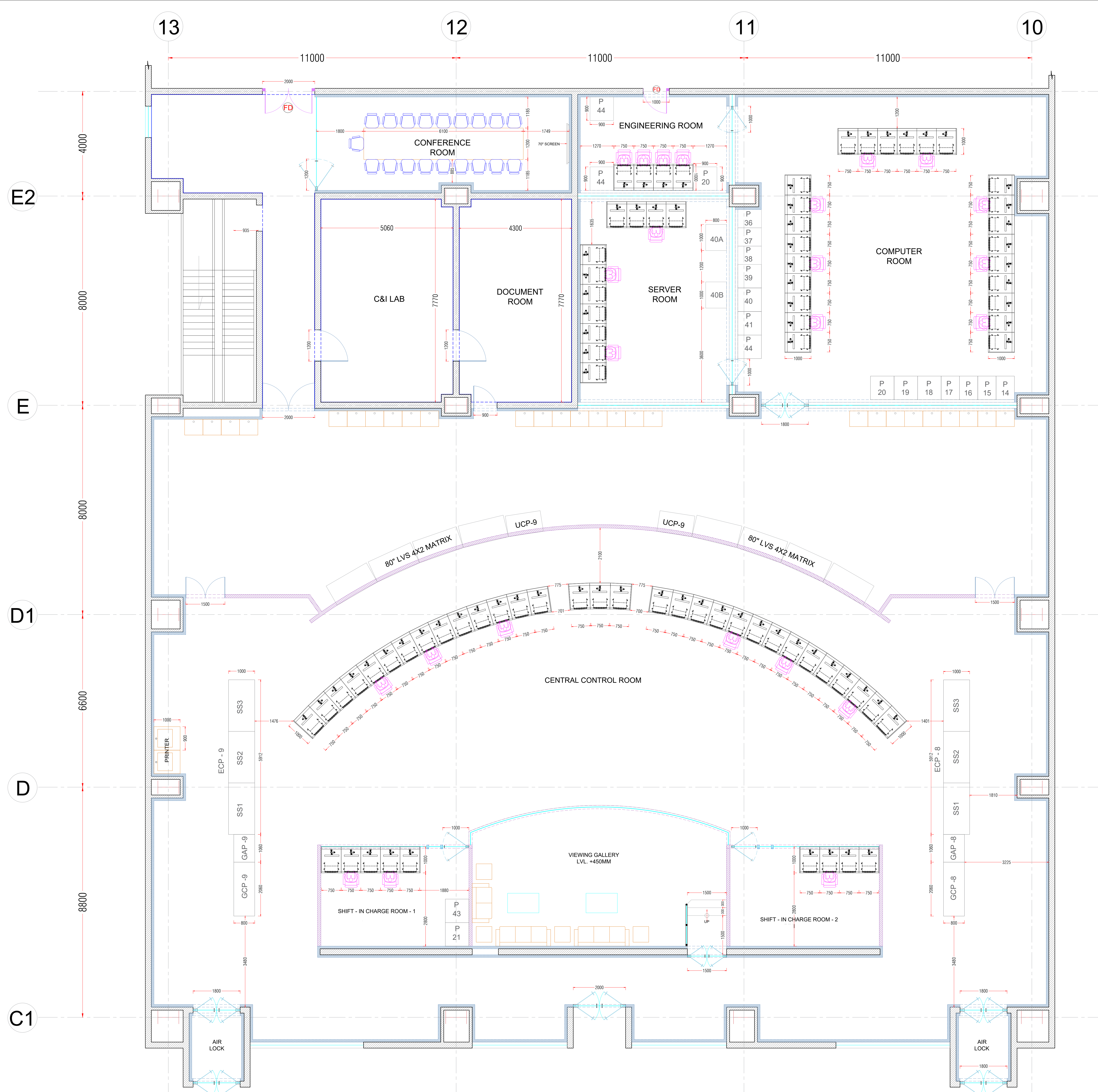


Server Room



Conference Room

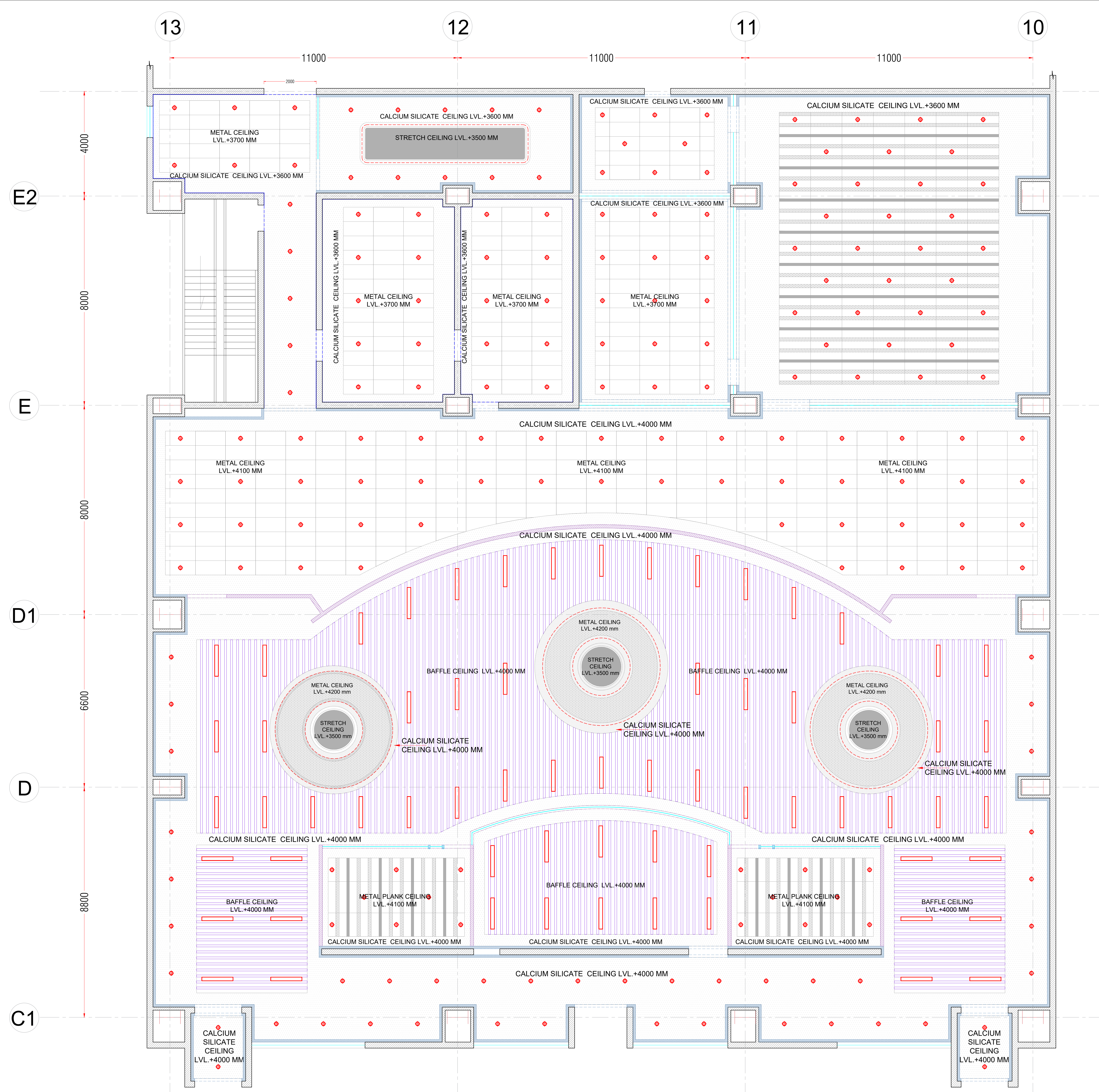




LEGEND	
SYMBOL	NAME
	BRICK WALL
	METAL PANELING
	METAL PARTITION
	GLASS PARTITION

PLAN AT EL. 17.00 M

PROPOSED KORADI 11,12 PROJECT
TYPICAL CONTROL ROOM INTERIOR LAYOUT



PLAN AT EL. 17.00 M

PROPOSED KORADI 11,12 PROJECT
TYPICAL CONTROL ROOM INTERIOR LAYOUT

LEGEND	
SYMBOL	NAME
	NON-PERFORATED TILES
	METAL PERFORATED TILES
	CALCIUM SILICATE CEILING
	METAL PLANK CEILING
	STRETCH CEILING
	BAFFLE CEILING

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ADDENDUM - 6

GAS CYLINDERS SPECIFICATION

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.
(A wholly owned subsidiary of STEAG Group, Germany)
A-29, Sector-16, NOIDA - 201301, India

MAY, 2024

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	GAS CYLINDERS SPECIFICATION	REV. - 0

1.00.00 SYSTEM DESCRIPTION

- 1.01.00 Hydrogen Gas shall be filled in the Generator for cooling purposes. Hydrogen Gas Cylinders shall supply make up to the system. Minimum quantity of Hydrogen Gas Cylinders to be supply by the bidder shall be as mentioned in Data sheet - A.
- 1.02.00 Carbon di-oxide shall be used to purge the air out of the Generator before initial Hydrogen filling or to purge out Hydrogen during shut down condition. Total minimum quantity of Carbon Di- oxide Gas Cylinders to be supply by the bidder shall be as mentioned in Data sheet - A.
- 1.03.00 Nitrogen Gas shall be used for nitrogen capping of boiler drum, regenerative Heaters etc. Minimum quantity of Nitrogen Gas Cylinders to be supply by bidder shall be as mentioned in Data sheet – A.

2.00.00 SPECIFIC REQUIREMENTS

- 2.01.00 The number of hydrogen gas cylinders required shall be calculated as per below criteria.

$$N_1 = L \times 30,$$

Where,

N_1 = Total number of hydrogen gas cylinders for one month storage to be installed

L = Normal leakage rate per day, shall be assumed as 8 cylinders per day (minimum). Bidder to inform the normal leakage rate per day.

- 2.02.00 The number of hydrogen gas cylinders supplied shall be as per quantity required by above calculation or 240, whichever is higher.

- 2.03.00 The number of carbon-dioxide cylinders required shall be calculated as per below criteria.

$$N_2 = \frac{M \times L}{V} + X$$

Where

N_2 = Total number of CO₂ cylinders required for one month storage

M = No. of fills required, minimum 2 nos. to be considered

L = Total fill required for turbo generator in NM³.

V = Volume occupied by CO₂ in each cylinder, in NM³.

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X = No. of cylinders to be kept in stock additionally to account for unforeseen eventualities.

2.04.00 The number of carbon di-oxide gas cylinders supplied shall be as per quantity required by above calculation or 150, whichever is higher.

2.05.00 The total number of N₂ cylinders required for one month storage shall be hundred minimum 100 nos. or higher as per system requirement. Bidder to furnish calculations deducing the total number of N₂ cylinders required for 2x660 MW unit.

2.06.00 The number of gas cylinders shall be equal to total requirement for one start up and one shut down of two units plus those required to be connected on manifolds of all units plus total requirements for seven days consumption of all units. The Bidder shall supply all gases till completion of trial operation. Filled cylinders shall be handed over to owner, during plant handover.

2.07.00 Higher out of the above requirements shall be considered for each type of cylinder.

3.00.00 DESIGN AND CONSTRUCTION

3.01.00 Supply & use of Gas Cylinders should confirm to Gas Cylinder Rules

3.02.00 Hydrogen and CO₂ Gas Cylinders

3.02.01 The water holding capacity of each Hydrogen and CO₂ cylinder shall be 46.7 liters.

3.02.02 The H₂ cylinders shall conform to IS-8198/equivalent standard and Gas cylinder Rules.

3.03.00 Nitrogen Cylinders

3.03.01 Nitrogen cylinders shall conform to IS-7285/equivalent standard.

3.03.02 The water holding capacity of each cylinder shall be 46.7 liters.

3.03.03 Each cylinder shall be hydro-tested at a pressure of 250 kg/sq.cm(g) (minimum).

3.04.00 The Gas Cylinders shall be located in a separate facility. Each cylinder shall be supplied with an integral isolating valve including cap and neck rings. The inlet side of these valves shall match with the threads of the cylinder neck ring and the outlet shall be as per IS-3224 (latest revision)/equivalent standard for further connection downstream.

3.05.00 Bidder shall submit calculation for total number of gas cylinder required (H₂, CO₂ and N₂) to the Owner's approval. The final requirements of the gas cylinders shall be based on approved calculation.

4.00.00 DRAWINGS, DATA AND INFORMATION

4.01.00 Drawing and Data furnished along with the Bid

4.01.01 Calculations to obtain the total number of H₂, CO₂ and N₂ Gas Cylinders.

4.01.02 Manufacturer's standard catalogue, literature and drawing showing technical details of each type of gas cylinder.

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- 4.02.00 Drawing and Data furnished after award of contracts
- 4.02.01 Final version of Calculations to obtain the total number of H₂, CO₂ and N₂ Gas Cylinders.
- 4.02.02 Technical details of all Gas Cylinders indicating component design features and material of construction.
- 4.02.03 General Arrangement and sectional Drawings of all Gas Cylinders.
- 4.02.04 QAP of each Gas Cylinders
- 4.02.05 Material test certificates for all major components of each Gas Cylinder.
- 4.02.06 Reports and certificates of various tests at shop.

5.00.00 DATA SHEET – A (FILLED DATA SHEET)

S. No.	Description	Data		
		Hydrogen Gas Cylinders	Carbon Di – Oxide Gas Cylinders	Nitrogen Gas Cylinders
1.	No. of cylinders (min.)	240	150	100
2.	Water capacity of each cylinders	46.7 litre	46.7 litre	46.7 litre
3.	Hydraulic test pressure of each gas cylinders	250 Kg/cm ² (g)	250 Kg/cm ² (g)	250 Kg/cm ² (g)
4.	Maximum gas filling pressure for each gas cylinders	140 Kg/cm ² at 15 degree C	140 Kg/cm ² at 15 degree C	140 Kg/cm ² at 15 degree C
5.	MOC of each Gas cylinders	Manganese steel	Manganese steel	Manganese steel
6.	Shape of bottom of each Gas cylinders	Convex inwards for suitable to keep cylinders in standing position		

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Sr. No	Clause No. /Section	Existing Clause				Modified Clause																																																			
1	Clause No. 34.6, Section-1	34.0 Contract Performance Security and Demand Guarantees: 34.1 The successful bidder (Contractor), within 30 Days from the date of issuance of the LOA, shall submit the bank guarantees as under: i) The Contract performance security amounting to 10% of the Contract Price strictly in the format as per Schedule –8 (A) issued by any Nationalized Bank/ scheduled commercial bank as notified by the Reserve Bank of India. . . 34.6 For the purpose of Clause No. 34.0, the contract price shall be including taxes & duties.				34.0 Contract Performance Security and Demand Guarantees: 34.1 The successful bidder (Contractor), within 30 Days from the date of issuance of the LOA, shall submit the bank guarantees as under: i) The Contract performance security amounting to 10% of the Contract Price strictly in the format as per Schedule –8 (A) issued by any Nationalized Bank/ scheduled commercial bank as notified by the Reserve Bank of India. . . 34.6 For the purpose of Clause No. 34.0, the contract price shall be excluding taxes & duties.																																																			
2	Schedule 6 C) Commissioning activities - Serial number 9, Section-1	<table><tr><td>Sr. No.</td><td>Milestone Activities</td><td colspan="2">Duration from the Zero Date For,</td></tr><tr><td></td><td></td><td>Unit#11 (Months)</td><td>Unit#12 (Months)</td></tr><tr><td>A</td><td>Boiler, ESP & FGD</td><td></td><td></td></tr><tr><td>...</td><td>...</td><td>...</td><td>...</td></tr><tr><td>C</td><td>Commissioning Activities</td><td></td><td></td></tr><tr><td>...</td><td>...</td><td>...</td><td>...</td></tr></table>				Sr. No.	Milestone Activities	Duration from the Zero Date For,				Unit#11 (Months)	Unit#12 (Months)	A	Boiler, ESP & FGD			...	...	...	...	C	Commissioning Activities			...	...	...	...	<table><tr><td>Sr. No.</td><td>Milestone Activities</td><td colspan="2">Duration from the Zero Date For,</td></tr><tr><td></td><td></td><td>Unit#11 (Months)</td><td>Unit#12 (Months)</td></tr><tr><td>A</td><td>Boiler, ESP & FGD</td><td></td><td></td></tr><tr><td>...</td><td>...</td><td>...</td><td>...</td></tr><tr><td>C</td><td>Commissioning Activities</td><td></td><td></td></tr><tr><td>...</td><td>...</td><td>...</td><td>...</td></tr></table>				Sr. No.	Milestone Activities	Duration from the Zero Date For,				Unit#11 (Months)	Unit#12 (Months)	A	Boiler, ESP & FGD			...	...	...	...	C	Commissioning Activities			...	...	...	...
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		9	Completion of Trial Operation & Handing over of Unit	45	51	9	Completion of Trial Operation	45	51
		10	Completion of PG Test	46	52	10	Completion of PG Test & Handing over of Unit	46	52
3	Schedule 8E, Note 2, Section – 1, Clause No.12.2.7 (Section-2A), Clause No.27.2.5 (Section-2B)	PROFORMA OF BANK GUARANTEE FOR ADVANCE Note 1.... 2. The Contractor may, if he so desires, reduce the value of Bank Guarantee(s) submitted against advance payments after every six (6) months to the extent of advance actually adjusted. The application for reduction in the value of the Bank Guarantee shall be submitted to the Project Manager.				PROFORMA OF BANK GUARANTEE FOR ADVANCE Note 1.... 2. The Contractor may, if he so desires, reduce the value of Bank Guarantee(s) submitted against advance payments after every three (3) months to the extent of advance actually adjusted. The application for reduction in the value of the Bank Guarantee shall be submitted to the Project Manager.			
4	Clause No. 21.7, Section-2	21.0 Vendor/Subcontractor Approval Prior to Appointment 21.7 Making Regular payments to the Sub-contractors is a matter of paramount importance for ensuring smooth and timely execution of the Project. The Contractor shall submit Sub-contractor wise Reconciliation Statement of Payments made to				21.0 Vendor/Subcontractor Approval Prior to Appointment 21.7 Making Regular payments to the Sub-contractors is a matter of paramount importance for ensuring smooth and timely execution of the Project. <u>On Quarterly basis,</u> the Contractor shall submit Sub-contractor wise Reconciliation Statement of Payments			

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		respective Sub-Contractor jointly signed by the authorised representatives of the Contractor and the Sub-contractor depicting therewith details of invoices raised by the Sub-contractor, recoveries/retentions if any, amounts due, their due dates, dates of payments made, balance payment etc. The format for such statement shall be finalised during the execution of the Contract.	made to respective Sub-Contractor jointly signed by the authorised representatives of the Contractor and the Sub-contractor depicting therewith details of invoices raised by the Sub-contractor, recoveries/retentions if any, amounts due, their due dates, dates of payments made, balance payment etc. The format for such statement shall be finalised during the execution of the Contract.	
5	Clause No. 28.0, Section-2	28.0 Insurance 28.1 The Contractor will arrange for insurance of equipment and materials included under the scope of contract including but not limited to marine-cum-storage-cum-erection insurance policy. The Contractor shall procure All Risk Marine-cum-Erection Insurance policy which shall insure fully and properly in fully convertible currency the goods to be supplied under this contract against loss or damage incidental to manufacture or acquisition, risks to be covered from his works to port of discharge, marine transportation, clearing forwarding and handling at port of entry, and equipment supplied from his works or sub-contractors works to project site, inland transportation up to project site (warehouse to warehouse), storage and handling at site and erection, testing and commissioning and up to taking over in the manner specified under Clause No.41.1 stipulated hereunder. . . 28.10 In case the final acceptance is delayed for the reasons attributable to the owner, his authorised representative or any other agency appointed by the owner, the insurance policy shall be	28.0 Insurance 28.1 The Contractor will arrange for insurance of equipment and materials included under the scope of contract including but not limited to marine-cum-storage-cum-erection insurance policy. The Contractor shall procure All Risk Marine-cum-Erection Insurance policy which shall insure fully and properly in fully convertible currency the goods to be supplied under this contract against loss or damage incidental to manufacture or acquisition, risks to be covered from his works to port of discharge, marine transportation, clearing forwarding and handling at port of entry, and equipment supplied from his works or sub-contractors works to project site, inland transportation up to project site (warehouse to warehouse), storage and handling at site and erection, testing and commissioning and up to successful Trial Operation of the unit . . 28.10 In case the Trial Operation is delayed for the reasons attributable to the owner, his authorised representative or any	

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		extended by the Contractor till taking over of the Plant and the actual premium charges along with applicable tax and cess towards such extension of insurance policy, shall be reimbursed by the Owner to the Contractor at actuals without any handling charges.	other agency appointed by the owner, the insurance policy shall be extended by the Contractor till completion of Trial Operation of the Plant and the actual premium charges along with applicable tax and cess towards such extension of insurance policy, shall be reimbursed by the Owner to the Contractor at actuals without any handling charges.
6	Clause No. 30.1.5, Section -2	30.0 Liquidated Damages (LD): . . 30.1.5 If the project gets delayed beyond contractual completion period for successful Trial Operation as per Schedule – 6, the Owner shall start to retain the amount against Liquidated Damages thereon from RA bills of the contractor. However, if the amount of retention made against milestones including PG Test from the running bills submitted so far is more than the amount equivalent to ceiling for Liquidated Damages against delay, no retention against Liquidated Damages against Delay shall be done and the payments towards milestones shall be released as and when due to the extent of the difference between the Amount Retained against milestones and the Ceiling of Liquidated Damages against delay. All further payments shall be released as and when the same are due ensuring the retention equal to ceiling for Liquidated Damages against delay till the issue of levy of Liquidated Damages is settled. Such retention shall be monitored collectively for all the contracts (i.e. Supply, Erection, Civil) awarded to the contractor for the particular project. No interest	30.0 Liquidated Damages (LD): . . 30.1.5 If the project gets delayed beyond contractual completion period for successful Trial Operation as per Schedule – 6, the Owner shall start to retain the amount against Liquidated Damages thereon from RA bills of the contractor. However, if the amount of retention made against Trial Operation & PG Test from the running bills submitted so far is more than the amount equivalent to ceiling for Liquidated Damages against delay, no retention against Liquidated Damages against Delay shall be done and the payments towards <u>Trial Operation & PG Test</u> shall be released as and when due to the extent of the difference between the Amount Retained against <u>Trial Operation & PG Test</u> and the Ceiling of Liquidated Damages against delay. All further payments shall be released as and when the same are due ensuring the retention equal to ceiling for Liquidated Damages against delay till the issue of levy of Liquidated Damages is settled. Such retention shall be monitored collectively for all the contracts (i.e. Supply, Erection, Civil) awarded to the contractor

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		shall be paid on retention against LD for delay. 30.1.6 In case the amount of retention made against milestones including PG Test made from the running bills submitted so far is less than the amount equivalent to ceiling for Liquidated Damages against Delay, the amount equal to difference between Ceiling and the Amount Retained so far shall be retained from the subsequent RA bills of the contractor against Liquidated Damages against delay. All further payments shall be released as and when the same are due ensuring the total retention equal to ceiling for Liquidated Damages against delay till the issue of levy of Liquidated Damages is settled. Such retention shall be monitored collectively for all the contracts (i.e. Supply, Erection, Civil) awarded to the contractor for the particular project. No interest shall be paid on retention against LD for delay 30.1.7 However, if the contractor exhibits his commitment towards curtailing the delay by taking measures such as deploying additional manpower and/or construction equipment, expediting supply of material etc. to the satisfaction of the competent authority of the owner, the contractor shall be allowed to submit additional Bank Guarantee equivalent to maximum leviabale amount of Liquidated Damages against delay in the format acceptable to the owner issued by any Nationalized / Scheduled Commercial Bank and no retentions against delay shall be made from the RA bills of the contractor. Further, the amounts retained	for the particular project. No interest shall be paid on retention against LD for delay. 30.1.6 In case the amount of retention made against Trial Operation & PG Test made from the running bills submitted so far is less than the amount equivalent to ceiling for Liquidated Damages against Delay, the amount equal to difference between Ceiling and the Amount Retained so far shall be retained from the subsequent RA bills of the contractor against Liquidated Damages against delay. All further payments shall be released as and when the same are due ensuring the total retention equal to ceiling for Liquidated Damages against delay till the issue of levy of Liquidated Damages is settled. Such retention shall be monitored collectively for all the contracts (i.e. Supply, Erection, Civil) awarded to the contractor for the particular project. No interest shall be paid on retention against LD for delay. 30.1.7 However, if the contractor exhibits his commitment towards curtailing the delay by taking measures such as deploying additional manpower and/or construction equipment, expediting supply of material etc. to the satisfaction of the competent authority of the owner, the contractor shall be allowed to submit additional Bank Guarantee equivalent to maximum leviabale amount of Liquidated Damages against delay in the format acceptable to the owner issued by any Nationalized / Scheduled Commercial Bank and no retentions against delay shall be made from the RA bills of the contractor. Further, the amounts	

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		against achievement of milestones shall be released as and when the same are due. 30.1.8 30.1.9 The issue of Establishing Responsibility of the Delay (Final Time Limit Extension) shall be submitted for the approval of the Competent Authority of Mahagenco as per DoP [currently Executive Director (Projects) in consultation with Chief General Manager (Finance)] within a period of six months from the date of completion of the work awarded. On approval, the decision of the authority shall be notified to the contractor by way of the amendment.	retained against achievement of <u>Trial Operation & PG</u> test shall be released as and when the same are due. 30.1.8.... 30.1.9 <u>For Establishing Responsibility of the Delay, a committee of owner's representatives shall be formed within two months after completion of Contractual Scheduled Trial Operation.</u> The issue of Establishing Responsibility of the Delay (Final Time Limit Extension) shall be submitted for the approval of the Competent Authority of Mahagenco as per DoP [currently Executive Director (Projects) in consultation with Chief General Manager (Finance)] within a period of six months from the date of completion of the work awarded. On approval, the decision of the authority shall be notified to the contractor by way of the amendment.	
7	Clause No. 30.4, Section -2	30.0 Liquidated Damages (LD): 30.4 Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under clause Nos. 30.1 and 30.2 above shall not exceed 10% and 10% of the contract price respectively. For the purpose of this clause No. 30.0, the contract price shall mean the bid price filled online by the contractor on SRM portal (excluding price of mandatory spares along with applicable freight) along with applicable	30.0 Liquidated Damages (LD): 30.4 Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under clause Nos. 30.1 and 30.2 above shall not exceed 7.5% and 10% of the contract price respectively. For the purpose of this clause No. 30.0, the contract price shall mean the bid price filled online by the contractor on SRM portal (excluding price of mandatory spares along with applicable freight) along	

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		price variation. Amount of taxes shall not be considered for levy of liquidated damages. The overall capping for liquidated damages against Cl. No. 30.1 & 30.2 above shall be limited to 15% of contract price.	with applicable price variation. Amount of taxes & duties shall not be considered for levy of liquidated damages. The overall capping for liquidated damages against Cl. No. 30.1 & 30.2 above shall be limited to 15% of contract price.
8	Clause No. 37.4, Section - 2	37.0 Trial Operation: 37.4 The fuel (Coal & Fuel Oil i.e. LDO), Limestone, Ammonia, Electricity and Auxiliary Steam for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner. Moreover, for the Purpose of commissioning and Guarantee Tests, the Owner shall provide operating personnel for operation of the equipment. Such personnel provided by the Owner shall work under the supervision of the Contractor till the Plant is taken over by the Owner as per Clause No. 41.0 hereunder.	37.0 Trial Operation: 37.4 The fuel (Coal, Biomass & Fuel Oil i.e. LDO), Limestone, Ammonia, Electricity and Auxiliary Steam for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner. Moreover, for the Purpose of commissioning and Guarantee Tests, the Owner shall provide operating personnel for operation of the equipment. Such personnel provided by the Owner shall work under the supervision of the Contractor till the Plant is taken over by the Owner as per Clause No. 41.0 hereunder.
9	Clause No. 43.2, Section - 2	43.0 Defect Liability (Guarantee) Period: 43.2 The Contractor shall guarantee that the equipment supplied shall be new and in accordance with the contract documents and be free from defects in design, material and workmanship for a period of 12 (twelve) calendar months commencing immediately upon completion of successful Performance Guarantee Test of the Plant <u>OR</u> taking over of the plant by the owner as per the provisions of Clause No. 41.4 above whichever is earlier. The Contractor shall be	43.0 Defect Liability (Guarantee) Period: 43.2 The Contractor shall guarantee that the equipment supplied shall be new and in accordance with the contract documents and be free from defects in design, material and workmanship for a period of 12 (twelve) calendar months commencing immediately upon completion of successful Performance Guarantee Test of the Plant <u>OR</u> taking over of the plant by the owner as per the provisions of Clause No. 41.4 above whichever is earlier.

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		responsible for replacement of any defective part in the equipment arising from faulty design, materials and/or workmanship. Such replaced defective parts may be collected by the contractor at his own cost from the site. 43.12 At the end of defect liability period, the Contractor's liability ceases except for latent defects and Contractor's obligation to prove 90% availability of the plant. In respect of goods supplied by sub-contractors to the Contractor, where sub-contractor provides a longer guarantee than the one indicated in this contract, the Owner shall be entitled to the benefit of such longer guarantees.	<u>However, Defect Liability Period shall be limited to not later than 18 months after successful completion of Trial operation if, intimation is received from Contractor within one month after successful completion of Trial Operation regarding readiness to perform PG Test and all major punch points which affect performance of plant directly are completed by contractor.</u> The Contractor shall be responsible for replacement of any defective part in the equipment arising from faulty design, materials and/or workmanship. Such replaced defective parts may be collected by the contractor at his own cost from the site. . . 43.12 At the end of defect liability period, the Contractor's liability ceases except for latent defects and Contractor's obligation to prove 90% availability of the plant. In respect of goods supplied by sub-contractors to the Contractor, where sub-contractor provides a longer guarantee than the one indicated in this contract, the Owner shall be entitled to the benefit of such longer guarantees. <u>The Contractor shall guarantee 90 % availability of SG, STG and associated auxiliaries for one (1) year from the date of successful completion of Performance Guarantee Test/Taking over of the plant in terms of the contract.</u> In case 90 % availability of SG, STG and associated	

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			<u>auxiliaries is not achieved, Defect Liability Period shall be further extended to one year from the date of repair/replacement of the equipment. Accordingly, Contract Performance Security shall require to be extended, till completion of Defect Liability Period.</u>	
10	Clause No. 61.1.2, Section-2	61 Termination of the Contract 61.1 Termination for Contractor's Default 61.1.2 If the Contractor a).... b).... c).... d).... e) refuses or unable to provide sufficient materials, service or labour to execute the works in the manner specified in the Work Completion Schedule appended to the Contract at the rate that give reasonable assurance to the Owner that the Contractor can attain completion of the work within the Time for Completion as amended, Then the Owner may, without prejudice to any rights and remedies it may possess under the Contract, give notice to the Contractor stating the nature of the default and the Contractor requiring remedy the same. If the Contractor fails to remedy or take steps to remedy the same within fourteen (14) days of its receipt of the notice, then the Owner may terminate the Contract by giving notice of Termination that refers to this Clause No. 61.	61 Termination of the Contract 61.1 Termination for Contractor's Default 61.1.2 If the contractor a).... b).... c).... d).... e) refuses or unable to provide sufficient materials, service or labour to execute the works in the manner specified in the Work Completion Schedule appended to the Contract at the rate that give reasonable assurance to the Owner that the Contractor can attain completion of the work within the Time for Completion as amended, Then the Owner may, without prejudice to any rights and remedies it may possess under the Contract, give notice to the Contractor stating the nature of the default and the Contractor requiring remedy the same. If the Contractor fails to remedy or take steps to remedy the same within Twenty Eight (28) days of its receipt of the notice, then the Owner may terminate the Contract by giving notice of Termination that refers to this Clause No. 61.	

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11		62 Force Majeure 62.1 Force Majeure is herein defined as any cause which is beyond the control of the contractor or the owner as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the performance of the contract as mentioned hereunder but not limited to a) Natural calamity including but not limited to floods, drought, earthquakes, epidemics, Volcanic Activity, typhoon or cyclone, hurricane. Moreover, guidelines, if any, issued by Govt. of Maharashtra and Govt. of India shall be followed while defining the Natural calamity.	62 Force Majeure 62.1 Force Majeure is herein defined as any cause which is beyond the control of the contractor or the owner as the case may be, which they could not foresee or with a reasonable amount of diligence could not have foreseen and which substantially affects the performance of the contract as mentioned hereunder but not limited to a) Natural calamity including but not limited to floods, drought, earthquakes, epidemics, Volcanic Activity, typhoon or cyclone, hurricane. Moreover, guidelines, if any, issued by Govt. of Maharashtra and Govt. of India shall be followed while defining the Natural calamity, <u>pandemics.</u>
12	Clause No. 63.3, Section-2	63 Settlement of Disputes 63.3 New Clause	63 Settlement of Disputes 63.3 <u>However, in case the parties are a Public Sector Enterprise or a Government Department, such disputes or difference shall be taken up by either party for resolution through Administrative Mechanism for Resolution of CPSES Disputes (AMRCD) as mentioned in DPE Office Memorandum No. 05/003/2019-FTS-10937 dated 14.12.2022 issued by Department of Public Enterprises, Ministry of Finance, Government of India and its further clarifications, modifications and amendments, issued from time to time. The decision of AMRCD on the said dispute will be binding on both the parties.</u>
13	Clause	64 Arbitration :	64 Arbitration

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	No. 64.3.3, Section-2	64.3.3 In cases the value of the claim exceeds INR 1,00,00,000/- (INR One Crore) as above, the Arbitral Tribunal shall consist of panel of 3 arbitrators. The Employer and the Contractor shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the two arbitrators do not succeed in appointing a third arbitrator within twenty-eight (28) days after the latter of the two arbitrators has been appointed, the third arbitrator shall, at the request of either party, be appointed as per the provisions of Arbitration & Reconciliation Act 1996. If one party fails to appoint its arbitrator within forty-two (42) days after the other party has named its arbitrator, the party which has named an arbitrator may request the Appointing Authority to appoint the second arbitrator.	64.3.3 In cases the value of the claim exceeds INR 1,00,00,000/- (INR One Crore) as above, the Arbitral Tribunal shall consist of panel of 3 arbitrators. The Employer and the Contractor shall each appoint one arbitrator, and these two arbitrators shall jointly appoint a third arbitrator, who shall chair the arbitration panel. If the two arbitrators do not succeed in appointing a third arbitrator within twenty-eight (28) days after the latter of the two arbitrators has been appointed, the third arbitrator shall, at the request of either party, be appointed as per the provisions of Arbitration & <u>Conciliation</u> Act 1996. If one party fails to appoint its arbitrator within forty-two (42) days after the other party has named its arbitrator, the party which has named an arbitrator may request the Appointing Authority to appoint the second arbitrator.
14	Clause No. 66, Section-2	New Clause	66.0 Change in Laws – - <u>If, after the date seven (7) days prior to the deadline set for bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Project Schedule, the Contract Price shall be correspondingly increased or decreased, and/or the Project Schedule shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of</u>

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			<u>its obligations under the Contract. However, these adjustments shall not be applicable on procurement of raw materials, intermediary components, and intermediary services etc.by the Contractor. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions.</u>	
15	Clause 8.3, Section - 2A	8.3 In the event of dispatch /arrival of the goods, whichever may be applicable for incidence of the said taxes & duties, beyond the contractual work completion date, the rate of payment /reimbursement of the taxes & duties shall be minimum of the rate applicable as on the Record date or the rate applicable as on the date of dispatch /arrival of the goods, as the case may be.	8.3	In the event of dispatch /arrival of the goods, whichever may be applicable for incidence of the said taxes & duties, beyond the contractual work completion date, the rate of payment /reimbursement of the taxes & duties shall be minimum of the rate applicable as on the <u>Scheduled Completion</u> date or the rate applicable as on the date of dispatch /arrival of the goods, as the case may be.
16	Clause No. 9.1, Section-2A & Clause No.24.1, Section-2B	Statutory Variation in Taxes & Duties If the rates of GST and custom duty are increased by the respective statutory authorities OR the concession available as on Record Date are withdrawn by the respective statutory authorities OR If any tax(es) or duty(ies) are introduced by the Indian Central or State Govt. or Local body with effect from the next day of record date, such changes shall be to Owner's account and to be paid by Owner against documentary evidence. Similarly, benefit of downward revision and benefit of abolishment of Taxes and duties need to be passed on to Mahagenco by the Contractor.	Statutory Variation in Taxes & Duties If the rates of GST and custom duty are increased by the respective statutory authorities OR the concession available as on Record Date are withdrawn by the respective statutory authorities OR If any tax(es) or duty(ies) are introduced by the Indian Central or State Govt. or Local body with effect from the next day of record date, such changes shall be to Owner's account and to be paid by Owner against documentary evidence. Similarly, benefit of downward revision and benefit of abolishment of Taxes and duties need to be passed on to Mahagenco by the Contractor. <u>However, Statutory</u>	

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			<u>variations towards GST and custom duty are payable at actuals against documentary evidence, over and above ceiling limit of amount of GST & amount of Custom Duty indicated in online Price bid.</u>	
17	Clause No. 12.2.1, Section-2A	12.0 Payment Terms: 12.2 Advance Payment: 12.2.1 Seven percent (7%) Ex-Works/CFR price for supply of equipment/materials shall be paid as the first instalment of the advance within thirty days from the date of submission of the documents as under: i) Invoice in triplicate (one original + two copies). ii) A Copy of Letter of Award issued by the owner duly acknowledged by the contractor. iii) A copy of the acceptance of the contract performance security issued by the owner/the Project Manager. iv) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against advance payment. v) A copy of All Risk Marine-cum-Erection Insurance. 12.2.2 Further one & half percent (1.5%) Ex-Works/CFR price for supply of equipment/ materials shall be paid as second instalment of advance within thirty days from the date of submission of the documents as under whichever is later: i) Invoice in triplicate (one original + two copies). Copy of the Micro Detail Project Schedule Network duly approved by the Chief Engineer (P&P) iii) A copy of the acceptance of the bank guarantee of equivalent	12.0 Payment Terms: 12.2 Advance Payment: 12.2.1 Ten percent (10 %) Ex-Works/CFR price for supply of equipment/materials shall be paid as the first instalment of the advance within twenty one days from the date of submission of the documents as under: i) Invoice in triplicate (one original + two copies). ii) A Copy of Letter of Award issued by the owner duly acknowledged by the contractor. iii) A copy of the acceptance of the contract performance security issued by the owner/the Project Manager. iv) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against advance payment. v). Deleted. 12.2.2 Further two & half percent (2.5%) Ex-Works/CFR price for supply of equipment/ materials shall be paid as second instalment of advance within twenty one days from the date of submission of the documents as under whichever is later: i) Invoice in triplicate (one original + two copies). Copy of	

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		amount submitted by the contractor against advance payment. 12.2.3 Further one & half percent (1.5%) Ex-Works/ CFR price for supply of equipment/ materials shall be paid as third instalment of advance within thirty days from the date of submission of the documents as under whichever is later: i) Invoice in triplicate (one original + two copies). ii) Copy of the letter of the owner forwarding signed contract agreement to the contractor. iii) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against advance payment.	the Micro Detail Project Schedule Network duly approved by the Chief Engineer (P&P) iii) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against advance payment. 12.2.3 Further two & half percent (2.5%) Ex-Works/ CFR price for supply of equipment/ materials shall be paid as third instalment of advance within ~~thirty~~ twenty one days from the date of submission of the documents as under whichever is later: i) Invoice in triplicate (one original + two copies). ii) Copy of the letter of the owner forwarding signed contract agreement to the contractor. iii) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against advance payment.
18	Clause No. 12.3.1, Section-2A	12.0 Payment Terms: 12.3 Payment Against Supply of Materials/Equipment: 12.3.1 82% of the of Ex-works / CFR supply price as per the approved billing break-up minus advance adjustment on prorata basis (e.g. 72% if the advance paid till then is 10%) along with 100% taxes & duties stipulated under clause 8, as may be applicable shall be paid on prorata basis within 30 days from the date of submission of invoice and the related documents as mentioned below: a) In case of offshore supplies on CFR basis:	12.0 Payment Terms: 12.3 Payment Against Supply of Materials/Equipment: 12.3.1 90 % of the of Ex-works / CFR supply price as per the approved billing break-up minus advance adjustment on prorata basis (e.g. 75% if the advance paid till then is 15%) along with 100% taxes & duties stipulated under clause 8, as may be applicable shall be paid on prorata basis within 21 days from the date of submission of invoice and the related documents as mentioned below: a) In case of offshore supplies on CFR basis:

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		(i)Invoice: 1 original + 2 copies (ii)Packing slip for each consignment included in invoice: 3 copies (iii)Pre-despatch clearance certificate by Owner wherever applicable or Supplier's certificate confirming that IIA/ Mahagenco inspection is not applicable. :1 original + 2 copies (iv)Copy of Bill of Lading / Air way Bill. :1 original + 2 copies (v)Copy of Stores Receipt Note (SRN) issued by Owner's site authority. :1 original + 2 copies b)In case of Indigenous Supplies: (i)Invoice : 1 original + 2 copies (ii)Packing slip for each consignment included in invoice. :3 copies (iii)Manufacturer's Original Tax Invoice / Endorsed copy of original tax invoice from Manufacturer / Vendors/ Sub Contractors', as the case may be, is acceptable as a Invoice related document:1 original + 2 copies (iv)Pre-despatch clearance certificate by the Owner wherever applicable or Supplier's certificate confirming that IIA/ Mahagenco inspection is not applicable. :1 original + 2 copies (v)Copy of Stores Receipt Note (SRN) issued by Owner's site authority. :1 original + 2 copies	(i)Invoice: 1 original + 2 copies (ii)Packing slip for each consignment included in invoice: 3 copies (iii)Pre-despatch clearance certificate by Owner wherever applicable or Supplier's certificate confirming that IIA/ Mahagenco inspection is not applicable. :1 original + 2 copies (iv)Copy of Bill of Lading / Air way Bill. :1 original + 2 copies (v)Copy of Stores Receipt Note (SRN) issued by Owner's site authority. :1 original + 2 copies b)In case of Indigenous Supplies: (i)Invoice : 1 original + 2 copies (ii)Packing slip for each consignment included in invoice. :3 copies (iii)Manufacturer's Original Tax Invoice / Endorsed copy of original tax invoice from Manufacturer / Vendors/ Sub Contractors', as the case may be, is acceptable as a Invoice related document:1 original + 2 copies (iv)Pre-despatch clearance certificate by the Owner wherever applicable or Supplier's certificate confirming that IIA/ Mahagenco inspection is not applicable. :1 original + 2 copies (v)Copy of Stores Receipt Note (SRN) issued by Owner's site authority. :1 original + 2 copies
19	Clause No. 12.3.3, Section-2A	12.0 Payment Term 12.3 Payment Against Supply of Materials/Equipment:	12.0 Payment Terms 12.3 Payment Against Supply of Materials/Equipment:

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause										
		12.3.3 18% payment of invoice value shall be retained and out of which 13% payment shall be released on achievement of important milestones in the project completion as stipulated below.	12.3.3 10 % payment of invoice value shall be retained and out of which 5 % payment shall be released upon completion of successful Trial Operation and within 21 days from the date of submission of application for release of payment along with Certificate issued by the Project Manager declaring the completion of successful trial operation and completion of all supplies to achieve trial operation. Contract value for this purpose shall be excluding Taxes and Duties and shall be calculated apportionately for each unit (i.e. half of the total contract price).										
20	Clause No.12.3.4, Section-2A	12.0 Payment Terms 12.3.4 Milestone Payments: 13% payment of invoice value out of retained 18% of invoice value shall be released within 30 days from the date of achievement of milestones as under and submission of the application of release of respective payment: <table><tr><td>S.N</td><td>Milestone</td><td>Payment (% of half of the Contract Value) for each Unit</td></tr><tr><td>1</td><td>Commencement of Boiler Erection</td><td>0.5</td></tr><tr><td>2</td><td>Commencement of</td><td>0.5</td></tr></table>	S.N	Milestone	Payment (% of half of the Contract Value) for each Unit	1	Commencement of Boiler Erection	0.5	2	Commencement of	0.5	12.0 Payment Terms 12.3.4 Deleted	
S.N	Milestone	Payment (% of half of the Contract Value) for each Unit											
1	Commencement of Boiler Erection	0.5											
2	Commencement of	0.5											

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Sr. No	Clause No. /Section	Existing Clause				Modified Clause
				TG building foundation		
		3		Completion of STG Foundations & Deck	0.5	
		4		Completion of foundation for ESP column erection	0.5	
		5		Completion of ID/FD/PA fan Foundations	0.5	
		6		Hydro Test	0.5	
		7		Completion of De-aerator Erection	0.5	
		8		Completion of Condenser Erection	0.5	
		9		Chemical Cleaning of Boiler	0.5	

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Sr. No	Clause No. /Section	Existing Clause			Modified Clause
		10	TG Box up	0.5	
		11	Readiness of SCR	0.5	
		12	Completion of Oil Flushing	0.5	
		13	Boiler Light Up	0.5	
		14	Readiness of GT	0.25	
		15	Readiness of FGD	0.25	
		16	Synchronisation of Unit	0.5	
		17	Coal Firing	0.5	
		18	Trial Operation	5.0	
		Contract value for this purpose shall be excluding Taxes and Duties, Price for Mandatory Spares and inland freight. For claiming above payments, the contractor, along with his application for release of the payment, shall submit the certificate issued by the project manager to the effect that the			

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause
		said milestone is achieved and supplies to achieve said milestone are completed by the contractor.	
21	Clause No. 12.4.1, Section-2A	12.0 Payment Terms 12.4 Supply of Mandatory Spares, Special Tools & Tackles: 12.4.1 95% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 30 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above.	12.0 Payment Terms 12.4 Supply of Mandatory Spares, Special Tools & Tackles: 12.4.1 95% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 21 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above.
22	Clause No. 12.7, Section-2A	12.0 Payment Terms 12.7 Payment of Price Adjustment: 12.7.1 82% payment towards the Price Adjustment on supply of equipment/mandatory spares along with 100% taxes thereon shall be paid against submission of invoices along with documentary evidence (one original + two copies). 12.7.2 Balance 18% payment of price adjustment shall be released as per the provisions of Clause No.12.3.4 and Clause 12.5 above.	12.0 Payment Terms 12.7 Payment of Price Adjustment: 12.7.1 90 % payment towards the Price Adjustment on supply of equipment/mandatory spares along with 100% taxes thereon shall be paid against submission of invoices along with documentary evidence (one original + two copies). 12.7.2 Balance 10% payment of price adjustment shall be released as per the provisions of Clause No.-12.3.3 and Clause 12.5 above.
23	Clause No. 13.1.5. Section-2A	13.0 Spares and Special Tools & Tackles 13.1.5 In case of delay in supply of Mandatory Spares and if	13.0 Spares and Special Tools & Tackles 13.1.5 In case of delay in supply of Mandatory Spares and if

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause	
		ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the amount of Contract Value (excluding taxes and duties thereon) of delayed spares plus the amount of the price adjustment thereon shall be payable by the contractor. However, total Levy of Liquidated Damages on account of delay in supply of Mandatory Spares and if ordered, the 3 Year's O&M (Recommended Spares), shall not exceed 10% of contract value (excluding the taxes and duties thereon) of Mandatory Spares or the Recommended Spares, as the case may be, ordered against contract plus the amount of the Price Adjustment thereon.	ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the amount of Contract Value (excluding taxes and duties thereon) of delayed spares plus the amount of the price adjustment thereon shall be payable by the contractor. However, total Levy of Liquidated Damages on account of delay in supply of Mandatory Spares and if ordered, the 3 Year's O&M (Recommended Spares), shall not exceed 7.5% of contract value (excluding the taxes and duties thereon) of Mandatory Spares or the Recommended Spares, as the case may be, ordered against contract plus the amount of the Price Adjustment thereon.	
24	Clause No. 27.2.1, Section-2B	27.0 Payment Terms: 27.2 Advance Payment: 27.2.1 10% of contract price and taxes payable on the advance payment, if any, shall be paid within 30 days upon mobilisation of contractor's establishment at site for undertaking services against this contract and submission of the documents as under: i) Invoice in triplicate (one original + two copies). ii) A Copy of Letter of Award issued by the owner duly acknowledged by the contractor. iii) A copy of the acceptance of the contract performance security issued by the owner/the Project Manager. iv) A copy of the acceptance of the bank guarantee of	27.0 Payment Terms: 27.2 Advance Payment: 27.2.1 10% of contract price and taxes payable on the advance payment, if any, shall be paid within 21 days upon mobilisation of contractor's establishment at site for undertaking services against this contract and submission of the documents as under: i) Invoice in triplicate (one original + two copies). ii) A Copy of Letter of Award issued by the owner duly acknowledged by the contractor. iii) A copy of the acceptance of the contract performance security issued by the owner/the Project Manager. iv) A copy of the acceptance of the bank guarantee of equivalent amount submitted by the contractor against	

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause
		equivalent amount submitted by the contractor against advance payment. v) A copy of “site mobilisation of contractors establishment” certificate issued by the owner/the Project Manager. vi) A copy of All Risk Marine-cum-Erection Insurance.	advance payment. v) A copy of “site mobilisation of contractors establishment” certificate issued by the owner/the Project Manager. vi) A copy of All Risk Marine-cum-Erection Insurance.
25	Clause No.27.3.1, Section-2B	27.0 Payment Terms: 27.3 Payments towards Services Rendered: 27.3.1 82% of the Contract price (excluding taxes and duties) as per the approved billing breakup minus advance adjustment on prorata basis (e.g. 72% if advance paid till then is 10%) together with applicable tax as stipulated under Clause No. 23 above shall be paid on prorata basis within 30 days from the date of submission of the invoice and related documents as mentioned below: (i) Invoice : 1 original+ 2 copies (ii) Service entry sheet approved by the Owner : 3 copies	27.0 Payment Terms: 27.3 Payments towards Services Rendered: 27.3.1 90% of the Contract price (excluding taxes and duties) as per the approved billing breakup minus advance adjustment on prorata basis (e.g. 80% if advance paid till then is 10 %) together with applicable tax as stipulated under Clause No. 23 above shall be paid on prorata basis within 21 days from the date of submission of the invoice and related documents as mentioned below: (i) Invoice : 1 original+ 2 copies (ii) Service entry sheet approved by the Owner : 3 copies
26	Clause No. 27.3.2, Section-2B	27.0 Payment Terms: 27.3 Payments towards Services Rendered: 27.3.2 18% payment of invoice value shall be retained and out of	27.0 Payment Terms: 27.3 Payments towards Services Rendered: 27.3.2 10% payment of invoice value shall be retained and out of

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause										
		which 13% payment of invoice value shall be released on achievement of important milestones in the project completion as stipulated below.	which 5% payment shall be released upon completion of successful Trial Operation within 21 days from the date of submission of application for release of payment along with a) Certificate issued by the Project Manager declaring the completion of successful trial operation b) Certificate issued by the Project Manager declaring the completion of all the services to be rendered for successful Trial Operation. Contract value for this purpose shall be excluding Taxes and Duties and shall be calculated apportionately for each unit (i.e. half of the total contract price).										
27	Clause No.27.3.3, Section-2B	27.0 Payment Terms: 27.3.3 Milestone Payments: 13% payment of invoice value out of retained 18% of invoice value shall be released within 30 days from the date of achievement of milestones as under and submission of the application of release of respective payment: <table><tr><td>S.N</td><td>Milestone</td><td>Payment (% of half of the Contract Value) for each unit</td></tr><tr><td>1</td><td>Commencement of Boiler Erection</td><td>0.5</td></tr><tr><td>2</td><td>Commencement of TG building</td><td>0.5</td></tr></table>	S.N	Milestone	Payment (% of half of the Contract Value) for each unit	1	Commencement of Boiler Erection	0.5	2	Commencement of TG building	0.5	27.0 Payment Terms: 27.3.3 Deleted	
S.N	Milestone	Payment (% of half of the Contract Value) for each unit											
1	Commencement of Boiler Erection	0.5											
2	Commencement of TG building	0.5											

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Sr. No	Clause No. /Section	Existing Clause			Modified Clause
			foundation		
		3	Completion of STG Foundations & Deck	0.5	
		4	Completion of foundation for ESP column erection	0.5	
		5	Completion of ID/FD/PA fan Foundations	0.5	
		6	Hydro Test	0.5	
		7	Completion of De-aerator Erection	0.5	
		8	Completion of Condenser Erection	0.5	
		9	Chemical Cleaning of Boiler	0.5	
		10	TG Box up	0.5	
		11	Readiness of SCR	0.5	
		12	Completion of Oil Flushing	0.5	
		13	Boiler Light Up	0.5	

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Sr. No	Clause No. /Section	Existing Clause			Modified Clause
		14	Readiness of GT	0.25	
		15	Readiness of FGD	0.25	
		16	Synchronisation of Unit	0.5	
		17	Coal Firing	0.5	
		18	Trial Operation	5.0	
		Contract value for this purpose shall be excluding Taxes and duties.			
28	Clause No.27.5, Section-2B	27.0 Payment Terms: 27.5 Payment of Price Adjustment: 27.5.1 82% payment towards the Price Adjustment on Site Works along with taxes thereon shall be paid within 30 days from the date of submission of invoices along with documentary evidence (one original + two copies). 27.5.2 Balance 18% payment of price adjustment shall be released as per the provisions of Clause No. 27.3.3 and Clause No. 27.4 above.			27.0 Payment Terms: 27.5 Payment of Price Adjustment: 27.5.1 90 % payment towards the Price Adjustment on Site Works along with taxes thereon shall be paid within 21 days from the date of submission of invoices along with documentary evidence (one original + two copies). 27.5.2 Balance 10 % payment of price adjustment shall be released as per the provisions of Clause No. ~~27.3.3~~ 27.3.2 and Clause No. 27.4 above.

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause
29		38 Disposal of Scrap : The Contractor shall with the agreement of the Owner/Project Manager promptly remove from the site any 'Scrap' generated during performance of any activities at site in pursuance of the Contract. The term 'Scrap' shall refer to scrap / waste / remnants arising out of the fabrication of structural steel work and piping work at the project site in the course of execution of the contract and shall also include any wastage of cables during the termination process while installing the cables. The ownership of such Scrap shall vest with the Contractor except in cases where the items have been issued by the Owner from its stores for their installation only without any adjustment to the Contract Price. The removal of scrap shall be subject to the Contractor producing the necessary clearance from the relevant authorities (Custom, Excise etc.), if required by the law, in respect of disposal of the scrap. The liability for the payment of the applicable taxes/duties shall be that of the Contractor. The Contractor shall also indemnify to keep the Owner harmless from any act of omission or negligence on the part of the Contractor in following the statutory requirements with regard to removal/disposal of scrap. The Indemnity-cum-Undertaking Agreement shall be furnished by Contractor as per proforma enclosed in Annexure-XIX of Section-I. Further, in case the laws require the Owner to take prior permission of	38 Disposal of Scrap : The Contractor shall with the agreement of the Owner/Project Manager promptly remove from the site any 'Scrap' generated during performance of any activities at site in pursuance of the Contract. The term 'Scrap' shall refer to scrap / waste / remnants arising out of the fabrication of <u>all types of Steel</u> work and piping work at the project site in the course of execution of the contract and shall also include any wastage of cables during the termination process while installing the cables. The ownership of such Scrap shall vest with the Contractor except in cases where the items have been issued by the Owner from its stores for their installation only without any adjustment to the Contract Price. The removal of scrap shall be subject to the Contractor producing the necessary clearance from the relevant authorities (Custom, Excise etc.), if required by the law, in respect of disposal of the scrap. The liability for the payment of the applicable taxes/duties shall be that of the Contractor. The Contractor shall also indemnify to keep the Owner harmless from any act of omission or negligence on the part of the Contractor in following the statutory requirements with regard to removal/disposal of scrap. The Indemnity-cum-Undertaking Agreement shall be furnished by Contractor as per proforma enclosed in Annexure-XIX of Section-I. Further, in case the laws require the Owner to take

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause
		the relevant Authorities before handing over the scrap to the Contractor, the same shall be obtained by the Contractor on behalf of the Owner.	prior permission of the relevant Authorities before handing over the scrap to the Contractor, the same shall be obtained by the Contractor on behalf of the Owner.
30	Clause No. 3.0, Section-2C	3.0 Facilities for other Contractors 3.1 The contractor shall in accordance with the requirements of the Engineer afford all reasonable facilities for any other contractors employed by the owner and their workmen, for the workmen of the owner and of any other properly authorized authorities or statutory bodies who may be employed in the execution on or near the site of any work not included in the contract or of any contract which the owner may enter into in connection with or ancillary to the works.	3.0 Facilities for other Contractors 3.1 The contractor shall in accordance with the requirements of the Engineer afford all reasonable facilities <u>such as drinking water, washroom, approach road etc.</u> for any other contractors employed by the owner and their workmen, for the workmen of the owner and of any other properly authorized authorities or statutory bodies who may be employed in the execution on or near the site of any work not included in the contract or of any contract which the owner may enter into in connection with or ancillary to the works.
31	Clause No. 7.2, Section-2C	New Clause	<u>7.2 Royalty Charges Levied by Government :</u> <u>In the event of there being a statutory increase in the rates of royalty charges/fresh levy of royalty on materials, the same shall be reimbursed to the Contractor upon submission of original challan by him of having made the payments at revised rates. In the event of there being a decrease in such rates, the same shall be recovered from the Contractor. The base date for calculating the increase or decrease shall be the rate as on seven (7) days prior to the deadline set for Price Bid submission. The total reimbursement (positive or negative) as specified above, to be paid or recovered, shall however be calculated on the quantity of materials actually considered while making the royalty</u>

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause
			<u>payments to the concerned authorities, or the theoretical consumption of these materials (calculated on the basis of the volume of concrete or fill accepted for payment), whichever is less, and on the basis of documentary evidence of Govt. Notification. However, the Contractor will settle claims, if any, on account of over charge by the State Authorities.</u>
32	Clause No. 3.1.2, Section-3	3.0 Owner's Representatives: 3.1.2 All the bank guarantees against the contract including on demand bank guarantees shall be submitted to the project manager only.	3.0 Owner's Representatives: 3.1.2 All the bank guarantees against the contract including on demand bank guarantees shall be submitted to the Chief Engineer (Projects & Planning) only.
33	3 Clause No 6.2.2	6.0 Liquidated Damages : 6.2.2 If the Contractor fails to complete the supply of all mandatory spares within the time specified in Project Completion Schedule then the Owner shall levy liquidated damages for delay on the Contractor at the rate of ½% per week or part thereof of the Contract Price for the undelivered portion of mandatory spares along with applicable price variation subject to the maximum 10% of the contract price of mandatory spares pending in supply beyond the contractual cut-off date along with applicable price variation. Amount of taxes shall not be considered for levy of liquidated damages.	6.0 Liquidated Damages : 6.2.2 If the Contractor fails to complete the supply of all mandatory spares within the time specified in Project Completion Schedule then the Owner shall levy liquidated damages for delay on the Contractor at the rate of ½% per week or part thereof of the Contract Price for the undelivered portion of mandatory spares along with applicable price variation subject to the maximum ~~10~~ 7.5 % of the contract price of mandatory spares pending in supply beyond the contractual cut-off date along with applicable price variation. Amount of taxes shall not be considered for levy of liquidated damages.
34	Sec-3, Clause-2.7.2 (4)	2.0 Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: The contractor /associate/ collaborator / Parent Manufacturer / his sub- vendor(s) is	2.0 Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: The contractor /associate/ collaborator / Parent Manufacturer / his sub- vendor(s) is

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Sr. No	Clause No. /Section	Existing Clause	Modified Clause	
		required to meet the Proven-ness criteria and qualification requirement for critical equipment, auxiliaries, systems and bought out items as per criteria stipulated below 2.1 2.7 Wet Limestone based Flue Gas Desulphurisation System 2.7.2 4) The successful Bidder or Bidder's sub-vendor (Contractor), within 30 days from the date of issuance of the LOA, shall submit the Bank Guarantees as under: i) Contract Performance BG amounting 10% of the EPC contract cost & BG amounting 10% of O&M contract cost of the FGD system. ii) For TLA / Collaboration Agreement with QFGDM : In case of award of a project, the QFGDM will be required to furnish an on demand bank guarantee for an amount of as indicated below in addition to the contract performance security to be furnished by the Bidder or Bidder's sub-vendor . a) In case of 1 DJU partner - 1.5% of the contract price. b) In case of 2 DJU partners - 0.75% each of the contract price. c) In case of 3 and above DJU partners - 0.5% each of	required to meet the Proven-ness criteria and qualification requirement for critical equipment, auxiliaries, systems and bought out items as per criteria stipulated below 2.1 2.7 Wet Limestone based Flue Gas Desulphurisation System 2.7.2 4) Deleted	

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		the contract price. iii) For QFGDM as a consortium partner: In case of award of a project, the QFGDM will be required to furnish an on demand bank guarantee for an amount of as indicated below in addition to the contract performance security to be furnished by the Bidder or Bidder's sub-vendor . a) In case of 1 Consortium partner – 5% of the contract price. b) In case of 2 Consortium partners – 2.5% each of the contract price. Consortium partners submitting the above bank guarantees are not required to submit the bank guarantees against the DJU.		
35	Clause No. 2.7.4, Section-3, Volume-I	The deed of joint undertaking (DJU) & collaboration agreement / TLA should be submitted along with the Techno-commercial bid. The DJU shall be submitted by the Bidder or Bidder's sub-vendor, QFGDM, Subsidiary Company/Joint Venture Company, Collaborator, TLA provider (As applicable).	The deed of joint undertaking (DJU) & collaboration agreement / TLA should be submitted <u>at the time of placement of order on the approved sub vendor</u>. The DJU shall be submitted by the Bidder or Bidder's sub-vendor, QFGDM, Subsidiary Company/Joint Venture Company, Collaborator, TLA provider (As applicable). <u>In case of award, QFGDM and Bidder's subvendor (if Applicable) shall each be required to furnish an on demand bank guarantee of INR 24 million (Twenty Four Million only) in addition to the contract performance security to be furnished by the bidder.</u>	

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Schedule – 7

GUARANTEE DECLARATION

(to be submitted on letter head of the bidder)

Dear Sir,

We declare that the ratings, capacities and performance figures of the equipment furnished by us under the package are guaranteed. We further declare that in the event of any deficiencies in meeting the guaranteed figures indicated below as established after conducting the guarantee tests, you may at your discretion accept the equipment/system after assessing the liquidated damages or reject the equipment/system and recover payments already made as specified in Section-2, Clause-30 and Section-3, Clause 6.0 of the Bidding specification.

Note:- Refer Amendment-3 to Vol.-II, Section-2 Performance Guarantees for additional details.

Category-I

Reject the equipment/system/plant & recover from the bidder the payments already made OR
Accept the equipment/system after levying LD as per specific clause.

If, the demonstrated guarantees continue to be more than stipulated acceptable shortfall limit, the owner may at his discretion reject the equipment/system and recover the payment already made or accept the equipment/system only after levying liquidated damages against the bidder.

Sr. No.	Guaranteed Parameters	Load Point	Unit	Value Guaranteed (for each unit)
1	Unit Heat Rate at 100% TMCR Load	at 660MW under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make- up.	kCal/kWh	2100 Maximum
2	TG Output at VWO Condition	Continuous TG output of 693 MW unit load (i.e. 105% of rated load) under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make- up.	MW	693

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		vacuum), with zero make-up.		
3	Auxiliary Power Consumption (APC)	Auxiliary power consumption of all BTG package auxiliaries including FGD with 100% TMCR, 33°C cooling water inlet temp., zero make up, guaranteed average condenser pressure	KW	36000 KW Maximum {Unit APC + (half) Station APC}
4	Capacity of Steam Generator (Main Steam)	100% BMCR with Worst coal	TPH	2100 TPH Minimum
5	Average Condenser Pressure	Measured at 300 mm above the top row of condenser tubes with 660 MW output, 0% make up, design CW temperature and design CW flow	Mm Hg	Bidder to optimize & indicate, considering CW inlet temperature of 33 deg C and minimum temperature rise across condenser as 10 deg C (however not more than 77 mm hg)
6	APH Leakage	Not more than 8%	%	8% Maximum
7	Lime stone consumption	100% TMCR, while firing worst coal	Kg/hr	15650* Maximum
8	Ammonia (anhydrous) consumption	100% TMCR while firing design coal.	Kg/hr	445 Maximum

Refer Amendment-3 to Vol.-II, Section-2 Performance Guarantees, for further details

*Note: In case Sulphur % varies in the fired coal, Maximum limestone consumption shall be derived as below:

$3.1278 * (S\% \text{ in Coal} * \text{Coal Consumption Rate} / 100) \text{ kg/h.}$

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Category-II

Reject the equipment/system/plant & recover from the bidder the payments already made. Conformance to the performance requirements.

Sr. No.	Guaranteed Parameters	Load Point	Unit	Value Guaranteed (for each unit)
1	Suspended Particular Matter (SPM)	100% TMCR, while firing worst coal	mg/Nm ³	less than 27 at ESP outlet before FGD inlet at 6%O ₂ dry.
2	SO ₂ in Chimney	100% TMCR, while firing Worst coal	mg/Nm ³	less than 70 at 6%O ₂ dry.
3	NO _x in Chimney	100% TMCR, while firing design coal	mg/Nm ³	less than 70 at 6%O ₂ dry.
4	Noise Level			All the plant, equipment and systems covered under this specification shall perform continuously without exceeding the noise level over the entire range of output and operating frequency specified in the technical specifications.

Refer Amendment-3 to Vol.-II, Section-2 Performance Guarantees, for further details

Category-III

Reject the equipment/system/plant & recover from the bidder the payments already made OR

Accept the equipment/system after assessing the deficiency in respect of various performance & recover amount equivalent to the damage as determine by the owner

Sr. No.	Guaranteed Parameters	Value Guaranteed (for each unit)
1	As listed under clause 11.32.00 of Amendment-3 to Vol.-II, Section-2 Performance Guarantees	

Auxiliary Power Consumption(APC)

- a) The respective Auxiliary Power Consumption for Unit and Station (2x660MW BTG Package) are to be calculated in isolation to calculate the respective

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guaranteed power consumption as is illustrated hereunder: The guaranteed auxiliary power consumption shall be sum of the calculated Unit and Station Auxiliary Power Consumption.

b) Unit Auxiliary Power Consumption

- 1) The unit auxiliary power consumption shall be calculated using the following relationship, with design coal-

$$PAU = PU + TL \text{ (Unit)}$$

Where,

PAU = Guaranteed Unit Auxiliary Power Consumption

PU = Power consumed by the auxiliaries of the unit under test

TL = Losses of the Generator transformers and Unit Transformers supplied by bidder based on works test reports. While guaranteeing the auxiliary power consumption the bidder shall necessarily include all continuously operating unit auxiliaries.

- 2) The power consumption (Pu) of entire unit auxiliaries fed from unit transformers shall be measured at the incomers of respective unit boards. Suitable correction for auxiliaries not in service at the time of this measured power consumption like MDBFP etc, shall be done on as per the technical specification. If GCB scheme is adopted, suitable corrections for station auxiliaries shall be done.
- 3) All unit auxiliaries required to be operated to continuously operate the plant at the rated load of 100% TMCR have to be considered. The auxiliaries to be considered shall include but not be limited to the following:
 - Unit Auxiliaries to be considered for calculating PU
 - ◆ Turbine generator and auxiliaries
 - ◇ Turbine unit oil purifier
 - ◇ Turbine unit control oil purifier
 - ◇ Booster pumps for TDBFP (if applicable)
 - ◇ TDBFP lube. Oil pumps
 - ◇ Feed and discharge pumps of turbine oil purification system
 - ◇ Oil purifiers of TDBFP including feed and discharge pumps
 - ◇ Electric oil heater of TDBFP lube Oil (if applicable)
 - ◇ Electric oil heater for turbine lube oil tank (rated power shall be considered)

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- ◇ Vapour extractor fan motors
- ◇ MDBFP Auxiliary Oil pump (if applicable)
- ◇ Condensate Extraction Pumps (CEP)
- ◇ TG control oil pumps
- ◇ Oil pumps for HP & LP bypass system
- ◇ Condenser air evacuation equipment (Vacuum pumps)
- ◇ BFP drive turbine condenser air evacuation pumps (if applicable)
- ◇ BFP drive turbine condenser extraction pumps (if applicable)
- ◇ COLTCS
- ◇ Drip pumps (if applicable)
- ◇ Chemical Dosing pumps
- ◇ Hotwell make up pumps (Duty factor - 0.2)
- ◇ CW Pumps, including all auxiliaries
- ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ Steam Generator and Auxiliaries
 - ◇ Primary Air (PA) Fans including its lube oil pumps
 - ◇ Coal Feeders
 - ◇ Seal air fans
 - ◇ Coal mills including its lube oil pumps
 - ◇ Forced Draft (FD) Fans including its lube oil pumps
 - ◇ Regenerative Air Preheater including its lube oil pumps
 - ◇ Electrostatic precipitators (ESP) - with all TR sets, all hopper heaters including wrap around heaters of adapters, if applicable & all insulator heaters/pent house fans (if applicable) of all ESP passes working and rapping system in normal operation. During the test all hopper heaters including wrap around heaters of adapters, if applicable & all insulator heaters/pent house fans (if applicable) of all ESP passes will be in ON condition and set point temperature shall be kept 5 degree Celsius above the flue gas temperature.
 - ◇ Induced Draft (ID) Fans including its lube oil pumps
 - ◇ Boiler circulation pumps
 - ◇ Scanner air fans

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- ◇ Electrical Heat Tracing (if applicable)
- ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ SCR system and auxiliaries
 - ◇ Ammonia forwarding pump
 - ◇ Dilution air fan
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ FGD system
 - ◇ Absorber recirculation slurry pumps
 - ◇ Air oxidation blowers
 - ◇ Gypsum bleed pump
 - ◇ All Process/filter water pumps
 - ◇ Gypsum dewatering system - Vacuum belt filter, vacuum pump, filtrate pump & agitator, waste water pump and agitator
 - ◇ Lime stone preparation system – gravimetric feeder, grinding mill, limestone slurry pump and agitator
 - ◇ Sump system – Absorber area sump pump & agitator, gypsum area sump pump & agitator, limestone area sump pump & agitator and auxiliary absorbent pump and agitator
 - ◇ All agitators
 - ◇ Lime handling system (0.3)
 - ◇ Gypsum handling System (1.0)
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ Mill Reject System (1.0)
- ◆ Balance of plant - Unitised systems
 - ◇ ACW (booster) pumps of the unit
 - ◇ DMCW pumps to supply cooling water on the primary (DM) side of the plate type heat exchangers in the closed loop Equipment cooling (Unit auxiliaries) water system.
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)

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- Electrical system
 - ◆ Losses in Bus ducts (at rated load conditions)
 - ◇ Isolated phase bus duct (IPBD)
 - ◇ Segregated phase bus duct (SPBD)
 - ◆ UPS power consumption (at rated load condition)
 - ◆ DC System power consumption (at rated load condition)
 - ◆ GCB Losses of Unit : Losses and fan power for Generator Circuit Breaker (ifapplicable)
 - ◆ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- 4) Transformer losses (for Unit)
- Transformer losses (at rated capacity) shall include –
 - ◆ Iron loss
 - ◆ Copper loss
 - ◆ Cooler pump and fan loss
 - Following transformers are included:
 - ◆ Generator Transformer losses (at rated Load Condition)
 - ◆ Unit auxiliary transformer losses (at rated load conditions)
 - ◆ Station transformer losses (at Unit rated load conditions)
 - ◆ Losses in all other service/auxiliary transformers (at rated load conditions)
- 5) The bidder shall furnish a list of equipment to be covered under Unit auxiliary power consumption, which shall be subject to Owner's approval. The bidder shall ensure that power supply to all such equipment to be covered under unit auxiliary power consumption is fed from unit board of the respective unit.
- 6) The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:-
- Power consumption of ESP will be measured pass wise and for one pass/stream (Say ESP-A) at a time with the help of energy meter in ESP MCC.
 - Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test.
 - Before starting collection efficiency test, note down energy meter readings

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for period t_1 i.e. E1. The power consumption shall be $W_1 = E_1/t_1$.

- During the collection efficiency test the total energy fed in to ESP MCC of one pass (say ESP-A) will be measured during entire period of collection efficiency test i.e. E2. Total time period (t_2) of test shall be noted. The power consumption shall be $W_2 = E_2/t_2$. During the test all hopper heaters of all ESP passes will be in ON condition and set point temperature shall be kept 5 °C above the flue gas temperature.
- Measured power consumption for one ESP pass (say ESP- A) = $(W_2 - W_1)$
- Measured Electrostatic Precipitator power of one unit = Power of (ESP-A + ESP-B + ESP-C + ESP-D + ESP-E + ESP-F)
- Number of stream & fields shall be as per the PG test of ESP as detailed elsewhere.

7) Guaranteed Unit Auxiliary Power Consumption of FGD system shall be taken by considering the additional pressure drop in the FGD system during FGD SO₂ removal efficiency test at specified guarantee point conditions. For this purpose, difference of FGD system pressure drop during FGD SO₂ removal efficiency test and that at Unit Auxiliary Power Consumption test shall be loaded as additional Auxiliary Power Consumption.

- Generation from roof top solar during the test period shall be added to the total measured power consumption.

c) Station Auxiliary Power Consumption

1) The station auxiliary power consumption shall be calculated using the following relationship, with design coal-

$$PAS = PS + TL \text{ (Station)}$$

&

$$PS = \text{SUM} (PI \times DI)$$

PS = Total Power Consumption, while running the units at 100% design load for all auxiliaries of the (2x660MW) station, supplied by the Bidder under this Package.

PI = Power consumed by each station auxiliary

DI = Duty factor to be considered for each station auxiliary

TL = In this case (Station) - Transformer Losses of the Station transformers and that of any other Transformers associated with station auxiliary power supply system (excluding those in Unit system like GT, UT, UAT, UST etc.) and shunt reactor supplied by bidder, for meeting station auxiliary power supply, based on works test reports.

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- 2) Losses of transformers shall be considered based on the works test reports as per the criteria specified in subsequent clauses under the subheading Transformers.
- 3) While guaranteeing the station auxiliary power consumption the bidder shall necessarily include all the station auxiliaries running at full load with duty factors as have been defined herein.
- 4) The station auxiliaries that shall be running during the guarantee test for calculating " PS " shall include but not be limited to the following:
 - Plant Instrument and Service Air Compressors & Air Drying Plant
 - ◆ Instrument Air Compressors (All Normally Running ('N_{IA}' Nos.)) – Duty Factor=0.6
 - ◆ Service Air Compressors (All Normally Running ('N_{SA}' Nos.)) – Duty Factor=0.35
 - ◆ ADP Heaters (if applicable) (All Normally Running ('N_{IA}' Nos.)) – Duty Factor=0.5
 - ◆ ADP Blowers (if applicable) (All Normally Running ('N_{IA}' Nos.)) – Duty Factor=1.0
 - ◆ Power consumption at rated duty point for compressors to be arrived based on shop test and power consumption at rated duty point for Air Drying plant to be arrived based on site test.
 - Air Conditioning System
 - ◆ Power consumption at motor input terminals of working units (i.e. excluding stand-by) at its rated duty point of Chilling machines / VAM machine, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, cooling tower fans and other auxiliaries for the Air conditioning system of main plant building, FGD control room, ESP control room of each units, AHP control room, service building, administrative building. Power consumption at motor input terminals of working units (i.e. excluding stand-by) at its rated duty point of compressor and condenser fans of air cooled condensing unit, Air handling unit (AHU) fans for the Air conditioning system of auxiliary plants like ESP control rooms, FGD control rooms, etc. Power consumption at motor input terminals of centrifugal fans of mechanical ventilation system.
 - ◆ Power consumption at rated duty point for water cooled chillers & air cooled condensing units shall be based on site test and for other drives like chilled water pumps, Condenser water Pumps & AHU/centrifugal fans shall be based on shop test.
 - Auxiliary Water System Pumps (Working Pumps)

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- ◆ Service water pumps
 - ◆ Potable water pumps
 - ◆ DM water transfer pumps
 - ◆ Waste water transfer pumps
 - ◆ Any other pump/drive required for continuous operation of the plant.
 - Fuel Oil System
 - ◆ LDO forwarding/pressuring pumps – Duty factor – 0.5
 - Plant Illumination
 - ◆ Indoor Lighting
 - ◆ Outdoor Lighting – Duty factor – 0.4
 - DMCW / ECW system for common auxiliaries
 - ◆ ECW system for common station auxiliaries (as provided). Total power consumption of all equipments (excluding envisaged standby ones) shall be included.
 - Transformers
 - ◆ Transformer losses (TL) shall be considered as per following (as applicable)-
 - ◇ GT - 100% no load loss, 54% of Copper losses & 100% Cooler Loss.
 - ◇ ST- 100% no load loss, 8% of Copper losses & 9% Cooler Loss.
 - ◇ UT – 100% no load loss, 52% of Copper losses & 50% Cooler Loss.
 - ◇ Aux/ LT Outdoor/ LT Indoor Transformer: 100% no load loss & 25% of Copper losses
 - ◇ Reactor – losses at rated voltage
- 5) The above list is not comprehensive and only indicative. Bidder shall furnish the comprehensive list of equipment to be covered under station auxiliary system, which is to be considered under station auxiliary power consumption. That will be subject to Owner's approval.
- 6) Where duty factor is not indicated the same is to be considered as '1.0'.
- 7) Auxiliary power for steam generator shall be accounted for continuously operating auxiliaries/ drives as well as intermittently operating drives. Power consumed by intermittently operative auxiliaries/drives shall be on hourly average basis.
- 8) List auxiliary power consumers and their duty factor will be further

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finalised during finalisation of PG test procedure.

Signature: _____

Name: _____

Designation: _____

Seal of the Company: _____

VOLUME - VI

AMENDMENT - 3

**AMENDMENT TO LIQUIDATED DAMAGES FOR
PERFORMANCE GUARANTEES**

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.
(A wholly owned subsidiary of STEAG Group, Germany)
A-29, Sector-16, NOIDA - 201301, India

JUNE, 2024

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	VOLUME - VI
	KORADI THERMAL POWER STATION 2X660 MW UNITS - 11 & 12 PROJECT	-
	RFx No. 3000046202 (BTG Package)	AMENDMENT - 3
	AMENDMENT TO LIQUIDATED DAMAGES FOR PERFORMANCE GUARANTEES	REV. - 0

6.0 Liquidated Damages:

6.1 Further to the provisions under Clause No. 30, section – 2, volume – I of the contract, the rates of Liquidated Damages shall be as under:

6.2 Liquidated Damages for Delay in Completion:

6.2.1 If the Contractor fails to achieve Trial Operation of the unit within the time period specified in Project Completion Schedule due to reasons attributable to him then the Owner shall levy liquidated damages for delay on the Contractor at the rate of ½% per week of delay or part thereof of the Contract Price.

6.2.2 If the Contractor fails to complete the supply of all mandatory spares within the time specified in Project Completion Schedule then the Owner shall levy liquidated damages for delay on the Contractor at the rate of ½% per week or part thereof of the Contract Price for the undelivered portion of mandatory spares along with applicable price variation subject to the maximum 10% of the contract price of mandatory spares pending in supply beyond the contractual cut-off date along with applicable price variation. Amount of taxes shall not be considered for levy of liquidated damages.

6.3 Liquidated Damages For failure to meet Performance Guarantees: The rates of Liquidated Damages to meet /demonstrate the various Guaranteed Particulars offered by the bidder shall be as under:

Category-I

Reject the equipment/system/plant & recover from the bidder the payments already made OR Accept the equipment/system after levying LD as per specific clause.

If, the demonstrated guarantees continue to be more than stipulated acceptable shortfall limit, the owner may at his discretion reject the equipment/system and recover the payment already made or accept the equipment/system only after levying liquidated damages against the bidder at the rates listed herein.

Sr. No.	Description	Guaranteed Technical Parameters	Variation factor	Rate of Liquidated Damages
1	Unit Heat Rate at 100% TMCR Load	2100 kCal/kW.h	For increase in the Guaranteed unit Heat Rate in kCal/kWh, at 660MW under rated steam conditions at 33 deg.C cooling water inlet	Rs. 9,13,98,000/- per kCal/kWh up to limiting value of 2140 Kcal/kWh.

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	AMENDMENT TO LIQUIDATED DAMAGES FOR PERFORMANCE GUARANTEES	REV. - 0

Sr. No.	Description	Guaranteed Technical Parameters	Variation factor	Rate of Liquidated Damages
			temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make-up.	
2	TG Output at VWO condition	Not less than 693 MW at VWO, 0% Make-up	Decrease in VWO output as compared to 693 MW.	Rs. 79,160/- per kW shortfall in TG VWO output.
3	Steam Generating Capacity (Main Steam)	2100 TPH	Drop of every one TPH or part thereof in the capacity of Steam Generator.	Rs. 2,77,06,000/- for every 1 TPH shortfall in steam output; up to limiting value of 2050 TPH.
4	Average Condenser Pressure	Bidder to optimize and indicate considering 660 MW output at 0% make up, 33 deg.C design CW temperature and minimum CW temperature rise 10 deg.C. (however not more than 77 mm hg)	Increase of average condenser pressure in mm Hg (abs) measured at 300 mm above the top row of condenser tubes.	Rs. 3,51,88,230/- per 1 mm Hg increase in condenser pressure; up to limiting value of 85 mmHg.
5	Auxiliary Power Consumption for Plant (BTG Package) Auxiliaries	36000 KW @ 100% TMCR each unit	Increase of Auxiliary power consumption of all auxiliaries including FGD with zero make up, guaranteed average condenser pressure 100% TMCR	Rs. 3,69,973.00/- per KW excess consumption; up to limiting value of 39600 KW.
6	Limestone Consumption Rate	15650 kg/h	Increase of limestone consumption of FGD system by 100 kg/hr over guaranteed	Rs. 18,50,000/- for every 100 kg/hr increase. (Not more

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	AMENDMENT TO LIQUIDATED DAMAGES FOR PERFORMANCE GUARANTEES	REV. - 0

Sr. No.	Description	Guaranteed Technical Parameters	Variation factor	Rate of Liquidated Damages
			consumption.	than 16500 Kg/Hr.)
7	APH Leakage	Not more than 8%	Increase of APH Leakage by every 0.1% over the guaranteed.	Rs. 2,11,58,637/- for every 0.1% point increase from the guaranteed or specified value (whichever is lower); up to limiting value of 10 %.
8	Ammonia consumption	Not more than 445 kg/hr.	Increase of Ammonia consumption of SCR system by 10 kg/h over guaranteed consumption.	Rs. 12,92,000/- for every 10 kg/hr increase in ammonia consumption rate. (Not more than 490 kg/h)

Note:- Refer Volume-II, Section-2 & its amendment for additional details.

Amendment - 4

MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2 X 660 MW UNITS - 11 12 PROJECT
RFx NO. 3000046202 (BTG Package)
BTG ELECTRICAL AMENDMENT

BTG Electrical Amendements for 2x660 MW Koradi Project

Sr. No.	Electrical Equipment / Package Section	Cl. No.	Page no	Bid specification clause	To be read as/New clause
1	Volume-III/Part-B	8.01.14	201	The outgoing feeders in 11KV Station switchgears shown in SLD are of indicative only. The exact quantity and ratings of the feeders required for BOP and purchasers shall be decided during detail engineering. Any increase in quantity and rating shall not have any price impact on the bidder.	The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4Nos(1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detailed engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detailed engineering.
2	Volume-III/Part-B	1.05.00: System Particulars	8	Fault Level : 400kV System : 50 kA for 1 sec	Fault Level : 400kV System : 63 kA for 1 sec (as per latest CEA Gazette) shall be considered for all the related equipments and design calculations.
3	Volume-II/SECTION 2	2.13.11 (ix)	38	All the 11kV motor feeders and power supply feeders required for BOP & station loads shall also be considered under BTG scope of work.....Any other feeder requirement of BOP bidder during detail engineering from HT unit & station boards which are in BTG scope of work shall also be considered under BTG bidder scope.	All the 11kV motor feeders and power supply feeders required for BOP & station loads shall also be considered under BTG scope of work. The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4 Nos (1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detailed engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detailed engineering.
4	Volume-II/SECTION 2	2.13.11 (x)	38	Bidder shall also provide necessary feeders for BOP area from emergency switchgear / PMCC as per BOP requirement during detail engineering; necessary design, space requirement and layout/cut-outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in BTG building/area shall also be considered under BTG scope of work.	Bidder shall also provide necessary feeders for BOP area from emergency switchgear / PMCC as per BOP requirement during detail engineering; necessary design, space requirement and layout/cut-outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in BTG building/area shall also be considered under BTG scope of work. The outgoing feeders for 415 V systems in SLD are indicative only. For BOP,2 nos. of outgoing feeders (1 no. from each bus section) on Emergency MCC (415V) are shown in SLD. In addition, 2 nos of outgoing feeders (1 no. from each bus section) on CW PMCC (415V) and FOPH PMCC shall be considered. The ratings of the feeders required for BOP shall be decided during detailed engineering.
5	Volume-II/SECTION 2	2.13.11 (xv)	39	Actuators - All motor driven actuators of the plant shall be integral type.	All motor driven actuators of the plant shall be Non-integral type. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non - integral Type only.
6	Volume-III/Part-B	2.09.06 (2) vii)	84	Features of Static Excitation System (If Applicable): 7) Field Application & Suppression Arrangement: a) Field breaker : The generator field breaker shall be of DC, multipole air break type, suitable for operation from local panel as well as from UCR	a) The generator field breaker shall be of DC or AC. The same shall be decided during DDE subject to approval from MAHAGENCO.
7	Volume-III/Part-B	9.01.12 i) ----- 9.03.04	243	9.01.12 MVA Rating i) The Quantity and rating of the 11/0.433 kV service Transformers shall be based on the actual load figures and 100% redundancy. For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer. Standby motors will be considered for Transformer sizing, maximum 70% loading of standby motors shall be considered. ----- 9.03.04 20% spare margin shall be considered while calculating the total load on the L.T. board.	9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered.Each Transformer shall be rated to meet the loads on both the bus sections of switchgear . Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b)Highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00).
8	Volume V/ Annexure III (Mandatory Spares)	8.1.12	102	Breaker contacts	Breaker contacts: 2 nos.

Amendment - 4

MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2 X 660 MW UNITS - 11 12 PROJECT
RFx NO. 3000046202 (BTG Package)
BTG ELECTRICAL AMENDMENT

BTG Electrical Amendements for 2x660 MW Koradi Project

Sr. No.	Electrical Equipment / Package Section	Cl. No.	Page no	Bid specification clause	To be read as/New clause
9	Volume V/ Annexure III (Mandatory Spares)	9	103	Power and Control Cables along with cabling accessories : 10 % of the installed quantity	Power and Control Cables along with cabling accessories : All types /grades of power and control cables along with cable accessories - 10 % of the executed cable length in standard specified drum length. Non standard drum length shall not be acceptable as a mandatory spare quantity. 10%of the executed cable accessories like straight through jointing kits, termination kits, glands and lugs shall be supplied as a mandatory spares. (Up to next round figure)
10	Volume V/ Annexure III (Mandatory Spares)	8.1 (415 V SWITCHGEAR, DC BOARDS)	103	To Be added	8.1.46 Intelligent Motor Control Relay (IMCR) : 3 no of each type with associated CTs 8.1.47 Electronic Overcurrent Relays (EOCR) : 3 no of Each Type with associated CTs 8.1.48 Transducer : 1 no for each type and rating 8.1.49 Multifuction meter communicable Type : 2 no of each type and rating
11	Volume V/ Annexure III (Mandatory Spares)	11.00 (BATTERY CHARGERS)	104	To Be added	11.1.8 Indicating Lamp : 2 No. for each colour
12	Volume IV/ Bid drawings	KEY SLD	-	To Be added	Typical feeders with lighting transformers & welding transformers to be considered in SLD.
13	Volume-III/Part-B	Data Sheet: NEUTRAL GROUNDING RESISTOR	186	Sr. No. 3.5 Enclosure Protection Class - IP 23	Enclosure Protection Class - IP 33
14	Volume-III/Part-B	8.01.10	201	Incomers from all the Transformers and all outgoing feeders (power supply and motor feeders) shall be provided with Lightning Arrestor 11kV side.	Incomers from all the Transformers and all outgoing feeders (power supply and motor feeders) shall be provided with Surge Arrestor 11kV side.
15	Volume-III/Part-B	12.17.04	318	Cl.8.17.04 All equipment to be supplied shall be of type tested quality. These tests may have to be repeated if desired:-	All equipment to be supplied shall be of type tested quality. However, following type tests shall be performed:-
16	Volume-III/Part-B	DATASHEET	319	7. Busbar material (Conductor)- Aluminium alloy 13.Earth bus ii) Size-50mmx10mm 14. Enclosure i) Degree of protection-IP55	7. Busbar material (Conductor)- i) Upto 2000A- Alluminium alloy ii) Above 2000A-Copper 13.Earth bus ii) Size-75 x 10 mm 14. Enclosure i) Degree of protection- Indoor-IP55 & outdoor-IPW55

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MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2 X 660 MW UNITS - 11 12 PROJECT
RFx NO. 3000046202 (BTG Package)
BTG ELECTRICAL AMENDMENT

BTG Electrical Amendements for 2x660 MW Koradi Project

Sr. No.	Electrical Equipment / Package Section	Cl. No.	Page no	Bid specification clause	To be read as/New clause
17	Volume-III/Part-B	NEW CLAUSE	326	New clause addition after Cl. No.14.01.01	SERVICE CONDITIONS 1 The motors will be installed in hot, humid and tropical atmosphere, highly polluted at places with coal dust and/or fly ash canopy to be provided to all outdoor install motors. 2 Unless otherwise noted, electrical equipment/system design shall be based on the service conditions and auxiliary power supply given in the annexure to this specification. 3 For motor installed outdoor and exposed to direct sunrays, the effect of solar heat shall be considered in the determination of the design ambient temperature 4. Motor located in Hazardous area shall be flame proof type.
18	Volume-III/Part-B	NEW CLAUSE	328	addition in 14.04.01: AC Motors: i) Squirrel cage induction motor suitable for direct-on-line starting. ii) Crane duty motors shall be squirrel cage Induction motor of S4 dutyand 40% CDF. Addition in 14.04.02: DC Motors shall generally be of shunt wound type rated for 220V DC.	AC Motors 1. Motors shall be general purpose, constant speed, squirrel cage, three phase, induction type. 2.All motors shall be rated for continuous duty. They shall also be suitable for long period of inactivity. 3.The motor name plate rating at 50DegreeC shall have more than 10% margin over the input power requirement of the driven HT equipment & 15% for LT driven equipments at rated duty point unless stated otherwise in driven equipment specification or in general electrical specification. 4.The motor characteristics shall match the requirements of the driven equipment so that adequate starting, accelerating, pull up, break down and full load torques are available for the intended service. DC Motors 1. D.C. Motor provided for emergency service shall be shunt/compound wound type rated for 220V DC 2. Motor shall be sized for operation with fixed resistance starter for maximum reliability. 3. Starter panel complete with all accessories shall be included in the scope of supply
19	Volume-III/Part-B	NEW CLAUSE	329	New clause addition after clause 14.12.00	RUNNING REQUIREMENTS 1 Motor shall run continuously at rated output over the entire range of voltage and frequency variations as given in the annexure. 2 The motor shall be capable of operating satisfactorily at full load for 5 minutes without injurious heating with 75% rated voltage at motor terminals. 3 The motor shall be designed to withstand momentary overload of 60% of full load torque for 15 second without any damage. 4 Motor shall not be stalled if the supply voltage drops to 70% of the rated voltage for 1 minute duration. STARTING REQUIREMENTS 1. Motor shall be designed for direct online starting at full voltage. Starting current shall not exceed 6 times full load current for all auxiliaries except boiler feed pump where the starting current shall be limited to 4.5 times. No further tolerances are applicable on starting current specified above for HT motors 2. The motor shall be capable of withstanding the stresses imposed if started at 110% rated voltage 3.Minimum starting requirement for mill motor (double cage) shall be 85% rated voltage at motor terminals. 4.Motor shall be capable of three equally spread starts per hour, two starts in quick succession from cold condition and one restart from hot condition. 5.Cranking motor shall be capable of six equally spread starts per hour, three starts in quick succession from cold condition and one restart from hot condition. The coal conveyor and crusher motors shall be suitable for 3 consecutive hot starts with maximum 20 starts per day. 6.Pump motor subject to reverse rotation shall be designed to withstand the stresses encountered when starting with shaft rotating at 125% rated speed in reverse direction. 7. HT pump motors shall be suitable to start with forward rotation. 8.The motors shall be designed to withstand 120% of rated speed for 2 minutes without any mechanical damage
20	Volume-III/Part-B	14.028.01	192	BEARINGS Furnishing of all labour, skilled and unskilled, supervisory and administrative personnel, erection tools and tackles, testing equipment implements, supplies, consumables & hardware for timely efficient execution of complete work	Clause is not relevant for Bearing . Hence, deleted.

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Sr. No.	Electrical Equipment / Package Section	Cl. No.	Page no	Bid specification clause	To be read as/New clause
21	Volume-III/Part-B	17.06.03 (ii)	392	The maximum acid gas emission shall be less than 20 by weight.	The maximum acid gas emission shall be less than 20 by weight and shall not exceed 2% for FS cable.
22	Volume-III/Part-B	17.07.00	395	To Be added	v) Write up on Manufacture's recommended method of splicing, jointing, termination etc of the cable
23	Volume-III/Part-B	17.10.04 Junction Boxes	401	Existing clause to be replaced.	Modified 'Annexure - B' (enclosed) shall be referred for Junction Boxes details instead of existing clause (17.10.04)
24	Volume-III/Part-B	New Clause	411	New clause addition after 17.18.00	TERMI-POINT CONNECTION- 1 .The conductor (solid or stranded) is forced against the contact area of the 2.4 x 0.8 mm or 1.6 x 0.8 mm connection pin by means of a tin-coated bronze clip, which maintains a constant pressure. In the Maxitermi-point method, 2.4 x 0.8 mm pins is used without exception. 2 .The conductor is "shot" onto the pin together with the clip. The resulting friction causes both the wire and the contact area of the pin to be cleaned and any oxide layers to be penetrated. 3.Apart from this the wire and the clip are deformed in such a way that a gas- tight connection with very good electrical and mechanical properties is established. 4. A special manually or pneumatically driven gun is required. Up to 3 adjacent connections can be "shot" onto one pin. In most cases only one clip at the base of the pin is attached. The sections above usually remain vacant. Any part of a connection pin may be reused several times after removal of the existing clip connection. Contact areas below existing connections that have become vacant can be reused by pushing the connections above the vacant space downwards, so that the new connection can be "shot" on above the top connection. The single jumper wires need not be specially prepared as the end insulation is stripped within the tool. 5. This connection method requires special insulation of the wires. The diameter of solid conductors is 0.8 mm the cross-section of stranded conductors 0.5 Sq.mm. 6. The conductor is deformed greatly when attached and is to be shortened by 3 mm when disconnected and reused. 7. Strips and special tools for termi-point connection shall be supplied by the Contractor.
25	Volume-III/Part-B	20.07.00	464	All the equipment supplied shall be of type tested quality. Type test on HT VFD's shall be conducted at independent laboratory and same shall be witnessed by customer.	All the equipment supplied shall be of type tested quality. Type test on HT VFD's shall be conducted at <u>NABL/Govt.of India accredited laboratory</u> and same shall be witnessed by customer.
26	Volume-III/Part-B	24.03.10 Jointing and Connection	328	To Be added	For test pits, the Electrode will be 100 mm dia. Heavy duty C.I. pipe with perforations. Electrodes installed in test pits will have disconnecting facilities
27	Volume-III/Part-B	24.03.11	541	To Be added	Dedicated treated earth pit shall be provided for lightning protection system.
28	Volume-III/Part-B	24.03.11	541	To Be added	Material for electronics earthing system (electronics earth electrode, earthing bus and single core copper cable from earth pit to electronic earthing bus) shall be of hard drawn copper wire as per equipment vendor suppliers requirement. Connection from electronic earth bus to individual equipment shall be with minimum 6 sq. mm. copper cable or equipment supplier recommendation whichever is higher
29	Volume-III/Part-B	24.03.11	541	To Be added	The spacing between two horizontal air termination shall not exceed 10 meters
30	Volume-III/Part-B	1.28.00: Selection of Cables	34	1.28.10. (i) Wherever the termination of Aluminium cable is not possible due to size of motor terminal box, local JB to be suitably located near the motor terminal box and then copper cable of appropriate cross section shall be provided from the local JB to the motor terminal box.	Wherever the termination of Aluminium cable is not possible due to size of motor terminal box, local JB to be suitably located near the motor terminal box and then copper cable of appropriate cross section shall be provided from the local JB to the motor terminal box with provision of suitable bi-metallic connectors.

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Sr. No.	Electrical Equipment / Package Section	Cl. No.	Page no	Bid specification clause	To be read as/New clause
31	Volume-III/Part-B	1.48.00 Spares philosophy	50	1.48.05 10% or minimum 1(one), whichever is higher, spares to be provided for all electronic cards related to Excitation system, VFD, Battery charger etc.	10% or minimum 1(one), whichever is higher, spares to be provided for all electronic cards related to all electrical systems consisting of electronic cards such as Excitation system, VFD, Battery charger etc.
32	Volume-III/Part-B	8.01.00 Scope of Supply	201	8.01.08 In each bus section of the 11 and 3.3 kV switchgear at least one spare feeder shall be provided for highest and lowest rating motors or 20% of total motor feeders whichever is higher and one spare feeder for largest and smallest rating Service transformer or 20% of total transformer spare feeder whichever is higher and one spare feeder for largest and smallest rating outgoing power supply feeder or 20% of total power supply feeder whichever is higher.	In each bus section of the 11kV and 3.3 kV switchgear at least one spare feeder shall be provided for highest and lowest rating motors ~~or 20% of total motor feeders whichever is higher~~ and one spare feeder for largest ~~and smallest~~ rating Service transformer ~~or 20% of total transformer spare feeder whichever is higher~~ and one spare feeder for largest and smallest rating outgoing power supply feeder ~~or 20% of total power supply feeder whichever is higher~~ .
33	Volume-III/Part-B	8.01.00 Scope of Supply	201	8.01.09 In each bus section of the 3.3 kV switchgear at least one spare feeder shall be provided for highest rating motor and one spare feeder for lowest rating Motor.	Delete the clause as already covered in cl. No. 8.01.08
34	Volume-III/Part-B	23.09.00 SPECIFIC REQUIREMENT-SUPPLY	513	Note to be added under cl. 23.09.09	The welding DB of respective area shall be fed from 2 Nos. 415 V/415 V ± 5%, indoor, dry type cast resin encapsulated welding transformers which shall be fed from LT MCC of respective area
35	Volume-III/Part-B	22.10.00:TESTS	485	22.10.03 : The Bidder shall conduct all the type tests as per latest IS-1146 (for rubber & plastic containers for lead-acid storage batteries)/IS 1652 (for lead-acid plante batteries).	22.10.03 : The Bidder shall conduct all the type tests as per latest IS-1146 (for rubber & plastic containers for lead-acid storage batteries)/IS 1652 (for lead-acid plante batteries). 1. Verification of constructional requirements 2. Dimensional Check 3. Tests for capacity 4. Retention of charge test 5. Ampere-hour and watt-hour efficiency tests 6. Life & endurance test 7. Short circuit current and internal resistance measurement test 8. Test for loss of capacity on storage 9. Test for resistance for overcharge 10. Test for voltage & specific gravity during discharge 11. Test for high rate discharge at normal temperature & at low temperature 12. Accelerated aging test followed by Seismic test
36	Volume-III/Part-B	22.10.00: TESTS	485	22.10.04 : Routine and Acceptance tests shall be as per Quality Assurance & Inspection table of battery	22.10.04 : Routine and Acceptance tests shall be as per Quality Assurance & Inspection table of battery 1. Visual Inspection 2. Dimensional Check 3. Test for capacity 4. Test for voltages & specific gravity during discharge 5. Insulation resistance. 6. Internal resistance of cells
37	Volume-III/Part-B	1.12.03: Unit Transformer/Station Transformer/Unit Auxiliary Transformer Protections	17	To be added under note	Minimum electrical protections for Generator, GT, UT & ST are mentioned in respective sections. However, any additional requirement (including cabling, system integration, incorporation, etc.) for system healthiness / completeness, from MSPGCL OR MSETCL / MSEDCL, during erection, commissioning & testing stage shall also be incorporated by the Bidder without any financial implication to MAHAGENCO.
38	Volume-III/Part-B	3.00.00 : Power Transformer	136	Annexure - 1 pertaining to NIFPS	Modified 'Annexure - A' (enclosed) shall be referred for NIFPS details instead of existing 'Annexure - 1'.

Annexure-A**(Enclosure to Amendment 4, Sr. No. 38)****Vol. III, Part – B, Cl. No. 3.00.00 - Power Transformer****FIRE PROTECTION SYSTEM****1.00.00 General**

Nitrogen Injection Fire Protection System (NIFPS) shall be provided for Transformers including Generator Transformers (Including Spare GT), Station Transformers, Unit Transformers and all transformers rated 10 MVA & above Located outside Main Plant Boundary, against the transformer explosion which shall use nitrogen as quenching medium.

The system shall include 'Nitrogen Injection, drain and Stir Method type' fire prevention and extinguishing system along with all associated fitting and control equipments. All items for complete system shall be listed out in bill of material for supply.

All equipment provided under the specification shall in general, conform to the latest issue of International standards or following Indian standards:

IS: 10028 - Code of practice for selection installation & maintenance of transformers

IS: 3034 - Fire Safety of Industrial Buildings Electrical Generating and Distributing Stations-Code of Practice

CBIP Guidelines for Fire Protection of Power Transformers

The electrical installation shall meet the requirements of Indian Electricity act 2003 & IS: 10028 'Code of practice for selection, installation & maintenance of transformers' and relevant CEA regulations as named up to date.

2.00.00 Details of the system

- a) The fire protection/prevention system shall work on the oil drain, Nitrogen Inject and Stir method. The system shall operate correctly during fire on transformer due to internal or external factors, including fire due to bursting of transformer bushing. Fire detectors (bulb type or linear hear detector type) provided on the transformer top cover / body shall take minimum time for detection of fire and initiate the fire protection system. The Bidder shall give complete details of the system and also arrange to demonstrate the operation of the fire-fighting system, if desired by the Purchaser.

- b) Operational Controls:

Owner shall provide two distinct station auxiliary DC feeders for control purposes.

The system shall work on station DC supply with voltage variation +/- 10%. The control box of fire protection system shall have facility to receive

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these feeders for auto changeover of supply. It shall be the contractor's responsibility to further distribute power to the required locations. Individual system component, equipment should not have working voltage other than station DC voltage. AC-DC / DC-DC converter, timer shall not be used for reliable operation.

Systems suitable for operation on station DC aux. supply (220V DC) shall be offered. The system shall operate in 'Auto'/'Remote Electrical'/'Local Manual' modes. Provision shall be available to keep the system "OUT", which is necessary for preventing any mal-operation during transformer maintenance.

On initiation of the fire extinguishing system on detection of fire, if the circuit breakers fail to trip/trip-relay fails to operate, suitable audible alarm should be sounded so as to call the attention of the operator to trip the breakers manually, and simultaneously initiating the oil drain and nitrogen injection system.

System shall operate on following situations:

i) Prevention of transformer from explosion and fire:

To prevent transformer from explosion and fire in case of an internal fault, signals given by operation of Electrical protection Differential / Restricted earth fault relays AND operation of either Buchholz relay or pressure relief valve (PRV) or rapid pressure rise relay (RPRR) AND tripping of circuit breaker of transformer shall be used to activate the system.

On receiving activation signals, the following shall take place:

- a) Open the quick opening drain valve to drain the top layer oil
- b) Shut off the conservator isolation valve to prevent flow of oil from the Conservator tank to the main tank
- c) Open the gas valve after commencement signal of oil drain valve to inject Nitrogen into the transformer tank to create stirring of oil.

ii) Prevention of transformer from fire:

In case of fire, sensed by fire detectors, the system shall be activated only after operation of either Buchholz relay or pressure relief valve (PRV) or rapid pressure rise relay (RPRR) AND electrical isolation of the transformer, confirmed by breaker trip shall be used to activate the system.

On receiving activation signals, Following shall take place:

- a) Shut off the conservator isolation valve to prevent flow of oil from the Conservator tank to the main tank
- b) Open the quick opening drain valve to drain the top layer oil
- c) Open the gas valve after commencement signal of oil drain valve to inject Nitrogen into the transformer tank to create stirring of oil.

If the fire detection is not associated with any other fault, the system activation shall be only manual.

Manual operation switch shall be provided in the control room with a cover to avoid accidental operation of it.

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The manual operating system shall be used only in case the automatic system fails to operate and hence the arrangement for manual operation shall be provided in a box and shall be accessible only after breaking the glass cover on this box.

The Bidder shall confirm whether it is advisable to initiate the “oil drain and nitrogen injection” manually even when the transformer is not electrically isolated due to stuck breaker problem.

- c) The system shall be compatible to be hooked on to the station SCADA/ fire alarm system. Systems using micro-processor/micro-controller will be given preference.
- d) The system should have its own temperature sensors to detect all types of fires. On detection of fire (by the sensors) and receipt of positive feedback signal regarding “Master trip relay operated” the system shall start operation, initially draining out top level oil in the main tank and simultaneously closing the valve in the conservator line and then start nitrogen injection into the transformer tank.
- e) The system shall have built-in on line testing facility, which will be operatable without affecting the functioning of the transformer.
- f) The system shall preferably have built-in facility for monitoring/display of the following:
 - (i) Oil temperature.
 - (ii) Tank pressure.
 - (iii) Healthiness of all sensors.
 - (iv) ‘Open’/ ‘Close’ status of valves. (Conservator oil isolation valve, Oil drain valve, Gas inlet valve, etc.)
- g) Provision shall be available for indication / annunciation (along with audible alarm) of the following:
 - (i) Increase in temperature of oil/tank pressure beyond the set limit.
 - (ii) Detection of fire due to external causes.
 - (iii) Low nitrogen pressure.
 - (iv) DC supply fail
 - (v) System initiated (automatic)
 - (vi) Automatic operation failed.
 - (vii) Control cable faulty.
 - (viii) Oil drain started
 - (ix) Nitrogen injection started

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- h) All valves used in the system shall preferably be stainless steel ball type together with flanges. By-pass valves along with electrical limit switches shall be provided wherever required. The connecting cables shall be Fire Retardant Low Smoke (FRLS) armoured cables. Cables passing along the top of the transformer shall be Fire Survival (FS) type.
- i) The Bidder shall furnish the complete details including bill of materials of the fire extinguishing/fire prevention system offered. The list of all accessories including FRLS & Fire Survival cables, pipes, valves, sensors, control cubicle, Nitrogen gas cylinder, etc. shall be listed out and furnished in the offer.
- j) The Bidder/manufacturer shall ensure that the fire protection/prevention system offered is fool-proof and reliable. Installation, testing and commissioning of the fire-fighting system shall also be in the Bidder's scope.
- k) Fire Protection System should be capable of working on Automatic Mode, Remote Electrical mode and Local manual mode.
- l) The Fire Fighting Scheme for the power transformer should have authentic certification regarding performance issued by any standard approved laboratory.
- m) The manufacturers of such scheme should have past experience and should submit the list of such scheme supplied and commissioned.
- n) System shall be compatible to fit with generator transformer in case of replacement of spare GT.
- o) Nitrogen release scheme shall be designed in such way that the nitrogen gas shall not enter the energized transformer in case of passing/leakage of valve.

3.00.00 Technical Particulars:

- 3.01.00 The contractor shall be responsible for the design of the complete system and shall submit the drawings and design calculations for the number of fire detectors, pipe sizing of drain pipe and Nitrogen injection pipe, Nitrogen cylinder capacity, etc. and get approval from MAHAGENCO.
- 3.02.00 Facility shall be provided to test the system when the transformer is in service, without actually draining the oil and injecting Nitrogen.
- 3.03.00 The Nitrogen gas valves shall be designed in such a way that the Nitrogen shall not enter the transformer tank even in case of passing/ leakage of valve and shall exit from exhaust port of the valve.

Fire extinction period from commencement of nitrogen injection	30sec(max)

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Total time duration to bring oil temperature below flash point	30 minutes (Max)
Fire detector's (quartz bulb) heat sensing temperature	141 deg. C
Transformer Conservator Isolation valve setting for normal operation (Valve should not close) to ensure no obstacle for transformer breathing	40 Ltr/min
Transformer conservator isolation valve setting for operation during abnormal flow of oil due to rupture/explosion of tank or bursting of bushing/oil drain during system operation	60 Ltr/min (Minimum)
Capacity of nitrogen cylinder	10 m ³ gas at pressure of 150 kg/cm ² up to 60000 liters oil capacity of transformer / transformer and 20m ³ gas at pressure of 150 kg/cm ² above 60000 liters of oil capacity of transformer / tractor tank
Power supply for control box	220V DC
for fire extinguishing cubicle for lighting	220V DC

4.00.00 System Equipment:

4.01.00 Fire extinguishing cubicle frame shall be made of CRCA sheet complete with the base frame, painted inside and outside with post office red colour (shade 538 of IS -5). It shall have hinged / hinged split doors fitted with high quality tamper proof lock. The doors, removable covers and panels shall be gasketed all round with gaskets. The degree of protection shall not be less than IP56, containing at least the following:

- Nitrogen gas cylinder of sufficient capacity with pressure regulator having excess pressure relief device, pressure adjusting knob at bottom and manometer with sufficient number of adjustable NO contacts.
- Oil Drain Assembly including oil drain pipe extension of suitable size for connecting pipes to oil pit.
- Nitrogen gas release unit with primary and secondary gas devices with exhaust port.
- Mechanical release devices for oil drain and nitrogen release
- Machine control unit to co-ordinate operation of oil drain and nitrogen release.
- Limit switches for monitoring of the systems
- Panel lighting

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- Flanges on top of the panel for connecting oil drain and nitrogen injection pipes for transformer
- Back up pressure monitoring switch having two way and three way valve arrangement, detecting pressure of oil in addition to signal from limit switch to operate nitrogen gas valve
- Pressure indicators for Nitrogen pressure of the cylinder and actual injection through Nitrogen regulator
- Nitrogen injection gas shall be released through flow control device.
- Fire Extinguishing Cubicle shall have oil leakage detection arrangement for detecting oil leakage from drain valve. In case of any oil leakages from drain pipe, alarm to be provided.

4.02.00 The remote control panel, to be mounted inside the control room shall accommodate the necessary control unit operating switches, push buttons, etc., as also the display unit and alarm annunciation unit.

4.03.00 Required number of fire detectors (quartz bulb) to be located in strategic locations to be finalized during detailed engineering. Fire detectors shall have minimum IP 67 class degree of protection.

4.04.00 All controls, alarms, panels, cables, cable trays (if required), junction boxes, etc.

4.05.00 Flow sensitive conservator Isolation valve:

- a. In order to restrict the supply of oil in case of a fire in transformer/reactor, rectangle flow sensitive valve shall be provided to isolate the conservator oil from the main tank. The valve shall be flow sensitive and shut off when the flow in the pipe is more than the flow expected in the permissible normal operating conditions. It shall not operate when oil pumps are switched on or off. This valve shall be located in the piping between the conservator and the buchholz relay and shall not affect the flow of oil from and to the conservator in normal conditions.
- b. When the flow from conservator to main tank is more than the normal operating conditions, the valve shall shut off by itself and will have to be reset manually. It shall be provided with valve open/close position indicator along with alarm contact indication in control room during closing operation of valve. This valve shall be provided with locking arrangement for normal position and oil filling / filtration position. A suitable platform or ladder (if required) shall be provided by transformer manufacturer to approach the valve for manual reset.

4.06.00 Signal box: It shall be mounted away from Transformer main tank, preferably near the marshalling box, for terminating cable connections from conservator isolation valve & fire quartz bulb detectors and for further connection to be control box. The degree of protection shall be IP55.

4.07.00 CABLE

Fire survival cables (capable to withstand 750° C.) of 4 core x 1.5 sq. mm size for connection of detectors in parallel shall be used. The fire survival cable shall conform to BS 7629-1, BS 8434-1, BS 7629-1 and BS 5839-1, BS EN 50267-2-1 or relevant Indian standards. Fire Retardant Low Smoke (FRLS) cable of adequate size shall be used for connection of signal box / marshalling box near Transformer and FEC mounted near Transformer with control box mounted in control room.

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Fire Retardant Low Smoke (FRLS) copper cable of 4 core x 1.5 sq. mm size shall be used for connection between control box to DC & AC supply source, FEC to AC supply source, signal box / marshalling box to transformer conservator isolation valve connection on Transformer. Separate cables for AC supply & DC supply shall be used.

4.08.00 **Specification of UG tank**

Each transformer unit shall be provided with an underground oil storage tank. The oil storage tank shall have Non Corrosive, water proof, epoxy coated (from Inside) mild steel (minimum thickness 5 mm) to store drained out oil on operation of NIFPS. The tank shall be painted from outside as per table below:

PAINTING	Surface Preparation	Primer Coat	Intermediate undercoat	Intermediate undercoat	Total dry film thickness (DFT)	Colour shade
Oil storage Tank	Shot Blast cleaning Sa2 ½*	Epoxy base Zinc primer (30-40µm)	Epoxy high build Micaceous iron oxide (HB MIO) (75µm)	Aliphatic polyurethane (PU) (Minimum 50µm)	Minimum 155µm	RAL 7035 / Black
Note: (*) indicates Sa 2 ½ as per Swedish Standard SIS 055900 of ISO 8501 Part-1.						

All the pipe and physical connection from transformer to oil pit shall be in the scope of contractor.

A. OIL Container:-

- i) Capacity of tank shall be of 20% excluding free board as per requirement of the total oil capacity of the largest transformer.
- ii) Tank shall be of cylindrical shape and made of minimum 5 mm thick MS sheet.
- iii) Cylinder shall be placed with horizontal axis below ground level with adequate supporting frame of angles and channels at bottom and clamp on sides. The bottom frame shall be fixed firmly with bolts grouted in ground with cement concrete 1:2:4 (1 cement: 2 Coarse sand: 4 graded stone aggregate).
- iv) Tank shall have
 - a) 700mm dia. air tight manhole cover with gasket.
 - b) Drainage/suction valve.
 - c) Lifting hooks of suitable strength.
 - e) Air vent pipe with through silica gel breather. One no.

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drain/suction pipe DN 50 NB on topmost circular surface of tank.

- f) One no. drain pipe DN 150 NB on vertical flat surface of tank and
- g) All other accessories for functional requirement of tank.

B. Chamber for OIL tank below GL :-

- i) Chamber shall be of rectangular in size having minimum 50 CM clearance on sides and top of the MS tank.
- ii) Bottom slab of the tank shall be minimum 125 mm thick RCC 1:1:5:3 (1 cement: 1.5 coarse sand: 3 grade stone aggregate of 20 mm of nominal size) having reinforcement 12 mm dia. @ 175 center to center both ways (TMT bars confirming to relevant IS codes).
- iii) Cement shall confirm OPC 43 grade
- iv) Water proofing compound @ 1 kg./bag cement as per CPWD specification shall be mixed with the cement in RCC and plaster work.
- v) Side walls of the chamber shall be brick masonry in cement mortar. (1 cement: 4 Coarse sand) with bricks confirming to class designation 75 thickness of wall shall be given below.
 - a. From GL to 500 mm below GL -230mm.
 - b. From 500 mm below GL to 1250 mm below GL -345 mm.
 - c. From 1250 mm below GL to 2000 mm below GL -4 60 mm.
- vi) Complete inside face and outer surface up to 300 mm below of GL of wall shall be plastered with 15 mm thick cement mortar 1:4 (1 cement : 4 fine sand) having neat cement punning on top of the plaster.
- viii) Top of brick wall shall have 100mm thick coping in cement concrete 1:2:4 (1 cement : 2 Coarse sand : 4 graded stone aggregate 20 mm nominal size.) Space between wall and MS tank including bottom gap and top of tank shall be filled with dry Jamuna sand after fixing of tank in chamber and on top of Jamuna sand gap shall be plugged with cement concrete 1:2:4 (1 cement: 2 coarse sand: 4 graded stone aggregate) having minimum 125 mm thickness.
- ix) For 700 mm dia. of manhole of tank, round MS sheet of 700 mm dia., 5mm thick and length as per requirement to be provided as attachment with tank.

5.00.00 Installation and pre-commissioning test

The Contractor shall carry out a detailed inspection and testing program for field activities covering areas right from the receipt of material stage up to commissioning stage jointly with the Owner's representative before the system is put in service.

6.00.00 General Information to Bidder

The bidder is advised to visit project site and get detail information/drawings and make comparative study of connections, orientation of marshalling box/cubicle & conservator, existing foundation plan and location of fire wall etc. The bidder shall offer the system for as a standalone one to existing transformer i.e. there will be no need to change the existing foundation, LV side bus duct connection and external cable connection etc.

ANNEXURE – B**(Enclosure to Amendment 4, Sr. No. 23)****Vol. III, Part – B, Cl. No. 17.10.04 - JUNCTION BOXES****A) Glass Fibre Reinforced Junction Boxes (For outdoor use)**

1) No. of Ways: 12 / 24 / 36 / 48 with 20% spare terminals.

2) Design

Junction boxes shall be Glass Fibre Reinforced with saturated polyester informing to standards like DIN 16911 type 803 / 16913 type 834, 5 self-extinguishing in accordance with ASTM D 635 / UL 94 VO. Junction boxes for use in outdoor or damp locations shall be sturdy construction. Temperature resistance between – 10 to 100°C. Impact resistance shall be greater than 7 Nm, (EN 50 014). Protective insulation shall be in line with VDE 0100, dielectric strength shall be greater than 10 kV/ mm, halogen free toxicity, the enclosure and door cover shall be painted and electrostatically powder coated (preferably in RAL 7032). Earth connection (studs size shall be M 6) shall be provided on the cover as well as door.

3) Doors:

With integrated viewing window of 3 mm resistant plexi – glass or equivalent. The doors shall have industrial heavy – duty hinges. The doors shall be easily but firmly lockable with quick release fastener.

4) Protection Class- Protection Category shall be IP 66 to EN60 529. There shall be guaranteed perfect seal to meet Protection class IP 66 providing sealing arrangement like highly elastic foamed in special type seal like polyurethane / chloroprene. The sealing rubber shall not have aging effect and shall retain its sealing characteristics for more than 20 yrs. Bidder shall indicate this in data sheet. The rubber seal should be pasted at its place with pasting technology for like more than 20 yrs (double sealing arrangement is preferred).

5) Mounting clamps and accessories Suitable for mounting on walls, columns and structure. Brackets, bolts, nuts, screws, glands and lugs required for erection shall be of brass. The accessories like mounting plants etc. of steel shall be powdered coated. The support rails for terminal box shall be zinc coated

6) General

- (i) JBs shall have small canopy at the top.
- (ii) There shall be rainwater collection arrangement from top and side of the outer ages to ensure that any leakage in to the junction box shall be avoided and it shall fall outside.
- (iii) Cable entry shall be from bottom side only.
- (iv) Ensure gland plate sealing perfect. It shall be of the same quality and arrangement as that of door to cover arrangement.

B) Steel Junction Boxes :(For indoor use)

1) No. of Ways: 12 / 24 / 36 / 48 with 20% spare terminals.

2) Design

Junction boxes shall be designed in accordance with NEC, article 370, paragraph 18, 20 or equivalent standards.

3) Enclosure

Junction boxes for use in outdoor or damp locations shall be sturdy steel construction. The enclosure and door cover shall be surface finished clean, degreased, phosphate, deep coated primed (preferably in RAL 7044) and electrostatically powder coated (preferably in RAL 7032). Earth connection (studs size shall be M 6) shall be provided on the cover as well as door. The sheath steel thickness shall be minimum 2 mm.

4) Doors

The doors shall be hinged and lockable. The doors shall have industrial heavy – duty hinges. The doors shall be easily but firmly lockable with quick release fastener.

5) Protection Class

Protection Category shall be IP 66 to EN60 529 / 10.91 complies with NEMA 4. There shall be guaranteed perfect seal to meet Protection class IP 66 providing sealing arrangement like highly elastic foamed in special type seal like polyurethane. There shall be an arrangement like multi-fold protection channel for additional stability and prevention of ingress of dust and water when the enclosure is open. The sealing rubber shall not have aging effect and shall retain its sealing characteristics for more than 20 yrs. Bidder shall indicate this in data sheet. The rubber seal should be pasted at its place with pasting technology for like more than 20 yrs (double sealing arrangement is preferred).

6) Mounting clamps and accessories: Suitable for mounting on walls, columns and structure. Brackets, bolts, nuts, screws, glands and lugs required for erection shall be of brass.

7) General:

(i) JBs shall have small canopy at the top

(ii) There shall be rainwater collection arrangement from top and side of the outer ages to ensure that any leakage into the junction box shall be avoided and it shall fall outside.

(iii) Cable entry shall be from bottom side only.

(iv) Ensure gland plate sealing perfect. It shall be of the same quality and arrangement as that of door to cover arrangement.

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AMENDMENT TO PERFORMANCE GUARANTEES

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.

(A wholly owned subsidiary of STEAG Group, Germany)

A-29, Sector-16, NOIDA - 201301, India

JUNE, 2024

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11.30.00 GUARANTEES UNDER CATEGORY – I (PERFORMANCE GUARANTEES UNDER LIQUIDATED DAMAGES) ARE AS FOLLOWS:

11.30.01 UNIT HEAT RATE AT 100% TMCR LOAD

- i) This will be the Guaranteed Heat Rate in kcal/kW_{hr}, at 660MW under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make-up.

11.30.02 TG OUTPUT AT VWO CONDITION

- i) Continuous TG output of 693 MW unit load (i.e. 105% of rated load) under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make-up.

11.30.03 AUXILIARY POWER CONSUMPTION

- i) Power consumption of all unit & station auxiliaries shall be taken for continuous unit operation at 660 MW (i.e. 100% rated load) under rated steam conditions and at guaranteed condenser pressure with 0% make-up with design coal.
- ii) Note: Power consumption of each of the pump/fan/compressors/ Conveyors etc. wherever mentioned shall be measured with its own drive at the switchgear end.

11.30.04 STEAM GENERATING CAPACITY

- i) Steam generating capacity in Tons/hr of steam at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's discretion) with the coal being fired from within the specified range in Volume – II, Section – 1, Project Information.

11.30.05 AVERAGE CONDENSER PRESSURE

- i) Average Condenser pressure in mm Hg (abs) measured at 300 mm above the top row of condenser tubes with 660 MW output, 0% make up, design CW temperature and design CW flow.

Note: The condenser pressure measurement while conducting the guarantee tests from (i) to (iv) above shall be measured at 300 mm above the top row of condenser tubes.

11.30.06 APH LEAKAGE

- i) APH leakage; not more than 8%.

11.30.07 LIMESTONE CONSUMPTION RATE

- i) Limestone consumption of FGD system in kg/hr, while firing worst coal under guarantee point conditions.

11.30.08 AMMONIA (ANHYDROUS) CONSUMPTION RATE

- i) Ammonia consumption of SCR system in kg/hr under guarantee point conditions.

11.30.09 FOR THE ABOVE PURPOSE, RESPECTIVE (CAT-I) PERFORMANCES / GUARANTEES WILL BE COMPUTED AND ESTABLISHED AS FOLLOWS:

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i) *Unit Heat Rates are to be computed as below:*

$$\text{UNIT HEAT RATE (@100\%)} = \frac{\text{Turbine Cycle Heat Rate (THR @100\%)}}{\text{Steam Generator Efficiency (SG\_EFF @100\%)}}$$

ii) To establish the above, following tests for Turbine Cycle Heat Rate and Steam Generator Efficiency shall be conducted simultaneously but independently:

a) Following tests for Turbine Cycle Heat Rate and Efficiency of Steam Generator shall be conducted simultaneously, but independently:

- 1) Turbine Cycle Heat rate in kcal/kWhr under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum) with zero make up at 660 MW unit load (i.e. 100% of rated load).
- 2) Efficiency of the Steam Generator at 660 MW unit load (i.e. 100% of rated load) with 27 degree Celsius ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air.
- 3) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm² (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 565 deg C / 593 deg C (as selected) at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum) with zero make up at 363 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation.
- 4) Efficiency of the Steam Generator at 363 MW unit load (i.e. 55% of rated load) with 27 degree Celsius ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air.

iii) *Turbine Cycle Heat Rate -*

a) Turbine cycle heat rate at respective TMCR unit loads, after subtracting excitation power and power of TG integral auxiliaries with following conditions:

- 1) Cycle make-up : 0% makeup
- 2) Cooling water inlet temperature of 33 °C, and minimum 10 deg.C temperature rise across the condenser
- 3) TDBFP's in operation
- 4) Generator power factor of 0.85
- 5) Optimised Vacuum

b) Gross Turbine cycle heat rate at respective TMCR condition shall be calculated after accounting for pressure drop in main steam piping,

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Reheater system and all extraction steam piping from steam turbine to feed water heaters & deaerator

- c) Gross Turbine Cycle Heat Rate shall be calculated as follows & indicated in all computed heat balance diagrams:

$$\text{HEAT RATE} = \frac{M_1(H_1 - h_1) + M_2(H_3 - H_2) + M_{IS}(h_1 - h_{IS}) + M_{IR}(H_3 - h_{IR})}{P_G}$$

Where,

M_1 = Quantity of live steam entering the turbine stop valve including any live steam supplied to valve stems, or glands etc. in Kg/hr

M_2 = Quantity of steam from turbine to reheater in Kg/hr

M_{IS} = Quantity of Superheater desuperheating spray flow in Kg/hr

M_{IR} = Quantity of desuperheating water flowing into reheater system for regulation of steam temperature in Kg/hr

H_1 = Enthalpy in kcal/kg of live steam

H_2 = Enthalpy in kcal/kg of steam to reheater

H_3 = Enthalpy in kcal/kg of reheated steam

h_1 = Enthalpy of feed water in kcal/kg at the downstream of the junction of feed flow and bypass flow of last HP heaters

h_{IS} = Enthalpy of superheater desuperheating spray water in Kcal/Kg

h_{IR} = Enthalpy of desuperheating water flowing into reheat system in Kcal/Kg

P_G = Unit output after deducting the power consumption by auxiliaries as listed below and the same shall be 693MW @105%, 660MW @100% and 363MW 55% TMCR unit load –

- 1) Power taken by Excitation system (kW) including transformer losses, as applicable for various guarantee points, in case of static excitation system is offered. (The transformer losses at various points shall be based on factory test to be conducted)
- 2) Power required for ventilation of oil and control fluid tanks, if ventilating fans are separately driven (kW)
- 3) Power required for lubrication, if lubricating pumps are separately driven (kW)
- 4) Power required for control fluid pumps, if control fluid pumps are separately driven (kW)
- 5) Power required for hydrogen, seal oil auxiliaries, if separately driven (kW)
- 6) Power required for stator water cooling system, if cooling pumps are driven separately (kW)

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7) Power required for Gland Steam Exhauster (GSC) if GSC Exhausters are separately driven.

8) Power required for motors, heaters etc. of any other auxiliary service for the turbine generator (kW)

Note: The calculation formulae shall suitably be corrected or values to be considered depending on spray water tapping location.

d) Superheater and reheater spray component will be decided based on the desuperheating arrangement.

iv) It may be noted that the heat balance diagrams and guarantees shall be furnished considering zero spray water quantity for superheater and reheater spray. During Performance Guarantee Testing, in case water is required for superheater and/or reheater temperature control, the bidder shall be entitled to heat rate correction as per above formulae or correction curves to be submitted by him with his offer.

v) *Applicable Corrections for Heat Rate, Output and Condenser Pressure*

a) Based on the cycle conditions and covering entire range of operation for Turbine, following correction curves for variation in Turbine Cycle Heat Rate i.e. @105%, @100% & @55% TMCR load and TG output to be furnished along with bid:

- 1) Variation in main steam pressure and temperature
- 2) Variation in reheater steam pressure and temperature
- 3) Correction curves, if applicable, due to change in reheater spray quantities with respect to coal properties
- 4) Variation in condenser pressure for main condenser
- 5) Variation of power factor, frequency, generator hydrogen pressure and voltage.
- 6) Change in system water storage.

b) Above correction curves shall be provided for following cases:

- 1) 105% of TMCR for output guarantee
- 2) 100% of TMCR for heat rate guarantee
- 3) 55% of TMCR for heat rate guarantee

Note: In case, any of the above correction curves are not submitted along with price bid, no negative corrections shall be allowed on Turbine Heat Rate, on this account. Positive corrections, if required to be applied, then the amount shall be decided by Owner.

c) *Corrections Applicable for Condenser Pressure Guarantee*

- 1) Variation in Cooling Water Temperature
- 2) Variation in Cooling Water Flow
- 3) Variation in Heat Load

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- d) It may be noted that the Heat Balance Diagrams and Guarantees shall be furnished considering the quantities of water for reheater sprays with owner's choice of any mill combination in service. For reheater, the spray quantities used shall not exceed the limits specified elsewhere in the specification. During PG testing, in case, the spray quantity used are at variance from the values used in the heat balance diagrams, the actual values will be used for calculation of heat rate and no correction shall be allowed.
- e) However, correction on account of variation in Reheater spray quantities, with respect to values used for the purpose of turbine cycle heat rate values shall be permitted only to the extent that such variations are solely attributable to the change in coal properties, with respect to those specified for the design coal. Bidders shall necessarily include the correction curves for variation in reheater spray quantities with coal properties in his bid proposal, failing which no corrections shall be permitted.
- f) The above list of correction curves are conclusive and curves in addition to above shall not be applied.
- vi) During the PG tests, though heat rates will be calculated for VWO condition / 105% & 55% of TMCR; but Category-I guarantees will be applicable to -
- a) Unit Heat Rate at 100% TMCR Load
- vii) *Steam Generator Efficiency*
- a) Steam Generator efficiency by the bidder shall comply with following limiting parameters:
- 1) Firing design coal
 - 2) On Gross Calorific value (GCV) basis
 - 3) At 27°C DBT and 60% RH ambient air conditions
 - 4) Excess air at economizer outlet - 20%
 - 5) Corrected flue gas temperature at air preheater outlet
 - @105% TMCR - 135°C or as predicted by the Bidder whichever is higher
 - @100% TMCR - 130°C or as predicted by the Bidder whichever is higher
 - @55% TMCR – 128°C or as predicted by the Bidder whichever is higher
 - 6) Unburned fuel at all guaranteed efficiency load i.e. 1.0% on weight basis (max.), inclusive of bottom and fly ashes.
- b) Bidder to note that no credit shall be given in the bid evaluation or in the evaluation of the results of the guarantee tests for performance predictions/ guarantees etc. if the values considered by the Bidder for parameters indicated at 4), 5) & 6) above are lower than those specified above and the tested results shall be subjected to correction.

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c) Major requirements/methods of steam generator efficiency tests is as below -

1)	Test Code	As per PTC 4 and ASME PTC 6
2)	Test loads	105% TMCR (693 MW / VWO unit Load) 100% TMCR (660 MW unit Load) 55% TMCR (363 MW unit Load)
3)	Test conditions	Boiler operating with rated excess air, coal fineness and firing design coal.
4)	Ambient air condition	Dry bulb temperature and Relative humidity shall be as specified above. The reference air temperature for the efficiency guarantee/ testing shall be taken as the temperature of air (as the design temperature of air) entering PA and FD fans.
5)	No. of readings	Two sets of consistent readings for each of test loads. Average of the test efficiencies based on above two readings for each load shall be considered for guaranteed efficiency.
6)	Correction to tested efficiency shall be applicable for variation in following parameter only-	
	• Ambient air temperature.	
	• Relative humidity of ambient air.	
	• Hydrogen in coal.	
	• Moisture in coal.	
	• GCV of coal.	
	• Percentage of ash in coal.	
7)	The number, location, type and accuracy of the test grade thermocouples and pressure gauges shall be to Owner's approval	
8)	The Steam Generator efficiency testing shall be carried out with any combination of mills in operation to Owner's choice, with fineness of pulverized coal not exceeding 70% through 200 mesh.	
9)	The duration of the test shall be at least four hours. No Soot blowing shall be allowed during the stabilisation period, i.e. for at least four (4) hours prior to commencement of the PG test and also during the test period.	
10)	Steam generator efficiency shall be with guaranteed or actual air heater leakages, whichever is higher.	

d) Major requirements/methods of steam generator efficiency tests

Sl. No.	Losses to be Measured	Remarks
1)	Loss due to radiation from furnace bottom	To be calculated based on furnace bottom hopper opening and heat flux in this area.

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2)	Loss due to unburned carbon	Ash samples will be collected from furnace bottom hopper, Air heater, Economiser and ESP hoppers, duct/SCR hoppers (if applicable). The ash collection rate for computation of losses shall be 20%, 3%, 4% & 3% in the furnace bottom hopper, economiser hopper, SCR hoppers, Air Pre Heater hoppers and balance in ESP in the hoppers, respectively. The unburned carbon loss for Steam Generator Efficiency at each load shall be limited to 1.0% on weight basis.
3)	Loss due to sensible heat in ash	To be calculated based on the ash collection rates indicated above and ash temperature of furnace bottom ash as 1040 °C in case of wet bottom ash system. Temperature of Duct / economiser ash, SCR hopper ash, Air heater hopper ash, ESP ash shall be considered same as that of flue gas in these areas.
4)	Loss due to Mill Rejects	The total mill rejects throughout of the test (minimum four hours) from all mills shall be considered as one gross which will be weighed to measure the reject rate and then reduce by halving and quartering to the required sample size for calorific value analysis to be used for working out loss due to mill rejects.

- e) Computation other heat losses will be as per ASME PTC-4.
- f) Inlet air moisture to be considered in the vapour phase.
- g) Bidder shall furnish the correction curve, for Owner's approval, covering the expected ranges of variations, for all parameters, for the range of coal specified.
- h) The guaranteed steam generator efficiency shall be without any heat credit.
- i) For all other aspects, not spelt out here, or in the specifications, where PTC/BS code stipulates the agreement between the parties concerned, before commencement of the PG tests, the Bidder shall get these approved by the Owner. However, no correction to SG efficiency on account of variation in Turbine Cycle parameters, or vice versa, shall be allowed.

viii) *Gross Continuous TG Power Output*

- a) Gross continuous TG power output at 100% TMCR after subtracting excitation power and power of TG integral auxiliaries with following conditions:
 - 1) Cycle make-up: 0% makeup

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- 2) Cooling water inlet temperature of 33 °C, and minimum 10 deg.C temperature rise across the condenser.
- 3) Generator power factor of -0.85
- ix) *Steam generating capacity*
 - a) Steam generating capacity in T/hr of steam at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's discretion) with the coal being fired from within the range specified at the following conditions:
 - 1) BMCR/VWO condition
 - 2) TMCR conditions
 - x) *Auxiliary Power Consumption(APC)*
 - a) The respective Auxiliary Power Consumption for Unit and Station (2x660MW BTG Package) are to be calculated in isolation to calculate the respective guaranteed power consumption as is illustrated hereunder: The guaranteed auxiliary power consumption shall be sum of the calculated Unit and Station Auxiliary Power Consumption.
 - b) Unit Auxiliary Power Consumption
 - 1) The unit auxiliary power consumption shall be calculated using the following relationship, with design coal-

$$P_{AU} = P_U + T_L \text{ (Unit)}$$

Where,

P_{AU} = Guaranteed Unit Auxiliary Power Consumption

P_U = Power consumed by the auxiliaries of the unit under test

T_L = Losses of the Generator transformers and Unit Transformers supplied by bidder based on works test reports. While guaranteeing the auxiliary power consumption the bidder shall necessarily include all continuously operating unit auxiliaries.

- 2) The power consumption (P_U) of entire unit auxiliaries fed from unit transformers shall be measured at the incomers of respective unit boards. Suitable correction for auxiliaries not in service at the time of this measured power consumption like MDBFP etc, shall be done on as per the technical specification. If GCB scheme is adopted, suitable corrections for station auxiliaries shall be done.
- 3) All unit auxiliaries required to be operated to continuously the plant at the rated load of 100% TMCR have to be considered. The auxiliaries to be considered shall include but not be limited to the following:
 - Unit Auxiliaries to be considered for calculating P_U
 - ◆ Turbine generator and auxiliaries
 - ◇ Turbine unit oil purifier

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◇ Turbine unit control oil purifier ◇ Booster pumps for TDBFP (if applicable) ◇ TDBFP lube. Oil pumps ◇ Feed and discharge pumps of turbine oil purification system ◇ Oil purifiers of TDBFP including feed and discharge pumps ◇ Electric oil heater of TDBFP lube Oil (if applicable) ◇ Electric oil heater for turbine lube oil tank (rated power shall be considered) ◇ Vapour extractor fan motors ◇ MDBFP Auxiliary Oil pump (if applicable) ◇ Condensate Extraction Pumps (CEP) ◇ TG control oil pumps ◇ Oil pumps for HP & LP bypass system ◇ Condenser air evacuation equipment (Vacuum pumps) ◇ BFP drive turbine condenser air evacuation pumps (if applicable) ◇ BFP drive turbine condenser extraction pumps (if applicable) ◇ COLTCS ◇ Drip pumps (if applicable) ◇ Chemical Dosing pumps ◇ Hotwell make up pumps (Duty factor - 0.2) ◇ CW Pumps, including all auxiliaries ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment) ◆ Steam Generator and Auxiliaries ◇ Primary Air (PA) Fans including its lube oil pumps ◇ Coal Feeders ◇ Seal air fans ◇ Coal mills including its lube oil pumps ◇ Forced Draft (FD) Fans including its lube oil pumps ◇ Regenerative Air Preheater including its lube oil pumps ◇ Electrostatic precipitators (ESP) - with all TR sets , all hopper heaters including wrap around heaters of adapters, if applicable & all insulator heaters/pent house fans (if applicable) of all ESP passes working and rapping system in		
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normal operation. During the test all hopper heaters including wrap around heaters of adapters, if applicable & all insulator heaters/pent house fans (if applicable) of all ESP passes will be in ON condition and set point temperature shall be kept 5 degree Celsius above the flue gas temperature.

- ◇ Induced Draft (ID) Fans including its lube oil pumps
- ◇ Boiler circulation pumps
- ◇ Scanner air fans
- ◇ Electrical Heat Tracing (if applicable)
- ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ SCR system and auxiliaries
 - ◇ Ammonia forwarding pump
 - ◇ Dilution air fan
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ FGD system
 - ◇ Absorber recirculation slurry pumps
 - ◇ Air oxidation blowers
 - ◇ Gypsum bleed pump
 - ◇ All Process/filter water pumps
 - ◇ Gypsum dewatering system - Vacuum belt filter, vacuum pump, filtrate pump & agitator, waste water pump and agitator
 - ◇ Lime stone preparation system – gravimetric feeder, grinding mill, limestone slurry pump and agitator
 - ◇ Sump system – Absorber area sump pump & agitator, gypsum area sump pump & agitator, limestone area sump pump & agitator and auxiliary absorbent pump and agitator
 - ◇ All agitators
 - ◇ Lime handling system (0.3)
 - ◇ Gypsum handling System (1.0)
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- ◆ Mill Reject System
 - ◇ Mill Reject conveying system: Duty Factor – 1.0

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- ◆ Balance of plant - Unitised systems
 - ◇ ACW (booster) pumps of the unit
 - ◇ DMCW pumps to supply cooling water on the primary (DM) side of the plate type heat exchangers in the closed loop Equipment cooling (Unit auxiliaries) water system.
 - ◇ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- Electrical system
 - ◆ Losses in Bus ducts (at rated load conditions)
 - ◇ Isolated phase bus duct (IPBD)
 - ◇ Segregated phase bus duct (SPBD)
 - ◆ UPS power consumption (at rated load condition)
 - ◆ DC System power consumption (at rated load condition)
 - ◆ GCB Losses of Unit : Losses and fan power for Generator Circuit Breaker (if applicable)
 - ◆ Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)
- 4) Transformer losses (for Unit)
 - Transformer losses (at rated capacity) shall include –
 - ◆ Iron loss
 - ◆ Copper loss
 - ◆ Cooler pump and fan loss
 - Following transformers are included:
 - ◆ Generator Transformer losses (at rated Load Condition)
 - ◆ Unit auxiliary transformer losses (at rated load conditions)
 - ◆ Station transformer losses (at Unit rated load conditions)
 - ◆ Losses in all other service/auxiliary transformers (at rated load conditions)
- 5) The bidder shall furnish a list of equipment to be covered under Unit auxiliary power consumption, which shall be subject to Owner's approval.
- 6) The bidder shall ensure that power supply to all such equipment to be covered under unit auxiliary power consumption is fed from unit board of the respective unit.
- 7) The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:-

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- Power consumption of ESP will be measured pass wise and for one pass/stream (Say ESP-A) at a time with the help of energy meter in ESP MCC.
 - Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test.
 - Before starting collection efficiency test, note down energy meter readings for period t1 i.e. E1. The power consumption shall be $W1=E1/t1$.
 - During the collection efficiency test the total energy fed in to ESP MCC of one pass (say ESP-A) will be measured during entire period of collection efficiency test i.e. E2. Total time period (t2) of test shall be noted. The power consumption shall be $W2=E2/t2$. During the test all hopper heaters of all ESP passes will be in ON condition and set point temperature shall be kept 5 °C above the flue gas temperature.
 - Measured power consumption for one ESP pass (say ESP-A) = $(W2-W1)$
 - Measured Electrostatic Precipitator power of one unit = Power of (ESP-A + ESP-B + ESP-C + ESP-D + ESP-E + ESP-F)
 - Number of stream & fields shall be as per the PG test of ESP as detailed elsewhere.
- 8) **Guaranteed Unit Auxiliary Power Consumption of FGD system** shall be taken by considering the additional pressure drop in the FGD system during FGD SO₂ removal efficiency test at specified guarantee point conditions. For this purpose, difference of FGD system pressure drop during FGD SO₂ removal efficiency test and that at Unit Auxiliary Power Consumption test shall be loaded as additional Auxiliary Power Consumption.
- Generation from roof top solar during the test period shall be added to the total measured power consumption.
- c) **Station Auxiliary Power Consumption**
- 1) The station auxiliary power consumption shall be calculated using the following relationship, with design coal-

$$P_{AS} = P_S + T_L \text{ (Station)}$$

&

$$P_S = \text{SUM} (P_i \times D_i)$$

Where,

P_{AS} = Guaranteed Station Auxiliary Power Consumption

P_S = Total Power Consumption, while running the units at 100% design load for all auxiliaries of the (2x660MW) station, supplied by the Bidder under this Package.

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P_i = Power consumed by each station auxiliary

D_i = Duty factor to be considered for each station auxiliary

T_L = In this case (Station) - Transformer Losses of the Station transformers and that of any other Transformers associated with station auxiliary power supply system (excluding those in Unit system like GT, UT, UAT, UST etc.) and shunt reactor supplied by bidder, for meeting station auxiliary power supply, based on works test reports.

- 2) Losses of transformers shall be considered based on the works test reports as per the criteria specified in subsequent clauses under the subheading Transformers.
- 3) While guaranteeing the station auxiliary power consumption the bidder shall necessarily include all the station auxiliaries running at full load with duty factors as have been defined herein.
- 4) Common auxiliaries/system for both units such as Fire Protection System, Illumination, and HVAC etc shall be apportioned for individual units during testing & calculation.
- 5) The station auxiliaries that shall be running during the guarantee test for calculating " P_s " shall include but not be limited to the following:
 - Plant Instrument and Service Air Compressors & Air Drying Plant
 - ◆ Instrument Air Compressors (All Normally Running (' N_{IA} ' Nos.)) – Duty Factor=0.6
 - ◆ Service Air Compressors (All Normally Running (' N_{SA} ' Nos.)) – Duty Factor=0.35
 - ◆ ADP Heaters (if applicable) (All Normally Running (' N_{IA} ' Nos.)) – Duty Factor=0.5
 - ◆ ADP Blowers (if applicable) (All Normally Running (' N_{IA} ' Nos.)) – Duty Factor=1.0
 - ◆ Power consumption at rated duty point for compressors to be arrived based on shop test and power consumption at rated duty point for Air Drying plant to be arrived based on site test.
 - Air Conditioning System
 - ◆ Power consumption at motor input terminals of working units (i.e. excluding stand-by) at its rated duty point of Chilling machines / VAM machine, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, cooling tower fans and other auxiliaries for the Air conditioning system of main plant building, FGD control room, ESP control room of each units, service building. Power consumption at motor input terminals of working units (i.e. excluding stand-by) at its rated duty point of compressor and condenser fans of air cooled condensing unit, Air handling unit (AHU) fans for the Air

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conditioning system of auxiliary plants like ESP control rooms, FGD control rooms, etc. Power consumption at motor input terminals of centrifugal fans of mechanical ventilation system.

- ◆ Power consumption at rated duty point for water cooled chillers & air cooled condensing units shall be based on site test and for other drives like chilled water pumps, Condenser water Pumps & AHU/centrifugal fans shall be based on shop test.
- Ventilation System
 - ◆ Power consumption at motor input terminals of working units (i.e. excluding stand-by) at its rated duty point of Ventilation Fans (including Air Washers), Air Washer Water Pumps,
- Auxiliary Water System Pumps (Working Pumps)
 - ◆ Service water pumps
 - ◆ Potable water pumps
 - ◆ DM water transfer pumps
 - ◆ Waste water transfer pumps
 - ◆ Any other pump/drive required for continuous operation of the plant.
- Fuel Oil System
 - ◆ LDO forwarding/pressuring pumps – Duty factor – 0.5
- Plant Illumination
 - ◆ Indoor Lighting
 - ◆ Outdoor Lighting – Duty factor – 0.4
- DMCW / ECW system for common auxiliaries
 - ◆ ECW system for common station auxiliaries (as provided). Total power consumption of all equipments (excluding envisaged standby ones) shall be included.
- Transformers
 - ◆ Transformer losses (TL) shall be considered as per following (as applicable)-
 - ◇ GT - 100% no load loss, 54% of Copper losses & 100% Cooler Loss.
 - ◇ ST– 100% no load loss, 8% of Copper losses & 9% Cooler Loss.
 - ◇ UT – 100% no load loss, 52% of Copper losses & 50% Cooler Loss.
 - ◇ Aux/ LT Outdoor/ LT Indoor Transformer: 100% no load loss & 25% of Copper losses

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◇ Reactor – losses at rated voltage

- 6) The above list is not comprehensive and only indicative. Bidder shall furnish the comprehensive list of equipment to be covered under station auxiliary system, which is to be considered under station auxiliary power consumption. That will be subject to Owner's approval.
- 7) Where duty factor is not indicated the same is to be considered as '1.0'.
- 8) Auxiliary power shall be accounted for continuously operating auxiliaries/ drives as well as intermittently operating drives. Appropriate duty factor shall be suitably applied for power consumed by intermittently operative auxiliaries/drives based on hourly average basis.
- 9) Bidder to furnish the List of Aux power consumers along with their bid.
- 10) List auxiliary power consumers and their duty factor will be further finalised during finalisation of PG test procedure.

xi) *Condenser Pressure in mm Hg (abs)*

- a) Performance test for design condenser pressure shall be conducted in accordance with latest edition of ASME PTC-12.2. The condenser pressure shall be measured with a vacuum grid utilizing ASME basket tips. The grid shall be fitted at 300mm above top row of condenser tubes.
- b) The tube plug margin of 5%, as per design condition, shall be considered for condenser performance calculation at design condition.
- c) The tube side fouling resistance for design condition shall be calculated as per specified cleanliness factor of 0.9. The tube side fouling resistance for actual test condition shall be measured as per methodology given in ASME PTC 12.2. Alternately, the same shall be calculated using expected actual cleanliness factor appropriately assessed considering the aspect of actual tube cleaning prior to conducting the test.

xii) *Lime stone consumption*

- a) The bidder to calculate the lime stone consumption for the guaranteed SO_x generation based on the combustion calculation considering worst coal specified for the project to maintain SO₂ emission level less than 70 mg/Nm³ (6% O₂ dry at stack inlet) at 100% TMCR, considering 20% excess air at economizer outlet, 8% Air heater in leakage and 2% duct and 1% ESP leakage as a minimum.
- b) In case Sulphur % varies (from design coal) in the coal fired during PG test, Maximum limestone consumption shall be derived as per below formulae:
 - 1) $3.1278 \times (\text{S\% in Coal} \times \text{Coal Consumption Rate} / 100) \text{ kg/h.}$

xiii) *Ammonia consumption for DeNO_x /SCR system.*

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- a) Guaranteed Ammonia consumption rate (in Kg/hr/unit, 99.5 wt %), at 100% TMCR, for firing design coal, shall be demonstrated. The ammonia consumption rate shall be measured during the test for SCR efficiency for control of NO_x emission.
- b) Maximum NO_x emission (thermal as well as fuel) measured as NO₂ from the Steam Generator unit shall not exceed 70 mg/Nm³ (at 6% O₂ dry at stack inlet) for design coal specified; at 100% TMCR continuous operation provided the minimum catalyst inlet temperature required for ammonia injection is maintained.

11.31.00 Guarantees under Category – II (Performance Guarantees under rejection) are as follows:

11.31.01 NO_x EMISSION

- i) It shall be guaranteed that, total NO_x emission from the unit shall be less than 70 mg/Nm³ (6% O₂ dry at stack inlet), at 100% TMCR, with design coal.
- ii) The emission shall be measured during steam generating capacity test. The bidder shall furnish the methodology of measurement and demonstration of variations w.r.t. load up to 50% of total load.

11.31.02 SO_x EMISSION

- i) It shall be guaranteed that total SO_x emission from the unit shall be less than 70 mg/Nm³ (6% O₂ dry at stack inlet), at 100% TMCR, with worst coal.

11.31.03 PARTICULATE MATTER EMISSION

- i) It shall be guaranteed that, with one field out of service in each stream/pass, the particulate emission from ESP at 100% TMCR load and worst coal firing shall be less than 27 mg/Nm³ (6% O₂ dry at stack inlet). The corresponding ESP efficiency shall be worked out.

11.31.04 NOISE LEVEL

- i) All the plant, equipment and systems covered under this specification shall perform continuously without exceeding the noise level over the entire range of output and operating frequency specified in the technical specifications.

11.31.05 FOR THE ABOVE PURPOSE, RESPECTIVE (CAT-II) PERFORMANCES / GUARANTEES WILL BE COMPUTED AND ESTABLISHED AS FOLLOWS:

- i) Particulate Matter Emission from Electrostatic Precipitator
 - a) The performance/acceptance tests shall be carried out in accordance with method-17 of EPA (Environmental Protection Agency of USA) code. The details of the test shall, however be mutually agreed upon between the Owner and the Bidder.
 - b) The particulate emission from ESP shall not be more than 27 mg/Nm³ (6% O₂ dry at stack inlet) under guarantee point condition at 100% TMCR load with worst coal firing. The corresponding ESP efficiency shall be worked out.

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- c) The ESP air in leakage shall not be more than 1% of total gas flow at ESP inlet at the guarantee point condition and shall be demonstrated.
- d) The maximum pressure drop through the ESP at the guarantee point flow condition shall not exceed 25 mm WC, which shall be demonstrated.
- e) The gas distribution in the various stream and fields shall be demonstrated.
- f) Method of computing test efficiency of ESP

- 1) The performance test on electrostatic precipitator will commence along with Boiler PG test or soon after completion of COD. During the interval between the commencement of trial operation and the commencement of performance test only routine maintenance shall be carried out. No physical or chemical cleaning of ESP shall be permitted during this period or immediately before the conductance of the performance tests.
- 2) The test efficiency shall be based on the overall performance of the electrostatic precipitator over a mutually agreed period of operation under the conditions given in this specification and allowing the normal operation of the unit including rapping and normal soot blowing and/or when fuel oil is being fired in the igniters and/or warm up guns.
- 3) The overall test efficiency and test temperature/inlet dust burden for one set of ESP passes (stream) serving one Steam Generator shall be worked out as follows:
 - Vm (guarantee point test flow) shall be the total of inlet gas flows to the all the gas streams at the time of test.
 - Test inlet dust burden (Di) shall be weighted mean of the inlet dust burdens for the individual streams i.e.:

$$D_i = \frac{(V_{m1} \times D_{i1}) + (V_{m2} \times D_{i2}) + (V_{m3} \times D_{i3}) + (V_{m4} \times D_{i4}) + (V_{m5} \times D_{i5}) + (V_{m6} \times D_{i6})}{(V_{m1} + V_{m2} + V_{m3} + V_{m4} + V_{m5} + V_{m6})}$$

Where suffix 1, 2, 3, 4, 5 & 6, represent the six gas streams; The formula will be revised accordingly, if the no. of streams varies.

Similarly, the test outlet dust burden (Do) will be calculated based on outlet gas flow.

- The weighted test inlet gas temperature (Ti) shall also be worked out in a similar manner i.e.

$$T_i = \frac{(V_{m1} \times T_{i1}) + (V_{m2} \times T_{i2}) + (V_{m3} \times T_{i3}) + (V_{m4} \times T_{i4}) + (V_{m5} \times T_{i5}) + (V_{m6} \times T_{i6})}{(V_{m1} + V_{m2} + V_{m3} + V_{m4} + V_{m5} + V_{m6})}$$

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- The measured test efficiency shall be

$$E_m = \frac{D_i - D_o}{D_i} \times 100 (\%)$$

- The corrections for the variation in flue gas flow, inlet dust burden and ESP inlet flue gas temp. shall be based on the above computed test values and the procedure indicated in the next para.

Note: 5th & 6th gas stream if applicable

- At the time of performance testing if the inlet flue gas conditions are not consistent with the specified conditions, due to variation in coal characteristics from the design coal and boiler operating conditions the precipitator performance conforming to this specification, shall be determined using performance curves and correction factors accepted at the time of award of contract. However, the test efficiency shall be corrected to the guarantee point conditions in the following manner:

- $E_c = 1 - e^Z$

Where,

E_c = Corrected test efficiency to guaranteed point conditions

$Z = C \cdot \ln(1 - E_g)$

$C = 1/(C_a \times C_b \times C_c \text{ etc.})$

C_a , C_b , C_c etc. are correction factors for flue gas at temperature, ESP inlet dust loading and sulphur based on correction curves furnished by the bidder and approved by the owner.

- $E_g = 1 - e^Y$

Where,

$Y = (V_m/V_g)^{0.5} \ln(1 - E_m)$

E_g = Measured test efficiency corrected to the specified guaranteed point flow

V_g = Specified guaranteed point gas flow (m³/sec)

V_m = measured gas flow {m³/sec}

E_m = Measured test efficiency

$\ln$ = Logarithm, natural base

- The correction curves should be realistic for expected range of operation and variation in characteristic specified.
- The test efficiency shall be the average of at least three corrected test efficiencies

ii) Method of Computing Test Efficiency of FGD

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- a) The performance tests shall be carried out in accordance with ASME PTC 40 (2017) code.
- b) The details of the test shall, however be mutually agreed upon between the Owner and the Bidder.

iii) **Noise Levels**

- a) Noise level measurement shall be carried out using applicable and internationally acceptable standards. The measurement shall be carried out with a calibrated integrating sound level meter meeting the requirement of BS EN 61672-1, 2 & 3 / IS 15575.
- b) Sound pressure shall be measured all around the equipment at a distance of 1.0 m horizontally from the nearest surface of any equipment/ machine and at a height of 1.5 m above the floor level in elevation.
- c) A minimum of 6 points around each equipment, shall be covered for measurement. Additional measurement points shall be considered based on the applicable standards and the size of the equipment. The measurement shall be done with slow response on the A-weighting scale. The average of A-weighted sound pressure level measurements expressed in decibels to a reference of 0.0002 micro bar shall not exceed the guaranteed value. Corrections for background noise shall be considered in line with the applicable standards. All the necessary data for determining these corrections, in line with the applicable standards, shall be collected during the tests.

11.32.00 Guarantees under Category – III (Performance Guarantees under compulsory correction) are as follows:

11.32.01 START-UP

- i) Start-up time (upto full load), and loading capabilities for the complete unit (boiler, turbine and generator together) for cold start, warm start and hot start conditions as agreed shall be demonstrated, ensuring that the various turbine operational parameters like vibration, absolute and differential expansion, eccentricity and steam metal temperature mismatch etc. are within design limits.

11.32.02 UNIT LOAD RAMP RATE CAPABILITY

- i) Individual unit load ramp rate capability shall be demonstrated as per the requirements of the specification, ramp-up up to 100% load and ramp down up to minimum continuous operating load; while maintaining the parameters within prescribed limits.

11.32.03 MINIMUM CONTINUOUS LOW LOAD OPERATION

- i) Minimum continuous low load operation, without oil support, when firing with the coals from the range identified. The Bidder shall demonstrate that with any combination of mills/adjacent mills in service (to Owner's choice) the Steam Generator does not require oil firing for stable boiler operation at the minimum specified load.

11.32.04 STEAM GENERATOR AND AUXILIARIES

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- i) The total attemperation water flow quantity for super heater steam temperature control T/hr
 - a) 100% TMCR condition while firing design Coal
 - b) 100% TMCR condition while firing Worst Coal
 - c) 80% TMCR condition under sliding pressure operation while firing design Coal
 - d) 80% TMCR condition under sliding pressure operation while firing worst Coal
- ii) The total attemperation water flow quantity for reheater steam temperature control with rated excess air
 - a) 100% TMCR condition while firing design Coal
 - b) 100% TMCR condition while firing Worst Coal
 - c) 80% TMCR condition under sliding pressure operation while firing design Coal
 - d) 80% TMCR condition under sliding pressure operation while firing worst Coal
 - e) It shall also be demonstrated that the RH temperature is maintained at the rated value without any spray water requirement under normal operating conditions (100% TMCR)
- iii) The super heater steam temperature at the high pressure (HP) turbine inlet under the following conditions(°C)
 - a) Range of Coal specified
 - b) Steam Generator load 60% TMCR to 100% BMCR under sliding pressure operation
- iv) The reheat steam temperature at the intermediate pressure (IP) turbine inlet under the following conditions (°C):
 - a) Range of coal specified
 - b) Steam Generator load 60% TMCR to 100% BMCR under sliding pressure operation
- v) *Steam generating capacity*
 - a) Steam generating capacity in T/hr of steam at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's discretion) with the coal being fired from within the range specified at the following conditions with heaters out of service condition:
 - 1) BMCR/VWO condition
 - 2) TMCR conditions
 - 3) TMCR with all HP heaters out of service condition
- vi) Steam temperature imbalance

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- a) It shall be demonstrated at SH and RH outlets (in case of more than one outlet) that the temperature imbalance between the outlets does not exceed 10°C and 15°C respectively, under all loads including transients.
- vii) Furnace exit gas temperature (FEGT)
- a) It shall be demonstrated that maximum furnace exit gas temperature (FEGT) shall be as specified. A comprehensive thermal performance test (TPT) shall be conducted for this purpose on one unit only. FEGT shall be demonstrated through such TPT by indirect measurement, with coal pulveriser combinations of Owner's choice and all other requirement in line with Technical Specifications.
- b) The demonstration shall be done by backward calculations method, after having measured/tested/calculated the economizer outlet gas temperature (average), excess air (average), unit heat load (based on turbine flow and reheater flow), characteristics of coal being actually fired during testing, heat absorption in different stages of heat transfer equipments (based on steam/water temperature and pressure measurements) etc.
- c) FEGT for the specified design and worst coals shall be calculated using the measured FEGT (with test coal) as above and using computer modelling technique for necessary conversion of the results to the specified design and worst coals. The FEGT demonstration using computer modelling technique shall involve following steps:
- 1) Development of a computer field model (FM) (backward) using above measured/computed field data. This will be used to calculate the surface effectiveness factor (SEF) for each of heat transfer banks including furnace water walls with test coal.
 - 2) The above field model shall have to be validated by various tests (loads, coal pulveriser combination etc. with test coal) to ensure SEFs for each bank are consistent (within $\pm 5\%$) for all tests.
 - 3) Using above SEFs, for each heat transfer bank Bidder's original boiler design model will be changed to make it this '2X660 MW UNITS - 11 & 12 PROJECT specific'.
 - 4) The validity of the above model shall be checked for each test by feeding the test coal both from backward direction FM and the calibrated this '2X660 MW UNITS - 11 & 12 PROJECT specific' model as per above step. The model validity is established if the results for flue gas temperature profile in the boiler, zonal assumptions etc. are identical in both the 'BACKWARD' and 'FORWARD DIRECTION'.
 - 5) The validated "2X660 MW UNITS - 11 & 12 PROJECT" model shall have "Fuel Switching" capability i.e. it shall be able to appropriately vary the furnace absorption with changes in the coal properties. Validation of the above fuel switching capability will also have to be established to the satisfaction of Mahagenco.

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- 6) Having established and demonstrated Fuel Switching capability, the contractual FEGT can be demonstrated by using the site specific calibrated model as per step-(d) and plugging in the specified coal(s).
- 7) The detailed procedure and the correction curves for the above test shall be to Owner's approval.
- d) The Bidder through thermal performance test (TPT) as per above shall also demonstrate that the flue gas temperature (Actual/MHVT values) at the entry and exit of various boiler heating surfaces and also the variations across the cross section perpendicular to gas flow do not exceed the values indicated in the data sheets for 100% TMCR (660 MW).
- viii) Minimum stable load on the Steam Generator without oil support under the following condition (%)
 - a) It shall be guaranteed that oil support for flame stabilisation shall not be required beyond 35% of BMCR or 40% TMCR, whichever is conservative load (minimum steam generation) when firing the coals from the range identified.
 - b) It shall be demonstrated that with any combination of mills/adjacent mills in service (2 to 3 mills in operation), the steam generator does not require any oil firing for stable and efficient boiler operation at and above 35% BMCR or 40% TMCR loads
 - c) Minimum stable load without oil support shall be demonstrated under the following condition
 - 1) Range of coal specified
 - 2) Both Load ramp-up & ramp down
 - 3) Any combination of mills in operation
- ix) Coal consumption at 100% BMCR, and 100% TMCR for design coal and worst coal based on the following (T/h)
 - a) Ambient air temperature 27°C
 - b) Relative Humidity 60%
- x) Bidder shall guarantee NO_x concentration of 450 mg/Nm³ at 6%O₂ on dry basis at Boiler outlet/SCR inlet.
- xi) *Coal mills*
 - a) Performance testing shall be done on coal mills toward establishing its guaranteed capacity specified at the rated fineness, applying corrections for the variation in coal characteristics i.e., HGI (Hardgrove Grindability Index) and total moisture.
 - b) Loading of each mill when steam generator operating at 100% BMCR and 100% TMCR condition while firing design coal and worst coal
 - c) Coal fineness for the range of coal specified-
 - 1) Through 200 mesh screen
 - 2) Through 50 mesh screen

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- d) Capacity, efficiency and power consumption of each mill while firing design coal and worst coal (TPH) at:

- 1) New Condition
- 2) at 50% wear life
- 3) at worn out condition

- e) Capacity demonstration test shall be carried out for the following conditions:

- 1) Capacity output of one coal pulveriser (of Owner's choice) of each Steam Generator shall be demonstrated for establishing its capacity at 100% mill loading, at rated pulverized coal fineness with specified design coal with new set of grinding elements.
- 2) Capacity output shall also be demonstrated on four coal pulverisers (of Owner's choice) of each Steam Generator, not less than the 90% of guaranteed value of 1) above, at 100% mill loading with the originally installed grinding elements in nearly worn-out condition or at the end of guaranteed wear life of grinding elements, whichever is earlier.

- f) Capacity test as mentioned at 1) & 2) above shall be demonstrated at the following conditions occurring simultaneously during testing:

Rated pulverised coal fineness	1) not less than 75% through 200 mesh and 2) not less than 99% through 50 mesh screen
Test coal	Any available coal from the specified range

- g) In case the guaranteed capacity of coal pulverisers as stated above are successfully demonstrated, remaining coal pulverisers of corresponding steam generator will also be considered to have successfully met the above capacity guarantee requirement. However, in the event of any of the coal pulverisers not meeting the guarantee test, all the coal pulverisers of corresponding steam generator will have to be tested to demonstrate guaranteed capacity.

- h) During the demonstration of the pulveriser capacity output, manufacturer's operating instructions will be followed and pulveriser will be operated with the specified range of coals without any such readjustment that requires a shutdown of the pulveriser or reduction of the load and/or any replacement of any pulveriser wear parts.

- i) For the purpose of testing to demonstrate the capacity, if HGI (grindability) and total moisture vary from those given in coal characteristics, the above pulveriser measured capacity shall be corrected using the capacity correction curves furnished by the Bidder and approved by the Owner. HGI versus coal pulveriser capacity curve shall be furnished for HGI variation up to a value above which the capacity remain constant.

- j) LIFE OF COAL PULVERISER WEAR PARTS

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- Life of coal pulveriser wear parts, in hours of operation, for the entire range of coal characteristics specified.
- The Bidder shall warrant the wear life of all wear parts of the coal pulveriser when grinding the specified range of coal(s). Pulveriser wear parts are defined as those parts of the pulveriser which are in contact with coal or coal dust and are likely to wear out during the operation of the pulveriser.
- The guarantee/warranty shall be demonstrated on each pulveriser during the Guarantee Trial Period (GTP) commencing after establishing successful operation of the pulveriser continuously for a period of not less than twenty four (24) hours, at or near its guaranteed rated capacity.
- The GTP for the respective wear part(s) shall be at least three years or the wear life of that wear part(s), whichever occurs later. The establishment of the warranty will be based on equivalent running hours of the pulveriser regardless of the specified coal. The average wear life (AWL) of the mill wear parts during GTP shall, however be corrected for the variation in YGP index for the coal fired during GTP.
- Minimum Guaranteed Life for various coal pulveriser wear parts shall be as indicated in relevant sections of the specification.
- The wear parts shall be considered to have passed their warranted operating life when they have successfully demonstrated their capability to meet the full load rated capacity of the pulveriser (as per requirements of relevant clause of Specification) during the guaranteed life of the wear part.
- No weld build-up or reversing of grinding elements will be permitted for achieving the guaranteed wear life. In case any of the wear part has worn out to such an extent that either the normal or safe operation of the pulveriser is jeopardized, if that part is not replaced/repared, or continuous use with this part may lead to exposure or wear of other parts which are not meant for the purpose of checking the shortfall in wear life, even if there is no reduction in pulveriser rated capacity, then the part shall be deemed to have outlived its wear life.
- If any of the wear parts fail to meet the warranted life, additional quantities of these wear parts shall be supplied on pro-rata basis as defined below. For the duration of this warranty period, the replacement wear parts shall be available to the Owner at the spare part price indicated in the Contract, adjusted as per terms and conditions of the Contract.
- Computation of liquidated damages for plant life of 10 years.
 - ◆ On the expiry of GTP (minimum 3 years), deficiency in the life of each wear part that has not fulfilled the warranty will be worked out on an item wise basis and shortfall so established


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due to reduced wear life and its implications for the plant life shall be worked out.

- ◆ The Bidder at no extra cost to the Employer shall provide one and half times the wear parts needed to make good the shortfall in the wear life for 10 years of plant life.
- The shortfall part settlement (SPS) will be calculated based on the actual wear life of the parts that have worn-out in the GTP on a pulveriser-by-pulveriser basis. In this connection the procedure given below shall be followed.
- Pulveriser Warranty Shortfall Part Settlement (SPS) Procedure (With Example), for all wear parts of each coal pulveriser:

Sl. No.	Description	Procedure	Example
1)	Guaranteed wear life of wear part	Say, X – hours	X = 16000 hrs
2)	Total life achieved by a particular wear part during GTP	Say, X1 hours by Originally installed part(s), & X2 hours by Subsequently replaced part(s)	X1 = 13,000 hrs X2 = 14,000 hrs
3)	Average Wear Life (AWL) of failed wear part(s)	$AWL = (X1+X2)/2$	AWL = $(13000+14000)/2$ = 13500 hrs
4)	Shortfall in hours Total shortfall for wear part during GTP	$S = (X-X1)+(X-X2)$	S = $(16000-13000) + (16000-14000)$ = 5000 hrs
5)	GTP in years	$GTP = (X1+X2)/8760$	GTP = $(13000+14000)/8760$ = 3.08
6)	Shortfall Part Settlement	$SPS = (S \times 10)/(AWL \times GTP)$	SPS = $(5000 \times 10)/(13500 \times 3.08)$ = 1.202 (To be rounded off to nearest whole number) = 1.0

- The Bidder shall provide to Owner either the wear parts of original or better quality material in number equivalent to one and half

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times the quantity worked out based on the method explained in the above example so as to compensate for the shortfall in wear life for a plant life of 10 years as has been established above, or the cost of such number (i.e. one and half times the quantity worked out as per the above example) of wear parts based on the prices agreed for mandatory spares.

- The final mode of compensation for such shortfall viz. by means of additional quantities of spares worked out or by cost thereof shall be as per Owner's discretion. The total cost of such replacements shall be without any limit to the maximum amount recoverable subject to the provisions of this Specification.
- The credit of one and half times of shortfall in wear parts life shall also apply for already supplied mandatory spare parts under this contract based on average wear life achieved during GTP period.
- Average Wear Life (AWL) during GTP, to be considered for pulveriser wear part warranty shall be as arrived at from the station record for each pulveriser, and as corrected for variation in YGP index of the coal being fired during GTP. For this purpose the coal YGP shall be the average tested value during GTP. The Bidder shall collect the coal samples and get them tested for YGP index at recognized, Owner's approved test lab, periodically. (The frequency of sampling and testing shall be mutually agreed between Bidder & Owner). The YGP index testing shall be done as per the BS Standard specified. A jointly signed record shall be maintained during GTP.

xii) *Primary air fans*

- Capacity (m^3/hr)
- Head developed (mWC)
- Power consumption (kW)
- Margins envisaged on capacity and head

xiii) *Induced draft fans*

- Capacity (m^3/hr)
- Head developed (mWC)
- Power consumption (kW)
- Margins envisaged on capacity and head

xiv) *Forced draft fans*

- Capacity (m^3/hr)
- Head developed (mWC)
- Power consumption (kW)
- Margins envisaged on capacity and head

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- xv) *Seal air fans*
- Capacity (m^3/hr)
 - Head developed (mWC)
 - Power consumption (kW)
 - Margins envisaged on capacity and head
- xvi) Satisfactory operation of FD, ID and PA fans without undue noise and vibration while operating in isolation or in parallel with other fans shall be demonstrated at site.
- xvii) *Fuel oil firing system*
- Percentage load for which High Speed Diesel/Light Diesel Oil (HSD/LDO) firing system is designed (% BMCR)
- xviii) *Run-back capabilities*
- The automatic runback capability of the unit (boiler-turbine-generator) on loss of critical auxiliary equipment (such as tripping of one ID/FD/PA fan/ air heater etc.) shall be demonstrated ensuring smooth and stable runback operation, as mentioned in the technical specifications
- xix) CO emission at 100% TMCR at rated excess air for specified range of coal
- xx) Flue gas temperature at APH outlet (maximum) while firing design coal at 100% TMCR without considering air leakage, ($^{\circ}\text{C}$)
- xxi) Unburnt carbon in bottom ash while firing design coal at 100% TMCR(%)
- xxii) Unburnt carbon in fly ash while firing design coal at 100% TMCR(%)
- xxiii) Total unburnt carbon loss while firing design coal at 100% TMCR (%)
- xxiv) Surface temperature of thermal insulation with ambient temperature of 40°C at surface velocity of 0.25 m/s. ($^{\circ}\text{C}$)
- xxv) SCR System
- SCR Catalyst Life - Bidder shall guarantee and demonstrate minimum SCR catalyst life of 16000 hrs. The catalyst shall be deemed to have exhausted its life as and when NOx reached to a level of $100 \text{ mg}/\text{Nm}^3$, with ammonia slip not exceeding 3 ppm at 6% oxygen (O_2) content in flue on dry gas basis.
- xxvi) *FGD System*
- Absorber outlet gas temperature
 - Absorber outlet gas moisture percentage.
 - Leak-proofness of dampers and gates.
 - Oxidation air blower performance (flow, temperature, pressure).
 - Wet Ball Mill Capacity at rated fineness
 - The Bidder shall demonstrate the guaranteed capacity of each limestone pulveriser under the following conditions:

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Limestone fineness	90% or higher (as per the requirement of the absorber) through 325 mesh (for spray tower process) OR 90% or higher (as per the requirement of the absorber) through 200 mesh (for jet bubbling process)
Limestone Quality	All available quality from the specified range

- 2) Bidder shall demonstrate the above capacity with the originally installed grinding elements in nearly worn-out condition as mutually agreed for the purpose of ascertaining wear life of any of the wear parts.

f) Wet Ball Mill Wear Parts Guarantee

- 1) Bidder shall demonstrate the life of wet ball Mill wear parts in line with requirements stipulated in the Technical Specification. The establishment of the above guarantee shall be based on the operating records available at the Power station and will be computed for each pulveriser based on actual total hours of operation.

g) Wet Ball Mill Ball Consumption

- 1) Bidder shall guarantee ball consumption per ton of limestone throughput in line with requirements stipulated in the Technical Specification. Bidder shall furnish the minimum ball diameter below which the balls shall be replaced.

h) Pressure Drop Across FGD

- 1) The Bidder shall demonstrate that the total pressure drop in the gas path across the FGD System shall not exceed the guaranteed values for the range of coal and loads specified in the Technical Specification

i) Vacuum Belt Filter Capacity

- 1) Bidder shall demonstrate the capacity of the Vacuum Belt Filters to dewater the quantity of gypsum with the specified purity and moisture content as specified in respective Technical Specification.

j) Gypsum Purity

- 1) The Bidder shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and based on CaO content of 51% in limestone.

k) Limestone unloading stream

- 1) Capacity of all the equipment in the limestone unloading path up to the Storage silos/shed should be demonstrated.

l) Gypsum handling system

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- 1) Capacity of Gypsum conveyor taking feed from gypsum dewatering unit and feeding to gypsum storage shed through travelling tripper provided on last conveyor.
- m) Guarantee tests all left out Conveyors/bucket elevators not appearing above along with all associated equipments shall also be considered.

11.32.05 STEAM TURBINE AND AUXILIARIES

i) *Turbine-generator set capability*

- a) The steam turbine generator shall be capable of delivering at generator terminals the output as indicated in the heat balances under the following conditions:

- 1) Continuous TG output of 100% TMCR under rated steam conditions at 89 mm Hg (a) or worst condenser pressure with 1% make up.
- 2) While conducting this test, the condenser pressure measurement shall be done at 300 mm above the top row of condenser tubes.

- b) The automatic runback capability of the unit (boiler-turbine-generator) on loss of critical auxiliary equipment (such as tripping of one BFP/CEP etc.) shall be demonstrated ensuring smooth and stable runback operation.

- ii) Upon sudden total loss of all external loads, units will not trip on over speed but shall continue to be in operation to supply power for plant auxiliary load (house load).

- iii) Run-Back capabilities of the SG and STG upon loss of critical auxiliary equipment, shall ensure smooth and stable run back operation.

- iv) Variable pressure operating range (% TMCR)

- v) *Unit Heat Rate AT 55% TMCR Load*

- a) This will be the Guaranteed Heat Rate in kcal/kWhr, at 363MW under rated steam conditions at 33 deg.C cooling water inlet temperature and minimum 10 deg.C temperature rise across the condenser (optimized condenser vacuum), with zero make-up.

- b) Unit Heat Rates are to be computed as below:

$$\text{UNIT HEAT RATE (@55\%)} = \frac{\text{Turbine Cycle Heat Rate (THR @55\%)}}{\text{Steam Generator Efficiency (SG\_EFF @55\%)}}$$

- c) To establish this, refer clause 11.30.09, ii).

vi) *Condenser*

- a) Total pressure drop in condenser tube side with design cooling water flow and temperature (mWC)
- b) Total cooling water temperature rise (°C) in condenser with design cooling water flow and CW inlet temperature of 33 °C under the following condition:

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1) Unit operating at 100% TMCR condition 2) Unit operating at VWO condition 3) Unit operating with all HP Heaters out condition and generating 100% TMCR power output 4) Unit operating under house load and HP & LP bypass operating at rated capacity c) Condenser pressure 1) Performance test for design condenser pressure shall be conducted in accordance with latest edition of ASME PTC-12.2 2) The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips. 3) Temperature of condensate, at outlet of condenser, shall not be less than saturation temperature corresponding to the condenser pressure at all loads. 4) Air leakage in the condenser under full load condition shall not exceed more than 50% of design value taken for sizing the condenser air evacuation system. 5) When one half of the condenser is isolated, condenser shall be capable of taking at least 60% TG load under TMCR conditions. 6) The capacity of each vacuum pump in free dry air under standard conditions at a condenser pressure of 25.4 mm Hg (abs) and sub cooled to 4.17°C below the temperature corresponding to absolute suction pressure shall not be less than the design capacity. Correction curves for establishing the capacity at site conditions shall also be furnished. 7) The air and vapour mixture from air cooling zone of condenser shall be 4.17°C below the saturation temperature corresponding to 25.4 mm Hg (a) suction pressure. Correction curves for establishing the same at site conditions shall also be furnished. d) Tube plug margin of 5%, as per design condition, shall be considered for condenser performance calculation at design condition. e) If tube side fouling resistance for actual test condition is not measured as per methodology given in PTC 12.2, the tube cleanliness factor corresponding to the same shall be appropriately assessed considering the aspect of actual tube cleaning prior to conducting the test. vii) <i>Condensate extraction pump CEP)</i> a) Rated capacity (m³/h) b) Rated Total Dynamic Head (TDH) (mWC) c) Pump efficiency (%) viii) <i>Booster pump of CEP) (if applicable)</i> a) Rated capacity (m³/h)		
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- b) Rated Total Dynamic Head (TDH) (mWC)
- c) Pump efficiency (%)
- ix) *Condensate polishing unit (CPU)*
 - a) Effluent quality of outlet of each vessel at its rated design flow and design service length between two regenerations
 - b) Chemical consumption for regeneration
 - c) Pressure drop across the polisher service vessel, as specified, in clean and dirty condition of resin at rated design flow.
 - d) Condensate water quality.
- x) *Feed water heaters*
 - a) Pressure drop on the tube side of the individual LP heaters (Maximum) (mWC)
 - b) Pressure drop on the tube side of the individual HP heaters (maximum) (mWC)
 - c) TTDs and DCAs of feed water heaters shall be demonstrated as per guaranteed heat balance diagram for 100% TMCR condition.
 - d) Outlet temperature from final feed water heater(s)
- xi) *Deaerator*
 - a) Dissolved O² content at deaerator outlet without chemical dosing at all loads, not to exceed 0.005 CC/litre determined as per ASTM-D-888 – Reference method-A or Indigo Carmine method.
 - b) Difference between saturation temperature of steam entering the deaerator and temperature of feed water leaving the deaerator shall be demonstrated as per guaranteed heat balance diagram for 100% TMCR condition.
 - c) Continuous and efficient operation and performance of feed heating plant without undue noise and vibrations at all loads and duty conditions
- xii) *Boiler feed pump (BFP)*
 - a) Rated capacity (m³/h)
 - b) Rated Total Dynamic Head (TDH) (mWC)
 - c) Pump efficiency (%)
 - d) Noise
- xiii) *Booster pump of BFP*
 - a) Rated capacity (m³/h)
 - b) Rated Total Dynamic Head (TDH) (mWC)
 - c) Pump efficiency (%)
- xiv) Satisfactory operation of BFPs and CEPs without undue noise and vibration while operating in isolation or in parallel with other pumps shall be demonstrated at site.

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xv) *Equipment cooling water system (ECW/DMCW)*

- a) Capacity, head & power consumption of all the pumps with the respective job (own) motors to be demonstrated at shop. For the pumps which are included under "Unit Auxiliaries for calculation of Pu" as defined elsewhere the power consumption value (at rated duty point) during shop testing shall be considered for computation.
- b) Vibration, parallel operation and noise level of all the pumps at the rated duty point shall be demonstrated at site
- c) Design heat load of plate type heat exchangers and Inlet & Outlet temperatures of the Plate type heat exchangers on the primary and secondary side to be demonstrated at site. Pressure drop across the Plate type heat exchanger on the primary & secondary water circuit to be demonstrated at site.

xvi) *Condenser on-load tube cleaning system (COLTCS)*

- a) Life of sponge rubber balls and number of balls lost during 1000 hours of plant operation shall be as indicated by Bidder in the offer and accepted by the Owner.

xvii) *HP & LP bypass system capability*

- a) The HP & LP bypass system should satisfy the following functional requirements under automatic interlock action. It should come into operation automatically under the following conditions:
 - 1) Generator circuit breaker opening
 - 2) HP & IP stop valves closing due to turbine tripping
 - 3) Sudden reduction in demand to house load
- b) Under all above conditions, while passing the required steam flows as per the relevant heat balances, the condenser should be able to swallow the entire steam without increasing the exhaust hood temperature and condenser pressure beyond the maximum permissible values. The same shall be demonstrated.

11.32.06 POWER CYCLE PIPING

- i) Actual hanger readings under cold and hot condition (at rated parameters) to match with those of design cold and hot hanger readings for MS/CRH/HRH/HP & LP bypass piping system

11.32.07 FUEL OIL SYSTEM

- i) Capacity, head and power consumption of all the pumps shall be guaranteed.
- ii) Vibration and noise level of all the pumps at the rated duty point shall be demonstrated at site
- iii) Above shall be demonstrated with individual and parallel operations.

11.32.08 MILL REJECT SYSTEM

- i) Belt conveyors TPH

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- ii) Power consumption
- iii) Continuous effective removal of mill rejects without spillage in the system shall be demonstrated.

11.32.09 GENERATOR

- i) Generator Maximum Continuous Rating (MVA)
- ii) Generator Efficiency (minimum) (%)
- iii) Hydrogen Make-up per day (m³/day)
- iv) Excitation system
 - a) Capacity of excitation transformer for static excitation (kVA)
 - b) Total loss of excitation transformer (kW)
 - c) Total loss of static excitation system (kW)
 - d) Total loss of brushless excitation system (kW)

11.32.10 BALANCE OF PLANT (BOP) EQUIPMENT (BTG Package)

- i) Compressed air system
 - a) Free air delivery at site conditions per each compressor (Nm³/min)
 - b) Power consumption at site rated parameters per each compressor (kW)
 - c) Maximum capacity of each air dryer at min working pressure and max. temp at after cooler outlet (Nm³/min)
 - d) Parallel operation of air compressors shall be demonstrated at site.
 - e) Pressure drop across Air Drying Plant, Capacity and outlet dew point of each air drying plant shall be demonstrated at site.
 - f) Vibration level and noise level of each air compressor, blowers and any other rotating equipments of each air drying plant shall be demonstrated at site.
- ii) *CW Pumps*
 - a) Each pump shall be tested at shop/ site (as applicable) for capacity, head, and power consumption. Current, Voltage, Motor input Power, Frequency, Speed, Bearing/ Motor winding Temperature, Vibration and noise level of pumps and drives and parallel operation (as applicable) without hunting & abnormal noise and with load sharing within 10% of each other at the rated duty point of pumps shall be demonstrated at site as a part of Performance & Guarantee test.
 - b) Shop tests conducted with the actual motor shall be considered to determine the guaranteed performance parameters of Flow, Head, Efficiency and Power Consumption. During the shop test no negative tolerance in the guaranteed capacity, head and efficiency of the pump shall be allowed.
 - c) Detailed requirement of CW pump tests are mentioned in CW system specification.

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iii) *Pumps (For all other pumps under this BTG package)*

- a) Capacity, head, and power consumption of all the pumps at the rated duty point (to be demonstrated and proved at shop with the respective job motors) and to operate in accordance with the approved pump characteristic curves. During the shop test no negative tolerance in the guaranteed capacity, head and efficiency of the pump shall be allowed.
- b) Current, Voltage, Motor input Power, Frequency, Speed, Bearing/ Motor winding Temperature, Vibration and noise level of pumps and drives and parallel operation (as applicable) without hunting & abnormal noise and with load sharing within 10% of each other at the rated duty point of pumps shall be demonstrated at site as a part of Performance & Guarantee test.

iv) *Fire Protection System*

- a) Capacity, Head & Power consumption of fire water pumps. Shop tests will be acceptable.

v) *Elevators*

- a) Carrying capacity of Elevators (kg)
- b) Over speed test
- c) Over load test
- d) Travel and hoist Speed Checks
- e) Landing checks

vi) *Cranes and hoists in each area*

a) EOT cranes

- 1) Safe working load (T)
- 2) Operating speed (meters per minute)
 - Hoisting
 - Long travel
 - Cross travel

b) Under-slung cranes

- 1) Safe working load (T)
- 2) Operating speed (meters per minute)
 - Hoisting
 - Long travel
 - Cross travel

c) Electric hoists

- 1) Safe working load (T)
- 2) Operating speed (meters per minute)

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- Hoisting
- Long travel

vii) *Air conditioning system in each area*

- a) Capacity and discharge pressure of chilled water pumps, condenser water pumps at its rated duty point. Parallel operation of pumps
- b) Capacity and static pressure of AHU fans at its rated duty point.
 - 1) Capacity (TR) of A/C system of Main Plant Area (TG Building), A/C system of Service and A/C system of ESP/FGD control rooms.
- c) Auxiliary power consumption
- d) Inside room conditions during summer, for all air conditioned areas.
- e) Vibration and noise level of equipment.

viii) *Ventilation system in each area*

- a) Capacity and static pressure of centrifugal fans, roof exhausters at its rated duty point of Ventilation system.
- b) Auxiliary power consumption
- c) Inside room conditions
- d) Capacity and discharge pressure of pumps of air washer units and UAF units at its rated duty point of Ventilation system.
- e) Vibration and noise level of equipment.

ix) *CW Chemical Treatment*

- a) The bidder shall guarantee that the program offered shall meet the performance requirements stipulated for CW System. Also, the bidder shall demonstrate the guaranteed chemical consumption proposed in the bid, during the contract period.
- b) For the purpose of verifying the guarantees on scale, a deposit monitor/test heat exchanger/fouling monitor shall be provided by the bidder stimulating the condenser operating conditions. The deposit monitor shall be weighed in new and clean condition and then weighed again on monthly basis and after completion of the test period. Prior to commencement of treatment program and after chemical cleaning of condenser tubes, the fouling factor shall be calculated for each condenser of 2 x 660 MW units.
- c) The fouling factor shall also demonstrate the cleanliness of condenser tubes by visual examination of the same.
- d) Corrosion coupons reflecting the metallurgy of the system components shall be supplied and installed by the Bidder to measure guaranteed corrosion value and corrosion rate shall be determined based on observations on monthly basis after completion of six months.
- e) Guarantee Values of Scale, Corrosion, Fouling & Bio Fouling
 - 1) Cumulative Corrosion Rate on Mild Steel < 3 mils/year

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- 2) Cumulative Corrosion Rate on Stainless Steel < 0.1mils/year
- 3) Cumulative Corrosion Rate on Cu/Ni < 0.3 mils/year.
- 4) Cumulative Scaling Rate of Internal Tube Surface Area of Condenser <15mg/dm²/year
- 5) Fouling Factor: Deterioration in Heat Transfer Coefficient shall not be more than 5% of the original value just before commencement of the treatment program.
- 6) TVC (Total Viable Count) (Micro Biological Counts) < 1.2 x 100000 counts/ml of circulating water.
- 7) SRB (Sulphate Reducing Bacteria) <100 organisms/100 ml of circulating water.

f) Dosing capacity of all dosing pumps shall be demonstrated.

11.32.11 ELECTRICAL SYSTEM

- i) As applicable and/or as specified in the technical specification in electrical Section

11.32.12 CONTROL AND INSTRUMENTATION

- i) Performance guarantee tests for closed loop control system shall be carried out at site to verify the integrated performance of the total plant C&I and to verify as to whether all the important parameters remain within stipulated permissible limits under all the operating conditions. In case during this tests or otherwise it is observed that the behaviour/response of Bidder's system (drives actuators/ valves etc.) is not satisfactory/acts as a limitation/restriction in achieving the permissible limits, the bidder shall carry out all required modifications rectification etc., in his system whatsoever so that the permissible limits can be achieved. He shall also depute his experts for associating in the above tests and also for carrying out the necessary modifications, rectification etc.
- ii) Further the Performance guarantee tests shall be as applicable and/or as specified in the technical specification in Control & Instrumentation section.

11.32.13 AUTOMATIC ON-LINE TURBINE TESTING (ATT) SYSTEM

On-load testing of turbine protective equipment without disturbing normal operation and keeping all protective functions operative during the test

11.32.14 MAKE-UP WATER

Bidder shall specify the amount of make-up water required at TMCR and the conditions being the basis for his calculation. Bidder will be required to guarantee the amount.

11.32.15 VIBRATIONS

Bidder shall guarantee that the vibration levels as stipulated elsewhere in this specification will not be exceeded under any operating condition.

11.32.16 PLANT AVAILABILITY GUARANTEE

- i) Bidder shall guarantee the availability of the plant as a whole (BTG Package) to be demonstrated during the Warranty period.

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- ii) The availability shall be minimum 90%.
- iii) Refer Commercial Volume-I, Section-3, Clause 1.3, for further details
- 11.32.17 CONSUMABLES
 - i) Bidder shall specify the major consumables and their consumption. Bidder will be required to guarantee the consumption specified.
- 11.32.18 OTHER GUARANTEES
 - i) Any other guarantee as applicable and/or as specified in the respective sections of the technical specifications
- 11.32.19 Performance Guarantee on Helical Springs and Viscous Dampers for Machine Foundations
 - i) The Bidder shall guarantee the performance of the Steel Helical Springs and Viscous Dampers, to be provided by him for various machine foundations as specified in detailed technical specification, for a period of 24 months from the date of commissioning of each machine.
 - ii) For TG foundation, TDBFP & MDBFP & PA/FD/ID Fan foundations, in case Alternative-2 (Open Foundations) are adopted by the bidder, then bidder has to furnish extended warranty of Five Years for satisfactory Static & dynamic performance of the respective foundations.
- 11.32.20 Performance Guarantee on Acid / Alkali Resistant Linings & Anti-Weed Treatment
 - i) The Bidder shall furnish a performance guarantee for the acid/ alkali resistant linings and anti-weed treatment, as specified in detailed technical specification, for a period of three years from the date of completion of work or date of handing over, whichever is later.
- 11.33.00 Bidder shall guarantee all the above items unit wise, for each unit, and for station auxiliaries, preferably while both units are in operation; unless specified otherwise. The same will be finalised in the respective approved test procedures.
- 11.34.00 TURBINE GENERATOR PERFORMANCE ACCEPTANCE TEST
- 11.34.01 Performance test for the turbine generator set will be conducted in accordance with the latest edition of ASME PTC-6. Such test shall be binding on the parties to the contract to determine compliance with the guaranteed heat balance conditions at 693 MW (105% TMCR) MW, 660 MW (100% TMCR) & 363 MW (55% TMCR) unit outputs corresponding to the conditions stipulated in the specification.
- 11.34.02 Power consumed by the auxiliaries mentioned under in the Unit Heat Rate calculations, which is to be deducted from electrical power generated, shall be measured during the performance / Acceptance Test. Wherever the measurement is not possible, design values of power consumption by an auxiliary shall be considered.
- 11.34.03 Corrections to the test results for steam turbine shall be applied as per the correction curves listed in technical specification. All the efforts shall be made to control the unaccounted for leakage to the minimum, when the system is properly isolated for a performance test. It shall be bidder's responsibility to

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arrest all the cycle leakages and valves passing before start of initial operation. It will be endeavour of the bidder to keep the unaccounted for leakages below 0.1% of the design throttle flow at that load. In case the value of unaccounted for leakage, is more than 0.1% of design throttle flow at that load, the suitable correction for make-up shall be provided as per approved correction curve.

- 11.34.04 If due to any unavoidable situation, PG test is delayed, Ageing allowance will be given during evaluation of PG test results and hence guaranteed heat rates shall be increased by the amount calculated as per the formula given in Cl. No. 3.07, Sub-Section-3 of ASME-PTC-6 Report 1985 (Reaffirmed 1991). Period of ageing shall be considered from the date of successful completion of initial operation to the date of conductance of PG test, In calculating the above factor any period(s) during which the turbine has not been in operation at a stretch for more than a week shall not be considered.
- 11.34.05 The tests shall be arranged in a manner that the OWNER's operation is not disrupted Duplicate test runs shall be performed at 693 MW, 660 MW and 363 MW unit loads. The results of corrected heat rate shall agree within 0.25%. If they differ by more than 0.25%, third test shall be run at the same point. The corrected result of any one of the three test runs, which deviates from the corrected averaged result of all the runs by more than 0.25%, shall be eliminated; otherwise the results of all the three tests runs shall be accepted.
- 11.34.06 The applicable values of liquidated damages factors for non- fulfilments of guaranteed performances are indicated under Volume-1, Commercial conditions of Contract.

Amendment-6

RFx No. 3000046202 (BTG Package)

MAHAGENCO KORADI - 2x660MW COAL FIRED POWER PROJECT - FUEL ANALYSES						
Sl.No	Characteristics/ Parameters	Unit	Design Coal	Worst Coal	Imported Coal	Biomass
1.0	PROXIMATE ANALYSIS					
1.1	Total moisture	%	16.85	13.46	20	6.68
1.2	Ash	%	36.62	43.01	10	21.66
1.3	Volatile Matter	%	19.33	18.76	30	47.68
1.4	Fixed carbon	%	27.2	24.77	40	23.98
1.5	GCV	kCal/kg	3239	2980	5670	4165
2.0	ULTIMATE ANALYSIS					
2.1	Carbon	%	35.58	32.42	56.4	46.65
2.2	Hydrogen	%	2.05	2.12	4.5	3.93
2.3	Nitrogen	%	0.97	0.83	0.9	1.13
2.4	Sulphur	%	1.29	0.92	0.9	0.14
2.5	Oxygen	%	6.63	7.25	7.3	19.81
2.6	Total moisture	%	16.85	13.46	20	6.68
2.7	Ash	%	36.62	43.01	10	21.66
2.8	Carbonates	%	0.15	0.20	-	-
2.9	Phosphorous	%	0.03	0.03	-	-
2.10	Total	%	100.18	100.23	100.00	100.00
2.11	GCV	kCal/kg	3239	2980	5670	4165
2.12	Hard Grove Index	-	58	57	-	-
2.13	YGP Index (min)	mg/kg	80	80	-	-
3.0	ASH ANALYSIS					
3.1	Silica (SiO ₂)	%	58.96	60.12	32.74	67.48
3.2	Alumina (Al ₂ O ₃)	%	29.24	29.08	30.5	4.62
3.3	Iron Oxide (Fe ₂ O ₃)	%	4.18	3.8	18.2	2.83
3.4	Titanium oxide (TiO ₂)	%	2.1	2.18	1.56	1.9
3.5	Phosphoric Anhydride	%	0.09	0.08	0.44	1.9
3.6	Lime (CaO)	%	1.62	1.05	6.12	4.21
3.7	Magnesia (MgO)	%	1.3	1.2	1.83	7.78
3.8	Sulphuric Anhydride	%	0.98	0.98	6.95	6.15
3.9	Sodium Hydroxide (Na ₂ O) Max.	%	1.3	1.3	0.3	2.42
3.10	Potassium Oxide	%	0.23	0.21	0	0.39
3.11	Other alkalies	%	0	0	1.36	0.32
3.12	Total	%	100	100	100	100
4.0	ASH FUSION RANGE (Under reducing atmosphere)					
4.1	Initial Deformation Temp. (IDT)	deg.C	1100	1100	1100	1120
4.2	Hemispherical Temp. (HT)	deg.C	1280	1280	1300	1350
4.3	Flow Temperature (FT)	deg.C	1400	1400	1400	1420
4.4	Ash resistivity	Ohm-Cm	$8 \times 10^{13} \sim 9 \times 10^{13}$			

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BTG CONTROL INSTRUMENTATION AMENDMENT



BTG C&I Amendements for 2x660 MW Koradi Project					
Sr. No.	Volume	Part/Section No.	Clause No.	Bid Specification Stipulation	Amendment
1	Volume III	PART-C	1.02.03	All DCS and PLC based control system shall be supplied from OEM only as listed from Mahagenco approved vendor list.	All DCS and PLC based control system(if any) shall be supplied from OEM only as listed from Mahagenco approved vendor list.
2	Volume III	PART-C	7.14.15	NOX Analyser Range: 0-20 PPM	NOX analyzer Range: 0-10 PPM
3	Volume III	PART-C	7.14.17	Continuous Particulate Matter (PM10 & PM2.5) Analyser Type:Tapered Element Oscilating micro-balance	Continuous Particulate Matter(PM10 & PM2.5) Analyser Type:Tapered Element Oscilating micro-balance/Beta Attenuation
4	Volume III	PART-C	7.14.27	Carbon Monoxide (CO) Analyser Range: 0-1,000 PPM	Carbon Monoxide (CO) analyzer Range:0-100 PPM
5	Volume III	PART-C	7.14.28	Carbon Dioxide (CO2) Analyser Range: 0-10,000 PPM selectable	Carbon Dioxide (CO2) analyzer Range:0-1000 PPM
6	Volume III	PART-C	7.11.04	Specific requirements for Dilution Extractive type SOx/NOx/CO2 & CO Analysers :- In case this type of system is provided, it shall be AS PER CONTRACTOR's standard and proven practice for meeting system and latest CPCB REQUIREMENT	This clause to be deleted
7	Volume III	PART-C	7.11.02, 12 , Type technology	For Hot extractive sampling type and Dilution extractive sampling type system – The components involved in sample handling system shall be sourced from Original Analyser Manufacturer (OAM) approved reputed suppliers having successful trouble free operation duly certified by Original Analyser Manufacturer (OAM). Further, Sample handling system design shall be vetted by Original Analyser Manufacturer (OAM). Necessary documents shall be furnished during detailed engineering in order to establish the above requirement. Technical expert of OAM shall witness testing of sample handling system and validate it. Alternatively sampling handling system assembled at Original Analyser manufacturer (OAM) works shall also be accepted. SO2/NOx:- Hot extractive sampling type/ dilution extractive / In-situ (path) type CO: Hot extractive sampling type/ dilution extractive / In-situ (cross-duct) type (can be combined with SO2/NOx) CO2: Hot extractive sampling type/ dilution extractive / In-situ (cross-duct) type (can be combined with CO or SO2/NOx above) Particulate matters (Dust density): Extractive type with re-heating or dilution Mercury (Hg): Hot extractive type.	For Hot extractive sampling type system – The components involved in sample handling system shall be sourced from Original Analyser Manufacturer (OAM) approved reputed suppliers having successful trouble free operation duly certified by Original Analyser Manufacturer (OAM). Further, Sample handling system design shall be vetted by Original Analyser Manufacturer (OAM). Necessary documents shall be furnished during detailed engineering in order to establish the above requirement. Technical expert of OAM shall witness testing of sample handling system and validate it. Alternatively sampling handling system assembled at Original Analyser manufacturer (OAM) works shall also be accepted. SO2/NOx:- Hot extractive sampling type/ In-situ (path) type CO: Hot extractive sampling type / In-situ (cross-duct) type (can be combined with SO2/NOx) CO2: Hot extractive sampling type / In-situ (cross-duct) type (can be combined with CO or SO2/NOx above) Particulate matters (Dust density): Extractive type with re-heating Mercury (Hg): Hot extractive type.
8	Volume III	PART-C	9.10.00	ELECTRIC ACTUATORS WITH INTEGRAL STARTERS	This clause is deleted from C&I specification. For electrical motor driven actuator specification, please refer clause no.15.00.00 in Vol-III, Part-B Electrical Specification
9	Volume II	Lead Specification	2.13.02, i),l) page 24	Condensate Polishing Unit (CPU) 1)	PLC is mentioned in lead specification, it is to be read as DCS.
10	Volume II	Lead Specification	2.13.06, c)	Air Dryng Plant	PLC is mentioned in lead specification, it is to be read as DCS.
11	Volume II	Lead Specification	2.13.07, i), f)	Air Conditioning and Ventilation System	PLC to be deleted
12	Volume II	Lead Specification	2.13.07, iv), a)	Split type Air conditioner	PLC is mentioned in lead specification, it is to be read as DCS.

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MAHARASHTRA STATE POWER GENERATION CO. LTD.
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13	Volume II	Lead Specification	3.02.04, i), ii), iii) & iv)	Control & Instrumentation	PLC to be deleted
14	Volume III	Part-c			New clause to be added. 21.04.00 ENGINEERING PORTAL : Contractor shall provide the Engineering portal for review / approval of all project documents / drawings. After completion of engineering of project, contractor shall supply two nos. of server graded PCs will all project approved / As build documents and drawings in soft copy installed at site as well as at corporate office.
15	Volume III	Part-C	1.01.01	This part covers the specification of Control and Instrumentation system for BTG package including Distributed Control System (DCS), associated Primary and Secondary Instruments, Panels/ Desks, LIE/LIRs, Control Valves and Actuators, Process Connection and Piping, Electrical Actuators with integral starters, associated Instrumentation and power supply Cables etc. as identified in the specification.	This part covers the specification of Control and Instrumentation system for BTG package including Distributed Control System (DCS), associated Primary and Secondary Instruments, Panels/ Desks, LIE/LIRs, Control Valves and Actuators, Process Connection and Piping, Electrical Actuators with non-integral starters, associated Instrumentation and power supply Cables etc. as identified in the specification.
16	Volume III	Part-C	2.35.00		2.35.00 - Provision for interacting with Plant Information System (PI) OPC Server requirement: 1. The OPC server is envisaged for connectivity with owner’s PI server of OSI soft, USA. 2. OPC Data Access server with OPC Version 2.05a shall be supplied. Any other higher versions shall be backward compatible with version 2.05a. 3. Vendor shall ensure that data is accessible from the OPC server to a PI server of OSI Soft– version 3.4.375.38 and later (or any other 3rd party system) using PI-OPC client of OSISoft-version 2.3.7.0 and later (or any other 3rd party OPC client). 4. Timestamp when the measurement was made is to be used in the OPC Server. OPC server shall not use the time of the server as timestamp of the measured signal. 5. Vendor to indicate the latency between measurement and availability in OPC server. 6. All data like MW, MVAR, CB status, Metering Master Station data etc. shall be communicated through this OPC server. The number of tags to be licensed for the OPC Server as well as the maximum number of tags the OPC server can support shall be approved during detailed engineering. 7. Vendor shall inform method of testing the OPC compliance. Vendor shall demonstrate that data is accessible from the OPC Server using a standard 3rd party OPC client such as PI OPC client of OSISoft, OPC client of Matricon. 8. PI server shall be connected to MIS station of operation and efficiency PC.

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17	Volume III	Part-C	18.02.02	Control Desk	<u>Control Desk</u> <u>Clause 18.02.02 shall be read as</u> The proposed control desk shall be ANSI/BIFMA e3-2019 certified/tested as per Furniture Sustainability Standard to identify the sustainability level of the furniture with respect to the environmental, health & wellness, and social impacts applicable to product(s). The structure of control desk shall be made of heavy-duty extruded vertical and horizontal aluminium profiles. The extrusions shall be duly powder coated with 40+ microns over all surfaces. All sheet metal parts shall be finished with a durable, black, electrostatic powder coating. To allow future extension and expansion, a weld-free system shall be proposed. Interconnecting joints shall not be visible. The structure shall be rigid enough to withstand BIFMA X5.5 tests The structure shall allow easy assembly of hinged shutters, slat wall, gland plate, and monitor arms in extremely rigid manner. The EPD (Environmental product declaration) of Control Desk shall be verified in accordance with ISO 14025 for Impacts on Environment by Control Desk. The material of the working surface shall be minimum 25 mm thick MDF with High-Pressure laminate. The proposed Control Desk’s life cycle should be assessed for environmental impacts associated with all the stages of a product’s life for cradle to grave analysis. Slat wall shall be made of approximately 2mm thick extruded aluminium (aluminium alloy). The front edge of consoles is the component which comes in frequent contact of the operator. The soft polyurethane edge is meant to prevent injury (accidental impact) to operator during emergency and it also reduces the contact stress. In case of damage to this edge the desk design shall permit quick & easy replacement within half an hour without taking any shutdowns or removal of the tabletops. Audit certified design feature of modular PU Edge: High-density poly-urethane moulded on industrial grade aluminium core to form 50mm deep tapered edge to be installed on worktop. In case of damage or wear, the edge shall be mechanically replaceable within 30 minutes without opening or removing the worktop. The Console shall feature ergonomic display mounting arms. The Console shall be designed with vertical and horizontal cable trays to allow for continuous cable management between the cabinets. Wire shall be routed into the cabinet through gland plate. All bolts shall be of SS material to avoid rust due to environment. The remaining hardware shall be Nickel Plated MS.
18	Vol III	Part A/ Section 1	2.28.04	Coal feeders viii) The mass flow of the coal powder shall be adjustable with online orifice adjustment using micro-wave based flow measurement	Coal feeders The mass flow of the coal powder shall be adjustable with online orifice adjustment using Flow measurement
19	VOLUME - III,	PART - B	19.02.00	Scope of Work v) 600 nos. Analog Desk top Telephones. xi) GSM/5G Fixed Cellular Terminal for Voice applications (10 nos. GSM SIMS shall be provided) xxi) 50 nos. Wireless Walkie-Talkie system.	COMMUNICATION SYSTEM v) 600 nos. Analog Desk top Telephones - quantity revise to 300 nos. xi) GSM/5G Fixed Cellular Terminal for Voice applications (10 nos. GSM SIMS shall be provided) - quantity revise to 20 nos. xxi) 50 nos. Wireless Walkie-Talkie system. - quantity revise to 25 nos.
20	VOLUME - V	Annexure - 3	4.00.00, 1.12.	Control & Instrumentation - Mandatory Spares 1.12.3.- Fittings - 100 Nos. of each type	To be read as 1.12.3.- Fittings - 100 %. of each type.
21	VOLUME - V	Annexure - 3	1.11, (ii)	Measuring Instruments - Electronic Cards or PCB’s for each type and model of transmitter	Clause to be deleted.
22	VOLUME - II	Lead Specification	4.40.18	Maintenance Management and Store Management	Clause to be deleted.
23	VOLUME - III	PART - C	12.09.00	Power Supply 2. 24 V DC power supply system for PLC shall comprise of 2 x 100% power supply unit (power pack) along with 1 x 100% sealed maintenance free lead acid batteries for 30 minutes back up and DC distribution board, the whole assembly housed in a single panel. Power supply unit shall be capable of charging the batteries and feeding the load simultaneously. The DC distribution board shall have redundant feeders for critical loads. 5. Single phase 230V AC power supply for PC / monitor & printer units shall be derived from the incoming feeders provided, preferably from within the 24V DC power supply cabinet to be fed through mini-UPS.Surge protected power sockets shall be considered for powering the PC, monitor and printer units.	Clause to be read as: 2. 2X100% redundant UPS alongwith 1 X 100% lead acid plante battery with 60 min. battery backup shall be provided. PLC panels shall be powered with this UPS. Redundant SMPS shall be used in the PLC panel to convert to 24V DC. The DC distribution board shall have redundant feeders for critical loads. 5. Single phase 230V AC power supply for PC / monitor & printer units shall be derived from the incoming feeders provided, preferably from UPS. Surge protected power sockets shall be considered for powering the PC, monitor and printer units.

VOLUME - VI

AMENDMENT - 8

AMENDMENT TO FGD SPECIFICATION

PREPARED BY



(An ISO 9001:2015 certified Company)

STEAG Energy Services India Pvt. Ltd.

(A wholly owned subsidiary of STEAG Group, Germany)
A-29, Sector-16, NOIDA - 201301, India

JUNE, 2024

	MAHARASHTRA STATE POWER GENERATION CO. LTD.	VOLUME - VI
	KORADI THERMAL POWER STATION 2X660 MW UNITS - 11 & 12 PROJECT	-
	RFx No. 3000046202 (BTG Package)	AMENDMENT - 8
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3.06.00 The FGD system and all the associated auxiliaries shall be designed to comply with the requirements stipulated under 'Guarantee Point' and 'Design Point' conditions indicated below:

Sl. No.	Item	Guarantee point	Design point
1.	Boiler Load in MW (e)	TMCR	BMCR
2.	Type of Coal	Worst coal	Worst coal
3.	Ambient air condition	27 deg. C and 60% RH	45 deg. C and 60% RH
4.	Gas flow (m ³ /sec)	To be worked out by Bidder when firing the coal as per Sl. (2) above at TMCR (660MW) load, considering 20% excess air at economizer outlet, 8% Air heater in leakage and 2% duct and 1% ESP leakage as a minimum.	To be worked out by Bidder when firing the specified worst coal at BMCR load, considering 20% excess air at economizer outlet, 15% Air heater in leakage & 2% duct and 1% ESP leakage as a minimum.
5.	Gas temperature at FGD inlet (deg. C)	125 °C or as predicted by the bidder under conditions stipulated above, whichever is higher	150 °C or as predicted by the bidder under conditions stipulated above, whichever is higher
6.	Inlet SO ₂ concentration (mg/Nm ³)	To be worked out by the Bidder (based on the above conditions).	To be worked out by the Bidder (based on the above conditions).
7.	SO ₂ Removal Efficiency	To be worked out by the Bidder to achieve SO ₂ emission in the chimney to less than 70 mg/Nm ³ (6% O ₂ dry basis)	To be worked out by the Bidder to achieve SO ₂ emission in the chimney to less than 70 mg/Nm ³ (6% O ₂ dry basis)

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Koradi 2x660 MW Project -BTG Package

Amendments to Bid Specification (RFx.no. 3000046202)

Sr. No	VOLUME/SECTION	CLAUSE NO.	EXISTING CLAUSE				AMENDED CLAUSE			
1.	Volume-III, Section-1	6.10.01	Sl. No.	Item	Unit	Description	Sl. No.	Item	Unit	Description
			6.10.01	Coal mills Maximum permissible mill loading / fire fighting system		Medium speed vertical spindle; Coal Mill combination shall be (N+3) where, standby (1 under maintenance); i.e. total 10 no. of mills for each unit 90% of mill loading shall be able to meet 100% coal firing rate using TMCR. Proven inerting / fire fighting system shall be provided along with detection system as per NFPA guidelines.	6.10.01	Coal mills Maximum permissible mill loading / fire fighting system		The Coal mill combination shall be (N+2) at 100% TMCR with worst coal, here N=6 working and 2 standby (1 under maintenance) i.e total 8 Nos. of mill for each unit. However, Capacity of the mills shall be 90 TPH and above
2.	Volume-II, Section-2	6.01.04	The plant shall be suitable for load cycling which implies that it should be designed to operate continuously under two shift mode (daily start stop with one shift off) and load follow mode as specified. The design would cover adequate provision for quick start-up and loading of the unit to full load at a fast rate. The unit shall have minimum rate of loading or unloading of 3% per minute above the control load (i.e. 50% MCR). Plant shall be capable of minimum N1 number of daily load cycles (N1 shall not be less than 2), load variation from 100% to 50 % (and vice versa) of MCR with a minimum ramp rate of 3% per minute without affecting the design life of boiler and turbine-Generator systems. In addition, the plant shall also be capable of minimum N2 number of daily load cycles (N2 shall not be less than 1) from 50% to boiler minimum once through load (and vice versa) with a minimum ramp rate of 1% per minute without affecting the design life of boiler and turbine-Generator systems.				Following ramp rates as per CEA guidelines is envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR 1% per minute from 40% to 55%TMCR.			

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3.	Volume-III, Section-4	Limestone Analysis	Limestone Characteristic is as under: (a) Grade : Limestone Grade-III (b) Colour : Pale Yellow (c) CaCO3 : >85% (d) MgCO : <2% (e) Silica : <4% (f) Others : <9%																																																		
			Limestone Analysis																																																		
			Sl. No	Constituents	Unit	% by Weight		Analysis #1	Analysis #2	1.	Silica as SiO ₂	%	7.5	4-6	2.	Iron as Fe ₂ O ₃	%	8.0	1.5-2.2	3.	Aluminium as Al ₂ O ₃	%	1.0	1.8-2.8	4.	CaCO ₃	%	71.4	85-89	5.	MgCO ₃	%	3.4	6.	Acid Insoluble	%	7.0	Below 1%	7.	Others	%	1.02	-	8.	Inherent Moisture Content	%	Max 0.5	-	9.	Bond Work index	KW H/T	11.61	14
						Sl. No	Constituents	Unit	% by Weight																																												
			Analysis #1	Analysis #2																																																	
			1.	Silica as SiO ₂	%	7.5	4-6																																														
			2.	Iron as Fe ₂ O ₃	%	8.0	1.5-2.2																																														
			3.	Aluminium as Al ₂ O ₃	%	1.0	1.8-2.8																																														
			4.	CaCO ₃	%	71.4	85-89																																														
			5.	MgCO ₃	%	3.4																																															
6.	Acid Insoluble	%	7.0	Below 1%																																																	
7.	Others	%	1.02	-																																																	
8.	Inherent Moisture Content	%	Max 0.5	-																																																	
9.	Bond Work index	KW H/T	11.61	14																																																	
Note: Analysis#2 to be considered with 85% CaCO ₃ for Design Criteria and 89% CaCO ₃ for performance guarantee purpose.																																																					
		Guarantee Point 100% TMCR	Design Point BMCR	HCL	ppm-wet	45	45	NOx	Mg/Nm3	750	750	HF	ppm-wet	12	12	So ₃	ppm	10.50	10.20	NH ₃		Not Present																															
		Guarantee Point 100% TMCR	Design Point BMCR																																																		
HCL	ppm-wet	45	45																																																		
NOx	Mg/Nm3	750	750																																																		
HF	ppm-wet	12	12																																																		
So ₃	ppm	10.50	10.20																																																		
NH ₃		Not Present																																																			
Limestone fineness: 90% or higher through 325 mesh. In case of jet bubbling technology 90% or higher through 200 mesh.																																																					

KORADI THERMAL POWER STATION 2 X 660 MW UNITS-11 & 12 – BTG PACKAGE RFx no. 3000046202, Volume I					
Reply to COMMERCIAL PRE – BID QUERIS					
Sr. No.	Section No.	Clause No.	Bid Specification Stipulation	Bidder's query/ Stipulation	Owner's response
(1)	(2)	(3)	(4)	(5)	(6)
1.		-	-	Bidder understands, payment terms for civil works shall be as per payment terms for site works Clause 27.(pg 320-324) of Volume-I . Section 2 B (Terms & Conditions of the Contract – Site Works). Owner may kindly confirm.	Confirmed.
2.	3	2.1.2 2.2.3 2.4.1,2.4.2, 2.4.3,2.4.4 2.7.7	respective equipment(s) should have been in successful operation in at least one (1) plant for a period not less than one(1) year as on the date of bid opening	It is proposed that to rationalise the qualification requirement with current date, successful operation shall be reckoned as on the date of consideration for approval but not later than six months from award of contract to the Main contractor.	Bid specification prevails.
3.	3	New	Qualification requirements for accepting suppliers for Air conditioning package and Ventilation package are not given.	For air conditioning and ventilation packages, the capacity and type of plant are project specific and designed as per ASHRAE guidelines/ prevalent practices in the industry. In the absence of any specific qualification requirement, unlike mill reject and TG hall crane, general	Noted

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				requirement mentioned at Clause no 21.0, Section 2 (GCC) shall be applicable. For AC and Ventilation system, it will be difficult to match capacity of each equipment of present project with previously executed projects. We are proposing following qualification requirements for these two packages also, please accept. A) Air conditioning system: The Bidder/ its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of Air conditioning system having a total installed capacity of 300TR or more including stand-by chiller unit (if any), which should have included at least one chilling unit with a minimum capacity of 60TR. The system should have been in successful operation for at least one (1) year. B) Ventilation system The Bidder/its sub-vendor should have designed, supplied,	

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				erected, and commissioned at least one (1) number ventilation system including air washer unit having individual fan capacity of 80,000 Cum./Hr. or more. The system should have been in successful operation for at least one (1) year.	
4.	1	4.3	In case the Bidder/ Associate/Collaborator responsible for engineering has experience of detailed engineering with his in-house engineering set-up for 1 number of 210 MW or more capacity coal fired project as mentioned above, then the bidder/ / Associate/Collaborator shall get the engineering documents related to Thermal Cycle, Power cycle piping and flash tanks/flash boxes, Steam Generator start up system, sizing of the Main Plant equipment, interface between SG and TG, unit start up and control philosophy vetted by an Architect Engineering Firm/engineering associate , who has experience of detailed engineering with his in-house	There are several qualified Engineering Consultancy Firms which have the requisite capabilities and relevant experience to carry-out engineering of complete coal-based power Projects. Bidder understands that under QR Clause No. 4.3 of Section-1 Volume-I, a Bidder is allowed to propose more than one Engineering Consultancy Firm as its associate for engineering services for the project and submit relevant documents/certificates/DJUs for all such Engineering Consultancy Firm(s) in line with tender requirements.	Bid specification prevails.

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			engineering set-up for at least 1 no. 500 MW or more capacity coal fired supercritical projects as mentioned above.	In view if the above, Bidder requests to add following provision/note: <u>“Bidders can propose more than one Engineering Consultancy Firm(s) as their associate to carryout engineering of the project under Clause No. 4.3 in their bids. In case of award, bidders shall finalize and appoint only one qualified Engineering Consultancy Firm under clause 4.3 from all such Engineering Consultancy Firm(s) as proposed in their bids.”</u>	
5.	1	15.1.1	The bid price shall be in Indian Rupee (INR) only. Further, a bidder expecting to incur a portion of the expenditure, in the performance of the contract, in any currency other than Indian Rupees, should note that the payments shall be made in Indian Rupees only and the Owner shall not bear any burden on account of exchange rate variation.	The Owner is aware of the fact that the construction of a coal based thermal power project on EPC basis requires substantial amount of imports (in form of finished goods/parts /sub-components/sub-assembly/ raw materials etc.) which are required to be sourced from outside India	Bid specification prevails.

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				due to various reasons. Therefore, the Contractor is liable to pay such imported items in foreign currency to its vendors/sub-vendors. However, as per current tender condition, the payment to the Contractor is to be made only in Indian Rupees. This scenario will expose the Contractor to huge financial risk owing to exchange rate variation during the course of the project execution. Hence, we request Owner to kindly <u>allow bidders to quote in foreign currencies and receive payment in quoted currencies.</u> <u>OR</u> <u>Alternatively,</u> Owner is requested to introduce a suitable provision to compensate the Contractor for Exchange Rate Variation (ERV).	

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6.	1	18	Duration for Completion of the Project and Project Schedule: Unit#11: 46 months from zero date Unit#12: 52 Months from zero date	Considering the scope and quantity of underground dismantling work at BTG area, it is proposed to extended duration for Completion of the Project and Project Schedule to : Unit#11: 52 months from zero date Unit#12: 58 Months from zero date	Bid specification prevails.
7.	1	15.3	Cash Flow Statement: The successful bidder has to submit the Cash Flow Statement within 30 days from date of issuance of LOA showing proposed monthly drawl of the Contract Price considering the planned invoicing and the payment terms as stipulated in the bid specification.	Cash Flow Statement shall be indicative in nature and Mahagenco to permit $\pm 10\%$ variation in monthly payments depending on progress of work.	Bid specification prevails.
8.	1/2A/2B	16.1/8.7/23.6	The total amount of GST and Custom Duty payable to the contractor shall be limited to the amount of taxes indicated in the online bid price submitted by the Contractor.	GST should be paid extra at actual without any ceiling limit. Statutory Variation in Taxes & Duties should also not to be restricted by any ceiling limit.	Please refer Amendment-1 to Vol-I (Commercial).
9.	1	18.2	Duration for Completion of the Project and Project Schedule: The successful bidder, within the period of one Month from the date of	Bidder requests to additionally allow the preparation of work completion schedule through	Bid specification prevails.

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			issuance of LOA, shall submit unit wise (if more than one units are ordered) micro detailed Work Completion schedule indicating all Construction, Erection & Commissioning activities in Microsoft Project format (*.mpp) to match the Contractual Completion Period,.....	Primavera P6 software. Same is as per general industry practice.	
10.	1	18.1/sch-6	Handing over of Unit: Linked with PG Test under sec 18.1 of Section -1 Linked with Trial Operation under Schedule-6	Plant Handing Over shall be from 72 Hours Full Load or Declaration of COD by Mahagenco whichever is earlier. Mahagenco to accept.	Please refer Amendment-1 to Vol-I (Commercial).
11.	2	23	The bids (except for prices for 3 Years O&M Spares which shall be valid as stipulated under Clause No. 37.2 hereunder) shall be valid for acceptance till the last Day of the calendar Month in which 180 Days from the Date of Opening of Part – 1 i.e. Techno-commercial bid are completed. Bids with shorter validity shall be liable for rejection.	In case of extensions of bid validity beyond 180 days from date of opening Of Part-1, in order to address the cost implications suitably, bidder request owner to invite price impacts or invite new fresh tenders.	Bid specification prevails.
12.	1	34.2	Contract Performance Security and Demand Guarantees:	Bidder requests to delete the requirement of 6 months claim period in line with general	Bid specification prevails.

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			All the above bank guarantees shall be kept valid for the period of 90 Days beyond the expiry of the Defect Liability Period with further claim period of 6 months.	industry practice and modify the clause as follows: All the above bank guarantees shall be kept valid for the period of 90 Days beyond the expiry of the Defect Liability Period ~~with further claim period of 6 months.~~	
13.	1	34.6	For the purpose of Clause No. 34.0, the contract price shall be including taxes & duties.	To be deleted, as Performance Bank Guarantee amount should not be inclusive of T&D. However, PBG Shall be furnished for 10% of contract value (Excl. taxes). Mahagenco to accept.	Please refer Amendment-1 to Vol-I (Commercial).
14.	1	35.1	Construction of the Contracts: The Contracts shall be entered into with the successful bidder as under: i) First Contract: FOR Destination Site supply of All Equipment & Material including Mandatory Spares of (i) Indian origin and (ii) Foreign Origin. The above shall include port handling & customs clearance for imported items, inland transportation for delivery at Site. ii) Second Contract: For providing all services including design and	Bidder requests to modify as below to bring clarity regarding applicability of BOCW cess which shall be applicable on Third Contract only: First Contract: For Supply of all Plant and Equipment and Mandatory Spares Second Contract: For providing all services excluding Civil Works Third Contract: For Civil Works	Bid specification prevails.

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			engineering of the plant and Equipment, insurance and execution of works i.e. unloading, storage, handling at Site, erection, testing & Commissioning including performance testing in respect of all the Equipment supplied as per the Bid Specification. iii) Third Contract: For design, preparation of General Arrangement, Construction as well as fabrication drawings, supply of all labour and construction of all civil, structural as well as architectural works along with associated civil supply material like Cement, Steel and other aggregates as detailed in Bid Specification.		
15.	1	Schedule-3 Clause 1.0	PRICE ADJUSTMENT (PV) (i) Ceiling of $\pm 20\%$ of individual Contract Price [Viz. Supply, Erection, Testing & Commissioning Services (ETC) and Civil, Structural & Architectural Works]	The prices of various commodities (like steel and cement) and fuel prices keep on fluctuating owing to various macroeconomic factors and geopolitical reasons. PV Ceiling of 20% will result in inadequate cover for the Contractor against the risks of uncertain price	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			(ii) Labour index linked with CPI for industrial workers as published by Labour Bureau, Shimla, Govt of India (iii) Fixed portion a. Supply – 20% b. Service (ETC and Civil, Structural & Architectural Works) – 25%	movements and force the bidders to build-up for the same in the cost leading to increase in bid prices. Consumer Price Index (CPI) for industrial workers does not reflect the actual changes in wages on real time basis whereas payments to the workers shall be made in compliance with the minimum wages as notified by relevant agencies. The Contractor carries a huge risk of price variation which remains uncovered in present formulae. Reducing the fixed price component will help in reflecting the actual changes in variable portion of the contract price in more appropriate manner. This will also reduce the cost build-up by the bidders on account of fixed price component and in turn will result in lower capex for Owner.	

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				In view of the above and in line with provisions available in Central/State Utility tenders including NTPC, DVC, MPPGCL, CSPGCL etc., Owner is requested to introduce following changes in Price Adjustment (PV) provisions: (i) <i>The PV should be without any ceiling</i> (ii) <i>Labour Portion of PV should be linked with Minimum Wages notified by the Central Government for a particular area where site is located or notified by the State Government of the state where site is located, whichever is higher</i> (iii) <i>Fixed Price component should be reduced to:</i> • <i>15% for Supply and ETC</i> • <i>20% for Civil, Structural & Architectural Works</i>	
16.	1	Schedule 3	Details of Price Adjustments 1.1.5 In the event of the shipment beyond scheduled date of supply completion of the respective equipment/spares/material as the	In line with provision available in many State and Central Utility tenders (including NTPC tenders), Bidder requests to modify the clause as follows:	Bid specification prevails.

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			case may be, for the reasons attributable to contractor, the price adjustment shall be worked out based on i) the scheduled date of supply completion of equipment/spares/material and ii) the actual date of supply completion of the same and whichever is beneficial to the Owner shall be payable.	1.1.5 In the event of the shipment beyond scheduled date of supply completion of the respective equipment/spares/material as the case may be, for the reasons attributable to contractor, the price adjustment shall <u>not be applicable for the period of time between</u> be worked out based on i) the scheduled date of supply completion of equipment/spares/material and ii) the actual date of supply completion of the same and whichever is beneficial to the Owner shall be payable.	
17.	1	Schedule 3	Details of Price Adjustments 2.2 In the event of the work performed beyond scheduled date of completion of the respective activity, for the reasons attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and	In line with provision available in many State and Central Utility tenders (including NTPC tenders), Bidder requests to modify the clause as follows: 2.2 In the event of the work performed beyond scheduled date of completion of the respective activity, for the	Bid specification prevails.

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			whichever is beneficial to the Owner shall be payable.	reasons attributable to the Contractor, the price adjustment shall <u>not be applicable for the period of time between</u> be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the Owner shall be payable.	
18.	1	Schedule 3	Details of Price Adjustments 3.2 In the event of the work performed beyond scheduled date of completion of the respective activity, for the reasons attributable to the Contractor, the price adjustment shall be worked out based on i) the scheduled date of completion of respective activity and ii) the actual date of completion of the activity and whichever is beneficial to the Owner shall be payable.	In line with provision available in many State and Central Utility tenders (including NTPC tenders), Bidder requests to modify the clause as follows: 3.2 In the event of the work performed beyond scheduled date of completion of the respective activity, for the reasons attributable to the Contractor, the price adjustment shall <u>not be applicable for the period of time between</u> be worked out based on i) the scheduled date of completion of respective activity and ii) the	Bid specification prevails.

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				actual date of completion of the activity ~~and whichever is beneficial to the Owner shall be payable.~~	
19.	1	Schedule-8(E)	PROFORMA OF BANK GUARANTEE FOR ADVANCE The Contractor may, if he so desires, reduce the value of Bank Guarantee(s) submitted against advance payments after every six (6) months to the extent of advance actually adjusted. The application for reduction in the value of the Bank Guarantee shall be submitted to the Project Manager.	Six (6) months is a longer duration for reduction of Advance Bank Guarantee (ABG). Therefore, in line with standard industry practice followed by many Central/State Utilities including NTPC, DVC, MPPGCL, CSPGCL etc., Owner is requested to allow reduction of ABG every 3 months up to full adjustment of advance amount.	Please refer Amendment-1 to Vol-I (Commercial).
20.	2	3.0 (xvi)	Definitions of the Terms: "Equipment" or "Goods" shall mean all plants, tools and tackles, stores, materials to be provided by the contractor	Bidder requests to provide the definition of "Equipment" or "Goods" in two parts as mentioned below: Equipment" or "Goods" shall mean all plants, tools and tackles, stores, materials to be provided by the Contractor under the Contract but does not include Contractor's Equipment or Goods.	Bid specification prevails.

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				“Contractor's Equipment or Goods” means all plants, tools and tackles, stores, materials that are to be provided by the Contractor, but does not include Equipment or Goods, or other things intended to form or forming part of the Scope.	
21.	2	6.2	The Contractor to inform Himself Fully: The contractor shall be deemed..... The contractor shall not, except an expressly provided in these conditions be entitled to any extension to any guaranteed completion date or to any adjustment of the contract price on grounds of misinterpretation or misunderstanding of any such matter, nor shall except as so provided, it be released from any of the risks accepted or obligations undertaken by it under the contract on the ground that it did not or could not reasonably have foreseen any matter which affects the execution of	Clause 65 (Unforeseen Conditions) of Section 2 of Tender document enables the Contractor to claim for cost compensation and time extension against unforeseen condition, which is creating contradiction with below clause. Therefore, Bidder requests to modify the clause as follows: The contractor shall be deemed..... The contractor shall not, except an expressly provided in these conditions be entitled to any extension to any guaranteed completion date or to any adjustment of the contract price	Bid specification prevails.

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			the works. Site condition shall not relinquish the contractor from any of his obligations / responsibilities to be discharged and performed under the contract as per schedule within the contract price. However, any Asbestos material found during excavation etc., the same shall be disposed by the Owner at its own risks and costs.	~~on grounds of misinterpretation or misunderstanding of any such matter, nor shall except as so provided, it be released from any of the risks accepted or obligations undertaken by it under the contract on the ground that it did not or could not reasonably have foreseen any matter which affects the execution of the works. Site condition shall not relinquish the contractor from any of his obligations / responsibilities to be discharged and performed under the contract as per schedule within the contract price. However, any Asbestos material found during excavation etc., the same shall be disposed by the Owner at its own risks and costs.~~	
22.	2	14.3	Contract Performance Security: The performance security will be returned to the Contractor without any interest after successful completion of the defect liability period and after completion of	Bidder requests to modify the clause as follows: The performance security will be returned to the Contractor without any interest after	Bid specification prevails.

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			Contractor's other obligations under the contract.	successful completion of the defect liability period ~~and after completion of Contractor's other obligations under the contract.~~	
23.	2	14.4	Contract Performance Security: Further, the value of contract performance security will be proportionately reduced upon successful completion of Guarantee Period of each unit and after completion of Contractor's other obligations under the contract for the unit.	Bidder requests to modify the clause as follows: Further, the value of contract performance security will be proportionately reduced upon successful completion of Guarantee Period of each unit ~~and after completion of Contractor's other obligations under the contract for the unit.~~	Bid specification prevails.
24.	2	15.3	Bank Guarantees against the Contract: The bank guarantee shall have provision for extension of validity by the guarantor bank for a period of six months along with the claim period of minimum six months from the date of validity on each occasion when the owner makes a request for the same to the guarantor bank under intimation to the contractor. The guarantor Bank shall confirm such extension of validity without	Bidder requests to modify the clause as follows: The bank guarantee shall have provision for extension of validity by the guarantor bank for a period of six months along with the claim period of minimum ~~six~~ three months from the date of validity on each occasion when the owner makes a request for the same to the guarantor bank under intimation to the	Bid specification prevails.

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			any reference to the contractor. However, one month before the current expiry of the validity of the bank guarantee the contractor shall arrange to extend the validity of the same without waiting for the intimation by the owner for the further period of six months at a time at his own costs till the same is released by the owner. Failure of to extend the validity as above shall be sufficient ground for encashment (not forfeiture) of the bank guarantee	contractor. ~~The guarantor Bank shall confirm such extension of validity without any reference to the contractor.~~ However, one month before the current expiry of the validity of the bank guarantee the contractor shall arrange to extend the validity of the same ~~without waiting for the~~ upon the intimation by the owner for the further period of six months at a time at his own costs till the same is released by the owner. Failure of to extend the validity as above shall be sufficient ground for encashment (not forfeiture) of the bank guarantee.	
25.	2	18.2	Contract Price and Deductions from the Contract Price: All costs, damages or expenses that the owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills becoming due under this contract or any other	Bidder requests to modify the clause as follows: All costs, damages or expenses that the Owner may have incurred, for which under the contract the contractor is liable, shall be recovered by the owner as and when they are incurred from the contractor's bills	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			contract awarded by the Owner to the Contractor. Such recoveries shall be supported by appropriate documents or explanations in writing, to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.	becoming due under this contract ~~or any other contract awarded by the Owner to the Contractor.~~ Such recoveries shall be supported by appropriate documents or explanations in writing, to enable the contractor to properly identify such claims. These amounts may be recovered by actions of law or otherwise, if the contractor fails to satisfy the owner of such claims.	
26.	2	21.1	Vendor/Subcontractor Approval Prior to Appointment: The contractor may procure the goods/equipment /services stipulated under Clause No 2, Section – 3, Volume - I from the sources meeting qualifying/provenness criteria stipulated therein. However, before initiating the procurement, detailed credentials of such source indicating their experience, quality systems etc. shall be furnished to the Engineer for approval.	Bidder requests to modify the clause as follows: The contractor may procure the goods/equipment /services stipulated under Clause No 2, Section – 3, Volume - I from the sources meeting qualifying/provenness criteria stipulated therein. However, before initiating the procurement, detailed credentials of such source indicating their experience, quality systems etc. shall be	Bid specification prevails.

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				furnished to the Engineer for approval. <u>The Engineer promptly but not later than 15 days from the submission of the vendor/Subcontractor credentials, shall approve the same.</u>	
27.	2	21.0	21.3 However, the contractor may procure the goods/equipment/services mentioned in the list stipulated in Annexure-4, Volume – V from any other source which contractor considers being at par with the sources approved by the owner after prior approval of the owner. However, before initiating the procurement, the contractor shall furnish the details of credentials of such source(s) proposed by the contractor. Such source proposed by the contractor should have a. supplied/provided goods/equipment/services intended to be procured for at least one thermal power plant of 500 MW or above capacity. Such supplied/provided	It is proposed that to rationalise the qualification requirement with current date, one (1) year of successful operation shall be reckoned as on the date of consideration for approval but not later than six months from award of contract to the Main contractor. Qualification requirement for Rating/ type/ size/ class shall be minimum 80% of that required under this contract. Referred clause may be reviewed as under: However, the contractor may procure the goods/equipment/services mentioned in the list stipulated in Annexure-4, Volume – V from any other source which	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the unit. or b. supplied /provided goods/equipment/services of rating /type/size/class as required under the contract to any power plant / industry. Such supplied/provided goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the unit /commissioning of the equipment/services.	contractor considers being at par with the sources approved by the owner after prior approval of the owner. However, before initiating the procurement, the contractor shall furnish the details of credentials of such source(s) proposed by the contractor. Such source proposed by the contractor should have a. supplied/provided goods/equipment/services intended to be procured for at least one thermal power plant of 500 MW or above capacity. Such supplied/provided goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the unit reckoned as on the date of consideration for approval but not later than six months from award of contract to the Main contractor or b. supplied /provided	

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(1)	(2)	(3)	(4)	(5)	(6)
				goods/equipment/services of 80% of rating /type/size/class as required under the contract to any power plant / industry. Such supplied/provided goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the unit /commissioning of the equipment/services reckoned as on the date of consideration for approval but not later than six months from award of contract to the Main contractor.	
28.	2	21.3	In case of the source proposed by the contractor as mentioned above, the decision of the owner shall be generally communicated within one month from the date of receipt of the request with credentials of such source from the contractor. However, the owner does not bind itself to for certain timeframe in this regard nor the request for extension of work completion period shall be entertained on such grounds.	Kindly modified the clause as below: In case of the source proposed by the contractor as mentioned above, the decision of the owner shall be generally communicated within 7 days from the date of receipt of the request with credentials of such source from the contractor. (time extensions may kindly be granted for the reasons	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
				attributable to the owner any period of delay in vendor approval)	
29.	2	21.3	Such source proposed by the contractor should have: a. supplied/provided goods/equipment/services intended to be procured for at least one thermal power plant of 500 MW or above capacity. Such supplied/provided goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the unit. or b. supplied /provided goods/equipment/services of rating /type/size/class as required under the contract to any power plant / industry. Such supplied/provided goods/equipment/services should be in successful operation for more than 1 year from Commercial operation Declaration (CoD) of the	Bidder has its own robust and exhaustive process to qualify a vendor prior to award of contract. Bidders are meticulously scrutinized by bidder and qualified based on thorough evaluation including Technical as well as financial capability. Hence in order to minimize the ordering time owner may please exempt vendor approval for all type of subcontracting works viz. civil, E & C and site fabrication etc. and delete this clause pt. a. and pt b.	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
			unit /commissioning of the equipment/services.		
30.	2	21.3	Vendor/Subcontractor Approval Prior to Appointment: However, the contractor.... a. b. In case of the source proposed by the contractor as mentioned above, the decision of the owner shall be generally communicated within one month from the date of receipt of the request with credentials of such source from the contractor. However, the owner does not bind itself to for certain timeframe in this regard nor the request for extension of work completion period shall be entertained on such grounds.	Bidder requests to modify the clause as follows: However, the contractor.... a..... b..... In case of the source proposed by the contractor as mentioned above, the decision of the owner shall be generally communicated within ~~one month~~ 15 days from the date of receipt of the request with credentials of such source from the contractor. ~~However, the owner does not bind itself to for certain timeframe in this regard nor the request for extension of work completion period shall be entertained on such grounds.~~	Bid specification prevails.
31.	2	21.5	Vendor/Subcontractor Approval Prior to Appointment: The contractor's specification Such quality plans of the selected supplier/subcontractor shall be discussed and finalised in	Bidder requests to modify the clause as follows: The contractor's specification Such quality plans of the selected supplier/subcontractor	Bid specification prevails.

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			consultation with the Engineer and shall form a part of purchase/work order of contractor on that supplier/subcontractor. Unpriced copies of such order(s) shall be submitted to the owner within 15 days after placement of the order by the contractor showing promised delivery dates/places/work programme.	shall be discussed and finalised in consultation with the Engineer and shall form a part of purchase/work order of contractor on that supplier/subcontractor. ~~Unpriced copies of such order(s) shall be submitted to the owner within 15 days after placement of the order by the contractor showing promised delivery dates/places/work programme.~~	
32.	2	21.7	In the event any Sub-contractor approaches the Owner complaining delay in payments by the Contractor and the Owner is convinced that such delay is hampering or likely to hamper the progress of the Project, without prejudice to the provisions of Clause No. 30.1 below (Clause related to Delay LD), the Owner may directly pay Sub-contractor the payments due to the Sub-contractor as per the Reconciliation Statement submitted and any further payments those may have become due subsequent to submission of the	We request owner to kindly delete the referred clause as this would lead to unnecessary litigation and confusion during the project execution. However, owner may ask the Contractor for the explanation for such non-payment/delayed payment to subvendors for bought out items.	Bid specification prevails

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			Statement and recover from the amounts due or becoming due to the Contractor such payments made along with interest at the prevailing rate of borrowings for the Project for the period commencing from date of making payment to the Sub-contractor till the date of recovery.		
33.	2	21.7	Making Regular payments to the Sub-contractors is a matter of paramount importance for ensuring smooth and timely execution of the Project. The Contractor shall submit Sub-contractor wise Reconciliation Statement of Payments made to respective Sub-Contractor jointly signed by the authorised representatives of the Contractor and the Subcontractor depicting therewith details of invoices raised by the Subcontractor, recoveries/retentions if any, amounts due, their due dates, dates of payments made, balance payment etc. The format for such statement shall be finalised during the execution of the Contract.	Bidder shall release all due payment to its Sub-contractor inline with contract condition between bidder & Sub-contractor. Package wise reconciliation shall be done with respective sub-contractor before release of final bill. Hence, Reconciliation statement between bidder & its sub-contractor need not to be submitted to the owner. Owner is requested to delete this clause.	Please refer Amendment-1 to Vol-I (Commercial).

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34.	2	25.2	Submission & Approval of Design Documents: The Design document so submitted shall be approved/commented upon generally within 10 working days from the date of its submission at the office of the respective Engineer and Owner's Consultant. Both the parties shall put their efforts together to complete the activity of design document approval in good faith in order to complete the same within stipulated period as above. However, the contractor acknowledges that the duration of approval/ commenting largely depends upon quality of the submission and also bunching of submission and hence agrees with the owner that neither any specific period for approval can be ascertained nor the delay if any in the same (unless the delay is due to sheer negligence on the part of the engineer/his authorised personnel/owner's consultant in which case onus of proof of negligence shall rest with the contractor) can be considered as the	Bidder requests to modify the clause as follows: The Design document so submitted shall be approved/commented upon generally within 10 working days from the date of its submission at the office of the respective Engineer and Owner's Consultant. Both the parties shall put their efforts together to complete the activity of design document approval in good faith in order to complete the same within stipulated period as above. ~~However, the contractor acknowledges that the duration of approval/ commenting largely depends upon quality of the submission and also bunching of submission and hence agrees with the owner that neither any specific period for approval can be ascertained nor the delay if any in the same (unless the delay is due to sheer negligence on the part of the engineer/his~~	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			reason for extension of work completion period.	~~authorised — personnel/owner's consultant in which case onus of proof of negligence shall rest with the contractor~~) can be considered as the reason for extension of work completion period.	
35.	2	25.3	Submission & Approval of Design Documents: In the event of any discrepancy observed in the design document submitted during its scrutiny, the same shall be communicated to the contractor promptly. The contractor shall either arrange to correct the design document or shall justify the correctness of his submission.	Bidder requests to modify the clause as follows: In the event of any discrepancy observed in the design document submitted during its scrutiny, the same shall be communicated to the contractor promptly, but not later than 7 days after the submission. The contractor shall either arrange to correct the design document or shall justify the correctness of his submission.	Bid specification prevails.
36.	2	26	Flow Model Test The Contractor shall carry out flow model tests of various packages/equipment as applicable, on the models prepared by him and furnish the model test reports to the Owner for his review. The Contractor shall give advance notice to the	Bidder requests to delete such clause from General Terms & Condition of the Contract and incorporate in suitable technical specification.	Bid specification prevails.

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			Owner to enable Owner to depute his representative to witness the flow model test. Such flow model tests shall be carried out as applicable for the various packages.		
37.	2	28.10	In case the final acceptance is delayed for the reasons attributable to the owner, his authorised representative or any other agency appointed by the owner, the insurance policy shall be extended by the Contractor till taking over of the Plant and the actual premium charges along with applicable tax and cess towards such extension of insurance policy, shall be reimbursed by the Owner to the Contractor at actuals without any handling charges	Requested to modify the clause as : In case the final acceptance is delayed for the reasons not attributable to BTG contractor or for the reasons attributable to the owner, his authorised representative or any other agency appointed by the owner, the insurance policy shall be extended by the Contractor till successful trial operation and the actual premium charges along with applicable tax and cess towards such extension of insurance policy, shall be reimbursed by the Owner to the Contractor at actuals without any handling charges	Please refer Amendment-1 to Vol-I (Commercial).
38.	2	29.1	The period of completion of the work as stipulated in this contract shall be deemed to be essence of contract. The contractor shall organise his	In case, completion of any activities/milestone /facility/system remains pending due to reasons not attributable	Bid specification prevails.

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			resources and perform his work so as to complete the same not later than the period agreed as per the work completion schedule incorporated in the contract as Schedule – 6. All the activities given in the schedule shall be executed as planned	to BTG contractor or is pending due to owner/ owner's authorised representative or any other agency appointed by the owner, then such activities/milestone /facility/system shall be deemed as completed. And bidder requests Owner to release the payment due against completion of such activities/milestone /facility/system to the bidder.	
39.	2	30.1.1	If the contractor fails to complete the Successful Trial Operation of the main plant within the work completion period as per Schedule – 6 of the contract	Being a BTG contractor, lots of interfacing will be there with BOP pkgs contractors. Accordingly, we understand that this clause will be effective in case delay is solely due to reasons attributable to contractor. Mahagenco to confirm.	Clause no. 30.1.4, Sec-2, Vol-I is clear in this regard.
40.	2	30.1.4	Liquidated Damages for Delay in Completion of Works: Notwithstanding the foregoing, no Delay Liquidated Damages shall be payable for period of delay in achieving Trial Operation in	Bidder requests to modify the clause as follows: Notwithstanding the foregoing, no Delay Liquidated Damages shall be payable for period of	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			accordance with the provisions of Clause No. 30.1.1 above to the extent such delay is solely on account of Force Majeure Event or reasons attributable to the owner/the agencies under owner's control and contractor has been granted an extension of time in lieu of such reasons.	delay in achieving Trial Operation in accordance with the provisions of Clause No. 30.1.1 above to the extent such delay is ~~solely~~ on account of Force Majeure Event or reasons attributable to the owner/the agencies under owner's control <u>or any other reasons not attributable to Contractor</u> and contractor has been granted an extension of time in lieu of such reasons.	
41.	2	30.1.5	If the project gets delayed beyond contractual completion period for successful Trial Operation as per Schedule – 6, the Owner shall start to retain the amount against Liquidated Damages thereon from RA bills of the contractor.	1) Bidder request owner not to retain any amount against Liquidated damages from RA bills till Final Time Limit Extension is established as per BTG package. 2) In case of delay in completion of any milestone /facility/system is for the reasons not attributable to BTG contractor , Bidder requests Owner to accord provisional / regular time extension extensions without any additional recovery/ hold from the RA Bill till regularisation of	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
				final dealy analysis as th ecase may be.	
42.	2	30.1.9	The issue of Establishing Responsibility of the Delay (Final Time Limit Extension) shall be submitted for the approval of the Competent Authority of Mahagenco as per DoP [currently Executive Director (Projects) in consultation with Chief General Manager (Finance)] within a period of six months from the date of completion of the work awarded.	1) Bidder understand that necessary delay analysis report shall be put to competent authority within 6 months from scheduled completion of T.O.(2) Bidder requests Mahagenco to specify indicative time frame for approval of F.T.L.E by Mahagenco and issuance of the same to contractor.	Please refer Amendment-1 to Vol-I (Commercial).
43.	2/3	30.4/6	Liquidated Damages for Delay in Completion	We request Mahagenco to consider ceiling of LD for Delay in completion (incl. delayed spares) at 5% of the Contract Price in line with recent NTPC Tenders with overall capping for LD against Cl. 30.1 & Cl. 30.2 to 15%	Please refer Amendment-1 to Vol-I (Commercial).
44.	2	30.3	Liquidated Damages (LD): The Owner may, without prejudice to any method of recovery, deduct the amount Liquidated Damages from any amount due or which may become due to the Contractor against this contract or any other	Bidder requests to modify the clause as deleted portion is legally not tenable: The Owner may, without prejudice to any method of recovery, deduct the amount Liquidated Damages from any	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			contract for this project or any other project/work awarded by the owner.	amount due or which may become due to the Contractor against this contract or any other contract for this project ~~or any other project/work awarded by the owner.~~	
45.	2	30.4	Liquidated Damages (LD): Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under clause Nos. 30.1 and 30.2 above shall not exceed 10% and 10% of the contract price respectively. For the purpose of this clause No. 30.0, the contract price shall mean the bid price filled online by the contractor on SRM portal (excluding price of mandatory spares along with applicable freight) along with applicable price variation. Amount of taxes shall not be considered for levy of liquidated damages. The overall capping for liquidated damages against Cl. No. 30.1 & 30.2 above shall be limited to 15% of contract price.	The cap on Delay LD is very high compared to standard industry practice followed by Central & other State Utilities (incl. NTPC, DVC). Therefore, Bidder requests to reduce the same to 5%. Accordingly, the referred clause may please be modified as follows: Notwithstanding anything contained hereinabove, the aggregate liability of the contractor towards payment of Liquidated Damages stipulated under clause Nos. 30.1 and 30.2 above shall not exceed <u>5%</u> ~~10%~~ and 10% of the contract price respectively. For the purpose of this clause No. 30.0, the contract price shall mean the bid price	Please refer Amendment-1 to Vol-I (Commercial).

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(1)	(2)	(3)	(4)	(5)	(6)
				filled online by the contractor on SRM portal (excluding price of mandatory spares along with applicable freight) along with applicable price variation. Amount of taxes shall not be considered for levy of liquidated damages. The overall capping for liquidated damages against Cl. No. 30.1 & 30.2 above shall be limited to 15% of contract price.	
46.	2	30.2.2	Notwithstanding anything contained hereinabove; the total liability of the contractor against this clause No. 30.2 shall not exceed 10% of the contract price.	Kindly modify the clause as below: Notwithstanding anything contained hereinabove; the total liability of the contractor against this clause No. 30.2 shall not exceed 5% of the contract price.	Bid specification prevails.
47.	2	30.4	The overall capping for liquidated damages against Cl. No. 30.1 & 30.2 above shall be limited to 15% of contract price	1) Kindly modify the overall capping for liquidated damages for Delay in Completion & for failure to meet Performance Guarantees i.e. against Cl. No. 30.1 & 30.2 above shall be limited to 5 % of contract price.	Bid specification prevails for overall capping. Please refer Amendment-1 to Vol-I

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				2)Without any "Delay Analysis", no Liquidated Damages shall be levied from running bills. Kindly confirm. 3)Liquidated Damages shall be levied only when the scheduled date of commissioning is not achieved. Kindly confirm.	(Commercial) for LD details.
48.	2	32.1.2	Suspension by the Owner: If by virtue of such suspension order, other than by reasons of Contractor's default or breach of the contract, Contractor's performance of any of its obligation is suspended for an aggregate period of more than one hundred and twenty (120) consecutive days or two hundred and forty (240) in aggregate, then at any time thereafter and provided at that time such performance is still suspended.....	Bidder requests to modify the clause as follows: If by virtue of such suspension order, other than by reasons of Contractor's default or breach of the contract, Contractor's performance of any of its obligation is suspended for an aggregate period of more than ~~ninety one hundred and twenty (120-90) consecutive days or two hundred and forty (240) in aggregate~~, then at any time thereafter and provided at that time such performance is still suspended.....	Bid specification prevails.

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49.	2	36.2	All travelling and Lodging & Boarding expenses for the engineering personnel to be trained during the total period of training will be borne by the Contractor.	With respect to all travelling expenses, Bidder understand that only local travelling expenses of Engg. Personnel to be borne by contractor. Mahagenco to accept.	Bid specification prevails.
50.	2	37	The Fuel (Coal & Fuel Oil i.e. LDO)	The Fuel (Coal, Diesel & Fuel Oil i.e. LDO)	Bid specifications prevails.
51.	2	37.4	The fuel (Coal & Fuel Oil i.e. LDO), Limestone, Ammonia, Electricity and Auxiliary Steam for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner . Moreover, for the Purpose of commissioning and Guarantee Tests, the Owner shall provide operating personnel for operation of the equipment. Such personnel provided by the Owner shall work under the supervision of the Contractor till the Plant is taken over by the Owner as per Clause No. 41.0 hereunder.	1)Bidder understands fuel (Coal & Fuel Oil i.e. LDO incl. Diesel), Limestone, Ammonia, Electricity and Auxiliary Steam for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner free of charges . Kindly confirm. 2)Supply of Biomass is not envisaged in scope of bidder. Kindly confirm Biomass will be provided by owner free of charge.	1) Bid specification prevails. 2) Please refer Amendement -1 to Vol-I (Commercial)f or supply of Biomass.
52.	2	38.1	Liability for Loss or Damage: Under the contract, the contractor shall be responsible for any loss or damage to the plant until the plant is taken over by the Owner in	Bidder requests to modify the clause as follows: Under the contract, the contractor shall be responsible	Bid specification prevails. Cl. No. 62, Sec-2,

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			accordance with the contract. The contractor shall be responsible for making good the damage or loss by way of repairs and or replacement of the portion of the works damaged or lost. The transfer of title shall not in any way relieve the contractor of the above responsibilities	for any loss or damage to the plant <u>caused by the Contractor or its Subcontractors in the course of any work carried out</u> until the plant is taken over by the Owner in accordance with the contract. The contractor shall be responsible for making good the damage or loss by way of repairs and or replacement of the portion of the works damaged or lost. The transfer of title shall not in any way relieve the contractor of the above responsibilities. <u>Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the plant or that part thereof caused by reasons</u> <u>(a) of war, hostilities or warlike operations (whether a state of war is declared or not), invasion, act of foreign enemy and civil war</u> <u>(b) rebellion, revolution, insurrection, mutiny, usurpation of civil or</u>	Vol-I is clear in this regard.

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				<u>military government, conspiracy, riot, civil commotion and terrorist acts, and</u> (c) <u>of nuclear reaction, nuclear radiation, radioactive contamination, pressure wave caused by aircraft or other aerial objects, or any other occurrences that an experienced contractor could not reasonably foresee</u> (d) <u>any use or occupation by the Owner or any third party (other than a Subcontractor) authorized by the Owner of any part of the plant</u> (e) <u>any use of or reliance upon any design, data or specification provided or designated by or on behalf of the Owner, or any such matter for which the Contractor has</u>	

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				<u>disclaimed responsibility herein.</u>	
53.		39	39 Performance Guarantee Test: 39.1 After satisfactory completion of the trial operation, the performance test shall be conducted at site 39.1 Notwithstanding anything contained hereinabove, the PG test shall be completed successfully within the period of 120 days maximum from the date of first operation of the unit on designated fuel.	Conductance of Performance/ functional guarantee test for BoP (Balance of Plant) packages, like - Air Conditioning System, Ventilation system, Fuel Oil pump House, Mill Reject System, FGD -Vacuum Belt Filter, Crane, Compressed Air System, Elevator, etc may be allowed packagewise or part thereof delinking with the trial operation of the unit.	Bid specification prevails
		41	Final Acceptance and Handover of the Unit: 41.1 a. The owner shall accord final acceptance of the unit and takeover the unit from the contractor for commercial operation only if successfully completed the training programme for Operation and Maintenance personnel.	Similarly, Final acceptance & handover of these BOP packages shall be issued packagewise, delinking from the overall 660 MW unit handover schedule. Please accept.	

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54.	2	41	Taking Over of Unit	Plant Taking Over/Handing Over should be from 72 Hours Full Load or Declaration of COD by Mahagenco whichever is earlier. Mahagenco is also requested to consider system wise handover.	Bid specification prevails.
55.	2	41	Final Acceptance and Handover of the Unit: All punch list points are closed or reconciled between Contractor and Engineer.	Bidder request Owner to modify this clause as below: All punch list points (excluding minor Punch points /minor items not materially affecting the operation or safety of the Facilities), are closed or reconciled between Contractor and Engineer.	Bid specification prevails
56.	2	41.4	Final Acceptance and Handover of the Unit: In case the Performance Guarantee Test cannot be carried out at specified time due to reasons attributable to the owner, the plant shall be taken over 120 days after the intimation from the contractor provided the owner is satisfied about his readiness for conducting the Performance Guarantee Test. In such case, the Owner shall issue notification to	1) Bidder requests to add the following: However, if for reasons not attributable to the BTG contractor or due to reasons attributable to the owner, in case the performance Guarantee (PG) Test of the Facilities or the relevant part thereof to be conducted after Trial/Initial operations cannot be successfully completed within the period of 3 months after the	Bid specification prevails

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			the contractor to the effect that the plant is taken over which shall trigger the Defect Liability (Guarantee) Period and the payments becoming due against completion of successful Performance Guarantee Test shall be released to the contractor against the Bank Guarantee of equivalent amount. However, such taking over of the plant shall not absolve the contractor from its liability to prove the performance guarantees, which shall be proven through a Performance Guarantee Test at the earliest possible from the date of taking over of the plant but not later than 30 days from the date of issuance of notice by the owner confirming its readiness to provide inputs required for the PG test.	intimation from the contractor , then the due amount against PG test shall be released upon submission of Bank Guarantee of equivalent value. Such BG shall be released after successful conductance of PG test and issuance of Operational Acceptance Certificate by the Project Manager or on completion of 6 months from date of intimation from the BTG contractor about his readiness for conducting the Performance Guarantee Test, whichever is earlier.	
57.	2	41.4	In case the Performance Guarantee Test cannot be carried out at specified time due to reasons attributable to the owner, the plant shall be taken over 120 days after the intimation from the contractor	Owner is requested to include the provision of payment of overstay compensation in the referred clause and modify the same as follows:	Bid specification prevails.

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			provided the owner is satisfied about his readiness for conducting the Performance Guarantee Test. In such case, the Owner shall issue notification to the contractor to the effect that the plant is taken over which shall trigger the Defect Liability (Guarantee) Period and the payments becoming due against completion of successful Performance Guarantee Test shall be released to the contractor against the Bank Guarantee of equivalent amount. However, such taking over of the plant shall not absolve the contractor from its liability to prove the performance guarantees, which shall be proven through a Performance Guarantee Test at the earliest possible from the date of taking over of the plant but not later than 30 days from the date of issuance of notice by the owner confirming its readiness to provide inputs required for the PG test.	In case the Performance Guarantee Test cannot be carried out at specified time due to reasons attributable to the owner, the plant shall be taken over 120 days after the intimation from the contractor provided the owner is satisfied about his readiness for conducting the Performance Guarantee Test. In such case, the Owner shall issue notification to the contractor to the effect that the plant is taken over which shall trigger the Defect Liability (Guarantee) Period and the payments becoming due against completion of successful Performance Guarantee Test shall be released to the contractor against the Bank Guarantee of equivalent amount and <u>the overstay compensation shall be paid.</u> However, such taking over of the plant shall not absolve the contractor from its liability to prove the performance guarantees, which shall be	

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				proven through a Performance Guarantee Test at the earliest possible from the date of taking over of the plant but not later than 30 days from the date of issuance of notice by the owner confirming its readiness to provide inputs required for the PG test.”	
58.	2	41.4	In case the Performance Guarantee Test cannot be carried out at specified time due to reasons attributable to the owner, the plant shall be taken over 120 days after the intimation from the contractor provided the owner is satisfied about his readiness for conducting the Performance Guarantee Test. In such case, the Owner shall issue notification to the contractor to the effect that the plant is taken over which shall trigger the Defect Liability (Guarantee) Period and the payments becoming due against completion of successful Performance Guarantee Test shall be released to the contractor against the	Bidder requests to modify clause as: In case the Performance Guarantee Test cannot be carried out at specified time due to reasons attributable to the owner, the plant shall be taken over ~~120~~ 90 days after the intimation from the contractor provided the owner is satisfied about his readiness for conducting the Performance Guarantee Test. In such case, the Owner shall issue notification to the contractor to the effect that the plant is taken over which shall trigger the Defect Liability	Bid specification prevails.

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			Bank Guarantee of equivalent amount. However, such taking over of the plant shall not absolve the contractor from its liability to prove the performance guarantees, which shall be proven through a Performance Guarantee Test at the earliest possible from the date of taking over of the plant but not later than 30 days from the date of issuance of notice by the owner confirming its readiness to provide inputs required for the PG test.	(Guarantee) Period and the payments becoming due against completion of successful Performance Guarantee Test shall be released to the contractor against the Bank Guarantee of equivalent amount <u>and the overstay compensation shall be paid along with mobilization and demobilization compensation as applicable.</u> However, such taking over of the plant shall not absolve the contractor from its liability to prove the performance guarantees, which shall be proven through a Performance Guarantee Test at the earliest possible from the date of taking over of the plant but not later than 30 days from the date of issuance of notice by the owner confirming its readiness to provide inputs required for the PG test.	
59.	2	42	Operating the Plant Before Taking Over: Owner reserves the right to take	Bidder request owner to provide taking over certificate/ Completion certificate/ COF as	Bid specification prevails

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			possession of and use for any intended purpose in larger public interest pursuant to National or State directives, emergencies and not for commercial gain, any portion or all of any delivered but as yet unaccepted Plant. The taking of possession at any time or use of any of such portion of Plant shall not be deemed to be an acknowledgement of owner acceptance of Unit or the Plant, and shall not be exclusive with respect to the contractor until owner acceptance of the Plant, has occurred. Owner shall provide contractor with reasonable and timely access to complete its obligations hereunder. It is the expectation of the parties that any such modifications or repairs will be accomplished by Contractor with minimal interference with operation of the Plant, and that reduction in and shutdowns of Plant operations will be required only when necessary.	soon as full load/ Trial operation /COD is completed (whichever is earlier) , excluding the minor punch point not materially affecting the operation or safety of the Facilities. Owner may kindly release the payment against the same.	

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60.	2	42.1	Operating the Plant Before Taking Over: Owner reserves the right to take possession of and use for any intended purpose in larger public interest pursuant to National or State directives, emergencies and not for commercial gain, any portion or all of any delivered but as yet unaccepted Plant. The taking of possession at any time or use of any of such portion of Plant shall not be deemed to be an acknowledgement of owner acceptance of Unit or the Plant, and shall not be exclusive with respect to the contractor until owner acceptance of the Plant, has occurred. Owner shall provide contractor with reasonable and timely access to complete its obligations hereunder. It is the expectation of the parties that any such modifications or repairs will be accomplished by Contractor with minimal interference with operation of the Plant, and that reduction in and shutdowns of Plant operations will be required only when necessary.	Bidder requests to replace the clause with the following provision: If Owner fails to sign on the joint protocol after completion of trial operation and fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days of completion of trial operation, or if the Owner makes use of the Plant or part thereof, then the Plant or that part thereof shall be deemed to have achieved the "Trial Operation" as on the date of Owner's use of the Plant.	Bid specification prevails.

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61.	2	43.2	Defect Liability (Guarantee) Period The Contractor shall guarantee that the equipment supplied shall be new and in accordance with the contract documents and be free from defects in design, material and workmanship for a period of 12 (twelve) calendar months commencing immediately upon completion of successful Performance Guarantee Test of the Plant OR taking over of the plant by the owner as per the provisions of Clause No. 41.4 above whichever is earlier.	PG Test will occur after completion of Trial Operation whereas plant will start operating after successful completion of Trial Operation. Once Trial Operation is achieved, Owner will start using the facilities commercially and earn revenue. Therefore, Defect Liability Period (DLP) should start from Trial Operation itself. Further, many sub-vendors do not give extended warranty. In case they offer such extended warranty, it will come with an additional cost to the Contractor leading to increase in bid prices. Therefore, in line with standard industry practice followed by Central and many State Utilities including NTPC, DVC, MPPGCL, CSPGCL etc., Owner is requested to commence the Defect Liability Period from the date of completion of Trial Operation.	Bid specification prevails. However, please refer Amendment-1 to Vol-I (Commercial) for limitation to Defect Liability period.

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62.	2	43.2	Defect Liability Period: 12 months commencing immediately upon completion of successful Performance Guarantee Test of the Plant OR taking over of the plant by the owner as per the provisions of Clause No. 41.4 whichever is earlier	Being a BTG contractor, PG test of plant depends on certain inputs like readiness of BOP's, availability of design coal, shut down from grid etc. which is beyond the control of BTG contractor. Hence, bidder requests Mahagenco to delink the commencement of DLP from PG test completion. Accordingly bidder proposes that DLP shall be 12 months commencing immediately upon completion of 72 Hrs full load or declaration of COD by Mahagenco whichever is earlier.	
63.	2	43.2	The Contractor shall guarantee that the equipment supplied shall be new and in accordance with the contract documents and be free from defects in design, material and workmanship for a period of 12 (twelve) calendar months commencing immediately upon completion of successful Performance Guarantee Test of the Plant OR taking over of the plant by the owner.	The Defect Liability Period (Warranty Period) shall be twelve (12) months from the date of Trial/ Reliability Operation or Full Load or COD whichever is earlier.	

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64.	2	43.14	Defect Liability (Guarantee) Period: New Clause	Bidder requests to add a new clause as 43.14 as written below: <u>The Contractor's obligations under Clause 43 shall not apply to:</u> (a) <u>any materials that are supplied by the Owner, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein</u> (b) <u>any designs, specifications or other data designed, supplied or specified by or on behalf of the Owner or any matters for which the Contractor has disclaimed responsibility herein</u> (c) <u>any other materials supplied, or any other work executed by or on behalf of the Owner</u>	Bid specification prevails.

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65.	2	43.15	Defect Liability (Guarantee) Period: New Clause	Bidder requests to add a new clause as 43.15 as follows: <u>Except as provided in Clause 43 and Clause 38, Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the plant or any part thereof, the Equipment, design or engineering or work executed that appear after Completion of the successful Performance Guarantee Tests except where such defects are the result of the gross negligence, fraud, criminal or wilful action of the Contractor.</u>	Bid specification prevails.
66.	2	45.1	Long Term Availability of Spares: The Contractor shall ensure the long term availability of spares to the owner for the full life of the equipment covered under the contract. The contractor shall also ensure that before going out of production of spare part of the equipment covered under the	Bidder requests to modify the clause as follows: The Contractor shall ensure the long term availability of spares to the owner ~~for the full life of the equipment covered under the contract,~~ till the availability of such spares with OEM. The	Bid specification prevails.

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67.			contract, he shall give the owner at least 12 (twelve) months advance notice so that the latter may order his bulk requirement of spares, if he so desires. The same provision shall also be applicable to the sub-contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor or his sub- contractor, the contractor shall provide the owner, one year in advance, with full manufacturing drawings, material specification and technical information required by the owner for the purpose of procurement of such items.	contractor shall also ensure that before going out of production of spare part of the equipment covered under the contract, he shall give the owner, ~~at least 12 (twelve) months~~ advance notice <u>as soon as contractor becomes aware of the same</u> so that the latter may order his bulk requirement of spares, if he so desires. The same provision shall also be applicable to the sub-contractors. Further, in case of discontinuance of manufacture of any spares by the Contractor or his sub- contractor, the contractor shall provide the owner, ~~one year in advance, with full manufacturing drawings, material specification and technical information~~ <u>if shared by OEM to the contractor</u> required by the owner for the purpose of procurement of such items.	
68.	2	46.4	If any variation in works results in increase or reduction of Contract Price and/or Time for Completion,	Kindly modify the clause as below: If any variation in works results	Bid specification prevails.

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			the parties shall agree, to the extent of any change in the Contract Price and/or Time for Completion. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the contract price as the case may be and the time for completion shall be extended/reduced by such period which in all circumstances reflects the delay or impediment sustained by the contractor due to such variation. In all such cases, in the event of a disagreement as to the reasonableness of the said sum and/or the extension / reduction of Time for Completion, the decision of the Engineer shall prevail subject to arbitration as provided for in the contract.	in increase or reduction of Contract Price and/or Time for Completion, the parties shall agree, to the extent of any change in the Contract Price and/or Time for Completion. Any agreed difference in cost occasioned by any such variation shall be added to or deducted from the contract price as the case may be and the time for completion shall be extended/reduced by such period which in all circumstances reflects the delay or impediment sustained by the contractor due to such variation. In all such cases, in the event of a disagreement as to the reasonableness of the said sum and/or the extension / reduction of Time for Completion etc., the issues shall be settled by arbitration as provided in the Clause 'Arbitration' as provided for in the contract.	
69.	2	46	Powers to Vary or Omit Work: New Clause	Bidder requests to add a new clause as 46.6 as follows:	Bid specification prevails.

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				<u>Pursuant to the Clause 46.2, it becomes apparent that the aggregate effect of compliance would be increase or decrease the original Contract Price by more than Five (5) percent, in such a case, Contractor may give a written notice of objection thereto prior to follow the instruction as aforesaid. If the Owner accepts the Contractor's objection, the Owner and the Contractor shall agree on specific rates for valuation of the change.</u> <u>Within fourteen (14) days after such agreement, the Owner shall, if it intends to proceed with the Change, issue the Contractor with a Change Order. If the Owner decides not to proceed with the Change for whatever reason, it shall, within the said period of fourteen (14) days, notify the Contractor accordingly.</u>	

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70.	2	46.6	Powers to Vary or Omit Work: New Clause	Bidder requests to add a new clause as 46.6 as follows: <u>If the Contractor proposes a Change pursuant to Clause 46, the Contractor shall submit to the Engineer, a written notice giving reasons for the proposed Change and including the information specifying the effect of change over the scope of work, time for completion and cost of change. Upon receipt of the notice, the parties shall mutually discuss.</u>	Bid specification prevails.
71.	2	53.1	Measurement of Work: Completed portion of the work shall be measured jointly by the representatives of the Owner and the Contractor as per standard procedure for which all the arrangements shall be done by the contractor. If at any time and for any reason, whatsoever it becomes necessary to re-measure the work, either in part or in full, the Contractor shall arrange for the same and all expenses towards such	Bidder requests to modify the clause as follows: Completed portion of the work shall be measured jointly by the representatives of the Owner and the Contractor as per standard procedure for which all the arrangements shall be done by the contractor. If at any time and for any <u>reason attributable to Contractor</u> , whatsoever it becomes necessary to re-	Bid specification prevails.

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			measurement shall be borne by the Contractor.	measure the work, either in part or in full, the Contractor shall arrange for the same and all expenses——towards such measurement shall be borne by the Contractor.	
72.	2	60.1 (b)	The aggregate liability of the contractor to the owner under the contract shall not exceed the Total Contract Price, provided that this limitation shall not apply to any obligation of the contractor to repair or replace defective equipment or to indemnify the owner with respect to patent infringement	In line with standard industry practice followed by other State and Central Utilities (including NTPC), Bidder requests Owner to modify the clause as follows: The aggregate liability of the contractor to the owner under the contract shall not exceed the Total Contract Price, provided that this limitation shall not apply to any obligation of the contractor to ~~repair or replace defective equipment or~~ to indemnify the owner with respect to patent infringement	Bid specification prevails.
73.	2	61.1.2	Termination for Contractor's Default: If the Contractor: a) b)	Bidder requests to modify the clause as follows: If the Contractor: a) b)	Please refer Amendment-1 to Vol-I (Commercial)

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			e) Then the Owner may, without prejudice to any rights and remedies it may possess under the Contract, give notice to the Contractor stating the nature of the default and the Contractor requiring remedy the same. If the Contractor fails to remedy or take steps to remedy the same within fourteen (14) days of its receipt of the notice, then the Owner may terminate the Contract by giving notice of Termination that refers to this Clause No. 61.1.	 e) Then the Owner may, without prejudice to any rights and remedies it may possess under the Contract, give notice to the Contractor stating the nature of the default and the Contractor requiring remedy the same. If the Contractor fails to remedy or take steps to remedy the same within ~~fourteen~~ twenty-eight (14– 28) days of its receipt of the notice, then the Owner may terminate the Contract by giving notice of Termination that refers to this Clause No. 61.1.	
74.	2	62.1 (a)	Force Majeure: Natural calamity including but not limited to floods, drought, earthquakes, epidemics, Volcanic Activity, typhoon or cyclone, hurricane. Moreover, guidelines, if any, issued by Govt. of Maharashtra and Govt. of India shall be followed while defining the Natural calamity.	Bidder requests to modify the clause as follows: Natural calamity including but not limited to floods, drought, earthquakes, epidemics, pandemics , Volcanic Activity, typhoon or cyclone, hurricane. Moreover, guidelines, if any, issued by–Govt. of Maharashtra and Govt. of India shall be	Please refer Amendment-1 to Vol-I (Commercial)

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				followed while defining the Natural calamity-	
75.	2	62.6	Force Majeure: If performance of the Contract is substantially prevented, hindered or delayed for the single period more than one hundred and eighty (180) days on account of one or more reasons of Force Majeure during the currency of the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which the dispute shall be resolved in accordance with Clause 63.0, Settlement of Disputes stipulated hereunder.	Bidder requests to modify the clause as follows: If performance of the Contract is substantially prevented, hindered or delayed for the single period more than ~~one hundred and eighty~~ sixty (180- ~~60~~) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more reasons of Force Majeure during the currency of the Contract, the parties will attempt to develop a mutually satisfactory solution, failing which ~~the dispute shall be resolved in accordance with Clause 63.0, Settlement of Disputes stipulated hereunder~~ either party shall be entitled to terminate the Contract.	Bid specification prevails.
76.	2	64	Arbitration	In case of PSU and Govt. utilities, GOI has prescribed dispute resolution through AMRCD before going for arbitration.	Please refer Amendment-1 to Vol-I (Commercial).

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				Mahagenco is requested to kindly allow PSU bidder for the same.	Covered in Cl. No. 63 Settlement of Disputes
77.	2	63 & 64	63 Settlement of Disputes: 63.1 Any disputes or differences including those considered as such by only one of the parties, arising out of or in connection with the contract shall be, to the extent possible, settled amicably between the parties. 63.2 If amicable settlement cannot be reached, then all disputed issues shall be settled by arbitration as provided in the Clause 'Arbitration'. 64 Arbitration: 64.1 Matters to be determined by the Chief Engineer (P&P): 64.1.1 All disputes and differences of any kind whatsoever arising out of or in connection with the contract, whether during the progress of the work or after its completion and whether before or after the	Bidder requests to consider following clause for dispute resolution: <u>DISPUTE RESOLUTION AND ARBITRATION</u> <u>Any difference, dispute, controversy, or claim ("Dispute") which may arise between the Parties out of or in relation to or in connection with the contract, or the breach, termination, effect, validity, interpretation or application of the contract or as to their rights, duties or liabilities hereunder, other than a Dispute for which provisions specifically made in the contract, shall be settled by the Parties by mutual negotiations and agreement. If, for any reason, such Dispute</u>	Please refer Amendment-1 to Vol-I (Commercial) for inclusion of AMRCD in Cl. NO. 63, Sec-2, Vol-I

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			determination of the contract, shall be referred by the contractor to the Chief Engineer (P&P) and the Chief Engineer (P&P) shall (within 120 days) after receipt of the contractor's representation make and notify decisions of all matters referred to by the contractor in writing. 64.2 Demand of Arbitration: 64.2.1 In the event of any disputes or differences between the parties hereto as to the construction or operation of this contract, or the respective rights and liabilities of the parties on any matter in question, the dispute or difference on any account or as to the withholding by the owner of any certificate to which the contractor may claim to be entitled to, or if the Chief Engineer (P&P) fails to make a decision (within 120 days), then and in any such case, the contractor (after 120 days) but within 180 days of his presenting final claim on disputed matters, shall demand in writing that the dispute or	<u>cannot be resolved amicably by the parties, the same shall be settled by way of arbitration, as mentioned below.</u> <u>Any Dispute arising out of this Agreement or its termination, breach, invalidity, including the interpretation and validity thereof and the respective rights and obligations of the Parties hereof shall be settled in accordance with the Arbitration and Conciliation Act, 1996, as amended from time to time, by a panel of three arbitrators, one arbitrator to be appointed by each party and the two such appointed arbitrators to nominate the presiding arbitrator. The seat of arbitration shall be Mumbai, India. The arbitration proceedings shall be conducted in the English language.</u>	

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(1)	(2)	(3)	(4)	(5)	(6)
			difference to be referred to Arbitration....		
78.	2	64.3.3	Constitution of Arbitration Tribunal: In cases the value of the claim exceeds INR 1,00,00,000/- (INR One Crore) be appointed as per the provisions of Arbitration & Reconciliation Act 1996. If one party fails to appoint its arbitrator within forty-two (42) days after the other party has named its arbitrator, the party which has named an arbitrator may request the Appointing Authority to appoint the second arbitrator.	Bidder requests to correct typographical error as follows: In cases the value of the claim exceeds INR 1,00,00,000/- (INR One Crore) be appointed as per the provisions of Arbitration & Reconciliation Conciliation Act 1996. If one party fails to appoint its arbitrator within forty-two (42) days after the other party has named its arbitrator, the party which has named an arbitrator may request the Appointing Authority to appoint the second arbitrator.	Noted. Please refer Amendment-1 to Vol-I (Commercial)
79.	2	64.5.5	Arbitral Award: Where the arbitral award is for payment of money, no interest shall be payable on whole or any part of the money for any period till the date on which the award is made.	The decision for allowing payment of interest under arbitral award should lie with the arbitral authority/tribunal. Bidder, therefore, requests Owner to delete this clause.	Bid specification prevails.
80.	2A	2.1.1	Critical/Vital/Major Equipment or Materials:	Bidder requests to modify the clause as follows:	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			The list of major equipment/materials for which the quality plan shall be submitted by the contractor shall be finalised during the kick off meeting or a meeting specially organised for this purpose. The owner reserves the right to add/delete any item in/from such list during the period of currency of the contract but before the predespatch inspection of such equipment or material.	The list of major equipment/materials for which the quality plan shall be submitted by the contractor shall be finalised during the kick off meeting or a meeting specially organised for this purpose. ~~The owner reserves the right to add/delete any item in/from such list during the period of currency of the contract before the predespatch inspection of such equipment or material.~~	
81.	2A	2.3	2.3 The contractor shall ensure that the approved quality plan is followed scrupulously by him/his subcontractors. All the records of checks during manufacturing shall be made available for verification to the owner's representative during the stage inspection/pre-despatch inspection.	Approval of QAPs shall be as per mutually agreed QA Programme i.e. only a) category I items QAPs shall be submitted to client for approval, b) Category II items shall be approved by Bidder & shall be submitted to client for information, c) For Category III items COC shall be submitted, d) For Category IBR QAP shall be approved by Bidder & submitted for clients information. IBR items will be accepted based	Shall be discussed during detailed engineering in the event of award.

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(1)	(2)	(3)	(4)	(5)	(6)
				on IBR certification Note: QA Programme shall be submitted as part of bid submission	
82.	2A	3.2.2	3.2.2 The contractor, at-least twenty one (21) days prior to expected date of attaining the respective stage of manufacturing/readiness of the goods, shall submit the inspection call indicating the date of inspection	The inspection notification shall be provided as per QA Program (submitted along with this bid). Considering EPC Project, bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 days b) Domestic: For stage inspection - 3 days c) Overseas: Final Inspection - 15 days d) Wherever inspection being performed On machine, 2 days notification will be provided. e) In case remote inspection offered, 2 days notification provided	Shall be discussed during detailed engineering in the event of award.
83.	2A	3.2.2, 3.2.3 & 3.2.4	The contractor, at least 21 days prior to.....Controller of the quality.	For indigenous supplies, inspection call shall be raised 7 days in advance. In case of waiver from owner, or owner is unable to	Shall be discussed during detailed

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(1)	(2)	(3)	(4)	(5)	(6)
				attend the inspection, or no response from owner, contractor shall carry out inspection as per the approved Quality plan and submit the reports.	engineering in the event of award.
84.	2A	3.3.1	3.3.1 Inspection at customer hold points shall be carried out by the Independent Inspection Agency (IIA) of international repute and having presence in the country where inspection is to be carried at the offshore works of contractor/subcontractor. Such agency shall be appointed by the contractor on prior approval of the owner. All the costs of appointing such agency shall be borne by the contractor.	Cost of inspection including travel expenses etc. for Owner's personnel/Owner's independent inspection agency (IIA) shall be in Owner's scope. Please confirm.	Cl. No. 3.3, Sec-2A, Vol-I is clear in this regard.
85.	2A	3.3.3	The contractor immediately after the approval of Quality plans.....fresh list of agencies.	Inspection at foreign / off-shore works is carried out by Third party inspection agencies (LRS/BV/TUV) which are of international repute. Approval of these inspection agencies from owner is not envisaged	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
86.	2A	3.4	3.4 Notwithstanding anything contained hereinabove, the pressure parts of the boiler coming under the ambit of statutory inspection (IBR) whether manufactured in India or abroad, shall be carried out by the owner's personnel only.	a) Bidder requests Owner /Owner's representative to conduct inspection only for category I material. Also the inspection for Category I material may be conducted on virtual platform on case to case basis. b) Bidder do not envisage inspection from Owner for all such materials which will undergo inspection based on statutory compliance such as IBR etc. However, Bidder will provide statutory documents to Owner for reference.	Bid specification prevails
87.	2A	3.5	3.5 If the Owner/Owner's Representative requires such equipment, materials, design or workmanship to be re-tested, the tests shall be repeated under the same terms and conditions. The contractor shall undertake an additional testing of any material, equipment or the work, if the Owner/Owner's Representative believes the results of earlier tests are not accurate or do not establish	Bidder would like to clarify that repetition of the tests are not envisaged, if the test are successfully conducted meeting QAP requirements. If Owner insists to repeat any such tests, then the same shall be subjected to Manufacturer acceptance and the extra cost and extra time shall be borne by Owner. The extra cost and additional time will be informed	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			the true condition to specification of equipment, material or work being tested.	to Owner for their acceptance. Owner shall accept the Extra cost and additional time as per bidder notice and then only the subsequent works will start. Owner to confirm Bidder's understanding regarding the same.	
88.	2A	3.3.4	3.3.4 The contractor, at least forty five (45) days before the expected date of attaining such stage of manufacturing/readiness of goods, shall intimate the Chief Engineer (P&P).	The inspection notification shall be provided as per QA Program (submitted along with this bid). Considering EPC Project, bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 days b) Domestic: For stage inspection - 3 days c) Overseas: Final Inspection - 15 days d) Wherever inspection being performed On machine, 2 days notification will be provided. e) In case remote inspection offered, 2 days notification provided	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
89.	2A	3.3.4, 3.3.5, 3.3.6	The contractor, at least 45 days before.....to the owner for approval.	For off-shore supplies, tentative inspection call shall be raised 45 days in advance, however, firm date of inspection shall be intimated 15 days in advance. In case of waiver from owner, or owner is unable to attend the inspection, or no response from owner, contractor / IIA shall carry out inspection as per the approved Quality plan and submit the reports.	Bid specification prevails
90.	2A	4.1	4.1 On completion of tests of equipment/material enlisted in the list as mentioned under Clause No. 2.1 above, at manufacturer's works, the Contractor shall furnish 4 copies of test certificate(s) as required as per the approved quality plan to the Controller of Quality for approval under intimation to the Project Manager. The test report shall invariably indicate identification data, including Model No., Sr. No. etc. of the equipment, method of application and duration of test along with test results	Bidder propose to submit applicable inspection certificates and test certificate in soft copy considering present facilities of Computer data and to promote Green environment with Sustainable Development Goals (SDG) focus	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
91.	2A	4.1	On completion of tests.....along with the test results	Test certificates as per the approved Quality Plan shall be submitted preferably in soft copies.	BTG
92.	2A	4.3	The approval of test reports.....execution of the contract	Despatch clearance shall be granted by owner within 7 working days from the receipt of test certificates	BTG
93.	2A	4.4	However the test certificates / Inspection reports.....accompany the assignment.	for such non – critical / non vital / minor items, COC shall be submitted by the contractor.	Bid specification prevails
94.	2A	8.3	GST beyond contractual period shall be paid minimum of the rate applicable as on the Record date or the rate applicable as on the date of dispatch /arrival of the goods	Bidder understand that in case of Provisional TE issued during execution, the record date shall be suitably amended and GST shall be reimbursed accordingly by Mahagenco. This is to be confirmed by Mahagenco.	Please refer Amendment-1 to Vol-I (Commercial).
95.	2A	8.6	Mahagenco reserves the right to ask the vendor for submission of undertaking and / or certificate from CA/CMA firm that the taxes are paid to the concerned authorities.	Bidder requests to delete this clause, as all statutory payments are time done as per standard norms. Hence this certification is not required.	Bid specification prevails
96.	2A			In case BOCW Act is applicable, bidder shall pay the cess to the concerned authorities through	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
				their Sub-contractor for Civil construction works and following the statutory compliance in the act. Hence Bidder need not to register for BOCW , however BOCW registration would be done by Bidder 's sub-contract .	
97.	2A/2 B	10/25	PVC Ceiling: 20% of contract price	Due to vide variation in material, labour etc. indices, Power Utilities like NTPC has removed any ceiling on PVC in their tender. Accordingly, Mahagenco is requested to remove ceiling on PVC.	Bid specifications prevails.
98.	2A	9.3	Statutory Variation in Taxes & Duties: However, in case contract period is extended due to reasons attributable to the Owner then Statutory Variation for the extended period shall be reimbursed by the Owner to the Contractor against documentary evidence.	Bidder requests to modify the clause as follows: However, in case contract period is extended ~~due to reasons, attributable to the Owner~~ then Statutory Variation for the extended period shall be reimbursed by the Owner to the Contractor against documentary evidence.	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
99.	2A	10	The contract price (excluding taxes, duties, Inland freight, insurance) less advance paid for supply of equipment including supply of cement, reinforcement steel, structural steel for all civil, structural as well as architectural works shall be subject to adjustment in accordance with the formula stipulated under the Schedule-3, Section-I, Volume-I of the contract and subject to a ceiling of $\pm 20\%$ of the said contract price (excluding taxes, duties, freight, insurance).	1) No ceiling may please be imposed on the Price Adjustment over the total contract/agreed prices. Price Adjustment may please be applicable unlimited over the total contract/agreed prices. May kindly confirm. 2) Kindly provide no ceiling on the Price adjustment over the total contract price for the period pertaining to force majeure, for delays not attributable to contractor etc.	Bid specification prevails
100	2A	11.11	Delivery of Supply of Goods: 'The scheduled date of commencement of deliveries of materials/goods for particular activity shall be maximum 90 days prior to scheduled date of start of the particular activity	In order to expedite the site progress and availability of fronts, bidder plans to dispatch of certain materials prior to scheduled date of commencement of delivery. Accordingly, bidder proposes that the scheduled date of commencement of deliveries of materials/goods for particular activity shall be maximum 180 days prior to scheduled date of start of the particular activity.	Bid specification prevails

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(1)	(2)	(3)	(4)	(5)	(6)
101	2A	11.12	Delivery of Supply of Spares & Tools & Tackles: The deliveries of Mandatory Spares and Special Tools & Tackles (other than special lifting tool used for erection) shall commence from the date of first synchronisation of the unit (first unit if more than one units awarded) and shall be completed on or before the date of taking over the first unit	Please note that the spares are generally produced/manufactured along with corresponding main plant pkg. This involves cash out flow towards procurement of raw materials for spares much before the synchronisation schedule and will add inventory carrying cost to contractor. Hence, bidder requests Mahagenco to allow dispatches of spares along with corresponding main plant pkg.	Bid specification prevails
102	2A	12	Payment Terms-Supply of Materials/Equipment	The Terms of payment for Supply of Materials/Equipment may please be modified as: 1) 10% (Ten percent) of services contract price on Site Mobilization 2) 85% (Eighty Five percent) in along with 100% taxes & duties stipulated under clause 8, as may be applicable shall be paid on prorata basis within 30 days from the date of submission of invoice and the related documents 3) 2.5% (Two and half percent) of	Please refer Amendment-1 to Vol-I (Commercial) for terms of payment.

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(1)	(2)	(3)	(4)	(5)	(6)	
				the supply contract price on successful completion of trial operation. 4) 2.5% (Two and half percent) of the contract price on successful completion of PG Test and issuance of Final Acceptance Certificate (FAC)		
103	2A	12.1	Payment Against Supply of Materials/Equipment:	Timely cash inflow is paramount for successful execution of the project. Current 18% retention amount (including milestone payment) specified in tender is very high. Such high retention will result into substantial blockage of funds leading to negative cashflows for the BTG Contractor. In line with practice followed by Central and other State Utilities (including NTPC, DVC, MPPGCL, CSPGCL etc.), Owner is requested to increase the advance amount, remove milestone payment and provide payment on dispatch of materials as follows:		
			Advance			10% (Interest free)
			Dispatch			Nil
			Receipt			72%
			Milestone Payment			8%
			Trial Operation			5%
			PG Test			5%

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(1)	(2)	(3)	(4)	(5)	(6)												
				<table><tr><td>Advance</td><td>~~15~~—10% free)</td></tr><tr><td>Dispatch</td><td>~~55~~%</td></tr><tr><td>Receipt</td><td>~~20~~ 72%</td></tr><tr><td>Milestone Payment</td><td>~~Nil~~ 8%</td></tr><tr><td>Trial Operation</td><td>5%</td></tr><tr><td>PG Test</td><td>5%</td></tr></table>	Advance	~~15~~ —10% free)	Dispatch	~~55~~ %	Receipt	~~20~~ 72%	Milestone Payment	~~Nil~~ 8%	Trial Operation	5%	PG Test	5%	
Advance	~~15~~ —10% free)																
Dispatch	~~55~~ %																
Receipt	~~20~~ 72%																
Milestone Payment	~~Nil~~ 8%																
Trial Operation	5%																
PG Test	5%																
104	2A	12.1	Payment of Taxes and duties: 100% on receipt of material at site.	Since the Taxes and duties (GST) will be paid to the Government authorities upon dispatch of equipment, therefore we request Owner to kindly reimburse 100% taxes and duties upon production of satisfactory documentary evidence by the Contractor. Bidder requests Owner to kindly consider the same and confirm. The above request is in line with provisions available in recent central utility tenders including NTPC.	Bid specification prevails												
105	2A	12.3.3	13% payment of invoice value out of retained 18% of invoice value shall be released within 30 days from the date of achievement of milestones as	It is observed that this 13% payment pertaining to Supply of Materials/Equipment and services, is distributed among 18	Please refer Amendment-1 to Vol-I (Commercial)												

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			under and submission of the application of release of respective payment.	different intermediate milestone of 0.25% / 0.5% /5% of contract value for each unit . Please note linking payment to these intermediate milestone not only hamper the cash liquidity of project but also will complicate the invoice processing and record viz RA bills , price adjustments. Please note that a continuous good cash liquidity is required throughout the project for its smooth execution. Hence, bidder requests owner to de-link the the payment terms with the intermediate milestones and consider the payment terms as proposed by bidder in this pre bid queries.	
106	2A	New	Payment Terms: Site works	Bidder requests Owner to provide up to 75% secured advance against Cement & Reinforcement Steel wherein total secured advances shall not exceed 10% of cost of Civil Construction works for cement & 25% of cost of Civil Construction works for Reinforcement Steel.	Bid specification prevails.

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				Secured advance will improve the cashflow of the Contractor. Further such advance is paid only against non-perishable materials against receipt at site, thus making the advance fully secured for Owner. Accordingly, following clause may please be incorporated after terms of payment for Site works in line with provisions available in Central and other State Utility tenders including NTPC, DVC, MPPGCL, CSPGCL etc.: <u>“Secured advance against materials (Cement & Reinforcement Steel) shall be paid to the Contractor on the certificate of Project Manager. The contractor shall be paid material secured advance upto maximum limit of 75% (exact percent of material secured advance shall be decided by Project Manager based on total</u>	

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(1)	(2)	(3)	(4)	(5)	(6)
				<u>requirement of Cement and Reinforcement Steel for the complete work and total cost of Civil Construction works as provided in the Contract) of the cost of Cement & Reinforcement Steel which in the opinion of Project Manager is reasonably required in accordance with the Contract and the same has been brought to site for incorporation in the works and are safeguarded against loss due to any cause whatsoever and stored as per requirement of Technical specification.</u> <u>Total amount of secured advances against material (i.e., Cement & Reinforcement Steel) payable as per the above provision however, shall not exceed 10% of the cost of total Civil Construction works for cement & 25% of the cost of total Civil Construction works for Reinforcement Steel.</u>	

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(1)	(2)	(3)	(4)	(5)	(6)
				<u>The material secured advance payment under clause above shall be fully adjusted from the payments due to contractor for the works done against progressive payment as and when materials are utilised in the same."</u>	
107	2A	12.2(v)	Documents for advance payment : v)A copy of All Risk Marine-cum-Erection Insurance	Documents for advance payment: All risk MCE policy is effective from commencement of material supply or start of civil works whichever is earlier. Hence, bidder request owner to delete the requirement of All Risk Marine-cum-Erection Insurance for the 1st 7% Advance.	Please refer Amendment-1 to Vol-I (Commercial)
108	2A	12.2.6	For the unrecovered advance, if any, beyond the scheduled date of Trial operation of the unit as per the approved project schedule, interest at the rate of whichever is higher of i) one percent higher than the rate of borrowing by the owner for this project or ii) the prevailing Retail	Bidder requests owner to provide interest free advance. Hence may kindly delete this clause.	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			Prime Lending Rate (RPLR) of State Bank of India shall be levied.		
109	2A	12.3.1	...shall be paid on prorata basis within 30 days from the date of submission of invoice and the related documents...	It has been observed in running project that after issuance of (Store Receipt Note) SRN, it is taking more than 30 days in release of payment. MSPGCL Site marks the 30th day as the cut-off for 12payment release on their payment note, hence the Loan Section releases the payments on the 30th day or later. The due date for payments must fall within 30 days of the date on which the invoice and supporting documentation were submitted. Further, it is requested to kindly insert a clause on "interest on delayed payment" in case payments not released within 30 days.	Please refer Amendment-1 to Vol-I (Commercial).
110	2A	12.3.1	Store Receipt Note	Since BTG contractor is responsible for design, supply, erection & commissioning of main plant. Bidder requests to delink the	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
				requirement of enclosed copy of SRN as part of payment.	
111	2A	12.4	Payment Terms-Supply of Mandatory Spares, Special Tools & Tackles: 95% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 30 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above.	The Terms of payment for Supply of Mandatory Spares, Special Tools & Tackles may please be modified as: 100% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 30 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above.	Bid specification prevails. However, please refer Amendment-1 to Vol-I(Commercial) for payment cycle which is reduced to 21 days.
112	2A	12.4.1	Supply of Mandatory Spares, Special Tools & Tackles: 95% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 30 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above	Bidder requests to replace the clause with following: <u>90% of the contract value of the Mandatory Spares & Special Tools & Tackles and 100% taxes and duties stipulated under Clause No. 8 as may be applicable thereon shall be released within 30 days upon despatch to site and</u>	Please refer Amendment-1 to Vol-I (Commercial) for payment cycle which is reduced to 21 days.

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				<u>against invoices and shipping documents along with Material Despatch Clearance Certificate (MDCC) issued by the Owner.</u> <u>Further 10% of the contract value of the Mandatory Spares & Special Tools & Tackles shall be released within 30 days from the date of submission of respective documents as mentioned under clause No. 12.3.1 above.</u>	
113	2B	12.5	Payment Terms- Final Payment against Supply of Equipment/material and Mandatory Spares: The balance 5% payment against supply of the equipment/material, Mandatory Spares and Special Tools & Tackles shall be released after completion of successful PG Test against submission of application for release of payment along with i) Certificate	1) Bidder request owner to consider the payment terms proposed by bidder in this pre bid queries.	Bid specification prevails. However, Refer Amendment-1 to Vol-I(Commercial) for Payment terms.

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(1)	(2)	(3)	(4)	(5)	(6)
			issued by the owner/engineer declaring completion of successful Performance Guarantee Test and ii) Certificate issued by the Project Manager declaring the completion of all the supplies to be made against the contract		
114	2A	12.5.1	Final Payment against Supply of Equipment/material and Mandatory Spares: The balance 5% payment against supply of the equipment/material, Mandatory Spares and Special Tools & Tackles shall be released after completion of successful PG Test against submission of application for release of payment along with i) Certificate issued by the owner/engineer declaring completion of successful Performance Guarantee Test and ii) Certificate issued by the Project Manager declaring the completion of all the supplies to be made against the contract.	Bidder requests to delete this clause.	Bid specification prevails.
115	2A	12.8	100% Payments towards Statutory Variation as per Clause No. 9.0 above shall be made to the contractor along	Bidder understands the statutory variation in taxes duties covers	Please refer Amendment-1 to Vol-

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(1)	(2)	(3)	(4)	(5)	(6)
			with payment of respective invoice and documentary evidence of applicability of such statutory variations.	the variation in royalty rates as well. Owner to confirm	I(Commercial)
116	2A	13.1.5	General Requirement of Spares: In case of delay in supply of Mandatory Spares and if ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the amount of Contract Value (excluding taxes and duties thereon) of delayed spares plus the amount of the price adjustment thereon shall be payable by the contractor. However, total Levy of Liquidated Damages on account of delay in supply of Mandatory Spares and if ordered, the 3 Year's O&M (Recommended Spares), shall not exceed 10% of contract value (excluding the taxes and duties thereon) of Mandatory Spares or the Recommended Spares, as the case may be, ordered against contract plus the amount of the Price Adjustment thereon.	Bidder requests to modify the clause as follows: In case of delay in supply of Mandatory Spares and if ordered the 3 Year's O&M (Recommended) Spares, Liquidated Damages @ ½% per week of delay or part thereof on the amount of Contract Value (excluding taxes and duties thereon) of delayed spares plus the amount of the price adjustment thereon shall be payable by the contractor. However, total Levy of Liquidated Damages on account of delay in supply of Mandatory Spares and if ordered, the 3 Year's O&M (Recommended Spares), shall not exceed 5% ~~10%~~ of contract value (excluding the taxes and duties thereon) of Mandatory Spares or the Recommended Spares, as the	Please refer Amendment-1 to Vol-I(Commercial) in respect of L.D.

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				case may be, ordered against contract ~~plus the amount of the Price Adjustment thereon.~~	
117	2B	3.0	Access to Site and Works on Site: Suitable access to and possession of the Site shall be provided to the contractor by the owner to enable him to execute the site works.	1)Levelled & graded land for construction- free of encumbrance shall be made available by the Owner. Kindly confirm. 2)Bidder understands Owner will provide roads and approach roads upto the Main Plant for construction material, plant and equipments, ODCs etc. upto main gate. Owner may kindly confirm 3)Employer shall ensure the site is free from asbestos/ lead or any other hazardous material. In case, such materials are found at site, the Employer shall be responsible for removal of same, <u>the Contractor shall be entitled to suspend the work till site is made safe and free of the aforesaid materials.</u>	Owner will provide the land and bidder do the levelling and grading Owner will provide the road Overground items will be cleared by owner, however, dismantling and disposal for all underground structure shall be in bidder's scope

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118	2B	3.4	Access to Site and Works on Site: Any damage / disturbances caused to any of the existing facilities shall be promptly repaired and restored as existing, by the Contractor, at his own cost.	Bidder requests to modify the clause as follows: Any damage / disturbances caused to any of the existing facilities, for reasons attributable to Contractor, shall be promptly repaired and restored as existing, by the Contractor, at his own cost	Bid specification prevails.
119	2B	4.1.1	Open Space for Site Office: Contractor shall be given suitable open space only for establishing his site office at a location to be decided by the engineer free of rent. Contractor shall not use the site for any purpose other than for performing activities pertaining to the contract. No space for labour colony shall be provided.	Owner may please provide sufficient land (300000 Sqm approx.) suitably marked in the plot plan free of charge for temporary offices, fabrication yard, and storage facilities with in plant boundary. Temporary accommodation, including all fencing, water supply at two points (both for drinking and construction purposes), electricity supply, sanitation, fire prevention and fire-fighting equipment for contractor's staff and labour free of charge.	Refer clause 9.01.02, vii), of Vol-II, Section-2
120	2B	4.4	Storage Space: Reasonable open space shall be provided to the Contractor for the storage of materials during the period of storage and erection.		
121	2B	4.4	Water: Supply of water for construction and potable use shall be made available	1) Bidder understands supply of construction water and potable water shall be provided	Bid specification prevails.

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			at one point each at the location decided by the project manager. The contractor shall make further distribution arrangements thereafter at his own costs.	by owner free of cost. May kindly confirm. 2) Raw water and Service water shall be provided by owner free of all charges. Kindly confirm. 3) DM Water shall be provided by Owner free of Cost. Kindly confirm	
122	2B	6.0	Insurance	1) All risk MCE policy is effective from commencement of material supply or start of civil works whichever is earlier. 2) As per Tariff Advisory (TAC)/ IRDA's guidelines, MCE Insurance Policy shall be valid up to Trial Operation completion. Accordingly, Insurance clause may please amended as "...sub-contractors works to project site, inland transportation up to project site (warehouse to warehouse) storage and handling at site and erection, testing and commissioning and up to successful completion of Trial	Bid Specification Prevails

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				Operation (72 hours of Full Load continuous operation to be considered within the scheduled 15 days of operation)... "Thereafter, Owner to take O&M policy. Thus, bidder shall take insurance coverage till Reliability Run of 72 hours of un-interrupted operation at full load or near full load as may be provided by the Purchaser during the Trial Operation period . Owner may kindly confirm. 3) Third Party Insurance: Comprehensive Insurance All Risk Policy covers Third Party Insurance Cover. Hence, Third Party Insurance shall be covered under MCE Insurance Policy.	
123	2B	9.5.4	The Owner's Representative shall have the right to re-inspect any work though previously inspected and approved by him at the Site, before and after the same are erected . If by the above inspection the Owner's Representative rejects any work, the	All Inspections related to work /equipments/pkgs/ sytems etc. by Owner's representative shall be done prior to erection or commissioning as per approved FQP/MQP. After erection/commissioning of any	Bid specification prevails.

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			Contractor shall make good for such rejections either by replacement or modifications/repair as may be necessary to the satisfaction of the Owner's Representative.	works/equipments rejection is not acceptable. However any required modification/repair shall be dealt as per warranty/guarantee clause of the contract. Bidder requests owner to delete this clause.	
124	2B	9.5.5	Inspection and Testing: The Owner/Owner's Representative shall be entitled, during design, engineering, manufacture, fabrication and preparation at any places where work is being carried out, to inspect, examine and test the materials and workmanship, and to check the progress in the performance of the work at no extra cost to the Owner.....	Bidder requests to modify the clause as follows: The Owner/Owner's Representative shall be entitled, during design, engineering, manufacture, fabrication and preparation at any places where work is being carried out, to inspect, examine and test the materials and workmanship, and to check the progress in the performance of the work, <u>provided that the Owner shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all travelling and board and lodging expenses</u> at no extra cost to the Owner.....	Bid specification prevails.

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125	2B	9.5.6	Inspection and Testing: The Contractor shall agree, with the Owner / Owner's Representative about the time and place for the testing of any equipment / materials and other parts of the work as specified in the Contract. The Owner / Owner's Representative shall give the Contractor not less than 48 (Forty eight) hours notice of his intention to attend the Tests.....	Bidder does not understand the intent of the Clause and requests Owner to kindly elaborate the clause.	Clause mentions that, owners notice time period is 48 hours to convey his intention of attending the tests.
126	2B	21.12	Dismantling work should be done with due diligence so as not to damage the equipment. The dismantled materials / equipment should be handed over to the owner at the storage place & site indicated by the owner.	Since, the underground facilities are not visible, the underground facilities to be modified/ rerouted/ dismantled may please be taken care by the Owner. If not to be taken up by customer, please share the details (drawing, quantity in nos., weight in tonnage etc.) for any existing above and below ground facilities which are to be demolished/ rerouted/ reinstalled.	Tentative quantity for dismantling of underground concrete works are provided in the specification. If any details required, Bidder shall visit the site and collect the necessary data

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127	2B	27.0	Payment Terms: Site works		Timely cash inflow is paramount for successful execution of the Project. Current 18% retention amount (including milestone payment) specified in tender is very high. Such high retention will result into substantial blockage of funds leading to negative cashflows for the BTG Contractor. In line with practice followed by Central and other State Utilities (including NTPC, DVC, MPPGCL, CSPGCL etc.), Owner is requested to remove milestone payment. Accordingly, the payment terms may please be modified as follows:	Please refer Amendment-1 to Vol-I (Commercial).
			Advance	10% (Interest free)		
			Progressive	72%		
			Milestone Payment	8%		
			Trial Operation	5%		
			PG Test	5%		
128	2B	27.0	Payment Terms-Site Works		The Terms of payment for Site Works may please be modified as: 1) 10% (Ten percent) of services	Please refer Amendment-

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				contract price on Site Mobilization 2) 85% (Eighty Five percent) in monthly installment pro-rata of the services. 3) 2.5% (Two and half percent) of the services contract price on successful completion of trial operation. 4) 2.5% (Two and half percent) of the contract price on successful completion of PG Test and issuance of Final Acceptance Certificate (FAC)	1 to Vol-I (Commercial).
129	2B	27.0	Payment Terms: Site works	Bidder requests Owner to provide 75% of payment as Ad-hoc payment for Site Works, within 10 working days of the submission of invoice. Remaining payment shall be made after final checking of the invoice. This is in line with recent tenders floated by Central utilities (including NTPC, DVC) and the "General Instructions on Procurement and Project Management" released by	Bid specification prevails.

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				Department of Expenditure, Procurement Policy Division (Ministry of Finance) vide Notification No. F.1/1/2021-PPD, dated 29th October 2021.	
130	2B	27.2	Balance 5% payment shall be released upon completion of successful PG Test within 30 days from the date of submission of application for release of payment along with i) Certificate issued by the owner/engineer declaring completion of successful Performance Guarantee Test and ii) Certificate issued by the Project Manager declaring the completion of all the services to be rendered against the contract.		
131	2B	27.8.3	As per Building & Other Construction Workers Act-1996, BOCW cess @1% of contract price of Erection, Testing & Commissioning Contract and Civil works contract shall be deducted from the invoices of the contractor and deposited to the concerned authorities.	Please note that BOCW is applicable only on civil work contract and not applicable on Erection, Testing & Commissioning Contract. Therefore, it is requested to kindly delete this in mentioned clause.	Bid specifications prevails.

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				You may also please refer the judgement of Hon'ble Supreme Court dated 12.05.2021 (in Special Leave Petition No. 8630 of 2020 between M/s Uttar Pradesh Power Transmission Corporation Limited v/s M/s CG Power and Industrial Solutions Limited), it was amply clarified that BOCW Cess is only and only applicable on civil works contract and no other works. In various instances, it has been observed that amount is wrongfully withheld against BOCW Cess in other contracts (Supply, E&C, freight etc.) also. This creates contractual disputes at later stage.	
132	2B	27.8.3	As per Building & Other Construction Workers Act-1996, BOCW cess @1% of contract price of Erection, Testing & Commissioning Contract and Civil works contract shall be deducted from the invoices of the contractor and deposited to the concerned authorities. Any increase	In case BOCW Act is applicable, bidder shall pay the cess to the concerned authorities through their Sub-contractor for Civil construction works and following the statutory compliance in the act. Customer shall not recover	Bid specification prevails.

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			or decrease in the rate from the next day to the Record Date shall accrue to the Owner.	amount against BOCW Act from bidder and proof of payment in the form of challan shall be submitted to Customer for compliance against BOCW Act.	
133	2B	27.8.3	Statutory Deductions (Tax Deduction at Source): As per Building & Other Construction Workers Act-1996, BOCW cess @1% of contract price of Erection, Testing & Commissioning Contract and Civil works contract shall be deducted from the invoices of the contractor and deposited to the concerned authorities. Any increase or decrease in the rate from the next day to the Record Date shall accrue to the Owner.	Bidder requests Owner to consider BOCW cess only on Civil Works contract (i.e. Third Contract). Further, to make it fair & equitable and bring parity amongst all the participating bidders, we request Owner to exclude the BOCW cess from the bidder's scope. Owner may kindly settle this separately with relevant statutory authority. Accordingly, the bidders may please be allowed to quote their prices without considering the BOCW Cess.	Bid specification prevails.
134	2B	29.2	Contractor's Material Brought at Site: The Owner shall have a lien on such goods throughout the period of	Only after final reconciliation, dues (if any) owing to Owner by contractor shall be settled on mutually agreed terms . Bidder	Bid specification prevails

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			contract for any sum or sums which may at any time be due or owing to him by the Contractor, under, in respect of or by reasons of the contract. After giving a 15 (fifteen) days notice in writing of his intention to do so, the Owner shall be at liberty to sell and dispose of any such goods, in such manner as he shall think fit including public auction or private treaty and to apply the proceeds in or towards the satisfaction of such sum or sums due as aforesaid.	requests owner to delete this clause .	
135	2B	38	The term 'Scrap' shall refer to scrap / waste / remnants arising out of the fabrication of structural steel work and piping work at the project site in the course of execution of the contract and shall also include any wastage of cables during the termination process while installing the cables.	Kindly modify as below: The term 'Scrap' shall refer to scrap / waste / steel /reinforcement /remnants arising out of the fabrication of structural steel work and piping work at the project site in the course of execution of the contract and shall also include any wastage of cables during the termination process while installing the cables.	Please refer Amendment-1 to Vol-I(Commercial)

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136	2C	2.0	The contractor shall, in connection with the works, provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the engineer or by any competent statutory or other authority for the protection of the works or for the safety and convenience of the public or others.	Watch and ward arrangement shall be taken care for the scope of supplies and storage made by BTG contractor only .The arrangement for a strong security set up to insulate complete project contours and plant boundaries shall be Owner's responsibility. It is understood Owner will provide security at plant boundaries and all open entry points of the plant areas. Kindly confirm.	Bid specification prevails
137	2C	3.0	Facilities for other Contractors: 3.1 The contractor shall in accordance with the requirements of the Engineer afford all reasonable facilities for any other contractors employed by the owner and their workmen, for the workmen of the owner and of any other properly authorized authorities or statutory bodies who may be employed in the execution on or near the site of any work not included in the contract or of any contract which the owner may	Bidder does not understand the intent of the Clause and requests Owner to kindly elaborate the clause.	Please refer Amendment-1 to Vol-I(Commercial)

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			enter into in connection with or ancillary to the works.		
138	2C	10.1	Right to Waive and for Specific Clause: The Engineer can waive and/or relax any of the clauses of the technical specifications and/or other contract document and the cost tendered shall be suitably reduced by the Engineer based on the actual financial implications due to such waivers and/or relaxations.	Bidder requests to modify the clause as follows: The Engineer can waive and/or relax any of the clauses of the technical specifications and/or other contract document and the cost tendered shall be suitably reduced by the Engineer based on the actual financial implications <u>as accepted & agreed upon by Contractor</u> due to such waivers and/or relaxations.	Bid specification prevails.
139	2C	13.9	Drawing: The contractor shall physically verify all dimensions in the field before any portion of the works is executed or taken in hand. The approval of the owner/consultant on any or all drawings and material lists prepared and submitted by the contractor shall not relieve him of any of his responsibilities and obligations under the contract, the contractor shall at all times be responsible and	Bidder requests to modify the clause as follows: The contractor shall physically.....the contractor shall at all times be responsible and shall pay for all costs involved in any alteration, modification and addition to the works due to any discrepancies errors and omissions on the drawings and material lists and in the other documents supplied	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			shall pay for all costs involved in any alteration, modification and addition to the works due to any discrepancies errors and omissions on the drawings and material lists and in other documents supplied by him whether such drawings and material lists and other documents have been approved by the Owner/Consultant or not.	by him whether such drawings and material lists and other documents have been approved by the Owner/Consultant or not, <u>provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Owner.</u>	
140	2C	16.1	Decision of the Competent Authority of the Owner to be Final: Except where otherwise specified in the contract and subject to the powers delegated by owner under the owner's rule then in force, the decision of the competent authority of the owner for the time being shall be final, conclusive and binding on all parties to the contract upon all questions relating to the meaning of the specifications, designs, drawings and instruction herein before mentioned and as to the quality of workmanship or material used on the work, or as to any other question, claim, right, matter or thing	All contractual conditions shall be mutually agreed. Hence, Bidder request owner to delete the clause.	Bid specification prevails

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			whatsoever, in any way arising out of or relating to the contract designs, drawings specifications estimates instruction, orders or these conditions or otherwise concerning the works or the execution or failure to execute the same, whether arising during the progress of the work, or after the completion or abandonment thereof.		
141	2C	19.0	Materials, Workmanship and Tests: All materials and workmanship shall be of the respective kinds described in the contract and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacture or fabrication or on the site or at all or any of such places. The contractor shall provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any materials used and shall supply samples of materials before incorporation in the works for	Any such test shall be performed as per approved quality assurance plan. However, if Engineer instructs for such additional test, the Contractor shall be eligible for equitable adjustment in time for completion & Contract Price.	Noted Also refer Clause 7.25.00, Vol.11, Section 2

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			testing as may be selected and required by the Engineer.		
142	2C	20	The cement, steel etc. to be procured by the contractor shall be as under: i) Cement shall be of 33/43/53 grade conforming to IS: 269, IS: 8112, IS: 12269 as the case may be, sourced only from the manufacturers approved by the owner. ii) The reinforcement steel shall conform IS: 1786 and /or IS: 432 as the case may be and the structural steel shall conform to IS: 808, IS: 1730, IS: 1732 and IS: 2062 manufactured by TISCO or SAIL or of the manufacturers approved by the owner.	The cement, steel etc. to be procured by the contractor shall be as from BIS APPROVED SOURCES HAVING VALID BIS LICENCE. May kindly be allowed without any approval from OWNER after the award.	Bid specification prevails
143	2C	20.5	Materials to be Procured by the Contractor: Any materials if supplied by the Owner, the recovery will be effected at rates fixed by the Engineer-in-charge based on 'Cost Rate' or 'Market Rate' whichever is higher plus GST plus 15% to cover Owner's	Bidder requests to modify the clause as follows: Any materials if supplied by the Owner, the recovery will be effected at rates fixed by the Engineer-in-charge based on '~~Cost Rate~~' or '~~Market Rate~~' ~~whichever is higher~~ plus GST	Bid specification prevails.

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			overhead charges. The contractor shall also have to pay interest charges on the above amount at Owner's borrowing rate plus one percent per annum in case the cost of the materials has not been recovered within a reasonable period of one month from the date of issue of these materials by the Owner to the contractor duly reckoned at every month.	~~plus 15% to cover Owner's overhead charges. The contractor shall also have to pay interest charges on the above amount at Owner's borrowing rate plus one percent per annum in case the cost of the materials has not been recovered within a reasonable period of one month from the date of issue of these materials by the Owner to the contractor duly reckoned at every month.~~	
144	2C	28.2	Temporary Works: The layout and detail of such temporary works shall have the prior approval of the Engineer, but the contractor shall be responsible for proper strength and safety of the same. All temporary works shall be so constructed as not to interfere with any permanent work of other agencies. If it is necessary to remove any of the temporary work or works due to requirement of Owner, the contractor shall remove the same and re-erect the same at his own cost. Nothing extra shall be payable by the Owner on this account to the	Bidder requests to modify the clause as follows: The layout and detail of such temporary works shall have the prior approval of the Engineer, but the contractor shall be responsible for proper strength and safety of the same. All temporary works shall be so constructed as not to interfere with any permanent work of other agencies. ~~If it is necessary to remove any of the temporary work or works due to requirement of Owner, the~~	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
			contractor, notwithstanding the fact that the location was allotted by the Owner to the contractor.	~~contractor shall remove the same and re-erect the same at his own cost. Nothing extra shall be payable by the Owner on this account to the contractor, notwithstanding the fact that the location was allotted by the Owner to the contractor.~~	
145	3	2.1.2	Equipment : Mill Reject Handling Type Equipment of: Conveyor type mill reject handling system for 1% mill reject Rating : Handling coal reject to the tune of 5 tonne/Hr or higher capacity	To align qualification requirement of Mill reject handling system with industry practice, it is proposed to modify this as under: Equipment : Mill Reject Handling Type Equipment of: Conveyor type mill reject handling system for 1% mill reject Rating : metallic belt conveyor type or chain flight conveyor type handling systems of 1.5 tonne/Hr or higher capacity for any industrial installations	Noted. Shall be discussed during DDE.
146	3	2.4.4	Condensate Polishing Plant: The Contractor/subcontractor should have designed and supplied at least one (1) condensate polishing plant of mixed bed, deep bed type consisting	Bidder propose the Pre Qualification requirement for Condensate polishing Plant as per the REVISED GUIDELINES FOR QUALIFYING	Noted. However, bidder shall be required to furnish a

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			of at least two (2) service vessels operating in parallel and in conjunction with the main TG unit. Each of these vessels shall have a minimum capacity of 500 m ³ /hr. The plant shall have external regeneration system, incorporating the same resin separation and regeneration process as proposed by the contractor for this package. The above plant should be in successful operation for a period of at least one (1) year as on date of bid opening.	REQUIREMENTS FOR BIDDERS OF BALANCE OF PLANT FOR COAL/ LIGNITE BASED THERMAL POWER STATIONS Sept 2023 clause no. 8.0 published in Central Electricity Authority Reports. as stated below: 8.1 Bidder/Sub-vendor should have designed, supplied, erected and commissioned at least one (1) number Condensate Polishing Unit (CPU) of mixed bed, deep bed type consisting of service vessel of minimum capacity of 500 m³/hr which should have been in successful operation for a period of at least one (1) year prior to date of issue of letter of award. The reference CPU should have external regeneration system, incorporating the same resin separation and regeneration process as being offered by the bidder /sub-vendor. 8.2 Bidder/Sub vendor who does not meet the above requirement	letter of support from Association/ Collaboration firm for successful performance of CPU in the format as per CEA guidelines.

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				at paragraph 8.1 can also participate in association/collaboration with a firm which fully meets the requirement at 8.1 above provided the bidder/sub-vendor has designed, supplied, erected and commissioned at least one(1) number of ion exchange based demineralizing(DM) plant of minimum capacity of 60 m3/hr consisting of at least one (1) stream capable of producing outlet water quality with silica and conductivity not more than 0.02 ppm as SiO ₂ and 0.2 micro mho/cm respectively which should have been in successful operation for at least one (1) year prior to date of issue of letter of award. Please confirm.	
147	3	2.4.3	The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned COLTCS with ball collecting strainer having diameter of not less than 2100 mm, which is in successful operation in	1. It is to be noted that COLTCS is a supply package and its supplier is responsible only for the design, manufacturing, and commissioning of COLTCS and Erection is done by Bidder	Bid specification prevails

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			at least one (1) station for a minimum period of one (1) year.	through separate Erection agency. Therefore, 'Erection' should not be a part of Provenness criteria & shall be removed. Kindly accept. 2. Please also include option of JV/Indian subsidiary / Collaborators/ Licensor(s) etc. in provenness Criterion of COLTCS. Kindly accept.	
148	3	2.4.2	Turbine Hall EOT Crane: The contractor/ subcontractor should have designed, manufactured, erected and commissioned EOT cranes of capacity 100 MT or more with minimum crane span of 28 meters, which is in successful operation in at least one (1) station for a minimum period of one (1) year as on the date of bid opening.	The Gantry/Semi-Gantry Cranes and EOT crane, all are designed as per IS 3177. In fact, Gantry/ Semi-Gantry Cranes (generally outdoor duty) design is similar or more stringent (for leg designing) than EOT crane. Irrespective of type of industry, generally the design standard of Cranes is same. Turbine Hall EOT crane qualification requirement may be modified as below: The contractor/ subcontractor should have designed, manufactured, erected and commissioned EOT/ Gantry/	Bid specification prevails

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				Semi-Gantry cranes of capacity 100T or more with minimum crane span of 24 meters , which is in successful operation in at least one (1) station (power plant/ refineries/ shipyard/ workshop or any other industry) for a minimum period of one (1) year as on the date of consideration for approval but not later than six months to award date of contract to the Main bidder: In addition to the above clause, main bidder can be qualified to manufacture EOT crane in collaboration with the crane supplier who can meet the above mentioned criteria.	
149	3	2.7.1 (A) (c)	QFGDM should submit performance certificate regarding satisfactory operation of FGD system from any end user along with relevant Purchase Order/Contract Agreement. Such system should have been in successful operation for a period not less than two (2) years within last 10 years prior to the date	Ordering of FGD system on EPC basis in existing thermal power plants in India has gained substantial traction in past 5-6 years. Bidder is currently executing ~ 20 GW of plants in various stages. Bidder have also attained	Please refer Amendment-1 to Vol-I(Commercial)

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			of Techno-commercial bid submission.	Completion of Facilities (COF) of FGD system for couple of units. It may be pertinent to put emphasis on the fact that Bidder have absorbed the requisite know-how and further can be entrusted with bidding based on the reference of these plants. In view of above, we request Owner to additionally include criteria which references with the Completion of Facilities (COF) of these plants if attained prior to more than one (1) year within last 10 years prior to the date of Techno-commercial bid submission.	
150	3	2.7.2 (4) (i)	Contract Performance BG amounting 10% of the EPC contract cost & BG amounting 10% of O&M contract cost of the FGD system.	Since successful Contractor shall be submitting Contract Performance BG for the complete BTG Package Contract for which FGD is part of, separate Contract Performance BG is not envisaged for FGD.	Please refer Amendment-1 to Vol-I(Commercial)

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			Subsidiary Company/Joint Venture Company, Collaborator, TLA provider (As applicable)		
152	3	2.7.7.A.(e)	Name of Equipment: Agitators Type of Equipment :Vertical/Horizontal Application: Wet Limestone based FGD application in Coal fired power plant or in any other process application Equipment Rating : Agitator rating not less than that supplied for 500 MW or higher size unit for similar application. MSPGCL: Agitator rating not less than that supplied for 500 MW or higher size unit for similar application.	Based on provenness criteria specified for Agitator package, there are limited supplier (only one) in India who qualified this PQR. Inorder to increase the supplier base, bidder proposes the below modifications (a) Application: Wet Limestone based FGD application in Coal fired power plant or any other process application with a specific gravity of 1.216 (min) or with a slurry concentration (min) of 20% (wt) . (b) Agitator rating should be minimum 50% of rated power of largest power consuming agitator.(Shall be defined for the respective project) (c) A bidder can be qualified if it has a valid agreement with letter of support from OEM who meets the PQR. This option of JV/Subsidiary company is not	Bid specification prevails

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				very useful with Indian Vendors. Please accept.	
153	3	2.7.7.A.(f)	Name of Equipment : Vacuum Belt filters Type of Equipment :Belt type Application: Wet Limestone based FGD application in Coal fired power plant or in any other process application Equipment Rating : 35 T/hr. (minimum) MSPGCL : 80% of the offered Vacuum Belt filter capacity	To rationalize the Provenness for Vacuum Belt Filter in line with other packages & allow more capable bidders to participate using additional route, considering VBF is a newer package like other FGD equipments/sub-systems, the Provenness may be modified as below: f) Vacuum belt filter: 1. Application = Wet Limestone based FGD application in Coal fired power plant or in any other process application. Eqp rating = 17 T/hr or 75% of proposed equipment rating whichever is higher. 2. In addition to above, request Customer to consider the following clause for any Bidder/Sub-vendor quoting in partnership with Technology Provider/ Qualified OEM not resulting into JV/Subsidiary: In case, the Bidder or the	Bid specification prevails

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				proposed sub-vendor is not a manufacturer of proven Vacuum Belt Filters as per clause 4.26.1 (f) above, the Bidder or the proposed sub-vendor shall also be considered qualified for manufacturing and supply of the Vacuum Belt Filters, provided that it has valid partnership agreement for design, engineering, manufacturing, supply of such Vacuum Belt Filters with such manufacturer who meets the requirements stipulated at clause 4.26.1 (f). In addition, the Bidder shall be required to furnish a letter of support from Technology provider along with the agreed scope matrix for successful performance of the equipment valid up to the end of defect liability period of the contract as per the format enclosed in the bidding documents, at the time of placement of order on the approved sub-vendor.	

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154	3	6.2.1	If the Contractor fails to achieve Trial Operation of the unit within the time period specified in Project Completion Schedule due to reasons attributable to him then the Owner shall levy liquidated damages for delay on the Contractor at the rate of ½% per week of delay or part thereof of the Contract Price.	Bidder understands the cap/ceiling for Liquidated damages for delay in project completion is max. 10% of Contract Price . However bidder request owner consider the capping/ceiling for Liquidated damages for delay in project completion to max. 5% of Contract Price. May kindly confirm.	Bid specification prevails.
155	3	9.0 (Table-1)		1) Owner is requested to accept revised responsibility matrix as per attached annexure-I. 2) Further, Bidder shall arrange one time approval from concerned authority. Further extension (if any) shall be in Owner's scope.	Bid specification prevails
156	-	-	General	In line with circular No. F.1/1/2022-PPD by Government of India, Ministry of Finance, Department of Expenditure, Procurement Policy Division, dt. 02 nd February 2022, Bidder requests to allow ' Insurance Surety Bond ' in lieu of bank	Bid specification prevails.

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				guarantees including Contract Performance Security, DJU Security and Bid Security.	
157	2	28.1	The charges levied by the Directorate of Insurance or Lead Insurer proposed by them together with taxes and duties applicable thereon, if any, shall be reimbursed to the contractor at actual within 30 days from the date of submission of invoice along with all the relevant documents including money receipt.	1) Third Party Liability Insurance coverage is a part of Comprehensive Marine Cum Erection (MCE) insurance Policy. And the premium charged by the insurance agency for the said coverage is included in the MCE Insurance Premium. Hence, the total premium charged by the Insurance agency for the MCE Insurance Policy should be reimbursed by the Customer. Owner may kindly confirm.	Bid specification prevails. Refer Clause no. 6.5, Sec-2B, Vol-I in this regard.
158	-	-	New Clause	Bidder requests Owner to introduce following provision: Once the Contractor is ready to carry-out Pre-commissioning and Commissioning activities (including Hydro Test), the Contractor shall notify the Owner in writing. Within fourteen (14) days after receipt of the notice from the Contractor, the Owner shall arrange the BOP inputs	Bid specification prevails.

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(1)	(2)	(3)	(4)	(5)	(6)
				required for such Pre-commissioning and Commissioning activities (including Hydro Test). In case the Owner fails to provide BOP inputs, the Contractor shall issue repeat notice requesting for the same. If the Owner fails to arrange such BOP inputs within seven (7) days after receipt of Contractor's repeated notice, then the Contractor shall become entitled for cost compensation and extension of time from the date of Contractor's repeated notice.	
159	-	-	New Clause: Variation in Royalties	Variation of Royalties is considered as high risk for the Contractor, hence in line with variation of Taxes & Duties, variation in Royalties should also be re-imbursed by Owner against documentary evidence. This is a standard clause followed by Central & State Utilities	Please refer Amendment-1 to Vol-I (Commercial).

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(1)	(2)	(3)	(4)	(5)	(6)
				including NTPC, DVC, MPPGCL, CSPGCL etc. Owner is requested to re-imburse variation in Royalties and accordingly include the following clause: <u>“In the event of there being a statutory increase in the rates of royalty charges/fresh levy of royalty on materials, the same shall be reimbursed to the Contractor upon submission of original challan by him of having made the payments at revised rates. In the event of there being a decrease in such rates, the same shall be recovered from the Contractor. The base date for calculating the increase or decrease shall be the rate as on seven (7) days prior to the deadline set for Price Bid submission. The total reimbursement (positive or negative) as specified above, to be paid or recovered, shall</u>	

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				<u>however be calculated on the quantity of materials actually considered while making the royalty payments to the concerned authorities, or the theoretical consumption of these materials (calculated on the basis of the volume of concrete or fill accepted for payment), whichever is less, and on the basis of documentary evidence of Govt. Notification. However, the Contractor will settle claims, if any, on account of over charge by the State Authorities.”</u>	
160	-	-	New Clause: Change in Laws	In line with provisions available in Central/State Utility tenders, Owner is requested to incorporate suitable provision pertaining to 'Change in Laws'. This clause is in line in Central/State Utility tenders including NTPC, DVC, MPPGCL, CSPGCL etc.	Please refer Amendment-1 to Vol-I(Commercial) .

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(1)	(2)	(3)	(4)	(5)	(6)
				This will safeguard the interests of Contractor in case of any change in the laws and regulations and avoid disputes during execution of project. The proposed clause is as follows: <u>“If, after the date seven (7) days prior to the deadline set for bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed (which shall be deemed to include any change in interpretation or application by the competent authorities) that subsequently affects the costs and expenses of the Contractor and/or the Project Schedule, the Contract Price shall be correspondingly increased or decreased, and/or the Project Schedule shall be reasonably adjusted to the</u>	

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(1)	(2)	(3)	(4)	(5)	(6)
				<u>extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract.</u> <u>However, these adjustments shall not be applicable on procurement of raw materials, intermediary components, and intermediary services etc.by the Contractor. Notwithstanding the foregoing, such additional or reduced costs shall not be separately paid or credited if the same has already been accounted for in the price adjustment provisions.”</u>	
161	-	-	New Clause: Delay in Trial Operation due to reasons not attributable to BTG Contractor:	Owner is requested to introduce suitable remedial provision of “deemed completion” providing recourse e.g. overstay compensation, release of payment linked with Trial Operation & PG Test etc. to the BTG Contractor in case delays in Trial Operation and PG Test are	Bid specification prevails.

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				not attributable to the BTG Contractor. Introduction of deemed completion clause will avoid the possibility of delay for BTG Contractor in case other contractors fail to meet their commitments. Further, such provisions will safeguard the Contractor's interest and make the conditions more facilitative. The proposed clause is as follows: <u>If for reasons not attributable to the Contractor, the Contractor is unable to successfully complete the Trial Operation within the period of three (3) months from the date of Contractor's communication for readiness of Trial Operation, then the unit shall be deemed to have achieved the Trial Operation. In such a</u>	

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				<u>case, the Defect Liability Period for the unit shall commence and the Owner shall pay suitable overstay compensation and release the payment linked with Trial Operation and PG Test against separate Bank Guarantees of corresponding amount. Such bank guarantees shall be released respectively on successful completion of Trial Operation and PG Test.</u>	
162		-		Interpretation of milestone preparedness: BTG contractor shall assess and inform the owner regarding readiness for milestone.	Please refer Amendment-1 to Vol-I (Commercial).
163		-		Bidder understands ownership of all surplus/unused materials/scrap materials left after completion of project shall become property of Contractor. Kindly confirm.	'Scrap' as defined in bid specification clause no. 38.0, Sec-2B.
164			Observation during Site visit	With reference to the site visit, it is observed that Mill reject material is lying in the proposed	Confirmed

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				BTG area. Bidder understands that the same shall be removed and disposed by owner from the proposed BTG area. Kindly confirm.	
165			Observation during Site visit	Tree cutting is required in the proposed BTG area, customer may kindly carry the same work at their own. Kindly confirm. In case BTG contract has to carry the tree cutting work, then, all the necessary clearances from local/ statutory authorities shall be arranged by the Owner. May kindly confirm.	Confirmed
166			Observations during Site visit	Overground dismantling of existing tanks/building/ storage building/sheds/ Misc structures etc are still at the proposed BTG area. Bidder understands that owner will dismantle and dispose all the existing overground structures from the proposed BTG area. Kindly confirm.	Confirmed

MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2X660 MW UNITS - 11 12 PROJECT
RFx No. 3000046202 (BTG Package)
PRE-BID CLARIFICATIONS - ELECTRICAL



Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
1	VOLUME-III	Part B		18.04.01	The Emergency DG set shall be connected to 415V Isolation Panel which in turn shall be connected to 415V Emergency MCC for safe shutdown of the power plant	We propose to offer DG AMF panel with isolation breaker.	Tender Terms & Conditions Prevail.
2	VOLUME-III	Part B		18.05.02.v	The capacity of Common bulk oil Tank shall be of minimum rated for 8 hours (at rated capacity) consumption of all the three DG set at a time,	Bidder proposes to provide two nos 990 litres fuel day tank for each DG set. So, Kindly consider deleting requirement of common bulk oil tank and fuel transfer pumps.	Tender Terms & Conditions Prevail.
3	VOLUME-III	Part B		18.05.10.v	The limits of temperature rise shall be in accordance with Class B insulation.	Bidder proposes to supply alternator with insulation class- H with temperature rise limited to class-F.	Noted.
4	VOLUME-III	Part B		18.05.10 xix	DG sets rated 1000 kVA and above shall be connected through non segregated phase busduct to the respective AMF panel. Busduct entry shall be from the top.	Noted. Bidder understands that DG AMF panel and EMCC shall be connected through power cables.	Tender Terms & Conditions Prevail. However, based on the layout the same shall be discussed DDE.
5	VOLUME-III	Part B		18.05.14 xiii	All relays shall be of multifunctional numerical communicable type. e) Under voltage relay with timer f) Over voltage relay with timer g) Reverse Power relay h) Voltage controlled inverse time over current relay i) Inverse time earth fault relay j) Differential Protection k) Restricted earth Fault protection l) Voltage sensing relay to sense voltage developed is correct so that breakers are permitted to close. Having reset ratio better than 0.95 m) Under / over frequency relay, with built-in-timers n) Frequency sensing relay to check that the frequency of the DG Sets is O.K. enabling the breakers to close.	Bidder shall offer single numerical multifunction relay which shall have all the protections listed in the specifications.	Noted. Single numerical multifunction relay for each DG Set..
6	VOLUME-III	Part B		18.05.15	Constructional Features	Constructional features of engine shall be as per manufacturers design. DG shall be sourced from GSECL approved sources only.	Tender Terms & Conditions Prevail.
7	VOLUME-III	Part B		18.05.18	The acoustic enclosure shall provided at 800mm distance from the DG set. It shall be fabricated from 2.0mm thick CRCA sheet with ISMC(hot dip galvanised) frame of suitable size.	Acoustic shall be fabricated from 1.6 mm/ 2mm CRCA sheets as per manufacturers design. Paint shade of enclosure shall also be as per manufacturer design.	Tender Terms & Conditions Prevail.
8	VOLUME-III	Part B		18.07.00	The bidder shall indicate tests (as per ISO 3046-1986/BS 5514-1984/any other standard procedures acceptable/mutual procedure acceptable to both the owner and bidder) recommended to be carried out at site during installation and commissioning to ensure satisfactory performance of all the equipment supplied. These tests shall be carried out by the bidder in case order is placed on 6 Hours at maximum load, continuous running at low load to be performed in addition to the following test at site:- i) Fuel Consumption. ii) Lube oil Consumption iii) Generator Efficiency iv) Full Load test	Kindly note that lube oil consumption and generator efficiency cannot be demonstrated at site. Site testing can be done at available plant load only at the time of commissioning of DG Set at site.	Noted. However, the specified test shall be conducted at manufacture's shop as per approved datasheet and the same shall be witnessed by customer. Also maximum available load shall be arranged by bidder for loading of the DG set for tests at site.
9	VOLUME-III	Part B		18.08.00	Combined Load test of D.G. set alongwith AMF panel upto full load at 0.8 p.f. and for a combined load of D.G. Set at low load for 8 hrs. continuous run	Please note that load test shall be done as per available plant load only.	Noted. However maximum available load shall be arranged by bidder for loading of the DG set for tests at site.
10	VOLUME-III	Part B		18.06.11.vii	vii) Testing & Commissioning DG set. Following tests will be conducted at site: a) Full load test will be conducted for 12 hours continuously including one hour overloading (with 10% overload per day and for a period of three days (totally 36 hours of load test) by directly loading the DG set.	Load test has already been defined at clause 18.07.00 . Hence we request to delete this clause from tender.	Tender terms & conditions prevail. However, maximum available load shall be arranged by bidder for loading of the DG set for tests at site. Including maximum available load on EMCC plus available loading rehostats if any.
11	VOLUME-III	Part B		18.06.11.xi	xi) Guarantees a) The following performance parameters of the plant will be indicated and guaranteed by the Contractor. Values indicated for 100 % load (Item no. i, ii, iii, iv and v) are to be demonstrated at site:- □ Power output of diesel generator set at the generator terminals, kW. □ Auxiliary power consumption (for fuel oil, lubricating oil, jacket cooling, etc.), kW, in case of separate motor driven pumps. □ Heat rate, kCal / kWh □ Heat rate tolerance, % □ Net calorific value of the fuel used to calculate above heat rate, kCal / kg.	Please note PG test at site shall be done at maximum available load on EMCC. Further, Heat rate, Heat rate tolerance and net calorific value of fuel cannot be demonstrated at site. Bidder shall submit detailed PG test procedure during detailed engg for MAHAGENCO approval.	Noted. However, the specified test shall be conducted at manufacture's shop as per approved datasheet and the same shall be witnessed by customer. The maximum available load shall be arranged by bidder for loading of the DG set for tests at site.
12	VOLUME-III	SECTION-11/ 415 V SWITCHGEARS AND DC BOARDS		Annexure-1 (IMC)	Contractor shall provide complete list of data items available for cyclic and acyclic data communication on Profibus DP for DDCMIS interface and diagnostics	Communication protocol for Intelligent Motor Controller (IMC) shall be finalized during detailed engineering. As per standard practice, Profibus-DP, Profinet, Modbus-TCP, Ethernet/IP protocols shall be available for selection as per the DCS/PLC manufacturers.	Tender Terms & Conditions Prevail. However, the same shall be discussed DDE.
13	VOLUME-III	SECTION-11/ 415 V SWITCHGEARS AND DC BOARDS		Annexure-1 (IMC)	Communication to DDCMIS: The IMC shall be interfaced with DDCMIS on Profibus DP protocol for complete remote operation and control along with detailed diagnostics	Communication protocol for Intelligent Motor Controller (IMC) shall be finalized during detailed engineering. As per standard practice, Profibus-DP, Profinet, Modbus-TCP, Ethernet/IP protocols shall be available for selection as per the DCS/PLC manufacturers.	Tender Terms & Conditions Prevail. However, the same shall be discussed DDE.

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14	VOLUME-III	SECTION-1/ General technical Requirements		1.40.01	Variable speed drive system shall be provided as per the mechanical/ electrical system as well as other technical requirement shall be supplied by Bidder. VFD panels for these applications shall be located in Main Control Room/concerned area Control Room under air conditioned atmosphere	For LHP & GHP wherever mechanical equipments are far away from the MCC rooms, it is standard practice to keep the VFD panel in the junction tower in a closed air conditioned chamber. This is a standard practice so that the outgoing cable length from VFD to motor can be minimized as per the standard practice used in VFDs	Noted for remote location drives. Further the same shall be discussed DDE.
15	VOLUME-III	SECTION-1/ General technical Requirements		1.47.01v	These type test reports should be for the test conducted on the equipment similar (kVA/kW, kV, kA, application) to those proposed to be supplied under this contract and the test(s) should have been either conducted at an independent laboratory or should have been witnessed by a client.	Type test shall be applicable for same type of equipment, in case of transformer type test shall be applicable for same voltage ration, similar impedance (with minor variations) and type of transformer (Dry type/ Oil type). However for minor changes in the KVA rating, type test need not be conducted again. Type test conducted for a higher KVA rating transformer shall be accepted for a lower rating transformer.	Tender Terms & Conditions Prevail.
16	VOLUME-III	SECTION-1/ General technical Requirements		1.28.08	The minimum cable sizes in control cables shall be 2.5 sqmm copper conductor unless otherwise specifically warranted. However for CT circuits the minimum size shall be 4 sqmm. However higher size may be selected based on the burden calculations.	Control cable of 1.5 Sq.mm also shall be allowed wherever applicable. This shall be selected as per the current requirement and distance of cable during detailed engineering.	Tender Terms & Conditions Prevail.
17	VOLUME-III	SECTION-1/ General technical Requirements		14.49.01 iia	For each type & rating of HV & MV motors the Bidder shall conduct all the type test as per relevant IEC and IS standards for all the proposed motors to be supplied under this contract and the test(s) should be conducted at an NABL accredited independent laboratory.	Type test shall be applicable for same type of equipment. In case of motor similar IE class, Frame size, Voltage shall be considered for type test. Type test report of a higher rated motor with same frame size shall be accepted for lower rating motors.	Tender Terms & Conditions Prevail.
18	VOLUME-III	SECTION-1/ General technical Requirements		-	-	Request customer to allow cable routing inside conveyor gallery for LHP-GHP areas due to space constraint and non hazardous areas.	Will be discussed and decided during detailed engineering.
19	VOLUME-III	SECTION-1/ General technical Requirements		1.09.06	Maximum continuous motor ratings shall be at least 15% above design duty point or the maximum load demand of the driven equipment under entire operating range taking into account voltage and frequency variation.	Maximum continuous motor ratings shall be at least 10% above design duty point or the maximum load demand of the driven equipment under entire operating range taking into account voltage and frequency variation, which is general standard practice.	Tender Terms & Conditions Prevail. However if the margin is specified over and above 15% in any of the motors under mechanical equipment specification, then higher the margin shall be followed.
20	VOLUME-III	SECTION-1/ General technical Requirements		1.20.03	Each switchgear/MCC/distribution board shall be fed by 2x100% transformers/feeders and these shall be rated to carry the maximum load expected to be imposed.	Each switchgear/MCC/distribution board shall be fed by 2x100% / 3x50% transformers/feeders and these shall be rated to carry the maximum load expected to be imposed.	Tender Terms & Conditions Prevail.
21	VOLUME-III	SECTION-1/ General technical Requirements		1.25.06	Maximum continuous motor ratings shall be at least 15% above design duty point or the maximum load demand of the driven equipment under entire operating range taking into account voltage and frequency variation.	Maximum continuous motor ratings shall be at least 10% above design duty point or the maximum load demand of the driven equipment under entire operating range taking into account voltage and frequency variation., which is general standard practice.	Tender Terms & Conditions Prevail. However if the margin is specified over and above 15% in any of the motors under mechanical equipment specification, then higher the margin shall be followed.
22	VOLUME-III	SECTION-1/ General technical Requirements		1.34.03 (ii)	The minimum design vertical spacing for trays shall be 300 mm measured from the bottom of the upper tray to the top of the lower tray. At least a 250 mm clearance shall be maintained between the top of a tray and beams, piping, or other obstacles to facilitate installation of cables in the tray. A working space of not less than 600 mm shall be maintained on at least one side of each tray. Tray covers shall be provided on the top most tray of each tier of cable trays.	Tray covers shall be provided on the top most tray of each tier of cable trays only if horizontal formation is provided.	Tray cover shall be provided on top most tray of each tier of cable trays in horizontal formation. Rest of the tender terms and conditions prevails. However, tray cover on outer most tray in vertical formation up to @ 2 mtr. shall be provided where there is chance of cable damage on account of hitting by an object.
23	VOLUME-III	SECTION-1/ General technical Requirements		Annexure-1	Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination.	IMC is not considered for Local Control panels like Scoop coupling panel, All the local panels for Electro mechanical application like Sump Pump, MD, SM, Lime sampling unit, DE/DSS LCP, Travelling tripper etc. Kindly confirm. PMCC/MCC located in switchgear room will be pro-vided with IMC(Intelligent Motor controller)	Bidder to follow IMC for all drives as specified in tender Cl.11.06.05, xv.
24	VOLUME-III	SECTION-1/ General technical Requirements		17.03.06 xxv)	Motor rating Cable size (i) 0-5.5kW 3C-2.5/4/6/10 mm² Cu as per voltage drop (ii) 5.6-11kW 3C-16 mm² Al (iii) 11.1-22kW 3C-35 mm² Al (iv) 22.1-45kW 3C-95 mm² Al (v) 45.1-75kW 3C-185 mm² Al (vi) 75.1-below 90kW 2x3C-185 mm² Al	Bidder understands that the final cable size shall be decided as per voltage drop calculation.	Noted
25	III	B / ELECTRICAL		14.12.02	Pump motor subject to reverse rotation shall be designed to withstand the stresses encountered when starting with non-energized shaft rotating at 125% rated speed in reverse direction	Pump HT Motors are always started from rest in forward direction. Motors are not given start signal when shaft is rotating in opposite direction .	Noted. However, necessary provision like ratchet mechanism for preventing reverse rotation shall be considered.
26	III	B / ELECTRICAL		14.13.05 iii	iii) Motors above 3000 KW 450%. Not subject to any positive tolerance.	Motors can be guided through Starting MVA limitation , instead of relating it through rating. It becomes very stringent and unnecessary increase in equipment size if starting current is very less. Methodology like KVA/KW ratio as followed in NTPC Projects can be followed for the same. For very large capacity Motors of BFP & ID Fan Motor , starting current may please be reviewed for 450% FLC with Tolerances as per IEC.60034-1	Tender Terms & Conditions prevail.

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27	III	B / ELECTRICAL		14.15.02	Pull out torque at rated voltage shall not be less than 205% of full load torque.	We understand that Full load torque requirement herein means full load torque demand of load. In view of stringent starting conditions of 450% inclusive, Excess torque to be as per IEC:60034-1 or with applicable tolerances as per IEC:60034-1	Tender Terms & Conditions prevail.
28	III	B / ELECTRICAL		14.17.04	The value of the polarization index for motors above 160kW should not be less than 2 when determined according to IS: 78114.0	Polarization index shall be as per IEC:60034-27 Part 4	Tender Terms & Conditions prevail.
29	III	B / ELECTRICAL		14.23.00	HV & MV motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads.	The vibration pad size for vertical TEFC HT motor shall be 16x30x30 mm and horizontal TEFC motor shall be 40x40x40 mm. However the flat surface for both the cases shall be more than the probe size	Tender Terms & Conditions prevail. However, the same shall be decided DDE.
30	III	B / ELECTRICAL		14.28.07	Ring oiling system shall be adequate for starting and continuous operation of motor for at least half an hour, without pressure oiling system in operation.	For high speed applications like 1500 rpm and high capacity Motors, bearing shall be Sleeve type, forced oil cooled. Ring shall also be present to aid oil film formation. However, such system is not suitable for operation of Motor for half an hour. The same is suitable for coating down period without Forced Oil supply.	Noted.
31	III	B / ELECTRICAL		14.41.00	HV & MV motors shall be provided with dial type two (2) bearing temperature indicators and shall have two (2) sets of contacts, each set having 2 NO + 2NC contacts rated for 5A at 240V AC and 0.5A at 220V DC. One set shall be set to operate at lower value to give alarm and other set at a higher value to trip the motor.	As per latest Industrial practice, 2 Nos. BTDs are employed for Alarm & Tripping of Motor. Additional DTT is utilized for Local temperature indication only. We shall provide Gas filled DTTs in which 2 Change over contacts & shall be provided with Contact rating of 30 VAC for Modern Numerical relay system. Modern Relay system does not require 5 A Contact rating. The dial type thermometer is used only for local indication, so only 2NO contact shall be provided. Where as the alarm and trip setting to be taken from PT-100, Duplex bearing RTDs	Tender Terms & Conditions prevail.
32	III	B / ELECTRICAL		14.40. iii.h	Degree of protection	IP5X - Existing certificate within 10 Yrs of tender opening date from Statutory Labs shall be furnished for IP5X (Dust Test) IPX5 - Existing certificate or the same shall be conducted at our works in presence of Client	Clause mentioned by Bidder is to be corrected as 14.49.01.iii.h instead of 14.40.iii.h. Test for suitability of IP55/ IPW- 55 as per IS 4691 as type test. Type test certificate for first numeral (IP5X) shall be acceptable in lieu to test, provided the test motor is identical to motor being supplied. Second numeral (IPX5) test shall be carried out on one motor of each type and rating. However, Degree of Protection shall be as per Cl. No. 14.20.00 (Type of Enclosure) of Vol. III B.
33	VOLUME-III	Part-B/ TECHNICAL SPECIFICATION- ELECTRICAL/ Sub Section No. 15.00.00 / ELECTRICAL ACTUATORS - NON INTEGRAL STARTER (Page 350 of Doc no: ETG061-BTG-ELEC-TS)		Clause No: 15.06.02 Motor --> vii)	vii) The actuators shall be designed to be self locking upon loss of power. Motor shall be designed to close in 30 secs from full open position and shall have adequate capacity to open and close under full unbalanced design pressure.	Please note that for Guillotine Gates , open-close operation within 30 seconds is technically not possible. Guillotine Gates will take much more time (around 3 to 8 minutes) for open-close operation depending on the stroke height of Gates (which depends on the Duct height). This is in-line with Guillotine Gates supplied by the bidder till date for all projects, including those installed in MAHAGENCO Bhusawal 1x660 MW, Parli, Paras, Khaperkheda, Chandrapur, Koradi R&M projects. The open-close timing of 30 seconds is possible only for quarter-turn actuators used for Multi-louver Dampers. Please accept.	Can be decided DDE; Based on the stroke height of Gates and process requirement
34	VOLUME - II	Page 54 ETG106-EPC -LEAD-TS		Clause No:2.16.15 xiii) ELECTRICAL	Local Control Panel/JB/PBs- Local control panels for BTG auxiliaries like EOT& UNDERSLUNG EOT crane and hoist electrics.....	Bidder understand that the requirement of Local control panels is generic requirement and to be provided based on the system requirement. Kindly note that critical equipment like ID/FD/PA FANS and their LOS are directly controlled from DCS. Local control panels and local start PB are not recommended and not provided in any of the projects, considering the critical nature of the equipment for ensuring plant availability. Hence, bidder proposes that local control panels and local start are not provided for the ID/FD/ PA fans & their LOS. These shall be DCS controlled only. Owner may kindly review critically and confirm.	Tender Terms and Conditions prevail.
35	VOLUME - III	Page 34 ETG061-BTG-ELEC-TS		1.28.09	The minimum sizes of L.T power cable to be chosen are as below:- AL - 16 mm2 (3 core) & Cu - 2.5 mm2 (3 core)	Bidder proposes minimum sizes 10 sq.mm for power cable (AL). This is being followed for various power utilities. Owner may review and confirm.	Tender Terms and Conditions prevail.
36	VOLUME - III	Page 35 ETG061-BTG-ELEC-TS		1.28.12	HV & MV cables & LV power cables shall be laid in ladder type cable trays. Control & Instrumentation cables shall be laid in perforated trays. Even in vertical risers control & instrumentation cables shall be laid in perforated type trays	Bidder proposes ladder type cable trays for both power and control cables. Perforated cable trays shall be provided for the C&I cables. This is based on standard practice being followed for the various EPC projects Owner may kindly review and confirm	Tender Terms and Conditions prevail.

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37	VOLUME - III	Page 243 Doc no.: ETG061-BTG-ELEC-TS Sub Section No.9.00.00 LT SERVICE TRANSFORMERS		Clause No:9.01.01	The scope of supply shall include Cast Resin Encapsulated dry type indoor transformers of ratings to be decided by the Bidder based on selection criteria given in this specification.	Bidder understands that both ONAN outdoor and dry type indoor transformers are acceptable for the auxiliary LT transformers. Accordingly, bidder proposes ONAN outdoor auxiliary LT transformers for ESP and FGD applications. This is based on standard practice being followed for the various EPC projects. Owner may kindly review and confirm.	Noted for ESP and FGD applications.
38	VOLUME - III	Page 244 Doc no.: ETG061-BTG-ELEC-TS Sub Section No.9.00.00 LT SERVICE TRANSFORMERS		Clause No:9.01.12	For each switchgear, 2X100% rated transformer shall be considered	In case the load on any LT board increase beyond 2.5 MVA, bidder proposes 3 x 50 % instead of 2 x 100% transformer configuration. Owner may kindly review and confirm	Tender Terms and Conditions prevail.
39	VOLUME - III	Page 23 Doc no.: ETG061-BTG-ELEC-TS Sub Section No.9.00.00 LT SERVICE TRANSFORMERS		1.20.05	10% spare margin shall be considered over & above the estimated total load on the L.T. board		20% spare margin shall be considered while calculating the total load on the LT Board including standby & intermittent loads for designing LT Transformers.
40	VOLUME - III	Page 244 Doc no.: ETG061-BTG-ELEC-TS Sub Section No.9.00.00 LT SERVICE TRANSFORMERS		Clause No: 9.01.12	Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer	Bidder proposes 10% design margin for the LT transformers in-line with general LT transformer design practice. The 10% margin is being followed for the various EPC projects. This also limits the transformer sizing to be within commercially available size. Owner may kindly review and confirm.	9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads on both the bus sections of switchgear. Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b) Highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00). Please refer Sr. No 7 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
41	VOLUME - III	Page 263 Doc no.: ETG061-BTG-ELEC-TS Sub Section No.9.00.00 LT SERVICE TRANSFORMERS		Clause No:10.03.06	ix) Additional One no OWS and EWS shall be provided for each ESP control room with 132 column dot matrix printer and One no A4 Laser printer along with modular furniture.	Dot matrix printers are outdated. Hence bidder proposes that only the A4 laser printer shall be provided. Owner may review and confirm.	Tender Terms and Conditions prevail.
42	VOLUME - III	Page 271 Doc no.: ETG061-BTG-ELEC-TS		Clause No:11.03.011	POWER-CUM-MOTOR CONTROL CENTER (PMCC), shall mean a continuous line-up of vertical sections housing breaker panels, MCCBs, and contactor-operated modules in single front construction	Bidder proposes double front panels for the LT PMCC. The various incomer, bus coupler, outgoing breaker feeders etc shall be single front. However, the other MCCB, contactor operated modules are proposed to be double front. Kindly note that providing single front for all the feeders will make the LT panels very long and difficult to size the MCC room. This is based on standard practice being followed for the various EPC projects, including MAHAGENCO projects. Owner may kindly review and confirm.	Tender Terms and Conditions prevail.
43	VOLUME - III	Page 29 Doc no.: ETG061-BTG-ELEC-TS		Clause No:1.25.02	All LV motors rated 0.37kW and higher with S1 duty shall compulsorily be of energy efficiency level IE3 as per IS 12615:2011	The ESP geared rapping motor is fractional horse power drive and is operated intermittently for ESP application. Since the ESP rapping motor operation is intermittent, IE3 motors are not provided. Instead IE2 rated motors are provided. This is in-line with other projects also. Owner may kindly review and confirm	Tender Terms and Conditions prevail.
44	VOLUME - III	Page 384 Doc no.: ETG061-BTG-ELEC-TS		Clause No: 17.03.06	xx) All control cables shall be 2.5 mm ² copper cables	Bidder proposes 1.5 sq.mm size for control cable (copper). This is being followed for various power utilities. Owner may review and confirm.	Tender Terms and Conditions prevail.
45	VOLUME - III	Page 407 Doc no.: ETG061-BTG-ELEC-TS		Clause No: 17.15.01	All multicore cables shall be laid in touching formation. LT power cables above 95 sq.mm size shall be laid in single layer touching formation in trays while cables upto & including 95 sq.mm shall be laid in maximum of 2 layers	For ESP related cables, bidder proposes 2 layers for the power cables for all sizes of cables. This is required to meet the routing requirements of the ESP cables, especially at control room cable exits, along the ESP and at ESP roof top. This is based on standard practice being followed for the various EPC projects. Owner may kindly review and confirm	Tender Terms and Conditions prevail.
46	VOLUME - III	Page 199 Doc no.: ETG061-BTG-C&I-TS		Clause No:9.10.01	The actuators shall have integral starters along with over load relays with built in SPP (Single Phasing Preventer)	In section 15.00.00 of Electrical specification, non integral electrical actuators are mentioned for Valves, dampers and gates.	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only.
47	VOLUME - III	TECHNICAL SPECIFICATION ELECTRICAL		15.00.00	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER	Owner may kindly review and confirm whether to consider electrical actuators with integral starters or not.	
48	ETG061-BTG-GEN-LTS Volume II section 2	LEAD TECHNICAL SPECIFICATION	141	9.02.44 iii)	For whole plant buildings, all panels and switchgears should be kept at 1st floor, above cable floor which will be at the ground level.	For main plant building, Switchgears shall be kept at first floor and Ground floor shall be cable vault. However, switchboards (MV/LV) for specific load centers (located other than Main Power house building) shall be kept at ground floor with cable trench arrangement. Please confirm.	Tender Terms and Conditions Prevail.

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49	Volume III PART B	section 1 TECHNICAL SPECIFICATION ELECTRICAL	10	1.09.05	Control & Instrumentation cables shall be laid in perforated trays.	As per bidder's standard & proven practice, LT control cable shall be laid in ladder type trays and Screen control cable shall be laid in perforated trays. Please accept.	Tender Terms and Conditions Prevail.
50	Volume III PART B	section 1 TECHNICAL SPECIFICATION ELECTRICAL	34	1.28.08	However for CT circuits the minimum size shall be 4 sqmm. However higher size may be selected based on the burden calculations.	However for CT circuits the minimum size shall be 2.5 sqmm. However higher size may be selected based on the burden calculations, as there are many CT's like 51N, REF for small rating transformer 4 sqmm size is not required.	Tender Terms and Conditions Prevail.
51	Volume III PART B	section 1 TECHNICAL SPECIFICATION ELECTRICAL	467 & 472	21.03.01 & 21.06.00	shall be sealed with fire stops. Fire barriers and fire stops shall have a fire rating not less than 3 hours....& Fire Seal shall provide 2 Hrs. Fire Resistance.	Both clauses are different for time. Customer is requested to clarify and specify the Hours.	Fire Seal shall provide 3 Hrs. Fire Resistance
52	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	175	5.15.03 i) b	In addition, the following tests shall be performed on each transformer:- Frequency response analysis test	Frequency response analysis test shall not be applicable for upto 11kV & 10MVA transformers.	This test shall be applicable for all transformers Except for LT Aux. distribution transformer.
53	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	176	5.15.03 ii) a	Recurrence surge oscillograph Measurement.	Recurrence surge oscillograph Measurement test shall not be applicable for upto 11kV & 10MVA transformers.	This test shall be applicable for all transformers Except for LT Aux. distribution transformer.
54	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	176	5.15.03 iii) a	☐ Power taken by cooling equipment ☐ No load harmonic measurement ☐ Zero sequence impedance measurement	Mentioned special test shall not be applicable for upto 11kV & 10MVA transformers.	This test shall be applicable for all transformers Except for LT Aux. distribution transformer.
55	VOLUME - III/PART - B	SECTION - 1	182	6.03.08	One end of the resistor shall be connected to neutral side of the Transformer through suitable cable box (copper cables to be used) and the other end shall be connected to earth pit through bushing and Galvanized steel busbar.	a) Generally, copper busbar/single core power aluminium cable(specification) is used. Please clarify regarding this.	Tender Terms and Conditions Prevail.
56	VOLUME - III/PART - B	SECTION - 1	593	28.02.07	Cable schedule shall be as under, a) 4CX10 Sq.mm Copper cable for Aviation warning lights. b) 4CX6 Sq.mm Copper cable for Power receptacles, stair case lighting and tail end aviation warning lights etc. c) 2CX2.5 Sq.mm Copper cable for local connection from local Junction box to aviation warning lights.	As per general standard practice & IS 8130; Cables with cross section area geater than 6 sq.mm can be Al/ Cu. Please accept.	Tender Terms and Conditions Prevail.
57	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	40	1.34.03 iii)	The minimum design vertical spacing for trays shall be 300 mm measured from the bottom of the upper tray to the top of the lower tray.	We understand that the minimum design vertical spacing for trays shall be 300 mm measured from the bottom of the upper tray to the bottom of the lower tray.	Tender Terms and Conditions Prevail.
58	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	40	1.36.03 iii)	Tray covers shall be provided on the top most tray of each tier of cable trays.	With reference to clause No. 17.10.02 i) (page No. 400, SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL, VOLUME - III, PART - B), Cable trays in areas subject to excessive coal dust, oil spillage, mechanical damage or accessible to personal contact shall be provided with raised sheet metal tray covers, installed on upper tray in horizontal run and front in vertical run.	Tray cover shall be provided on top most tray of each tier of cable trays in horizontal formation. However, tray cover on outer most tray in vertical formation up to @ 2 mtr. Rest of the tender terms and conditions prevails.
59	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	400	17.10.02 i)	shall be provided with raised sheet metal tray covers, installed on upper tray in horizontal run and <u>front in vertical run</u>	Generally cable tray covers are provided only top tray of horizontal tray, which are subject to to excessive coal dust, oil spillage, mechanical damage or accessible to personal contact. Cable tray covers are not provided for vertical run of cable trays. Please confirm.	Tray cover shall be provided on top most tray of each tier of cable trays in horizontal formation. However, tray cover on outer most tray in vertical formation up to @ 2 mtr. Rest of the tender terms and conditions prevails.
60	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	46	1.43.01 xix)	Minimum clearance from top of busduct to nearest obstruction shall be atleast 1000mm.	We understand that minimum clearance from inspection window of the busduct to nearest obstruction shall be atleast 1000mm, as 1000mm clearance from the top of complete busduct will lead to increased elevation of SWGR room. Please clarify.	Tender Terms and Conditions Prevail.
61	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	39	1.34.01	Cable tray covers shall be fabricated from 16 gauge (1.7 mm thick) MS sheets.	With reference to clause No. 17.10.01 iii) (page No. 400, SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL, VOLUME - III, PART - B), Tray covers shall be minimum 1.6 mm.	Noted
62	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	401	17.10.03 iii)	Duct banks shall be high density PE pipes encased in PCC (10% spare of each size, subject to minimum one) with suitable water-proof manholes.	With reference to clause No. 17.15.05 (page No. 407, SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL, VOLUME - III, PART - B), Where cables cross roads/rail tracks, the cables shall be laid in Hume pipe/PVC pipe . Please confirm.	High density PE Pipe shall be used in Duct Banks. Where cables road crossing/rail tracks, the cables shall be laid in Hume pipe or High density PE pipes.
63	VOLUME - III, PART - B	SECTION - 1 TECHNICAL SPECIFICATION ELECTRICAL	588	27.04.06 viii)	Separate cable trays shall be used for the following - HT Power - LT Power - Control - Instrumentation/communication cables - Fire survival cables	Cable erection philosophy: We understand that separate cable trays shall be used for the following - HT Power - LT Power/ LT Fire survival cables - Control/ Control Fire survival cables - Instrumentation/communication cables	Noted

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64	VOLUME - III, PART - B	SECTION - 1	Page 40	1.35.06	This mat shall be buried at 600 mm depth below the ground and provided with ground electrodes at 6m intervals at the periphery of the grid.	For BTG Area: Ground electrode are generally provided to reduce the Step & Touch potential values where apparent soil resistivity (Ohm-m) decreases with the depth. Therefore horizontal ground conductor spacing & Ground electrode spacing are calculated as per Single line to ground fault (As per cl.no. 15.3 "Types of ground faults" of IEEE-Std 80-2000) analysis to bring Step & Touch potential Voltage in tolerable limit. Therefore ground electrodes shall be provided at periphery of the grid with the distance calculated as per fault study and spacing of 6m may not be required. However spacing of ground conductor & electrode shall be 15 Mtrs maximum.	Noted.
65	VOLUME - III, PART - B	SECTION - 1	Page 537	24.03.04 (xii)	Earth mat Grid spacing of the conductors shall be such that the touch and step potential are within the limits of permissible values and shall be maximum 15 Mtrs.		
66	VOLUME - III, PART - B	SECTION - 1	Page 40	1.35.06	The length of the ground conductors below earth shall be sufficient to ensure a ground resistance of less than one (1) ohm measured at the driest season.	Please note that ensuring a ground resistance less than 0.5 (point five) ohm for offsite area/ building requires large number of Ground electrode as ring system shall be followed for offsite areas which are far from Main plant area. As Ring ground conductor is further connected to Main plant ground grid through 2 interconnection for further safety. Therefore length of the ground conductors below earth shall be sufficient to ensure a ground resistance of less than one (1) ohm.	Less than 0.5 ohm resistance shall be considered for all the Main Plant areas where the step and touch potential is considered. And for other areas where peripheral earthing is considered, the same shall be less than 1 ohm. And overall plant shall be less than 1 ohm.
67	VOLUME - III, PART - B	SECTION - 1	Page 536	24.03.04 (ii)	The ground grid conductors shall be buried in earth at a depth of 600 mm. The length of ground conductors below earth shall be sufficient to ensure a ground resistance less than 0.5 (point five) ohm for each area/building.		
68	VOLUME - III, PART - B	SECTION - 1	Page 536	24.03.04 (i)	The ground grid mesh for entire plant area is designed to keep the touch and step voltages within safe limits as per recommendation of IEEE 80	For BTG Area: Fault current for the earthing system shall be designed for 50 kA for duration of 1 sec. Step & Touch potential tolerable limit shall be calculated for Single line to ground fault (As per cl.no. 15.3 "Types of ground faults" of IEEE-Std 80-2000). Also as per cl.no. 5.3 & 6.0 "Tolerable Body current limit" of IEEE-Std 80-2000, Duration of body current shall be 0.5 sec as per research done by Biegelmeier and Lee.	Kindly refer Clause no 24.03.02 ii) where Fault current for the earthing system shall be designed for 63 KA for duration of 1 sec. Hence Tender Terms and condition prevail.
69	VOLUME - III, PART - B	SECTION - 1	Page 41	1.35.08	For grounding of electronic equipment, a separate earthing system consisting of a number of deep driven treated earthing rods interconnected with insulated cables and insulated risers are to be installed. This system shall be totally isolated from the power equipment earthing mesh risers described above and shall be located underground vertically below the electronic equipment room	For grounding of electronic equipment, a separate earthing system is not required, however above ground connection of electronic equipment shall be totally isolated from the above ground connection of electrical equipment to avoid fault current running in electronic circuit. However earthing rod shall be connected to earth mat below ground. Location shall be near TG Hall/Transformer Yard area (i.e. At nearest possible location of Control room).	Tender Terms and Conditions Prevail.
70	VOLUME - V	ANNEXURE V			GEOTECHNICAL SURVEY REPORT *	Soil resistivity report is required for Step & touch potential values & design of grounding system.	Preliminary Geotech report for bidding purpose is part of the tender. If any further details required, the Bidder can do the same for his Own cost.
71	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	380	17.01.00 e)	Copper cables to be used for all NGR/NGT.	a) Copper cables in power applications is procured for small cable sizes e.g. 2.5 /6 sq mm. Procuring small quantity of various large sizes of copper cable for NGT NGR purpose is difficult from operational point of view. Customer may please accept Aluminium cond. XLPE insulated cable for NGT NGR. b) If a) above is not acceptable to customer. It is proposed that Cable for NGT NGR shall be provided in non-standard drum lengths as per requirement	Tender Terms and Conditions Prevail.
72	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	384	17.03.06 xxi)	Multicore control cables will generally have spare conductor (s) in accordance with the following chart : 1 or 2 : 1-3/C (b) 3 or 4 : 1-5/C (c) 5 or 6 : 1-7/C (d) 7 or 8 : 1-9/C (e) 9 or 10 : 1-12/C (f) Above 10 : Two or more of above Cables	Specification requirement is not clear. We shall consider 20% spare cores as per 17.03.06 xxiv) except 2C,3C control cable. No. of cores no. of spares 1. 2C, 3C Nil 2. 5C 1 3. 7C,10C,12C 2 Please Confirm.	Clause No 17.03.06 xxi) shall be read as :- " Multicore control cables will generally have spare conductor (s) in accordance with the following chart : (a) 3 Core Cable - 1 Spare Core. (b) 5 Core Cable- 1 Spare core (c) 7/9/12 Core Cable- 2 Spare core (f) Above 12 Core cable: Three or more cores."
73	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	385	17.03.06 xxiv)	For practical purposes, the minimum size chosen is as below: (a) Aluminum : 16 mm ² (b) Copper : 2.5 mm ² (c) Recommended cable sizes for various motor ratings Motor rating Cable size (i) 0-5.5kW 3C-2.5/4/6/10 mm ² Cu as per voltage drop (ii) 5.6-11kW 3C-16 mm ² Al (iii) 11.1-22kW 3C-35 mm ² Al (iv) 22.1-45kW 3C-95 mm ² Al (v) 45.1-75kW 3C-185 mm ² Al (vi) 75.1-below 90kW 2x3C-185 mm ² Al	i) 10 mm2 size may please be accepted with Aluminium conductor as per Industry standard practice. ii) Cable sizes, shall be as per cable sizing criteria specified in the specification. Please confirm.	Tender Terms and Conditions Prevail.

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74	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	385 & 397	17.04.01 iii) & 17.08.00	17.04.01 iii)- 1100 Volt grade, control cables with.....Armour shall be GS. Cl. No. 17.08.00 1100 V grade, PVC Control cable conforming to following requirement and in line with IS-1554, IS-8130, IS-5831 & IS-3975	In both clauses there is difference in type of insulation, inner sheath and outer sheath. Please specify the final requirements for LT Control cables.	Control Cables shall be with HRPVC Insulation, Inner & outer sheaths shall be FRLS Extruded HR PVC Type ST-1. All other parameters/specifications shall be as per specifications.
75	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	389	17.04.02 vi) a)	Armour a) For Single core cables to be used in A.C system, the armouring over inner sheath shall consist of single layer of round copper wire..	Aluminium round wire armour may please be accepted for single Core FS cables , aluminium round wire in single core FS cable is sufficient. It may please be noted that in thermal power projects of various customers single core FS cable is generally provided with Aluminium armour.	Noted for Armouring.
76	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	389	17.04.03 x)	Cables for the following systems shall be fire survival type. X) Incomer cables for DG board , emergency board, DC lighting board etc. ...	It is proposed to use Aluminium sandwich busduct from DG to DG Board and DG board to Emergency board because of following advantages of busduct over FS cable- i) Busduct is more economical ii) Low O & M cost iii) Aesthetically better than multiple runs of FS cable iv) No voltage drop limitations in Busduct	Noted, the same shall be decided DDE. If Busduct is used respective specification for NSPBD and Busbars shall be applicable. And if cable is used then tender terms and conditions shall prevail.
77	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	390	17.05.03 i)	Cable identification shall be provided by embossing on every meter on the outer sheath the following: ISI Mark	As per Cl. No. 17.04.02 i) FS cables shall be generally manufactured in conformity to IS-6380:1988. Please note that all the requirements of Fire survival cables (e.g. Fire survival test along with special tests (Oxygen index, temperature index, Acid gas generation, smoke density test etc.) are not specified in this IS. Therefore, cable vendors do not provide ISI marking in case of FS cables. In view of same, it is requested to waive off ISI marking requirement for Fire survival cables.	Tender Terms and Conditions Prevail.
78	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	17.00.00/HV/LV POWER & CONTROL CABLES, CABLING SYSTEM	392	17.06.05 i)	Acceptance test : One drum out of every 10 number of drums or less shall be selected at random sampling basis in each lot for every type & size of cable for the Acceptance Tests	Since the quantity of LT Power and control cables is very large, therefore sample size of " One drum out of every 10 number of drums or less" becomes very large for inspection purposes. Therefore, it is proposed to have sampling plan as per IS 7098 part-1 (LT power cable) and IS 1554 Part-1 (LT control cables) for Acceptance tests.	Tender Terms and Conditions Prevail.
79	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	1.00.00 GENERAL TECHNICAL REQUIREMENTS – ELECTRICAL	34	1.28.10 iii)	For DC system only single core cables shall be used.	For DC system, 1C/2C cable shall be used. Same is in line with cl. No. 17.04.02 vi)(single/two core cables in D.C. System).	Single core cables shall be used between battery charger & battery & DCDB incomer and outgoing Motor feeders also. Only From DCDB outgoing power feeders to individual equipment 2 core cables may be used.
80	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	1.00.00 GENERAL TECHNICAL REQUIREMENTS – ELECTRICAL 9.00.00 LT SERVICE TRANSFORMERS	23 & 244	1.20.05 & 9.01.12 i)	1.20.05 10% spare margin shall be considered over & above the estimated total load on the L.T. board.	Different design margin for service transformers is specified in both the clauses. Please specify the final design margin for service transformers.	20% spare margin shall be considered while calculating the total load on the LT Board including standby & intermittent loads for designing LT Transformers.
					9.01.12 Each Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer.		9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered.Each Transformer shall be rated to meet the loads on both the bus sections of switchgear . Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b) Highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00). Please refer Sr. No 7 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
81	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	9.00.00 LT SERVICE TRANSFORMERS & 11.00.00 DATA SHEET FOR 415V PCC/PMCC/MCC/DBs	244 & 305	9.01.12 i)	9.01.12 i)- 0.4 for intermittent loads like valve actuators, dampers, cranes, plug points, elevator etc., DATA SHEET FOR 415V PCC/PMCC/MCC/DBs Intermittent class for Unidirectional motors (IS:2959) 0.1 Intermittent class for Bidirectional motors (IS:2959) 0.3	a) There is mismatch in intermittent loads, load factor requirement in mentioned clauses. b) Please note that for intermittent loads, load factor of 0.4 is very high.As a standard practice load factor of 0.05 is considered for valve actuators, dampers as they run for very small time. c) Therefore, it is proposed to consider 5% load factor for valve actuators, dampers. d) For remaining intermittent loads it is proposed to have 10% or 20% load factor.	For intermittent loads, load factor of 0.4 shall be considered.
82	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	11.00.00 DATA SHEET FOR 415V PCC/PMCC/MCC/DBs	302	1 (d)	Material of bus bars: For rating upto 2000A, Al. or Al. alloy For rating above 2000A, Cu	Al. or Al. alloy may also be allowed for busbar rating above 2000A. Please confirm.	Tender Terms and Conditions Prevail.
83	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	11.00.00 415 SWITCHGEARS AND DC BOARDS	275	11.06.01 i)	The PCC/PMCC/MCC shall be of Form 4B Type 7 construction as per IEC 61439..	It is requested to allow Cable alley design as per Form IVb Type 6 (as per IEC 60439) for safety purpose.	Tender Terms and Conditions Prevail.

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84	Part-B/Section I/TECHNICAL SPECIFICATION ELECTRICAL	11.00.00 415 SWITCHGEARS AND DC BOARDS	274	11.05.12	Wireless temperature monitoring system to be provided and same shall be integrated to DDCMIS/ separate HMI. Temperature sensors shall be installed in all relevant joints, contact joints etc. as per the standard OEM Practice, however Position of such sensors shall be decided at the time of detailed engineering.	It is proposed that the temperture sensors to be provided for Boiler PMCC, Turbine PMCC & EMERGENCY MCC only. Wireless temperature monitoring system is not required for other PMCC/MCC Same is in line with practice followed by other customers.	Tender Terms and Conditions Prevail.
85	VOLUME - III, PART - B	SECTION - 1	442	19.01.00	Public Address System	As Qty. , Block Diagram for PA System item is not mentioned. Bidder shall provide PA system as per Bidder's standard & proven practice in line with 660 MW Thermal Power Plant Project executed by bidder.	Noted. However, it will be decided during detailed engineering.
86	VOLUME - IV				MAIN SINGLE LINE DIAGRAM (DRWG NO: ETG061-BTG-EE-GN-SLD-001)	1. Table-1: Nos. of BTG loads as indicated are indicative. The same shall be finalised as per bidder's design during detailed engineering. Please confirm. 2. Note no. 5: For a 415V system; 3 phase 3 wire is indicated. However, for various switchgears like FGD, SCR, HVAC etc., neutral grounding through NGR is indicated; & same is not possible without 3 phase 4 wire system. Bidder shall be considering 3 phase 4 wire system. Please confirm. 3. Note no. 6: 220V DC batteries to be rated to cater to Unit loads as well as station loads. However, station loads are not available in specification. Please provide the same.	1. Noted. However bidders design shall be in line with the tender specifications. 2. Noted. Please note that the LT (415V) System is solidly earthed as per various clauses specified in the tender specification. However, requirement of NGR in LT System shall be decided during DDE. 3. Shall be provided in DDE.
87	VOLUME - IV				MAIN SINGLE LINE DIAGRAM (DRWG NO: ETG061-BTG-EE-GN-SLD-001)	1. Since power transformer are in BTG scope, & power transformer are catering both BTG & BOP loads; customer is requested to furnish following: (i) Total HT feeder requirement bpdwise & its rating. (ii) BOP loads to be considered for Transformer sizing. Further, we understand that scope for BOP loads starts from 11 kV uncabled feeders of BTG scope switchgear. 2. Transformers as indicated in Main SLD for AC & Vent, CW area, FOPH area etc. are not required. Feeder arrangement for the same shall be decided during detailed engineering. 3. Requirement/ applicability of transformers & LT switchgears including nos./ rating etc. shall be decided during detailed engineering, in line with sizing as per the Technical specification.	1.i) The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4Nos (1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detailed engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detailed engineering. 1. ii) Bidder shall also provide necessary feeders for BOP area from emergency switchgear / PMCC as per BOP requirement during detail engineering; necessary design, space requirement and layout/cut-outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in BTG building/area shall also be considered under BTG scope of work. The outgoing feeders for 415 V systems in SLD are indicative only. For BOP, 2 nos. of outgoing feeders (1 no. from each bus section) on Emergency MCC (415V) are shown in SLD. In addition, 2 nos of outgoing feeders (1 no. from each bus section) on CW PMCC (415V) and FOPH PMCC shall be considered. The ratings of the feeders required for BOP shall be decided during detailed engineering. Refer terminal points. 2. Tender terms and conditions prevail. 3. Tender terms and conditions prevail.
88	II II III III	2 2 C B		2.13.11 (xv) 4.40.26 xi) b) 4) 9.10.00 15.00.00	Actuators - All motor driven actuators of the plant shall be integral type. Inching duty (remote-manually operated) and On-Off duty valves and dampers will be motor operated with non-integral starter. ELECTRIC ACTUATORS WITH INTEGRAL STARTERS ELECTRICAL ACTUATORS - NON INTEGRAL STARTER	Bidder understand that actuators shall be integral type inline with clause no. 2.13.11 (xv) of Sec 2, Vol II. Further actuator shall be provided as per detailed specification of actuator mentioned under clause 9.10.00 of Part C, Vol II. Kindly confirm.	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer Sr. No 5 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
89	III III	C B		9.12.00 15.06.03	Four nos. (2 each in open and close position) position limit switches and two nos. (One in open and other in close direction) torque switches each having two nos. NO and two nos. NC contacts shall be provided. A single shaft shall actuate all contacts of limit switches at each position. i) Each motor actuator shall have Six (6) rotary drum position limit switches..... ii) Each motor actuator shall also have two (2) torque limit switches with four (4) normally opened and four (4) normally closed contacts each.....	Bidder understand that actuators shall be provided in line with first reference i.e. clause 9.12.00 of Sec C of Vol III. Kindly confirm.	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer Sr. No 5 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
90	III	B		15.06.04 i)	Motor actuators shall be provided with clearly visible local position indicators mounted on the operator assembly itself. Suitable transducers shall be provided for remote indication of the position.	Bidder understand that clause 15.06.04 mentioned against first reference is applicable for modulating/inching type motorised valves. Kindly confirm.	Tender Terms & Conditions prevail.
91	III	Part B/ Page 30		1.25.09	Crane duty motors shall be slip ring type induction motor.	Crane duty motors shall be Squirrel cage induction motors as per industry practice.	Please refer cl. No 14.04.01 ii), Vol.-III, Part-B, for crane duty motors.
92	III	Part B/ Page 328		14.04.01 ii)	Crane duty motors shall be squirrel cage Induction motor of S4 duty and 40% CDF.	Kindly allow the same.	
93	Volume-III	Part B	74 & 12	2.09.04 v) 1.10.03 i)	Excitation System Ceiling Voltage: 2.0 times rated load excitation voltage. Excitation system The excitation system shall be designed for field forcing capability of minimum 150% of exciter voltage corresponding to the generator MCR output at rated power factor for not less than 10 seconds	Excitation system shall be designed for field forcing capability of minimum 150% for period not less than 10 seconds.	Noted. The excitation system shall be designed for field forcing capability of minimum 150% of exciter voltage corresponding to the generator MCR output at rated power factor for not less than 10 seconds.

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94	Volume-III	Part B	86	2.11.03 d)	Impulse withstand voltage test on the terminal bushings.	Impulse withstand voltage test on terminal bushing shall be performed at vendor's works. Test certificate of the same shall be submitted.	Impulse withstand voltage test on terminal bushing may be performed at vendor's works. However same shall be witnessed by MSPGCL/TPIA
95	Volume-III	Part B	86	2.11.03 g)	Measurement of leakage reactances & potier reactance.	The leakage reactance and potier reactance of the generator stator cannot be measured. Same is not feasible subject to test bed constraints.	Tender Terms & Conditions prevail.
96	Volume-III	Part B	331	14.13.05 i).	Motors upto 1000 KW 600% subject to IS Tolerance of plus 20%	As per IS 12615: 2018, Break-away starting current is limited to 770% of full load current for premium efficiency class IE3 motors. Accordingly, for motors of Generator Auxiliaries, starting current shall be limited to 770% of full load current.	Locked rotor current for LV motor corresponding to IE3 efficiency class as per clause number 14.13.05 iv) without any further positive tolerance.
97	Volume-III	Part B	341	14.48.00	Starting current of the DC motors shall be limited to 200% of the full load current of the motor and is subject to IS tolerance.	For DC motors fast response & less starting time is required. Therefore, starting current for DC motors of Generator Seal oil system shall be limited to 300% of full load current. This is as per standard & proven practice of BHEL.	Noted
98	Volume-II	Section-2	219	14.06.01 14.06.02	Two sets of special tools & gauges required for the maintenance of the plant. One set of special lifting and handling tackles/apparances required for the maintenance of the plant.	We shall supply one set of special tools and tackles which is sufficient for maintenance of the plant. This is as per bidder standard practice in all supercritical power plants.	One sets of special tools & gauges required for the maintenance of the plant.
99	Volume-II	Section-2	219	14.04.00	The tools, tackles and appliances supplied in general, shall not be used for erection purposes by the Bidder and shall be handed over in brand new condition. Damaged tools, tackles and appliances shall be replaced before handing over.	The tools & tackles supplied with unit are intended for repeated usage during multiple overhauling/maintenance shutdown of unit in the course of lifetime. One time usage of tools & tackles during erection neither affects their quality nor leads to their wear & tear. The tools & tackles supplied in general can also be used for erection purposes. However, any damaged tools, tackles and appliances shall be replaced before handing over.	Bid Specification Prevails
100	Volume-III	Part B	56	2.05.00 iv) f)	Suitable slot couplers/coupling capacitors (as applicable) shall be provided for partial discharge monitoring (under running condition)through portable Partial Discharge Monitoring Kit. Bidder to supply two (2) Nos. of portable Discharge Monitoring Kit.	In Generator, no slot coupler / coupling capacitors is envisaged in BHEL's standard design. Therefore, supply of 2 nos.of portable Partial Discharge Monitoring Kits are also not applicable.	Bid Specification Prevails
101	VOLUME-V	ANNEXURE - 3		3.00.00/6.2	415 V motors	a) Mandatory spares can be offered against Cl. 6.2.3, 6.2.5 & 6.2.6 only, rest of the items specified under this clause are not offered by any motor supplier as standard practice, hence cannot be included in offer. b) Item 6.2.3. is not applicable for motor ratings < 50 KW. c) Item 6.2.6 is not applicable for small sized motors as not offered by sub-vendors MAHAGENCO to accept.	a) Tender Terms and conditions prevail. b) Clause no 6.2.3 is applicable 30kW and above motors. c) Tender Terms and conditions prevail. However, if certain spares are not applicable the same shall be discussed DDE subject to undertaking from the OEM.
102	VOLUME-V	ANNEXURE - 3		3.00.00/6.3	DC motors	Mandatory spares can be offered against Cl. 6.3.1, 6.3.4, 6.3.6 & 6.3.7 only, rest of the items specified under this clause are not offered by any motor supplier as standard practice, hence cannot be included in offer. MAHAGENCO to accept.	Tender Terms and conditions prevail. However, if certain spares are not applicable the same shall be discussed DDE subject to undertaking from the OEM.
103	VOLUME-V	ANNEXURE - 3		3.00.00/6.4	Electrical Actuators	Mandatory spares offered against Cl. 6.4.1 includes items specified at Cl.6.4.2,6.4.3,6.4.4, 6.4.7, 6.4.8 & 6.4.9 also for Main Turbine Lube Oil Temperature Control Valve . For Generator Cold Gas Temperature Control Valve and Primary Water Temperature control valve, mandatory spares offered against Cl. 6.4.1 includes items specified at Cl.6.4.2,6.4.3,6.4.4, 6.4.8 & 6.4.9 also, items against 6.4.7 shall be included in offer against these valves. Items 6.4.5 & 6.4.6 specified under this clause are not applicable for TG C&I area. MAHAGENCO to accept.	Only to be considered in Electrical Tender Terms & Condition prevail. Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided However, if certain spares are not applicable the same shall be discussed DDE subject to undertaking from the OEM.
104	VOLUME-V	ANNEXURE - 3		3.00.00/8.0	415 V SWITCHGEAR	1. From BHEL-HWR, only applicable items of Lube Oil Purifier Unit (OPU) are being offered against complete clause 8.1, i.e. 8.1.1 to 8.1.45 2. Also, the mandatory spare quantity specified against these clauses seems to be on much higher side as compared to actual installed quantity. The mandatory spares included in offer against applicable items shall be kept same as main installed quantity of respective item, wherever the specified qty. of mandatory spares exceed installed qty. MAHAGENCO to accept.	Tender Terms and conditions prevail.

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105	VOLUME-V	ANNEXURE - 3		3.00.00/1.8.10	Relevant spares for Refrigeration type H2 drier	Requirement is not clear. MAHAGENCO to clarify.	To be decided DDE.
106	VOLUME-V	ANNEXURE - 3		3.00.00/1.8.11	Thermometers of each type and range	Thermometers are not envisaged in Gas system. Hence, not to be supplied. MAHAGENCO to record.	To be decided DDE.
107	VOLUME-V	ANNEXURE - 3		3.00.00/1.9.4	Screw pump (bearings rotating elements)	Requirement is not clear. MAHAGENCO to clarify.	Screw pump (rotating elements)
108	VOLUME-V	ANNEXURE - 3		3.00.00/6.1.9	Bearings(DE and NDE) : 1 Set for each type and rating.	Bearings for Condenser air evacuation pump motor are being offered under CL24.3 (Page. 38 of 129). Hence, not being offered here. MAHAGENCO to accept.	Noted. If duplicated for the same equipment of same system, then it need not be provided
109	VOLUME-V	ANNEXURE - 3		3.00.00/6.1.10	LT Motors of Main plant.: One number of each type & rating.	LT Motor for Condenser air evacuation pump (LRVP) is being offered under CL24.6 (Page. 38 of 129). Hence, not being offered here. MAHAGENCO to accept.	Noted. If duplicated for the same equipment of same system, then it need not be provided
110	VOLUME-V	ANNEXURE - 3			General	If any mandatory spare against any main supply item is called at two or more clauses in the tender spec. Spare against only one clause (Max Qty) shall be supplied by the bidder.	Noted. If duplicated for the same equipment of same system, then it need not be provided
111	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever same items have been specified at more than one clauses, mandatory spares shall be included in the offer against the clause specifying the highest quantity only. MAHAGENCO to accept.	Noted
112	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever 1 set has been specified, it is understood that the quantity of item is total no. of that item installed in one no. of assembly/ equipment in the unit. e.g. Position transmitter HP Turbine Stop Valves = 1 set implies that in although there are two no. HPT Stop valves per unit but as in one stop valve assembly, 2 no. position transmitters are installed, then against requirement of 1 set/unit, 2 no. position transmitters as mandatory spares per unit are to be offered. MAHAGENCO to accept.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of %, where clarity is required. In this case, 1 set means 1 identical assembly.
113	Volume - III	Part-B Electrical		8.03.10 (iii), 8.04.01, 8.08.02(iii)	The Switchgear shall have an Internal Arc Classification of IAC FLR 50kA 1 sec.	Please refer to clause no. A.4.1 of IEC62271-200 (2003), which states: "The short-circuit current applied during the test corresponds to the rated short-time withstand current. IT MAY BE LOWER IF SPECIFIED BY THE MANUFACTURER. A test performed at a given voltage, current, and duration is generally valid for all lower values of current, voltage, and duration. For short-circuit levels lower than tested, care should be taken in the interpretation of the results." Hence, as per IEC, it is clear that the manufacturer can choose a value lower than the full SC level (i.e., lower than 50kA & 40kA in this case). If the pressure relief device opens successfully at 40 kA (which is a typical short-time current even in a 50 kA designed system), it shall open successfully for all higher currents and durations. But if someone tests and demonstrates pressure relief opening at 50 kA, there is still doubt whether it would open at the typical fault level of 40 kA or not. For this reason, we recommend the lower level of 40 kA, which is allowed in the IEC. In view of this, we request the customer to accept IAC 40kA for 1s for all voltage levels (i.e., 11kV, 6.6kV & 3.3kV). Also, please refer to Annexure A for justification for the same	Tender terms and conditions prevail.
114	Volume - III	Part-B Electrical		8.03.10 (v)	Forced cooling for HV breakers (11 kV & 3.3 kV) and HV switchgear is not acceptable.	We request customer to allow Forced cooling for higher rating breakers (i.e., >3000A).	Tender terms and conditions prevail.
115	Volume - III	Part-B Electrical		8.04.04 (xv)	Inbuilt Motorised and Remote Rack in and Rack out facility for all MV & HV switchgear breakers shall be provided	We request customer to allow Trolley mounted (manually handled) breaker also against this clause.	Tender terms and conditions prevail.
116	Volume - III	Part-B Electrical		8.08.02	The following Type test shall be performed at an NABL/Govt. of India accredited laboratory and should have been witnessed by a client atleast on one switchgear of each current and voltage rating.	We shall be submitting valid type test reports as per CEA guidelines. It may please be noted that type tests may or may not have been witnessed by customer. Hence, non customer witnessed reports, but accepted in other power projects, may also be allowed to be submitted.	Tender terms and conditions prevail.

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117	Volume - III	Part-B Electrical		8.04.04 (x-a)	Two (2) nos. of Trip Coils with individual trip circuit (dedicated CT,PT) for all HT switchgear breakers. Supervision relays to be provided for trip coil monitoring	We confirm that two nos. trip coils shall be provided as per specification. However, please note that the trip circuit is energised by DC Battery supply & it is switched by tripping relay contacts. Hence, the trip circuit has no direct connection with CT's & PT's (which are used in separate circuit involving protection relays). As such, specified requirement of "dedicated CT/PT" for both trip circuits is technically not required. Customer is requested to kindly accept.	Noted for Trip coil.
118	II	2			440/220 KV Surge Arresters & 400/220KV PT in Transformer Yard	The scope of work is only limited to 400/220 kV Surge arresters & 400/220KV PT in transformer yard. 220 & 400kV switchyard and interconnections from CT/ST are excluded from scope of this tender. In this regard it is requested to delete the relevant scope as mentioned above in this tender and club with the switchyard tender which is not part of this package.	The Clause is self explanatory. Refer Clause no 3.02.02, 3.03.02, 4.39.01 & 4.39.02 of Volume II- Section -2.
119	Vol II	Section 2		2.13.11 (v)	xvi) Actuators- All motor driven actuators of the plant shall be integral type.	Customer is requested to clarify type of starter (integral or non-integral) for electric actuators	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer Sr. No 5 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
120	Vol II	Section 2		4.40.26 (b) (iv)	Inching duty (remote manually operated) and on-off duty valves and dampers will be motor operated with non-integral starter		
121	Vol III	Part B		15.00.00	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER 15.03.01 The actuator shall be Non integral type		
122	Vol III	Part C		1.01.01	...Electrical Actuators with integral starters...		
123	Vol III	Part C		9.10.00	ELECTRIC ACTUATORS WITH INTEGRAL STARTERS The actuators shall have integral starters		
124	Vol III	Part B		14.49.02	LT Motors i) Routine Test All equipment shall be completely assembled, wired, adjusted and routine tested as per relevant IS/IEC Standards at manufacturer's works in the presence of consultant/purchaser or his representative.	LT Motors are being supplied as a sub item of main equipment(such as fans, pumps, etc). Tests of motors will be carried out as per relevant IS/IEC standards at sub-vendor works of main equipment supplier. Hence, to reduce project execution time, routine test certificates will be submitted.	Tender terms and condition shall prevail.
125	III	Part B		Clause 15.06.00/page349	SPECIFIC REQUIREMENT OF MOTOR OPERATED NON INTEGRAL VALVE ACTUATORS	As per tender specification, all actuators are considered as Non-integral type. Requirements given in Clause 15.06.00 is applicable for MCC and shall not be in part of electrical actuators.	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer Sr. No 5 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
126	III	B		4.04.05 (C)	The Conductor shall be fastened on the set of 3 insulators, 120° apart.	As per BHEL design, the Conductor shall be fastened on the set of 3 insulators, 90° apart.	Tender terms and conditions prevail.
127	III	B		4.04.12 (ii)	The bidder shall guarantee and demonstrate at site the air leakage rate of not more than 5% of total enclosure volume per hour after installation.	As per IS:8084 Appendix-F, the air pressure drop shall be 150WC (water column) to 75 WC in 15 seconds, i.e., 50% leakage in 15 seconds. NTPC has recently removed this clause from its recent project Khurja. We request NLC to amend the clause as the specification is not practically possible.	Tender terms and conditions prevail.
128	III	B		4.05.01	The following are the minimum type tests for which type test are to be conducted on IPBD under this contract at no additional cost to the Purchaser and shall be witnessed by customer/Third party or in presence of client representative and submit the reports for approval. However, type test reports for other type tests (which are not mentioned in the list) are to be submitted, if the Bidder is not able to submit report of the type test(s) which are not listed below and are not conducted within last five years from the date of bid opening, or in the case of type test report(s) are not found to be meeting the specification requirements, the Bidder shall conduct all such tests under this contract at no additional cost to the Purchaser either at third party lab or in presence of client representative and submit the reports for approval.	As per CEA guidelines for all India power plant projects, Type test certificates validity for busduct and associated Equipments shall be Ten years. As such type test reports with 10 years validity shall be acceptable. As per contract, all the type tests mentioned in clause 4.05.01 shall be conducted in presence of customer representative. Conductanc of fresh type tests will increase the cost of project as some tests may have to be conducted out side India based on final ratings of busduct. As such customer to clarify whether earlier conducted type tests report for same offered section shall be acceptable for tests mentioned in clause 4.05.01	Tender terms and conditions prevail.
129	iii	B		7.04.01 (ii)	All joints shall be at least 10 microns thick silver plated for low contact resistance. Also Silver plating shall be done on copper bar wherever copper to copper and copper to aluminium contacts are envisaged. ½" Dia stainless steel bolts, nuts plain and Belleville washers shall be used. Densal or equivalent compound shall be applied at the joints to avoid ingress of moisture.	All Contact surface shall be plain bolted joints. Silver plating is recommended for high current carrying joints (8000A and above).The same is not recommended here as it will lead to cost escalation.	Tender terms and conditions prevail.

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130	iii	B		7.07.02	The Bidder shall submit for Purchaser's approval the reports of all the type tests as listed in this specification and carried out within last five years from the date of bid opening.	As per CEA guidelines for all India power plant projects, Type test certificates validity for busduct and associated Equipments shall be Ten years. As such type test reports with 10 years validity shall be acceptable.	Tender terms and conditions prevail.
131	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	37	2.13.11 v)	v) Bidder has to consider necessary loads on TG building 'A' row for stringing the overhead conductors from 400kV switchyard to 2 number of GT.	Owner may please provide the load to be considered for stringing on A row of TG building. Bidder would considered the same as applicable.	As Conductor selection, Conductor stringing will be done by Mahatransco, The same can be provided only after detailed Design Engineering from MSETCL End. However, as specified required loading details for stringing of overhead lines for 2 Nos of GT's shall be considered as per Bidder's past experience.
132	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	38	2.13.11 ix)	ix) HV switchgear (11 kV and 3.3kV) The numerical relays used for protection of incomers shall not be used for synchronizing / paralleling. Separate check synchronizing relay with its hard ware based logics and interlocks for auto changeover of the system shall be provided.....	Bidder proposes to have synch check function as part of numerical relay in line with current industry practice. Owner may please accept.	Tender terms and conditions prevail.
133	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	38 201	2.13.11 ix) 8.01.14	2.13.11 ix) HV switchgear (11 kV and 3.3kV) All the 11kV motor feeders and power supply feeders required for BOP & Station loads shall also be considered under BTG scope of work.....Any other feeder requirement of BOP bidder during detail engineering from HT unit & station boards which are in BTG scope of work shall also be considered under BTG bidder scope. 8.01.14 The outgoing feeders in 11kV Station switchgears shown in SLD are of indicative only. The exact quantity and ratings of the feeders required for BOP and purchasers shall be decided during detail engineering. Any increase in quantity and rating shall not have any price impact on the bidder.	Owner may please share the number of feeder requirement and load of each feeder to be considered for upstream equipment / building design. Bidder requests Owner to share the details before techno-commercial bid submission. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall have techno-commercial impact.	The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4Nos (1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detail engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detail engineering. Please refer Sr. No 1 & 3 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
134	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	38	2.13.11 x)	x) LV Switchgear (415V) Bidder shall also provide necessary feeders for BOP area from emergency switchgear/PMCC as per BOP requirement during detail engineering; necessary design, space requirement and layout/cut outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in the BTG building/area shall also be considered under BTG scope of work.....	Owner may please share the number of feeder requirement and load of each feeder for bidder for upstream equipment / building design. Bidder requests Owner to share the details before techno-commercial bid submission. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall have techno-commercial impact.	Bidder shall also provide necessary feeders for BOP area from emergency switchgear / PMCC as per BOP requirement during detail engineering; necessary design, space requirement and layout/cut-outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in BTG building/area shall also be considered under BTG scope of work. The outgoing feeders for 415 V systems in SLD are indicative only. For BOP 2 nos. of outgoing feeders (1 no. from each bus section) on Emergency MCC (415V) are shown in SLD. In addition, 2 nos of outgoing feeders (1 no. from each bus section) on CW PMCC (415V) and FOPH PMCC shall be considered. The ratings of the feeders required for BOP shall be decided during detailed engineering.
135	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	38	2.13.11 x)	x) LV Switchgear (415V) necessary design, space requirement and layout/cut outs for all the LT switchgears/panels and any other equipments under BOP scope of work to be located in the BTG building/area shall also be considered under BTG scope of work.....	Owner may please share the number of equipment along with their outline dimension and cut-out requirement of BOP bidder for space/cut-out consideration to size the buildings. Bidder requests Owner to share the details before techno-commercial bid submission. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall have techno-commercial impact.	Please refer Sr. No. 4 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
136	Volume-III/Part-B	LEAD TECHNICAL SPECIFICATION	39	2.13.11 xi)	xi) Segregated phase busducts :.....The conductor shall be of high conductivity aluminium / aluminium alloy sized for the same rating as associated PCC/PMCC bus. For rating 2000A conductor shall be copper.	Bidder would like to propose aluminium conductor as an alternative to Copper conductor for SPBD even for busduct rated 2000A and above inline with standard practice followed by NTPC/ other SEBs. Owner may please confirm.	Tender terms and conditions prevail.
137	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	39	2.13.11 xvii)	xvii) Cable and cable carrier system Necessary layout/cutout/openings and space requirement in the cable tray for laying cables under BOP scope of work inside BTG area and for laying the cables from 11kV Unit/Station Switchgears to the terminal points specified for cable trays for BOP areas (incomer cable of CHP, WTP, CT, and AHP) shall also be considered in the scope of BTG vendor for further design of cable and cable carrier system.....	Owner may please share the number cables/cable trays to be considered for BOP bidder for cable tray /space/cut-out consideration. Bidder requests Owner to share the details before techno-commercial bid submission. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall have techno-commercial impact.	1) This can only be shared after detailed design & Engineering of BOP package. 2) Not Acceptable. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall NOT have techno-commercial impact to MAHAGENCO (OWNER)
138	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	78	4.39.12 f)	f) The high voltage terminals of the transformer will be connected to the 400kV outdoor switchyard by 400kV overhead ACSR conductor (Not in bidder's scope).	Owner may please share the details of conductor to be connected at transformer bushing.	As Conductor selection, Conductor stringing will be done by Mahatransco, The same can be provided only after detailed Design Engineering from MSETCL End. However, as specified required loading details for stringing of overhead lines for 2 Nos of GT's shall be considered as per Bidder's past experience.

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139	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	80	4.39.14 iii)	4.39.14 iii) The Station auxiliary loads will be fed from the 11kv/3.3kv station switchgears located in power house.	Bidder would like to propose that Bidder shall provide 11kV feeders to 11kV load centers for BOP system. Further feeding to 3.3kV BOP loads shall be covered in BOP scope. Owner may please accept.	The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4Nos(1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detail engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detail engineering.
			138	9.02.41 ii)	9.02.41 ii) Generator transformer, Unit transformers, Station transformer, Standby Generatr transformer, Unit auxiliary transformers, station auxiliary transformer and auxiliary transformers shall be located in transformer yard.		
140	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	80	4.39.14 v)	v) Motors rated 200 kW and below will be supplied from 415 volts system. For this purpose, 11/433 Volts, 3 phase, 50 Hz, dry-type LV auxiliary transformers rated 2.5 MVA, 2 MVA, 1.6 MVA, and 1 MVA will be required.	Bidder would like to propose 800kVA, 630kVA and 315kVA ratings of dry-type transformers in line with industry practice. Owner may please accept.	Tender terms and conditions prevail.
141	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	80	4.39.14 vii)	vi) Additionally, power to the water plant outside power plant boundary would be provided from 11kV Bus.	Owner may please share the number of feeder requirement and load of each feeder for clarity on Bidder's scope of work. Bidder requests Owner to share the details before techno-commercial bid submission. Any feeder requirement by BOP bidder during detail engineering in addition to the requirement shared at bidding stage shall have techno-commercial impact.	The quantity of feeders for 11kV Loads of BOP and Purchaser use are shown in the Tender SLD. In addition to this total 4Nos(1 No in each Station Switchgear Board) of 11kV Power Feeders shall be considered by the Bidder. The ratings of the above feeders shall be decided during detail engineering. In 3.3kV SAT Switchgear, kindly consider four (4) Nos of feeders for BOP loads. The ratings of the feeders required for BOP shall be decided during detail engineering.
142	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	84	4.39.18 v)	4.39.18 v) Fire survival cable shall be used for important auxiliaries / area as recommended by standard technical specification by CEA as below but not limited to the following : a) DC emergency lube oil pump b) DC hydrogen seal pump c) Turbin lube oil pump/barring gear d) DC emergency lighting for main building and service building e) DC cables for battery to charger & DC distribution boards f) Jacking oil pump g) Emergency turbin trip in control room h) Boiler turbin generator inter trip which include the interconnection between - 1) Boiler master fuel trip and turbine trip 2) Generator trip relays & turbine trip relays 3) Generator trip relays & generator breaker 4) Generator trip relays & field breaker 5) Generator trip relays & unit auxiliary transformer breaker 6) Incomer cables for DG board, emergency board, DC lighting board etc. 7) Scanner air fan & fire/smoke detector system 8) Complete 220V DC 24V DC & UPS control, protection & supply of cables downstream of DCDB/ACDB shall be with minimum cables size of 2CX6 mm2 CU.	Bidder understands that the clauses are specifying contradicting requirements for applicability of fire survival cable. Bidder understands that fire survival cable will be provided as per clause number 1.28.11 of Volume-III/Part-B/Section-1 inline with CEA guidelines. Hence, all power cables of 220V DC, 24V DC & UPS is not applicable for fire survival cable except as per clause number 1.28.11. Owner may please confirm.	Tender terms and conditions prevail. Wherever mentioned, All systems/auxiliaries shall be provided with fire survival cables.
	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	35	1.28.11	1.28.11 The fire survival power & control cables suitable for withstanding 750°C temperature for three (3) hours shall be used for the following important auxiliaries/areas:		
	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	284	11.06.15	11.06.15 iii) All cable for DC system shall be F.S. copper cable		
	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	389	17.04.03	17.04.03 Cables for the following systems shall be fire survival type		
143	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	84	4.39.19 iv)	v) All power supply systems shall be sized for 2 hour(Min.) battery back-up to take up the entire load in case of total power blackout and with 25 % spare capacity for additional load augmentation in future. All charger feeder shall be DG backed supply.	Bidder understands that the charger located in TG building will only be powered from DG backed supply. Charger in the other area/BOP areas will be power from normal power available in that area. Owner may please confirm.	Tender terms and conditions prevail. Charger located in TG building will only be powered from DG backed supply. Charger in the other area/BOP areas will be power from normal power available in that area However, All power supply systems shall be sized for 2 hour(Min.) battery back-up to take up the entire load in case of total power blackout and with 25 % spare capacity for additional load augmentation in future.
144	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	85	4.39.19 vii) b)	4.39.19 vii) b) Battery would be Plante/Ni-Cd type and the capacity of each of the 220 V battery sets would be such that it will meet the above requirement of one unit and the requirement of common services.	Bidder would like to propose Ni-Cd type batteries as an option in addition to Lead-Acid plante as per acceptable practice in industry. Owner may please accept.	Tender terms and conditions prevail. Battery shall be Plante type only.
	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	10	1.09.04	1.09.04 The battery shall be Lead Acid Plante type only.		
145	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	86	4.39.21 iii)	iii) The mat will be laid up to the fence and 1.5 meter beyond it on all sides.	Bidder understands that this clause is not applicable for BTG scope. Owner may please confirm.	Fence, wherever applicable, is to be provided in BTG area.
146	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	102	4.40.21 ii) b)	4.40.21 ii) b) Necessary transducers with duel 4-20 mA output shall be housed in the respective electrical switchgear.	Owner may please note that for all incomers of MV switchgear, numerical relay and meters are already asked in the tender specification. All metering data shall be available in EMS through relay and IEMS through meters. Hence, bidder would like to propose that separate transducers will not be required for all incomers and bus couplers of MV & LV switchgears. Owner may please confirm.	Tender terms and conditions prevail.
	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	217	8.04.11 xiv)	8.04.11 xiv) For incomers & Tie feeders following Meters and transducers shall be provided:		

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147	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	139 139	9.02.41 xi) 9.02.41 x)	9.02.41 xi) As a safety requirement, fire wall shall be provided on 'A' row of PHB in front of power transformers. 9.02.41 x) Transformers shall be separated from the adjacent building/structure and from each other by a minimum distance, as mentioned below or by a fire wall of minimum two hours fire resistance rating of minimum height 600mm above bushing / pressure relief valve vent, whichever is higher.	Owner may please note that if transformers are placed with clear distance as mentioned in Clause no. 9.02.41 (x) from A-row of TG building, then bidder shall not provide fire wall. Owner may please accept.	Tender terms and conditions prevail.
148	Volume-II/Section-2 Volume-III/Part-B	LEAD TECHNICAL SPECIFICATION TECHNICAL SPECIFICATION ELECTRICAL	140 398	9.02.43 iii) 17.09.02 ii)	9.02.43 iii) Trussel height in the outlaying area shall be 5.0m (BoS). 17.09.02 ii) Transformer yard In transformer yard area, cables shall be laid in RCC concrete trenches with RCC covers. The main cable routes coming out from Main plant building and crossing the Transformer yard shall be laid in overhead trestles/ duct banks. Minimum clear height of trestle shall be 3 m and for Rail/road crossing, it shall be as per rail/road crossing norms.	Bidder would like to propose Trestle height in the outlaying area shall be 3 m (BoS) as per clause number 17.09.02 ii). Owner may please accept	Referred clause 17.09.02 is for transformer yard area only. For other areas kindly follow Clause no 9.02.43 i),ii) & iii) of Lead Tender specification.
149	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	141	9.02.43 xv)	xv) Separate cable tray for optical fibre cable / UTP cable shall be provided.	Bidder would like to propose that optical fiber cable/UTP cables shall be routed in instrumentation cable trays, wherever the same is available. Owner may please accept.	Tender terms and conditions prevail.
150	Volume-II/Section-2	LEAD TECHNICAL SPECIFICATION	141	9.02.43 ix)	A walkway of 800mm width (minimum) with hand rails and toe guards shall be provided all along length of the trestle for maintenance of cables and pipes. Ladders for approach to these platforms shall be provided near roads, passage ways. Gratings shall be provided for all external walkways.	Bidder proposes that hand rails & toe guard for the same may be avoided all along the length of the gallery, where walkway is between the vertical cable trays. Owner may please confirm.	Tender terms and conditions prevail.
151	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	8 236 241	1.05.00 8.08.02 DATA SHEET-A	1.05.00 SYSTEM PARTICULARS System particulars are as follows: S. No. 9 Fault Level 11 kV System : 50 kA for 3 Second 3.3 kV System : 40 kA for 3 Second 8.08.02 The following Type test shall be performed at an NABL/Govt.of India accredited laboratory and should have been witnessed by a client. atleast on one switchgear of each current and voltage rating : i) Short circuit duty test on circuit breaker, mounted inside the panel all test duties 1 thru 5 as per IEC 60056. ii) Short time current rating withstand test on circuit breaker mounted inside panel. (50 kA for 3 sec for 11 kV and 40 kA for 3 sec for 3.3 kV) DATA SHEET-A 1.5 Short circuit rating (a) Rated short time withstand current kA : 11kV 50kA 3.3kV 40kA (b) Duration : 11kV 3Secs 3.3kV 3 Sec	Bidder proposes that duration for fault level for 11kV and 3.3 kV system shall be 1 second as per type test design of OEM. Owner may please accept.	Tender terms and conditions prevail.
152	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	9 33 382 384	1.08.00 vii) 1.28.02 17.03.02 17.03.06 xvii)	vii. Cables to the feeders protected by breakers - Main protection fault clearing time with 0.16 second minimum The fault current & interrupting time shall be as under:- i) For 11kV – 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 1sec-for tie and incomer feeders. ii) For 3.3kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA-1 sec-for incomers & tie feeders. iii) For 415V - 50kA - 0.25 sec for motor feeders and 50kA-1sec-for incomer & tie feeders. 17.03.02 Power cables shall be sized to withstand the system fault current for the fault clearing time indicated below: i) Breaker operated Motor feeders and transformer feeders: 0.16 second. ii) Breaker operated outgoing feeders: 0.5 second. iii) Tie between two switchgear: 0.5 second. iv) Incomers: 1 second. xvii) For breaker protected circuits minimum size of the cable shall be as follows: 1100V Power : 240 mm ² XLPE 11000V & 3300 Power : 240 mm ² XLPE	Bidder understands that the clauses are specifying contradicting requirements. Bidder would like to follow clause number 17.03.02 which is also in inline with standard practice followed by NTPC/ other SEBs. Owner may please accept.	Bidder to follow tender clause no 1.28.02 The fault current & interrupting time shall be as under:- i) For 11kV – 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 1sec-for tie and incomer feeders. ii) For 3.3kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA-1 sec-for incomers & tie feeders. iii) For 415V - 50kA - 0.25 sec for motor feeders and 50kA-1sec-for incomer & tie feeders.

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153	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	10 35 383 399	1.09.05 1.28.12 17.03.06 iii) 17.10.01	1.09.05 HT & LT power cables shall be laid in ladder type cable trays. Control & Instrumentation cables shall be laid in perforated trays. 1.28.12 HV & MV cables & LV power cables shall be laid in ladder type cable trays. Control & Instrumentation cables shall be laid in perforated trays. Even in vertical risers control & instrumentation cables shall be laid in perforated type trays. 17.03.06 iii) Perforated type cable trays shall be used for Control cables. Even in cable risers perforated type cable trays shall be used for Control cables. 17.10.01 Cable trays, Fittings and Accessories i) Cable trays shall be ladder/perforated type as specified complete with matching fittings (like brackets, elbows, bends, reducers, tees, crosses, etc.) accessories (like side coupler plates, etc. and hardware (like bolts, nuts, washers, GI strap, hook etc.) as required. Cable tray shall be ladder type for power and perforated for control cables and instrumentation cables. Cable trays shall be designed to cater to a load of minimum 75 kg/m.	Bidder would like to propose that Ladder type cable trays shall be used for both Power & control cables and Perforated type cable trays shall be used for Instrumentation cables. However, In vertical cable tray risers, Ladder type cable trays shall be used for Power, control & Instrumentation cables. Owner may please confirm	Tender terms and conditions prevail.
154	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	13	1.11.02	The isolated phase bus ducts shall run partly indoor and partly outdoor. The isolated phase bus ducts on generator neutral side shall be complete with generator neutral side current transformers, neutral point formation and neutral bushing of appropriate voltage class.	Bidder would like to clarify that as per Generator OEM proven practice, protections, metering and AVR CTs for generator shall be mounted within the generator turret only. Bidder would like to propose protections, metering and AVR CTs for generator as per OEM proven practice. Owner may please accept.	Tender terms and conditions prevail.
155	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	14 142	1.11.03 4.03.8	The IPBD shall be based on following factors: i) Continuous current rating with 10 % design margin as per IS 8084 Sizing of Equipment i) Continuous Rating a) Main Run For calculating the continuous rating, it is to be considered that the Generator is loaded to 105% with 95% of the rated voltage at its terminal with 10% design margin. b) Tap-off Continuous rating to be considered shall be based on 95% of the rated voltage at Generator terminal and UAT under full load condition at its minimum tap with 10% design margin.	Bidder proposes to size IPBD for the maximum gross power output(VWO) with minimum voltage from generator without any margin in line with standard engineering practice considering worst case scenario. In no case, current through IPBD will exceed this calculated value. Owner may please accept.	Tender terms and conditions prevail.
156	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	19 190	1.17.00 7.03.11	SEGREGATED PHASE BUS DUCTS Segregated phase bus duct shall be rated for secondary side current of transformer at minimum tap plus 10% margin rounded off to the next higher rating. Rating of segregated phase bus duct used as interconnection between two switchgears shall be rated equal to the current rating of connected circuit breaker. SPBD of transformers shall be rated to carry name plate power rating of the associated transformers continuously, without exceeding the specified temperature limits. A design margin of 10% shall be considered further.	Bidder proposes to select the bus rating of segregated phase bus duct considering the name plate rating of LV winding of the transformer without any margin in line as acceptable industry practice. Adding further margin over selected transformer rating would result in double margin. Owner may please accept.	Tender terms and conditions prevail.
157	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	20	1.18.04	The incomers and bus bars of 11 kV switchgear shall be sized (continuous thermal rating) as per the LV winding current rating of UT or ST at minimum tap with 10% margin rounded off to the next higher rating. The outgoing breaker rating shall be based on the nameplate current rating of the connected equipment with 10% margin rounded off to the next higher rating. The outgoing breaker rating shall be standardized to avoid too many different spare requirement.	Bidder proposes to select the bus rating of switchgear considering the name plate rating of LV winding of the transformer without any margin without any margin in line as acceptable industry practice. Adding further margin over selected transformer rating would result in double margin. Owner may please accept.	Tender terms and conditions prevail.
158	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	21 204 205	1.19.02 8.03.10 8.04.01	The incomers, bus coupler and bus bars of 3.3 kV switchgear shall be sized (continuous thermal rating) as per the LV winding current rating of UAT at minimum tap with 10% margin rounded off to the next higher rating. Continuous Current Ratings i) The continuous rating of the 11/3.3kV switchgear buses and incomer breaker shall be based on the rated LV winding current of the transformer at its lowest tap position with 20% margin rounded off to the next higher standard rating. v) Forced cooling for HV breakers (11 kV & 3.3 kV) and HV switchgear is not acceptable.	Bidder proposes to select the bus rating of switchgear considering the name plate rating of LV winding of the transformer without any margin as the margin would already be applied while selecting the transformer rating. Adding further margin over selected transformer rating would result in double margin. Addition of both margin is resulting the LV incomer breaker size to go beyond available rating with naturally cooled. Forced cooling is not allowed as per tender specification and not recommended by bidder too. Owner may please accept the proposal of not applying any margin over selected transformer rating for selecting breaker and bus rating for switchgears.	Tender terms and conditions prevail.

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159	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	23 274	1.21.01 11.05.08	The secondary of the Service transformers shall be connected to the individual 415 V PCC/ PMCC through 415 V Non-segregated phase bus duct, which shall be rated for secondary side current of LV Service transformer at minimum tap plus 10% margin rounded off to the next higher rating. 11.05.08 Busbars for PCC/PMCCs being fed from service transformers shall be sized based on the rated continuous LV winding current of the transformer with 20% margin and rounded off to the next higher standard rating.	Bidder proposes to select the bus rating of non-segregated phase bus duct considering the name plate rating of LV winding of the transformer without any margin as the margin would already be applied while selecting the transformer rating. Adding further margin over selected transformer rating would result in double margin. Owner may please accept.	Tender terms and conditions prevail.
160	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	26	1.23.09	LV Power Supply LV power supply feeders shall have moulded case circuit breaker (MCCB) with ELCB for over current & short-circuit protection.	Bidder would like to propose that only MCCB for LV power feeder as per standard engineering Practice in LV switchgears & MCCs. MCCB with ELCB shall be provided for lighting system as per clause number 1.23.10, 23.09.07 & 23.09.08 Owner may please accept.	Tender terms and conditions prevail. Please refer clause no 11.06.05 and 11.06.07.
161	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	28	1.24.05	Measurement Multi-functional Transducers, if any required for giving analogue input to DCS system from LV modules shall be provided in the switchgear modules.	Bidder understands that wherever numerical relay or multifunction meters are available. Metering signals shall be interface with DCS via soft link. Hence, Transducer and hardwired input to DCS will not be required. This is inline with current industrial practice. Owner may please confirm.	Tender terms and conditions prevail.
162	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	29 218	1.24.05 8.04.11	k) Incomer of ACDB/MLDB/PDB/MCCB : Voltmeter with voltmeter selector switch. Electronic energy meter with communication port suitable for IEC 61850 protocol/EMS. xvii) Digital Multifunction Meters shall be provided with bright LED/LCD display for local indication and shall be provided with communication port suitable for communicating on MODBUS protocol to EMS/DCS.	Bidder understands that the clauses are specifying contradicting requirements. Bidder would like to clarify that energy meter with IEC 61850 are uncommon. Bidder proposes to provide energy meters with Mod bus RS-485 communication protocol inline with standard practice followed by NTPC/ other SEBs. Owner may please accept.	All Energy meters shall be three phase four wire multifunction, digital type with IEC 61850 Protocol communication port for DCS/EMS interface as referred in various clauses(1.24.05 & 8.04.11). Also bidder to refer and comply EMS architecture provided along with the tender.
163	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	30 330	1.25.04 14.13.05 iv)	Locked rotor current of the HV & MV motors rated 3000 kW and below shall be limited to 600% (subject to 20% IS tolerance) of the full load current of the motors and motor rated above 3000 kW and without VFD shall be limited to 450% (inclusive of 20% tolerance) of full load current of the motor. Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance. 14.13.05 iv) For energy efficient LT motors, locked rotor current shall be as per IS: 12615.	Bidder proposes to follow the locked rotor current for LV motor corresponding to IE3 efficiency class as per clause number 14.13.05 iv). Owner may please confirm.	For HV & MV motors, Bid specifications prevails. Locked rotor current for LV motor corresponding to IE3 efficiency class as per clause number 14.13.05 iv) without any further positive tolerance.
164	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	34	1.28.09	The minimum sizes of L.T power cable to be chosen are as below:- AL - 16 mm ² (3 core) & Cu - 2.5 mm ² (3 core)	Bidder requests Owner to allow AL cable from 6 sq. mm selected after meeting the design criteria specified in the tender specification. Owner may please accept.	Tender terms and conditions prevail.
165	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	34	1.28.10 v)	v) For DC system only single core cables shall be used.	Bidder requests Owner to allow two core cables also for DC system. Owner may please accept.	Single core cables shall be used between battery charger & battery & DCDB incomer and outgoing Motor feeders also. Only From DCDB outgoing power feeders to individual equipment 2 core cables may be used.
166	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	38	1.31.01 v)	v) The termination kits shall be suitable for termination of the cables to indoor switchgear or to a weatherproof cable box of an indoor/outdoor mounted transformer/motor. The short circuit fault withstanding capacity of the termination kits shall be as per the system fault level. The termination kits shall preferably be as of the following types:- a) PUSH ON type for LV power cables.	Bidder proposes to provide cable lugs for termination of LV power cables as per standard industry practice. Owner may please accept.	Tender terms and conditions prevail.
167	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	37 38	1.32.03 1.33.02	1.32.03 Galvanized rigid steel conduit shall be used for all conduit encased in concrete and all exposed conduit except at cooling towers. 1.33.02 All underground duct banks shall consist of plastic conduit encased in reinforced concrete.	Bidder understands that the clauses are specifying contradicting requirements for conduit encased in concrete. Bidder proposes to use HDPE for conduits encased in Duct bank/Concrete in line with clause number 1.33.02. Owner may please confirm.	Clauses are not contradictory. Clause 1.32.03 is about conduit encased in concrete and clause 1.33.02 is about underground duct banks. Tender terms and conditions prevails.
168	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	38	1.33.02	All underground duct banks shall consist of plastic conduit encased in reinforced concrete. The minimum nominal diameter/hume pipes of the plastic ducts shall be 125 mm. A 75 mm galvanized steel conduit shall also be installed where required for digital and analog low level circuits requiring noise immunity from adjacent power circuits.	Bidder proposes that 75mm and 100mm dia. of PVC conduits shall also be used in duct banks where ever requirement is lesser. Owner may please accept.	Tender terms and conditions prevail.
169	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	40	1.34.03 iii)	iii) The minimum design vertical spacing for trays shall be 300 mm measured from the bottom of the upper tray to the top of the lower tray.	Bidder proposes to provide 300mm spacing between bottom of upper tray to bottom of lower tray in horizontal run of cable trays and 100mm spacing between bottom of upper tray to top of lower tray in vertical run of cable trays as per standard engineering practice. Owner may please accept.	Tender terms and conditions prevail.

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170	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	42	1.36.06	For yard illumination, flood lights would be installed at suitable locations to provide the requisite level of illumination. Pole-mounted high-pressure sodium vapor fixtures would be used for approach roads. Maintenance light (24 Volt) would be used for maintenance purpose.	Bidder understands that all lights shall be LED type only. Owner may please confirm.	Noted
171	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	43	1.40.01	Variable speed drive system shall be provided as per the mechanical/ electrical system as well as other technological requirement shall be supplied by Bidder. VFD panels for these applications shall be located in Main Control Room/concerned area Control Room under air conditioned atmosphere. All HT & LT VFD's shall have Auto/manual bypass DOL starter facility, so that in case of any problem in VFD, the system shall run through DOL starter. In case where bypass starter is not possible, then spare/standby VFD shall be provided. VFD for RAPH feeder shall be considered and this VFD shall be located in central control room.	Bidder understands that bypass DOL starter is not applicable for MV VFD as per standard industry practice. Owner may please confirm.	Tender terms and conditions prevail.
172	Volume-III/Part-B Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL TECHNICAL SPECIFICATION ELECTRICAL	46 399	1.42.02 (v) *17.09.02 xi)	(v) The minimum 3.5m clear height (excluding roof beam) shall be maintained from finishing ground floor level. xi) Cable Vault: a) Cable vault of not less than 3.5 metres clear height shall be provided.	Bidder understands that 3.5m height is between floor to floor for cable vault area. Owner may please confirm.	Tender terms and conditions prevail.
173	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	46	1.42.01 xix)	xix) minimum clearance from top of busduct to nearest obstruction shall be atleast 1000mm.	Bidder would like to propose minimum 200mm spacing between bottom of nearest structure to top of busduct. Owner may please accept.	Tender terms and conditions prevail.
174	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	105	3.04.10	Cooling System i) Cooling equipment for Generator Transformer ii) Generator Transformer cooling shall be OFAF. The cooling system for each single-phase transformer shall be independent & complete in itself. iii) 2 nos. of 60% capacity radiators. Each radiator shall be provided with 2x100% capacity oil pump. One standby pump that would automatically come into operation, in case of failure of the running pump will be provided. Each bank will have one standby fan or 20% capacity standby fans (whichever is higher), which would automatically come into operation, in case of failure of any of the fan in the radiator bank. iv) In addition cooling equipment shall conform to the requirement stipulated below: a) Transformer cooling shall be affected by use of a No. of detachable type unit coolers. Capacity of each unit cooler shall be limited to maximum of 20% of the total cooling requirements. The coolers shall be tank mounted. b) Each unit cooler shall have its own cooling fans, oil flow indicator, shut off valves at the top and bottom (80 mm size) lifting lugs, top and bottom oil filling valves, air release plug at the top, a drain plug and sampling valve and thermometer pocket fitted with captive screw cap on the inlet and outlet..... g) Cooling fans for each radiator bank shall be located to prevent ingress of rainwater. Galvanized wire guard shall suitably protect each fan	Bidder understands that the clauses are specifying contradicting requirement for type of cooling arrangement of Generator transformer. Bidder proposes to supply unit coolers for GT. Owner may please accept.	If Unit coolers are provided then adequate number of coolers with one cooler as standby (6 x 20% coolers or 4x33% coolers) shall be provided.
175	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	136	Annexure -1	Annexure -1 Technical Specification for Nitrogen Injection Fire Protection System (NIFPS) for Transformers including Generator transformers,(Including Spare GT), Station transformers, Unit transformers and all transformers rated 10 MVA & above Located Outside Main Plant Boundary , against the transformer explosion which shall use nitrogen as quenching medium.	Owner is requested to consider use of Nitrogen injection fire protection system (NIFPS) only for transformers rated 100 MVA and above, which is as per SEBs' tenders. Owner may please accept the same.	Please refer Sr. No 38 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
176	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	137	2.00.00	(k.) All outdoor panels shall have IP 56 degree of protection.	Owner is requested to consider IP 55/55W degree of protection in case of Nitrogen injection fire protection system (NIFPS), which is inline with general requirements. Owner may please accept the same.	Tender terms and conditions prevail.
177	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	222	8.4.12 xv) viii)	xv) Requirements of protection functions of various feeders shall include the following. The same shall be achieved using numerical relays: viii) Motor feeders. m) Winding temperature n) Bearing temperature	Bidder understands that winding and bearing temperature will be monitored in DCS. Hence, Wiring and bearing RTD input will not be wired to numerical relay. Owner may please confirm.	Noted
178	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	138	4.00.00	GENERAL INFORMATION TO BIDDER The bidder is advised to visit project site and get detail information/drawings and make comparative study of connections, orientation of marshalling box/cubicle & conservator, existing foundation plan and location of fire wall etc. The bidder shall offer the system for as a standalone one to existing transformer i.e. there will be no need to change the existing foundation, LV side bus duct connection and external cable connection etc.	Bidder understands that following paragraph of referred clause is not applicable for this project. "The bidder shall offer the system for as a standalone one to existing transformer i.e. there will be no need to change the existing foundation, LV side bus duct connection and external cable connection etc." Owner may please confirm.	The clause is related to NIFPS system. Existing transformer refers to the transformer provided by BTG Bidder. Tender terms and conditions prevail.
179	Volume III/ Part- B	TECHNICAL SPECIFICATION ELECTRICAL	139	4.01.00	Three (3) sets of generator busduct (without canopy) & associated equipment with accessories shall be furnished for each 660 MW, "KV, 0.85 p.f. Generator ,	Bidder understands that Generator bus duct shall be supplied for generators of two units only. Owner may please clarify the requirement of 3 sets mentioned in the referred clause.	1. Noted 2.Three(3) sets refers to individual 3 phases (R,Y,B) of each generator.
180	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	141	4.03.1	The busduct shall serve as interconnection between the generator and its associated generator transformers, unit transformers and associated auxiliary equipment. The Busduct shall be isolated phase, continuous (bonded enclosure). IPBD shall be rated for short circuit duration of 3 seconds.	Owner is requested to consider short circuit duration of one second, which is as per NTPC and other SEBs standards. Owner may please accept the same.	Tender terms and conditions prevail.

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181	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	159	Annexure	A-C.T. RATINGS	Bidder would like to clarify that as per Generator OEM proven practice, protections, metering and AVR CTs for generator shall be mounted within the generator turret only. Bidder would like to propose protections, metering and AVR CTs for generator as per OEM proven practice. Owner may please accept.	Noted. However, the same shall be decided during detailed engineering (DDE) subject to approval from MAHAGENCO.
182	Volume III/ Part- B	TECHNICAL SPECIFICATION ELECTRICAL	182	6.03.08	One end of the resistor shall be connected to neutral side of the Transformer through suitable cable box (copper cables to be used) and the other end shall be connected to earth pit through bushing and Galvanized steel busbar.	Bidder requests Owner to allow to use aluminium cables from NGR to neutral side of the transformer after meeting the design criteria specified in the tender specification. Owner may please accept.	Tender terms and conditions prevail.
183	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	190	7.03.09	Same phase disposition shall be maintained throughout the run of the bus duct. Phase Cross over, if required in 11kV/3.3kV shall be accommodated at the switchgear end in the rear dummy panel.	Bidder proposes Owner to also allow phase crossover in Busduct run for ease of connection at both the ends. Owner may please accept.	Tender terms and conditions prevail.
184	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	207	8.04.02	Bus and Bus Taps i) The main buses and connections shall be of high conductivity copper for current rating above 2000Amps and aluminium alloy for lesser rating, sized for specified current rating with maximum temperature limited to: e) 90°C (i.e 40°C rise over 50°C ambient)- For bolted joints (Plain or tinned) f) 105°C (i.e 55°C rise over ambient 50°C)- For bolted joints (Silver Plated) g) 85°C (35°C rise over ambient 50°C)-For busbars	Based on manufacturer's feedback, bidder would like to clarify that the bus bars are designed for individual panels & runs through the complete panel line-up and needs to be bolted at all the panels individually phase wise. The temperature rise observed at the bus bar joining is usually higher compared to locations other than non-joining parts. As per tender specifications, the temp. rise allowed at bus bar joints is 55 deg. C (above ambient of 50deg. C) with silver plated joints. But the rise allowed on Bus bar surface is only 35 deg. C. During temperature rise test, the temperature recorded at joints were highest and at bus bar near to joints were near to the temperature of joints. Due to thermal conductivity characteristics of bus bar, the temperature at bus bar near to joints usually is similar to the temperature which gets recorded at joints. Practically the distance between joint is less hence the part of bus bars where joints are not present will have almost the same temperature as that of nearby joint. In view of above, Bidder requests Owner to accept the temperature rise of Bus bar as 105°C (i.e. 55°C rise over ambient 50°C). Further, Bidder confirms that considering high conductivity aluminium/aluminium alloy main buses, the temperature shall be limited to 105°C for joints (Silver plated) and Bidder will meet temperature rise requirement as per IEC for all other areas. Owner may please delete clause no 8.04.02 g) and issue amendment.	Tender terms and conditions prevail. However, for clause 8.04.02, i, g) "85°C (35°C rise over ambient 50°C)-For busbars:- Temperature rise limits shall be as per latest IS/IEC standards.
185	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	244 246	9.01.12 i) 9.03.04	9.01.12 MVA Rating i) The Quantity and rating of the 11/0.433 kV service Transformers shall be based on the actual load figures and 100% redundancy. For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer. Standby motors will be considered for Transformer sizing, maximum 70% loading of standby motors shall be considered. 9.03.04 20% spare margin shall be considered while calculating the total load on the L.T. board.	Bidder understands that the clauses are specifying contradicting requirements for margin. Bidder proposes to consider 10% design margin as per standard industry practice. Owner may please accept.	9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads on both the bus sections of switchgear . Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b) Highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00). Please refer Sr. No 7 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
186	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	247	9.03.11	Current density for H.V and L.V windings of all transformers should not exceed 2.08 A/Sq.mm.	Bidder proposes to consider 2.8 A/Sq. mm. as standard design. Owner may please accept.	Noted
187	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	248	9.05.01	vi) The dry type transformer shall be located near switchgear/power control center, minimum 2000m distance . The LV connections shall be with bus duct. The dry type transformer being relatively heavy the switchgear room shall be designed with stronger floor taking into account the movement of the transformer.	Bidder understands that the dry type transformer shall be located near switchgear/power control centre, minimum 2000 mm distance . Owner may please confirm.	Noted

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188	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	24 269 271	1.22.01 11.01.21 11.03.03	1.22.01 Power from LV service transformers shall be supplied to 415 V switchgears. Power from 415 switchgears to the various MCCs, PDBs, ACDBs etc. shall be supplied from redundant incomers. These switchgears shall distribute power to LV auxiliary motors and also to other auxiliary loads viz. MCCs / ACDBs, etc. LV switchgears shall be of metal enclosed indoor type. Incomers / bus-couplers, outgoing tie feeders rated 630A & above and motor feeders rated 90 kW & above shall be equipped with air circuit breakers of fault interrupting capacity of 50 KA rms. 11.01.21 All the incomers, buscouplers of PMCC/PCC/MCC shall be of ACB only irrespective of its current rating. 11.03.03 Motor Control Center Motor control centre (MCC), shall mean a continuous line-up of vertical sections in single / double front construction (as per space availability), housing breaker panels and MPCB / MCCB, contactor operated outgoing modules. All incomers and Bus-sections rated 630A & above shall be breaker controlled which are electrically inter-locked. MCCBs shall be provided for incomers and bus couplers rating below 630A with castle key interlocks.	Bidder understands that the clauses are specifying contradicting requirements. Bidder proposes to provide all incomers and Bus-sections rated 630A & above shall be breaker controlled which are electrically inter-locked. MCCBs shall be provided for incomers and bus couplers rating below 630A with castle key interlocks in line with clause number 11.03.03 & 1.22.01. Owner may please confirm.	All incomers buscoupler of PMCC/PCC/MCC shall be ACB. For DB's the incomers and buscoupler rated below 630A shall be with MCCB.
189	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	276 419	11.06.02 18.04.06	v) All service like essential motors for safe shutdown of the unit, UPS incomers, battery charger AC supply, lighting, etc. shall be connected to this MCC. DG supply shall be extended to emergency MCC in less than 15 sec from loss of power. 18.04.06 The emergency A.C. power supplied by D.G. sets will take minimum time (not exceeding 30 seconds i.e., time required to start the engine from cold condition and to bring up to full speed) to start during which the D.C. battery will take care of the immediate requirements.	Bidder proposes that the starting time for EDG shall be as per OEM's standard design. Owner may please accept.	The Clause 11.06.02 v) shall be read as "All service like essential motors for safe shutdown of the unit, UPS incomers, battery charger AC supply, lighting, etc. shall be connected to this MCC." The Clause 18.04.06 shall be read as "Diesel Generator Sets capable of starting and picking up the load connected in EMCC within 30 seconds."
190	Volume-III/Part-B Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL TECHNICAL SPECIFICATION ELECTRICAL	292 279	11.06.26 11.06.05	11.06.26 Interface with DCS G. Unidirectional LT Drive (MCCB/MPCB Controlled) Start Command DO Stop Command DO ON Feedback DI OFF Feedback DI Module disturbance (Control supply fail) DI Emergency LPBS Stop DI Numerical relays interface through IEC 61850 protocol or Profibus. xv) For all motors, less than 18.5KW shall be provided with MPCB and Electronic Overcurrent Relay (EOCR) with display and for all motors from 18.5 KW to less than 90KW shall be provided with MCCB and intelligent motor controller (IMC) in the power circuit. Intelligent Motor Controller (IMC) shall provide protection, metering, control, monitoring and historical logging for 1 phase and 3 phase AC induction motors using integral current transformers (CTs) or external CTs and Line-line voltages(415V). Intelligent motor controller (IMC) or EOCR should have multiple protections including overload single phasing, phase reversal, phase unbalance, lock rotor, ground fault, under current etc.	Bidder understands that for Unidirectional LT Drive (MCCB/MPCB Controlled), numerical relay will not be provided. Bidder shall provide for all motors, less than 18.5KW shall be provided with MPCB and Electronic Overcurrent Relay (EOCR) with display and for all motors from 18.5 KW to less than 90KW shall be provided with MCCB and intelligent motor controller (IMC) in the power circuit with profibus protocol as per clause number 11.06.05 xv). In addition, for all motors from 18.5 KW to less than 90KW shall be provided with MCCB and intelligent motor controller (IMC) in the power circuit with profibus protocol, hence hardwired interface with DCS is not envisaged. Owner may please confirm.	Tender terms and conditions prevail. Motors rated 90kW and above shall be facilitated with ACB with numerical relays and shall be interfaced with IEC 61850 protocol. Kindly refer Annexure-1 under Clause 11.00.00 Volume -III for IMC.
191	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	347	15.03.01	The actuator shall be Non integral type and suitable for operation in a hot, humid and tropical atmosphere, highly polluted at places with coal dust & fly ash and shall be suitable for an ambient temperature ranging from (-) 20 deg C to (+) 70 deg C.	Bidder proposes to provide integral type actuator as per current industry practice. Owner may please accept.	Tender terms and conditions prevail.
192	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	360	16.04.09	Black start DG set protections	Bidder understands that black start DG set is not applicable for this project. The clause is applicable for emergency DG. Owner may please confirm.	Noted. DG is for Emergency safe shut down.
193	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	367	16.08.03 v)	Generator /Electrical control panel /SAP shall be complete with: v) Closing and Opening Switch for Generator Circuit Breaker	Bidder understands that Generator Circuit Breaker is not applicable for this project. Owner may please confirm.	400KV GT Breaker Closing and Opening Switch shall be provided.
194	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	399	17.09.02 x)	x) Bidder shall provide two independent routes for cables between Switchyard Control Room & Main Plant Control Room. Bidder shall provide the cable trays along with its supporting structure arrangement on the trestle	Bidder would like to clarify that cables between Switchyard control room & Main plant control room shall be routed in separate cable trays in the same route in overhead trestle / Ductbank. Owner may please accept.	Tender terms and conditions prevail.
195	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	406	17.14.02	Laying of cables directly buried in ground is not acceptable.	Bidder proposes Owner to allow for the directly buried cables in ground for outdoor/remote area. Owner may please accept.	Tender terms and conditions prevail.
196	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	443	19.02.00	xxx) Communication system shall be interfaced with existing Koradi U#8,9,10 Communication system	Owner is requested to share the document of existing plant communication system where interface point is covered.	To be decided during detailed Engineering (DDE).

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197	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	512 512	23.09.08 ii) 23.09.07	ii) Each lighting panel shall have an incoming triple pole MCCB with neutral link along with a suitably rated ELCB and a number of outgoing miniature circuit breakers (MCB). v) The incoming to each Normal and Emergency AC Lighting Panel shall be provided with a triple pole MCB with neutral isolating facility and one earth leakage circuit breaker. Combined type triple pole MCB and earth leakage circuit breaker (ELCB) are also acceptable for incomers to Lighting Panels.	Bidder understands that the clauses are specifying contradicting requirement for incomers of lighting panel. Owner may please clarify.	Clause no 23.09.08 ii) shall prevail.
198	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	536	24.03.02 ii)	ii) Fault current for the earthing system shall be designed for 63 KA for duration of 1 sec.	Since EHV fault current is 50kA, hence bidder would like to propose that earthing system to be designed for 50kA for duration of 1 sec. Owner may please accept.	Fault Level : 400kV System : 63 kA for 1 sec (as per latest CEA Gazette) shall be considered for all the related equipments and design calculations. Please refer Sr. No. 2 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
199	Volume-III/Part-B	TECHNICAL SPECIFICATION ELECTRICAL	244	9.01.12 i)	9.01.12 MVA Rating i) The Quantity and rating of the 11/0.433 kV service Transformers shall be based on the actual load figures and 100% redundancy. For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer. Standby motors will be considered for Transformer sizing, maximum 70% loading of standby motors shall be considered.	Bidder would like to propose that any loading will not be considered for standby motors while sizing the transformer as a general practice. Owner may please accept.	9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads on both the bus sections of switchgear. Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b) highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00). Please refer Sr. No 7 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
200	Volume-IV/BID DRAWINGS	ETG61-BTG-EE-GN-SLD-001	1	TRANSFORMER DETAILS	Fuel oil transfer pump house transformer Package No. : BTG/BOP	Bidder understands that fuel oil transfer pump house transformers are not in BTG bidder scope. Owner may please confirm.	FOPH IS IN BTG SCOPE Tender terms and conditions prevail.
201	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	127	3.10.02(viii)	The following Type test will be carried out at an NABL/Govt. of India accredited laboratory and should have been witnessed by a client for atleast one transformer for MVA rating equal and greater than 5MVA (viii) Short circuit test	Transformer manufacturers in India are not willing to perform short circuit test and are not quoting for projects where short circuit test is required. Hence, there is no such supplier available in India who can follow tender specification requirement. In view of the above, the GT, ST & UT manufacturer will submit Annexure-J as per CEA specification and prove that its design is similar to referenced Short circuit tested transformer design for waiver of conducting Short circuit test. This procedure has been accepted by NTPC and other SEBs. Owner may please accept.	Tender terms and conditions prevail.
202	General	-	-	-	-	Bidder understands that dismantling or re-routing of any EHV/HT/LT lines passing through proposed power plant area including boundary shall be in Owner's scope. Please confirm.	Tender terms and conditions prevail. Further bidder to visit site for any specific dismantalling issues.
203	General	-	-	-	-	Bidder requests Owner to provide coordinates & voltage level of supply point for Construction power and locate it on plot plan.	Construction power supply will be provided at 11kV level (already mentioned in Vol I). Co-ordinates will be provided later.
204	Volume-III/Part-B/ Section-2	LEAD TECHNICAL SPECIFICATION	56	3.02.02	6. Cables (Power & Control) Terminal Point- However, supply, engineering, design, erection, laying and termination, including preparation of cable schedule, for all cables between switchyard and BTG shall be in BTG contract scope.	Bidder understands that only control cable from BTG equipment to switchyard is in Bidder's scope. Bidder requests Owner to provide approximate route distance between BTG and switchyard to estimate control cable quantity.	Both power & control supply cables are in BTG bidders scope. Bidder is requested to visit the site for estimation of Distance. Rest tender terms and conditions prevail.
205	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	5	1.04.04	Any additional feeder requirement on HT & LT switchgears required for purchaser/BOP contractor during detailed engineering shall be arranged by the bidder/Bidder without any price implication.	Owner may please clearly specify the list of feeders with rating required from HT and LT Switchgears before price bid submission. Any additional feeder requirement during detailed engineering shall be provided with price implication.	Refer our Reply to S.No 134 and S.No 135.
206	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	355	16.01.00	16.00.00 ELECTRICAL CONTROL & RELAY PANEL / ELECTRICAL CONTROL PANEL (ECP) 16.01.00 ix) Unit Electrical Control panel (ECP) including MIMIC & synchronisation for complete electrical systems of both Units & Station.	The concept of hardwired Electrical Control Panel is obsolete now. Electrical system shall be controlled as per clause no. 25.04.00, Section-1, Part-B, Vol.III. Hence, Electrical Control Panel is not envisaged. Owner may please confirm.	Tender terms and conditions prevail.

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207	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	167	5.05.02	Core i) The core shall be constructed from high-grade non-aging, low loss, high permeability, cold rolled, super grain oriented, silicon steel laminations, known as HI-B steel trade name .	Owner is requested to consider steel laminations of M4 grade or better quality, which is as per NTPC and other SEBs standards. Owner may please accept the same.	The Core of all the Transformers shall be of HI-B steel trade name.
208	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	163	5.01.03	5.01.03 LT Auxiliary service transformers shall be three phase, two winding, 11/0.433kV or 3.3/0.433kV, Dyn11, 50Hz, ONAN cooled with $\pm 5\%$ off circuit taps in steps of 2.5% on HV side. LV system shall be solidly earthed. Also refer section 9.00.00 (LT service Transformers) for design criteria and other technical details of LT Auxiliary service transformers.	Bidder understands that these two clauses are contradicting the requirement. Bidder proposes to provide all LV service transformer with AN cooling as indicated in single line diagram.	There is no contradiction. 5.01.03 is applicable to LT oil type transformers and 9.00.00 is applicable to LT dry type transformers. However, for any remote outdoor areas ONAN shall also be considered as required.
	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	243	9.00.00	The scope of supply shall include Cast Resin Encapsulated dry type indoor transformers of ratings to be decided by the Bidder based on selection criteria given in this specification.	Owner may please confirm.	
209	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	536	24.03.13 Point no.: iv)	All the vertical air terminal rods shall be electrically connected together by means of horizontal conductors of size 50 x 6 mm galvanized steel flats.	Bidder would like to clarify that 25x6 mm GI flat shall be used for Horizontal air termination and down conductors for buildings & other structures as per referred clause no.:24.03.18 point no.:x), Table-Point no.(1) . Owner may please confirm.	Tender terms and conditions prevail.
			538	24.03.18 point no.:x)	x) The sizes and materials of earthing conductors to be used in lightning protection system are listed below:- 1) Horizontal air termination and down conductors for buildings, boilers and other tall structures- 25 x 6 mm-GI Flat		
210	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	243	9.03.07	The transformer shall be capable of continuous operation at specified rating under the following conditions : i) Voltage variation -- $\pm$ 10% ii) Frequency variation -- $\pm$ 5% iii) Combined voltage and Frequency variation (absolute sum) -- 10%	Discrepancy is observed in selection of frequency variation. (as per Vol-III, General Technical Requirements - Electrical, Cl. No. 1.05.00, system particulars, which indicates frequency variation is +3% and - 5% for 400kV, 11kV, 6.6/3.3kV and 415V systems. Owner is requested to clarify.	Noted for only Generator with +3% and -5% frequency variation. And for other system $\pm$ 5% is applicable.
			98	3.03.03			
			162	5.04.03			
211	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	524	Illumination Level Table SI No.(y)	DC Emergency Lighting SI. No. Area Average Lux Level 1. Unit Control Room 100	There is discrepancy between referred clauses regarding illumination requirement in control room through DC lighting Owner is requested to clarify.	Bidder to follow tender CL. DC emergency lighting table SI No. 1. as 100 lux for control room.
	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	524	DC emergency lighting table SI No. 1.			
212	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	219	8.04.12	viii) Motor feeders. m) Winding temperature n) Bearing temperature	Bidder understands that winding and bearing temperature will be monitored in DCS. Hence, Wiring and bearing RTD input will not be wired to numerical relay. Owner may please confirm.	Noted
213	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	10 301	1.05.00 ---	1.05.00 SYSTEM PARTICULARS System particulars are as follows: 220 V DC System : 25 kA \$\$ for 1 second Note: \$\$ denotes fault level at DCDB level shall be 25kA while at DLDB level fault level shall be 9kA. DATA SHEET FOR 415V PCC/PMCC/MCC/DBs 8. Short circuit level : 50 kA (rms) at 415 V	For DCDB short circuit rating shall be 25kA as per clause no. 1.05.00. Owner may please confirm.	Clause is self explanatory. Tender terms and conditions prevail.
214	Volume-III, Part-B, Section-1	TECHNICAL SPECIFICATION ELECTRICAL	330	14.17.03	14.17.03 However temperature rise shall be restricted to limits corresponding to Class 'B' insulation for both MV, HV & LT motors. The temperature under abnormal running conditions shall be limited to 50C above class 'B' limits.	Bidder understands that the temperature under abnormal running conditions shall be limited to 5 Deg C above class 'B' limits. Owner may please confirm.	Noted
215	VOLUME - II / SECTION -2	LEAD TECHNICAL SPECIFICATION	132	k.2 Electrical equipment	H.V. sample tests of transformer oil in accordance with IEC	Bidder understand BDV and PPM test to be conducted on HV Transformers	Tender terms & condition prevails. All test to be carried out as per the relevant IEC/IS Standards
216	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	8	1.04.17	Latest Cyber security guidelines laid down by CEA/Government of India shall be followed.	At present there is no facility available for testing in India, However COC shall be submitted for applicable equipment's	Shall be applicable as per latest CEA/GOI guidelines
217	VOLUME - III / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	49	1.47.01 Type Tests	i) Type tests shall be performed for CAT-1 Electrical items as per relevant IEC and IS standards at an NABL/Govt.of India accredited laboratory and should have been witnessed by a client.. Details regarding Type Test performance to be performed in each section as per categorisation of Electrical Equipment. Only Type test reports / certificates for all Electrical items are not accepted. Particular tests to be carried out. ii) Type test related to Generator, power transformers / Auxiliary power Transformers shall be performed as per IEC & IS-2026. iii) Type test for all other major electrical equipments such as HT, LT Switchgear, motors (above 50KW), Battery & battery chargers, HT,LT Power cables, IPBD, VFD's, DG set etc. shall be performed as per relevant IEC/IS standard.	Bidder would like to clarify that Type test reports as per latest CEA guideline shall be submitted	Tender terms & condition prevails.

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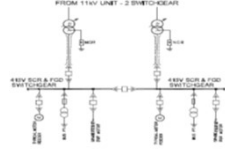
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218	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	126	3.10.01 Routine Test / Sr. no. 10	2KV/10 kV core isolation (core-clamp, clamp-tank, core-tank)	2 KV Core isolation test shall be carried out as per Sr. No. 20	10kV Core Isolation Test shall be applicable for GT, ST and UT
219	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	126	Sr. No. 16	Dry power frequency withstand test (ACLD) test as per IEC 60076-3 shall be conducted	Bidder would like to clarify that ACLD test is replaced by IVPD test as per IEC 60076	Noted. The same shall be as per the latest standards.
220	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	129	Sr. No. 19	Transformer tank with coolers shall be tested for leaks for one unit of each type with normal pressure of oil/air plus 35 KN/m2 for a period of 12 hours for oil	Leakage test shall be conducted for 6 Hrs. during final inspection of transformer	Tender terms & condition prevails.
221	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	127	Sr. No. 26	Radiographic test on Transformer Tank	RT/UT shall be conducted on Bottom plate if welded	Tender terms & condition prevails.
222	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	127	Sr. No. 31	Test on tap changer as per IS: 2026	Mechanical operation test of Tap Changer shall be conducted	Shall be applicable as per latest relevant standards.
223	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	127	Sr. No. 28	Test on oil. Following tests shall be conducted on oil samples drawn from transformer tank. a) Break down voltage b) Tan delta and resistivity test. c) Water content d) Acidity e) Other chemical test as indicated in IS 335.	As a routine test BDV and PPM shall be conducted, However for Oil directly supplied from Refinery Subject test shall be conducted	Tender terms & condition prevails. All test to be carried out as per the relevant IEC/IS Standards
224	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	128	3.15.02 Type Tests	Type Tests The following Type test will be carried out at an NABL/Govt.of India accredited laboratory and should have been witnessed by a client for atleast one transformer for MVA rating equal and greater than 5MVA. i) Temperature rise test for ONAN/ ONAF / OFAF. ii) Zero sequence impedance measurement test at principal tap, rated frequency (for ICT Only). iii) Measurement of noise level at rated voltage and rated current. iv) Harmonics present in no load current at rated voltage and 110% rated voltage and frequency. v) Pressure test and Vacuum test with deflection measurement. vi) Measurement of power taken by cooling fans & oil pumps. vii) Degree of protection for cooler control cabinet. viii) Short circuit test	We would like to clarify that Type test report not older than 10 years shall be submitted for review Also we would like to clarify that this clause shall be applicable only for Power Transformers for UAT / Auxiliary transformers we have to refer clause No. 5.15.03 (i) of this specification	Tender terms & condition prevails. Cl. 3.15.02 is applicable for all power transformers - GT,ST,UT. CL.5.15.03 , is applicable for Unit Aux & station Aux. transformers(11/6.9KV,11/3.6KV,11/0.415KV, 6.6/0.415KV)
225	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	129	3.15.03 / SPECIAL TEST	Following Special tests shall be conducted on one transformer of each type and each rating of 5MVA and above: i) Long duration induced AC voltage test for transformer winding. ii) Test with lightning impulse chopped on the tail. iii) Determination of capacitance and dissipation factor between windings to earth and between windings. iv) Determination of transient voltage transfer characteristics. v) SFRA test before dispatch and after installation at site.	Bidder understand these tests are applicable only for ICT	Applicable for all power transformers considered under scope of supply at Cl. 3.01.00
226	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	155	4.05.01 List of Type Tests / IPBD	If the Bidder is not able to submit report of the type test(s) which are not listed below and are not conducted within last five years	Clause is not clear. Bidder shall submit the Type tests reports which are mentioned in specification and same shall not be older than 10 years	Tender terms & condition prevails.
227	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	156	4.09.01 Pre-Commissioning/Commissioning:- / IPBD	i) 10% radiography and 100% DP test on all site welded joints of busbar and enclosure. vi) One minute high potential power frequency withstand test at full test voltage.	i)2 % RT and 10 % DPT shall be conducted vi)Power Frequency test shall be conducted at shop	i)Tender terms & condition prevails. vi) Noted
228	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	175	5.15.03 List of Tests to be Conducted / Auxiliary Transformers	ii) Type Tests a) Following type tests shall be conducted at an NABL/Govt.of India accredited laboratory and should have been witnessed by a client. atleast one transformer of each type(oil/dry) and each MVA rating of the transformer	Type test report shall be submitted	Tender terms & condition prevails.
229	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	182	6.05.03 Type Test / NGR	Type Test a) Temperature test (on one unit of each rating) b) Impulse voltage test c) Power frequency voltage withstand test d) Degree of protection.	Type test report shall be submitted	Noted for Type Test of NGR only. However, all routine test shall be carried out.
230	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	195	7.07.02 Type Tests /	7.07.02 Type Tests i) The Bidder shall submit for Purchaser's approval the reports of all the type tests as listed in this specification and carried out within last five years from the date of bid opening.	Bidder would like to clarify that reports not older than 10 years	Validity of Type test reports shall be as per latest CEA guidelines amended time to time.
231	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	197	7.09.00 COMMISSIONING CHECKS	7.09.00 COMMISSIONING CHECKS iv) 10% radiography and 100% DP test on all site welded joints of busbar and enclosure. i) Power frequency voltage withstand test.	i)2 % RT and 10 % DPT shall be conducted vi)Power Frequency test shall be conducted at shop	i)Tender terms & condition prevails. vi) Noted
232	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	236	8.08.02	8.08.02 The following Type test shall be performed at an NABL/Govt.of India accredited laboratory and should have been witnessed by a client. atleast on one switchgear of each current and voltage rating :	Type test Report shall be submitted for review	Tender terms & condition prevails.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
233	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	254	9.08.00 TESTS / ii) Type Tests / Dry Transformer	However, in spite of availability of valid type test certificate following minimum tests shall have to be performed on one transformer (selected by Purchaser) of each rating and each type have to be performed in presence of Purchaser / Purchaser's representative as per IS/IEC Standards:- ☐ Impulse test. ☐ Heat run (Temperature rise) Test. ☐ Induced overvoltage withstand test ☐ Separate source voltage withstand test. ☐ Measurement of impedance voltage, short circuit impedance and load loss. ☐ Lightning Impulse test ☐ Partial discharge measurement ☐ Short Circuit test.	Type test Reports of past similar transformer not older than 10 years shall be submitted for review	Tender terms & condition prevails.
234	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	251	General	Type tests	Wherever mentioned about type tests in the specification we would like to clarify that Type test report not older than 10 years shall be submitted for review	Tender terms & condition prevails.
235	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	265	10.03.12 Type Test / i) TR Set	f) Short Circuit Test (To be conducted as described below)	Please clarify " To be described below" We would like to clarify that SC test report shall not be applicable for TR set	SC test is applicable for TR set also. The clause no 10.03.12 i) f), Short Circuit Test (To be conducted as described below) shall be read as :- " This short circuit test shall be performed on TR set along with the TR panel and controller with a spark gap connected across the output. The gap is adjusted to get the spark at required peak voltage which is the short circuit condition and the controller will control the voltage to quench the spark. " Rest Tender terms & condition prevails.
236	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	317	12.16.01 Routine Test / NSPBD	12.16.01 Routine Test v) Water tightness test	Bidder would like to clarify that Water Tightness test is a Type test and reports shall be submitted for review	Noted
237	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	318	12.17.04 / NSPBD	12.17.04 All equipment to be supplied shall be of type tested quality. These tests may have to be repeated if desired:-	Type test reports shall be submitted for review	Noted
238	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	342	14.49.00 TESTS / HV & MV Motors	a) For each type & rating of HV & MV motors the Bidder shall conduct all the type test as per relevant IEC and IS standards for all the proposed motors to be supplied under this contract and the test(s) should be conducted at an independent laboratory.	Bidder would like to clarify that all the approved Motor manufacturer have inhouse facility for conducting Type test so report from independent laboratory is not required	Tender terms & condition prevails.
239	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	342	14.49.00 TESTS / HV & MV Motors	ii) Type Tests / iii) List of minimum type tests to be conducted / h) Degree of protection	This test is conducted in third party labs and it is not the regular practice, However we will submit the reports for review	Tender terms & condition prevails.
240	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	343	14.49.02 LT Motors	ii) List of minimum tests for which type test are to be conducted The following minimum type test reports shall be submitted for each type and rating of LT motor of above 50 KW only	Bidder would like to change 100 KW from 50 KW	Tender terms & condition prevails.
241	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	392	17.06.03 Special Tests on PVC 'FR-LS' Material / Cables	iii) Smoke density test on sheath material:- This test shall be carried out as per American National Standard ASTM-D- 2843/1977 and also as per UIITP method (3M cube test on finished cable sample). The ASTM test method is compulsory. For passing this test, the requirement of light transmission shall be minimum 40% after the test	Smoke Density test shall be conducted as per ASTM-D-2843/1977	Tender terms & condition prevails.
242	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	392	17.06.05 Acceptance Test: / Cables	17.06.05 Acceptance Test: i) The following test shall be carried out as Acceptance Test in the presence of Inspecting Engineer on samples taken from the delivery lot. One drum out of every 10 number of drums or less shall be selected at random sampling basis in each lot for every type & size of cable for the Acceptance Tests which shall be carried out at manufacturer's /supplier's cost.	Bidder would like to clarify that sampling shall be as per IS 1554 / IS 7098	Tender terms & condition prevails.
243	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	392	17.06.04 Routine Tests: / Cables	i) The following tests shall be carried out as Routine tests on each and every drum length of cable, as per IS 7098 (Part 2) / 1985. a) High Voltage Test b) Conductor Resistance Test c) Partial discharge test (for screened cables) -- on full drum length.	Bidder would like to clarify that IS 7098 shall not be applicable for LT Cables also PD test is not applicable for LT Cables	IS 7098 is applicable for both LT & HT. Part-1 for LT and Part-2 for HT cable (33kV) . All test shall be as per the relevant latest Standards.
244	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	434	18.06.01 /Type Test	iii) The minimum list of Type test to be conducted on each rating DG set at factory as well as site are as below,	Report shall be submitted fore review	Tender terms & condition prevails.
245	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	437	18.07.00 SITE TESTS / DG Set	These tests shall be carried out by the bidder in case order is placed on 6 Hours at maximum load, continuous running at low load to be performed in addition to the following test at site:- i) Fuel Consumption ii) Lube oil Consumption iii) Generator Efficiency iv) Full Load test v) All the type test as mentioned above in factory test	Full load test sand Type tests cannot be conducted at site	Full Load test shall be conducted at site with the maximum available load and the same shall be arranged by the bidder for loading of the DG set. However, any specific type test that is not conducted at site by the bidder, then those specified test shall be conducted at manufacture's shop as per approved datasheet and the same shall be witnessed by MAHAGENCO/TPIA.

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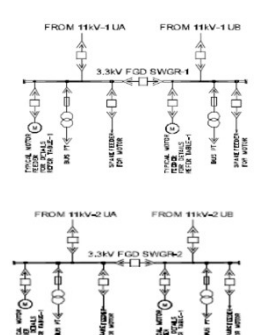


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246	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	468	20.07.00 TESTS /VFDs	All the equipment supplied shall be of type tested quality. All the type test for all HT VFD's of each rating shall be conducted as per relevant IEC and IS standards. Type test on HT VFD's shall be conducted at independent laboratory and same shall be witnessed by customer.	Type test reports of similar VFD conducted at Manufacturer works shall be submitted fore review	Tender terms & condition prevails.
247	VOLUME - III / Section -1 / Part - B	TECHNICAL SPECIFICATION ELECTRICAL	468	20.07.00 TESTS /VFDs	For LT VFD's, Type test reports shall be submitted for each voltage class and current rating.	Reports for similar ratings shall be submitted fore review	Similar rating -voltage and current shall be submitted.
248	Volume-II	Section-II		2.13.11	Power transformers – Generator transformers (GTs), Station transformers (STs), Unit transformers (UTs)	Majority of the electrical items including distribution transformers are included in BOP package scope. Also GT and ST can be separately supplied without any major interface, accordingly Bidder request Owner to shift the scope of supply of Generator transformer, station transformer & Unit transformer scope from BTG scope to BOP package scope.	Tender terms & condition prevail
249	Volume-V	Annexure-3		-	Following minimum Mechanical, Electrical & C&I spares shall be provided for each Unit of 660MW i.e. Unit No 11 & Unit No 12	Bidder understands that mandatory spares list provided is common for 2 units & there is no requirement of duplicating the spares for each unit. Bidder understands that each unit mentioned is a typo error. Please confirm.	Listed Mandatory spares are the minimum requirement for each unit.
250	Volume-1	Section-3		3	Auxiliary power consumption (APC) : 36000 KW @ 100% TMCR each unit Total auxiliary power consumption of all auxiliaries including FGD at 660 MW load with zero make up, 76 mm of Hg(a) or lower guaranteed/design back pressure & at 100% TMCR.	Bidder understands that limiting value of 36000 KW provided is for Unit auxiliaries. Request Owner to also provide the limiting values of Auxiliary power consumption for station auxiliaries. Also auxiliary power consumption will be guaranteed at optimized vacuum (as finalized) instead of 76 or 77 mmHg (abs).	The limiting value is inclusive of (50%) BTG station auxiliaries Bidder can be allowed to prove guarantee at optimised Vacuum. Mahagenco to decide
251	Volume-1	Section-3		-	Station auxiliary power consumption : DM water transfer pump Waste water transfer pump	DM water transfer pump is not part of BTG tender scope. Accordingly request Owner to delete this line item from aux power list. Waste water transfer pump is not an continuous operating pump. Hence request Owner to delete this line item from aux power list.	Bid Specification Prevails Can be decided DDE
252		Section-2 Section-2 Section: 3 Section: 3		x), b), 4) x), c), 5) b), 4) C), 4)	4) Transformer losses (for Unit) • Following transformers are included: • Generator Transformer losses (at rated Load Condition) • Unit auxiliary transformer losses (at rated load conditions) • Station transformer losses (at Unit rated load conditions) • Losses in all other service/auxiliary transformers (at rated load conditions) Transformers Transformer losses (TL) shall be considered as per following (as applicable) - • GT - 100% no load loss, 54% of Copper losses & 100% Cooler Loss. • ST- 100% no load loss, 8% of Copper losses & 9% Cooler Loss. • UT - 100% no load loss, 52% of Copper losses & 50% Cooler Loss. • Aux/ LT Outdoor/ LT Indoor Transformer: 100% no load loss & 25% of Copper losses • Reactor - losses at rated voltage Auxiliary Power Consumption (APC) 4) Transformer losses (for Unit) • Following transformers are included: • Generator Transformer losses (at rated Load Condition) • Unit auxiliary transformer losses (at rated load conditions) • Station transformer losses (at Unit rated load conditions) • Losses in all other service/auxiliary transformers (at rated load conditions) Transformer losses (TL) shall be considered as per following (as applicable)- • GT - 100% no load loss, 54% of Copper losses & 100% Cooler Loss. • ST- 100% no load loss, 8% of Copper losses & 9% Cooler Loss. • UT - 100% no load loss, 52% of Copper losses & 50% Cooler Loss. • Aux/ LT Outdoor/ LT Indoor Transformer: 100% no load loss & 25% of Copper losses • Reactor - losses at rated voltage	Bidder observed that there are discrepancies regarding % loading to be considered for calculating Auxiliary power consumption guarantee. Hence, bidder understand that clause no 4), C), Page no.400, Section-3, Volume-I to be followed for Unit and Station Auxiliary power consumption guarantee and is also mentioned below: * Transformer losses (TL) shall be considered as per following (as applicable)- • GT - 100% no load loss, 54% of Copper losses & 100% Cooler Loss. • ST- 100% no load loss, 8% of Copper losses & 9% Cooler Loss. • UT - 100% no load loss, 52% of Copper losses & 50% Cooler Loss. • Aux/ LT Outdoor/ LT Indoor Transformer: 100% no load loss & 25% of Copper losses • Reactor - losses at rated voltage * Owner may please confirm.	Bid Specification Prevails
253	Volume-II Volume: I	Section-2 Section: 3		x), c), 5) C), 4)	• Indoor Lighting • Outdoor Lighting – Duty factor – 0.4 Station Auxiliary Power Consumption • Indoor Lighting • Outdoor Lighting – Duty factor – 0.4	Bidder would like to clarify that indoor and outdoor lighting are not auxiliaries which are contributing in power generation. Hence, Bidder request to exclude lighting from Auxiliary power consumption guarantee. This is also inline with practice followed by NTPC/Other SEBs for recent power plants. Owner may please issue amendment.	Bid Specification Prevails
254	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (1.28.00 SELECTION OF CABLES)		1.28.09 page No 34	The minimum sizes of L.T power cable to be chosen are as below:- AL - 16 mm2 (3 core) & Cu - 2.5 mm2 (3 core)	As per standard industrial practice, kindly accept minimum size of LT power cable for aluminium as 6sqmm and number of cores depending on load requirement. Owner to please confirm.	Bid Specification Prevails

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
255	VOL-III VOL-IV	PART-B, Doc no.: ETG061-BTG-ELEC-TS (9.00.00 LT SERVICE TRANSFORMERS) ETG061-BTG-EE-GN-SLD-001 (Bid drawing)		9.01.12 Page No 244 Note no. 18	Each Transformer shall be rated to meet the loads connected on both the bus sections of switchgear with 15% design margin on total load of Transformer. Standby motors will be considered for Transformer sizing, maximum 70% loading of standby motors shall be considered. MVA rating of the transformer as indicated above shall be considered as the minimum requirement for the project. Transformer offered by the Bidder shall be sized according to the minimum demand considering all the normal running loads in service and starting of one no. highest rated motor with driven equipment, no load correction factor of 5% while sizing of transformer at most stringent condition plus minimum 10% margin.	MVA rating of transformer will be calculated as per note no. 18 of ETG061-BTG-EE-GN-SLD-001. Request to confirm.	9.01.12 MVA Rating : i) For each switchgear, 2X100% rated transformer shall be considered. Each Transformer shall be rated to meet the loads on both the bus sections of switchgear . Transformers offered by the bidder shall be sized considering all following conditions a) the maximum demand considering all the normal running (continuous & intermittent) loads plus b) highest rating standby motor with driven equipment plus c) No Load Voltage Correction factor 5% at most stringent condition plus d) minimum 20% margin on above (a+b+c) Bidder shall furnish sizing calculation for owners/consultant review/approval. Above resolution is also applicable to Notes, Sr. No. 18 of Main SLD (ETG-061-BTG-EE-GN-SLD-001 Rev 00). Please refer Sr. No 7 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
256	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (1.22.00 LV SWITCHGEAR)		1.22.02 page 24	All PCC/PMCC/MCC shall be of draw out type compatible with IEC-61850 communication protocol.	1) As per Bidder understanding IEC-61850 is applicable only for ACB module in PCC/MCC/PMCC with numerical relay. Owner to please confirm 2) Because of space constraint, all MCCs on moving machines like Travelling Tripper etc shall be non draw out, fixed type, single front and non intelligent type. Owner to please accept	Tender Terms and Conditions prevail. However, 1. All ACBs including Motors rated 90kW and above shall be facilitated with numerical relays and shall be interfaced with IEC 61850 protocol. All Energy meters shall be three phase four wire multifunction, digital type with IEC 61850 Protocol communication port for DCS/EMS interface as referred in various clauses(1.24.05 & 8.04.11). Also bidder to refer and comply EMS architecture provided along with the tender. 2. Tender terms and conditions prevail.
257	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (11.00.00 415 SWITCHGEARS AND DC BOARDS)		11.01.27 Page 269	All PCC & PMCCs shall be of single front construction	As per Bidder understanding 415V Air circuit breaker panels in PCC and PMCC shall be of single front type. All other panels of PCC & PMCC can be of double front type. Request to confirm.	Bid Specification Prevails
258	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (1.25.00 MOTORS)		1.25.04 Page 30	Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance.	Starting current of LV motor shall be as per IS:12615. Request to confirm.	Locked rotor current for LV motor corresponding to IE3 efficiency class as per clause number 14.13.05 iv) without any further positive tolerance.
259	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (17.03.00 DESIGN CRITERIA – POWER & CONTROL CABLES)		17.03.06 xxiv) Page-385	Motor rating cable size (i) 0-5.5kW 3C-2.5/4/6/10 mm ² Cu as per voltage drop (ii) 5.6-11kW 3C-16 mm ² Al (iii) 11.1-22kW 3C-35 mm ² Al (iv) 22.1-45kW 3C-95 mm ² Al (v) 45.1-75kW 3C-185 mm ² Al (vi) 75.1-below 90kW 2x3C-185 mm ² Al	Cable size shall be as per project specific cable sizing calculation. Request to confirm.	Tender terms and conditions prevail. The cable sizes mentioned here are the minimum cable size suitable for motor ranges. However, during cable sizing calculation, the higher size of cable is envisaged due to voltage drop, the same may be considered.
260	VOL-IV	ETG061-BTG-EE-GN-SLD-001 (Bid Drawing) PART-B, Doc no.: ETG061-BTG-ELEC-TS (6.03.00 Neutral Grounding Resistor) PART-B, Doc no.: ETG061-BTG-ELEC-TS (11.00.00 415 SWITCHGEARS AND DC BOARDS)		sheet-1 of 1 6.03.01 page-181 DATA SHEET FOR 415V PCC/PMCC/MCC/DBs, Page 302	In main Single Line diagram 11kV/ 0.415kV service transformers neutral earthing in secondary side is shown through NGR for FGD/SCR and HVAC Plant MCCs  The Neutral Grounding Resistor (NGR) shall be used for non-effective grounding of 11000V and 3300V System of the plant. Sr. No. (b) : System neutral earthing - Solidly earthed	Bidder understand that 415V System will be solidly earthed and 11kV, 3.3kV system will be earthed through NGR. Request to confirm.	Noted

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261	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (1.28.00 SELECTION OF CABLES) (17.03.00 DESIGN CRITERIA – POWER & CONTROL CABLES)		1.28.02 Page-33 17.03.02 page-382	i) For 11kV – 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 1sec-for tie and incomer feeders. ii) For 3.3kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA-1 sec-for incomers & tie feeders. iii) For 415V - 50kA - 0.25 sec for motor feeders and 50kA-1sec-for incomer & Tie feeders i) Breaker operated Motor feeders and transformer feeders: 0.16 second. ii) Breaker operated outgoing feeders: 0.5 second. iii) Tie between two switchgear: 0.5 second. iv) Incomers: 1 second.	There is a mismatch between these two clauses. Owner to please confirm which clause is to consider.	Bidder to follow tender clause no 1.28.02 The fault current & interrupting time shall be as under:- i) For 11kV – 50kA - 0.2 sec for outgoing motor feeders and transformer feeders and 1sec-for tie and incomer feeders. ii) For 3.3kV - 40kA - 0.2 sec for outgoing motor feeders and transformer feeders and 40kA-1 sec-for incomers & tie feeders. iii) For 415V - 50kA - 0.25 sec for motor feeders and 50kA-1sec-for incomer & tie feeders.
262	VOL-IV	Bid Drawing			Typical section of cable tray arrangement in trestle	Please note that Typical section of cable tray arrangement in trestle is missing in Tender drawings received. Request to share the same.	To be prepared and submitted during DDE by the bidder as per the Tender Specification.
263	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (17.03.00 DESIGN CRITERIA – POWER & CONTROL CABLES)		17.03.05 Page - 383	For HT motors the voltage drop in the cable, during motor starting condition, shall be limited to 10% and during full load running condition, shall be limited to 2.5% of the rated voltage.	As per standard practice, 15% voltage drop for all HT motors during starting condition and 3% voltage drop during running condition for all HT motors is proposed. Request to accept.	Bid Specification Prevails
264	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (1.23.00 PROTECTION PHILOSOPHY)		1.23.10 page-27	Lighting distribution board shall have 4 pole MCCB incomers & bus couplers and 4 pole MCCB with ELCB outgoing feeders. Lighting panels shall have MCB with ELCB incomers and SPN outgoing feeders	ELCB in outgoing feeder of MLDB and also ELCB in incoming of Lighting panel is technically not required. Bidder proposes to consider ELCB only in the incomer of Lighting panel. Request to accept.	Bid Specification Prevails
265	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (8.00.00 11KV & 3.3 KV SWITCHGEAR)		8.04.04 xiv) Page - 209	Vacuum contactor as an alternative to breaker is not acceptable	For drives with frequent start stop operation requirement like Crusher motors, etc., Bidder proposes to use vacuum contactor with fuse as per standard industrial practice. Request to accept.	Bid Specification Prevails
266	VOL-III	PART-B, Doc no.: ETG061-BTG-ELEC-TS (24.03.00 GROUNDING & LIGHTNING PROTECTION)		24.03.13 Page-542	The vertical air terminal rods shall be installed at the roof of buildings for MCC/Switchgear rooms, ESP/FGD Control rooms etc to protect these objects from lightning strokes.	Bidder understands that common ESP cum FGD control building is acceptable. Request to confirm.	Bid Specification Prevails
267	VOL-IV VOL-III	ETG061-BTG-EE-GN-SLD-001 (Bid Drawing) ETG061-BTG-ELEC-TS(1.25.00 Motors)		sheet-1 of 1 Table-1 SI No-8 1.25.01 Page-29	For FGD Motors Like Booster Fan , Oxidisation blower, Recirculation Pump,Wet Mill Motor voltage grade is written as 11 KV. Motors rated upto and including 200 kW shall be connected to 415V, 50 Hz AC supply. Motors rated above 200 kW upto and including 1500 kW shall be connected to 3.3 KV, 50 Hz supply. Motors rated above 1500 kW shall be connected to 11 kV, 50 Hz supply.	 Bidder understands that FGD Motors Like Booster Fan, Oxidisation blower, Recirculation Pump, Wet Mill Motor shall be 11KV or 3.3KV based on rating of motor as per clause No 1.25.01 MOTORS Page-29 . Owner to confirm.	Noted
268	VOL-III	ETG061-BTG-ELEC-TS(1.41.00 EMERGENCY POWER SYSTEM)		1.41.02 Page -44	The minimum rating of DG set rating shall be 1750 kVA, 415 V, 0.8 p.f, 3 phase, 3 wire, Emergency Diesel generator set in acoustic enclosure to provide emergency power to units 1 & 2 in case of grid power failure	Bidder understand these 1750 KVA DG are for main plant including loads of FGD and ESP. Owner to confirm.	The query is irrelevant. Kindly follow tender Clause no 18.04.03 in Vol-III B & Clause no 2.13.11.xx) in Vol-II. Hence tender terms and conditions prevail.
269	VOL-IV	ETG061-BTG-EE-GN-SLD-001 (Bid Drawing)		Sheet 1 of 1		Bidder understands that all the 3.3KV FGD Motors shall be fed from 3.3 KV FGD Switchgears and 11KV FGD motors shall be fed directly from Main plant 11KV Unit Switchgear.	Power for 11kV FGD Switchgear shall be derived from 11kV Unit Switchboards. Hence all motors related to FGD shall be fed from 11kV FGD Switchgear. For any motor for FGD which is in 3.3kV the same shall be derived from the 11kV FGD Switchgear through FGD auxiliary transformers.

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270	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		1.10.03 2.09.04	i) Excitation System The excitation system shall be designed for field forcing capability of minimum 150% of exciter voltage corresponding to the generator MCR output at rated power factor for not less than 10 seconds. Equipment design & sizing criteria vi) Excitation system ceiling voltage: 2.0 times rated load excitation voltage.	Two clauses in the tender exhibit ambiguity. However, to ensure the stable operation of the Generator, the bidder suggests a ceiling voltage exceeding 1.5 times the rated field voltage. Consequently, the bidder proposes an Excitation system ceiling voltage set at over 1.5 times the rated excitation voltage to address this concern.	Tender terms and conditions prevail.
271	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.04.00	Short Circuit withstanding capacity: Capable of withstanding of 3 phase short circuit at the generator terminals when operating at rated MVA and power factor with 5 % over voltage for a period of not less than 3 seconds. However generator to be type tested for sudden short circuit test as per cl. 4.16 of IEC 60034-3.	Bidder clarifies that, Generator Sudden short circuit test shall be carried out as per cl. 4.16 of IEC 60034-3. It says, "For a generator that will be connected to the system through its own transformer or reactor, usually by an isolated phase bus, the test at the terminals shall be carried out at reduced voltage, agreed upon between the purchaser and the manufacturer". Alternatively, the acceptance of Generator Sudden Short Circuit Test certificates for generators of similar ratings in accordance with IEC 60034-3 is also acceptable.	Tender terms and conditions prevail.
272	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.05.00 iv) 2.05.00 xiii)	Stator Winding: f) Suitable slot couplers/coupling capacitors (as applicable) shall be provided for partial discharge monitoring (under running condition) through portable Partial Discharge Monitoring Kit. Bidder to supply two (2) Nos. of portable Discharge Monitoring Kit. Generator Instrumentation: ON line partial discharge (PD) monitoring	Bidder request owner to delete this requirement as this is not required and same has been agreed by project under execution by central utilities.	Tender terms and conditions prevail.
273	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.05.00 ix)	Stator Winding: Self aligning type sleeve bearings either mounted on separate pedestals or on the end shields.	Bidder proposes to modify the clause as follows: Self aligning type sleeve/ ~~Tilting~~ bearings either mounted on separate pedestals or on the end shields.	Tender terms and conditions prevail.
274	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.05.00 xiii)	Generator Instrumentation: iv) Vibration monitoring System (This shall be realized in DDCMIS): Also a standalone station for the vibration monitoring system shall be provided.	Bidder request to modify the clause as below: Alternatively a standalone station for the vibration monitoring system shall be provided acceptable .	Tender terms and conditions prevail.
275	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.07.00 2.08.00 iv)	No clause no. is mentioned, but it is just after the last clause of 2.07.00 xv): Alarms in TG MMI & Annunciation contacts for use in station DDCMIS shall be provided for these conditions. Alarms in TG MMI & Annunciation contacts for use in station DDCMIS shall be provided for these conditions	List of Alarms in TG MMI & Annunciation contacts for use in station DDCMIS shall be discussed during the Detail Engineering	Tender terms and conditions prevail.
276	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.09.06 2 vii)	Features of Static Excitation System (If Applicable): 2) Excitation Transformer : 70 deg.C over an ambient temperature of 50 Deg.C.	Bidders Supplied Excitation Transformer shall confirm to IEC 60076-11 & Thermal class 155 (F) Insulation. Bidder proposes changes in referred clauses as follows: "Temperature rise: ~~70 deg.C~~ 90 deg C over an ambient temperature of 50 Deg C " Owner is requested to confirm acceptable.	Excitation transformer shall be as per IEC-60076-11 & Thermal Class F (155 DegC) insulation. Rest of the tender terms and conditions prevail.
277	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.09.06 2 vii)	Features of Static Excitation System (If Applicable): 7) Field Application & Suppression Arrangement: a) Field breaker : The generator field breaker shall be of DC, multipole air break type, suitable for operation from local panel as well as from UCR	Due to the unavailability of a DC Breaker that meets the tender criteria and project requirements in the market, the bidder will provide an alternative DC Breaker available in the market during the project execution phase, which must be acceptable to the owner. Alternatively, the bidder can supply an AC side field breaker. In light of these circumstances, the following modification is proposed to the clause. a) Field breaker : The generator field breaker shall be of DC or AC, multipole air break type, suitable for operation from local panel as well as from UCR	The generator field breaker shall be of DC or AC. The same shall be decided during DDE subject to approval from MAHAGENCO. Please refer Sr. No. 6 of Amendment - 4 to Vol. III, Part - B, Electrical Spec.
278	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.11.03	List of Type Tests to be Conducted	Bidder proposes to modify the clause as follows: List of Type Tests to be Conducted. Alternatively, Type Test Certificate /report of tests conducted on the Generator similar to those proposed to be supplied under this contract shall also be acceptable.	Tender terms and conditions prevail.
279	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.11.04	Electrical Tests on AVR ii) Static excitation system (if applicable) Type test for which type test to be conducted are	Electrical Tests on AVR ii) Static excitation system (if applicable) Type test for which type test to be conducted are Alternatively, Type Test Certificate /report of tests conducted of the Static Excitation System similar to that proposed to be supplied under this contract shall also be acceptable	Tender terms and conditions prevail.

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280	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		2.11.04	Electrical Tests on AVR ii) Static excitation system (if applicable) a) All type and special tests on excitation transformer as per IEC-60076-11.	Bidder proposes to modify the clause as follows: Electrical Tests on AVR ii) Static excitation system (if applicable) a) Type tests on excitation transformer as per IEC-60076-11 shall be performed: i. Short circuit Test ii. Lighting Impulse Test iii. Temperature rise Test iv. Noise level Test	Tender terms and conditions prevail.
281	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		4.04.13	Current Transformer i) The current transformers shall be epoxy cast-resin, single core ring type, mounted within the bus duct enclosure	Bidder standard & Proven practice is to mount Current Transformer on the Generator, hence bidder proposes to modify the clause as follows: Current Transformer i) The current transformers shall be epoxy cast-resin, single core ring type, mounted within the bus duct enclosure or Bidders standard & proven practice shall also be acceptable. Owner is requested to confirm acceptable.	Noted. However, the same shall be decided during detailed engineering (DDE) subject to approval from MAHAGENCO.
282	Volume-III TECHNICAL SPECIFICATION ELECTRICAL	Part B		Annexure after 4.09.00 Sheet 162 of 601	The ratings indicated hereunder are tentative	The bidder confirms to supply epoxy cast-resin, single core ring type current transformers, ensuring compliance with all protection and metering requirements stipulated in the tender. However, the requirements regarding the rating and quantity of current transformers will be subject to discussion in line with bidders standard & proven practice and same shall be finalized during the detailed engineering. In view of above clarification, bidder request to modify the clause as follows: The ratings & quantities indicated hereunder are tentative	Tender terms and conditions prevail. Shall be discussed during detail engineering.
283	Volume-III	Part B	Sheet 348 of 597 (Page 352 of 601)	15.06.00	15.06.01 ii) The actuator enclosure shall be totally enclosed, dust tight, weather proof (NEMA-6/IP-68) suitable for outdoor use without necessity of any canopy.	Please refer clarification regarding Electrical actuators above. Additionally, actuator enclosure shall be suitable to IP-65 as per standard practice of BHEL.	Tender Terms & Conditions prevail.
284	Volume-III/Part B		330	14.13.05	Motors (above 1000 KW upto 3000 KW) 600%. Not subject to any positive tolerance	As per Volume III, Part B, Clause 1.25.04, Page 29 " Locked rotor current of the HV & MV motors rated 3000 kW and below shall be limited to 600% (subject to 20% IS tolerance) of the full load current of the motors and motor rated above 3000 kW and without VFD shall be limited to 450% (inclusive of 20% tolerance) of full load current of the motor. Locked rotor current of the LV motor shall not exceed 600% of full load current subject to 20% IS tolerance." The clause 14.13.05 & 1.25.04 are contradicting. Please clarify the exact requirement of tolerance	Kindly Follow Vol-III, Part B, Clause no 14.13.05 for Motor Starting Current requirement. For energy efficient LT motors, locked rotor current shall be as per IS: 12615 not subject to any positive tolerance.
285	Volume-III/Part B		340	14.40.00	HV & MV motor shall be provided with four (4) Nos. simplex or two (2) Nos. duplex platinum resistance temperature detectors (RTDs) in each phase embedded in stator winding at locations where high temperatures are expected. In addition one (1) duplex type RTD shall be provided in each bearing. The RTDs shall be 3 wire duplex platinum resistance type having a value of 100 ohms at 0 Deg.C.	As per Motor OEM standard , the following quantities is proposed: Winding RTD 12 Nos Simplex or 6 Nos Duplex RTD will be provided. RTD - 3 Wire Type Bearing RTD 2 Nos Duplex RTD / Bearing will be provided. RTD - 3 Wire Type Dial Type Indicator 1 No DTT / Bearing will be provided. For local monitoring	Tender Terms & Conditions Prevail.
286	Volume-III/Part B		340	14.41.00	HV & MV motors shall be provided with dial type two (2) bearing temperature indicators and shall have two (2) sets of contacts, each set having 2 NO + 2 NC contacts rated for 5A at 240V AC and 0.5A at 220V DC. One set shall be set to operate at lower value to give alarm and other set at a higher value to trip the motor.		
287	Volume-III/Part B		350	15.06.03	Each motor actuator shall have Six (6) rotary drum position limit switches with two for open each with 2 NO + 2NC contacts and two for close each with 2 NO + 2 NC contacts positions, each with adjustable setting between fully open and fully closed positions. Each rotary drum limit switch shall have two (2) limit switches for intermediate open position each with 2 NO + 2 NC contacts. The limit switches shall have capacity of 5A at 240V AC or 0.5A at 220V DC. ii) Each motor actuator shall also have two (2) torque limit switches with four (4) normally opened and four (4) normally closed contacts each. r.mally opened and four (4) normally closed contacts each	As per OEM design , the following is proposed : Each motor actuator shall have switches as follows: Limit Switches with contacts Open - 2NO+2NC Close - 2NO+2NC Torque Switches with contacts Open - 2NO+2NC Close - 2NO+2NC Intermediate Limit Switches with contacts Open - 2NO+2NC Close - 2NO+2NC Position feedback Position Transmitter is provided for Inching Type application actuator	Tender Terms & Conditions Prevail.

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288	Volume III/Part B		270	11.02.01	Auto-changeover facility shall be provided in PCC/ PMCC and MCCs. These Switchgears/MCC shall normally operate with Bus coupler open. If sustained under voltage is detected on any one of the bus section, the respective Incoming Breaker shall trip and bus - coupler shall close if voltage is available on the other bus section. Auto changeover shall be blocked if the Incoming Breaker has tripped due to bus fault.	Bidder has considered Soot blower MCC, which consists of Two Incomer and One Bus-Coupler with auto changeover facility. The Soot Blower motor is having maximum rating of 1.1KW. As per SB operation, maximum of Two No's of Soot blower can be operated at a time and load consumed is 2.2 kW maximum. The soot blower MCC incomer rating is only 32A. Hence, bidder shall be allowed to consider the SFU type incomer	Tender Terms & Conditions Prevail.
289	Volume III/Part B		269	11.01.18	All 415V PCC, PMCC & MCC shall generally be compatible with IEC 61850 Communication protocol. A marshalling module shall be provided on each bus of LV Switchgear (PCC, PMCC, MCC) for interfacing with DCS. Control of incomers and bus-coupler breakers of LV switchgear shall be possible from the DCS. The check synchronizing relay shall be housed in the respective switchboards. Dummy panels shall be integral part of the LV Switchgear and of same size	Sootblower MCC shall be non intelligent type due to following reason The Soot Blower motor is having maximum rating of 1.1KW. As per SB operation, maximum of Two No's of Soot blower can be operated at a time and load consumed is 2.2 kW maximum. The soot blower MCC incomer rating is only 32A.	Tender Terms & Conditions Prevail.
290	Volume III/Part B		270	11.01.34	All the switchgears shall be of intelligent type having intelligent motor controller and they strictly follow the specification as per Annexure-1 attached in this chapter.		
291	Volume III/Part B		352	15.06.09	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER	Bidder clarify that MOV will be integral type actuator as per standard OEM practice	Tender Terms & Conditions Prevail.
292	VOLUME - II ETG061-BTG-GEN- LTS	SECTION - 2		7.07.00	Routine tests and type test certificates shall be submitted for each item of equipment wherever applicable.	For type tests wherever applicable, If already done for the same design/size, it will not be repeated. Reports will be offered for review.	For electrical scope please refer individual specifications regarding type and routine tests.
293	Volume - V	ANNEXURE - 4 SUB-VENDOR LIST		40.00	NUMERIC RELAY FOR HT (a) ABB (b) AREVA/ALSTOM (c) SIEMENS	We request customer to kindly accept Schneider Electric & other reputed make relays also. Schneider Electric is one of the reputed manufacturer for protective relays & have supplied relays to many projects of NTPC, TSGENCO, NHPC, IOCL, etc. Required credentials for review & acceptance shall be furnished during detailed Engg.	Noted for Schneider Electric only.
294	Volume - V	ANNEXURE - 4 SUB-VENDOR LIST		68.00	VACUUM INTERRUPTERS (HT SWGR) (a) BHARAT ELECTRONICS LTD.(BEL)	Vacuum Interrupter for offered HT Switchgear shall be as per BHEL type tested design only.	Noted.
295	Volume - V	ANNEXURE - 4 SUB-VENDOR LIST		II	II Electrical	All the bought- out items shall be procured from BHEL Sub- vendors list/GeM portal. However, required credentials shall be furnished during detailed Engg for review & acceptance.	Noted. However, Vendor Approval shall be taken from MSPGCL before placing the order.
296	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG- GEN-MS	Page 21	15.11.1.	Transformer Rectifier Controller set - 2 (two)	Bidder provides ESP controller with inbuilt rapping control. Hence separate rapping controller cards is not applicable. Hence , same may be excluded.	For ESP Controller with inbuilt rapping control Four (4) sets of complete ESP controller shall be provided as mandatory spare.
297	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG- GEN-MS	Page 21	15.11.2.	Rapper controller complete- 2 (two)	Bidder provides ESP controller with inbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
298	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG- GEN-MS	Page 21	15.11.3.	Communication controller complete- 2 (two)	Bidder provides ESP controller with inbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
299	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG- GEN-MS	Page 21	15.11.4	Electronic cards For rapper controller and ESP management system-One (1) set For transformer rectifier controller-Two (2) sets	Bidder provides ESP controller with inbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
300	Vol. III Vol. III	B C		15.06.03 v) 9.14.02	The motor actuators shall have 2 nos. potentiometric type transmitters of 100 ohm rating. Position Transmitter (For Modulating/Inching Type)	Bidder understand that clause 15.06.03 mentioned against first reference is applicable for modulating/inching type motorised valves as mentioned in second reference (clause 15.06.03) also. Further one potentiometric type transmitter shall suffice the requirement. Kindly confirm.	Tender Terms & conditions Prevail
301	Volume-III	Part B	Sheet 61 of 597 (Page 65 of 601) & Sheet 578 of 597 (Page 582 of 601)	2.05.00 & 26.03.00	xiii) vi) Online partial Discharge (PD) monitoring System: The system offered shall be applicable to the turbo Generator of large rating conforming to IEEE-1129, 1434 / IEC60034-27-2. Sensors for to be provided for on-line partial discharge (PD) monitoring complete with all software and hardware. Permanently connected independent sensing unit for each generator shall be provided along with necessary terminal equipment. However, evaluation unit for all generators in each station shall be common and portable. Latest software shall be provided to interpret the PD result. It shall also be suitably connected to TG MMI. A minimum of two Nos. per phase, sensors (e.g. combination of slot coupler and coupling capacitors etc.) shall be located as per the recommendation of supplier of PD Analyser. Also, as per as per technical Specification Volume-III, Part-B, Cl. 26.03.00 LIST OF MINIMUM REQUIREMENTS, Sl. No. 33, quantity specified for this system is 2 no.s. hence, 2 sets of Partial Discharge monitoring system , i.e. 1 no./ unit is requirement as per technical specification.	Online PD monitoring system is not included in our offer as the performance of systems available in the market and their noise cancellation effectiveness is not proven and is not verifiable against any reference.	Tender Terms & Conditions prevail.
302	Volume-III	Part B	Sheet 346 of 597 (Page 350 of 601)	15.00.00	Electrical Actuators - Non Integral Starter	Electrical motor Actuators in BHEL HWR scope shall be provided with Integral Starter as per Technical Specification Volume-II, Part-C, Cl. 9.10.00. This is also as per standard practice of BHEL for all supercritical sets.	Non-integral starter philosophy has been adapted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only.
303	Volume-III	Part B	Sheet 60-61 of 597 (Page 64-65 of 601)	2.05.00	xiii) iv) Vibration monitoring system (This shall be realized in DDCMS): At least six (6) numbers of dual axis optical sensor type vibration pickups at each end of over hang portion of the winding shall be provided, symmetrically located around the periphery with connection to Turbine Supervisory system for vibration monitoring and analysis. The connection between the pickups and Turbine Supervisory system for vibration monitoring shall be provided. Also a standalone station for the vibration monitoring system shall be provided.	As Generator winding bars are tightly fitted/bounded with each other and further suitable support has been provided to each bars. Hence, very less vibration seen in tangent direction and vibration always seen in radial direction only. Hence, as per OEM standard practice and to meet tender specification requirements, it is proposed to provide 12 No. single axis (instead of dual axis) optical sensors each side (TE & EE side) for measuring radial vibration only.	Tender Terms & Conditions prevail.

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1	II	2		2.13.05 xi) 4.40.26 xi) a) 6)	Ultrasonic flow measurement for CW and ACW. CW flow measurement shall be by Annubar.	Bidder understand that either type of flow measurement i.e. Ultrasonic flow meter (UFM) or Annubar can be used for CW and ACW flow measurement. Kindly confirm.	Tender terms and condition shall prevail.
2	Vol II	Section 2		2.13.11 (v)	xvi) Actuators- All motor driven actuators of the plant shall be integral type.	Customer is requested to clarify type of starter (integral or non-integral) for electric actuators	Non-integral starter philosophy has been adopted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer BTG C&I amendment 7, Sr.no.8
3	Vol II	Section 2		4.40.26 (b) (iv)	Inching duty (remote manually operated) and on-off duty valves and dampers will be motor operated with non-integral starter		
4	Vol III	Part B		15.00.00	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER 15.03.01 The actuator shall be Non integral type		
5	Vol III	Part C		1.01.01	...Electrical Actuators with integral starters...		
6	Vol III	Part C		9.10.00	ELECTRIC ACTUATORS WITH INTEGRAL STARTERS The actuators shall have integral starters		
7	II	2		2.13.11 (xv)	Actuators - All motor driven actuators of the plant shall be integral type.	Bidder understand that actuators shall be integral type inline with clause no. 2.13.11 (xv) of Sec 2, Vol II. Further actuator shall be provided as per detailed specification of actuator mentioned under clause 9.10.00 of Part C, Vol II. Kindly confirm.	Non-integral starter philosophy has been adopted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer BTG C&I amendment 7, Sr.no.8
	II	2		4.40.26 xi) b) 4)	Inching duty (remote-manually operated) and On-Off duty valves and dampers will be motor operated with non-integral starter.		
	III	C		9.10.00	ELECTRIC ACTUATORS WITH INTEGRAL STARTERS		
	III	B		15.00.00	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER		
8	VOLUME - II SECTION-II	LEAD TECHNICAL SPECIFICATION	40	2.13.11 (xxii)	Telephone system - complete with EPABX & its accessories required for the complete power project including all BOP areas shall be under the scope of BTG	Bidder wish to inform that Communication system (Intercommunication system, Telephone system, EPABX) are not linked to BTG contractor's works . Hence, Bidder request Customer to remove Communication system (Intercommunication system, Telephone system, EPABX) from Bidder's scope and include the same in BOP contractor's scope.	Bid Specification prevails.
			88	4.39.23	Communication system		
9	VOLUME - II /SECTION-II	LEAD TECHNICAL SPECIFICATION	106	4.40.26	xi, b.4) inching duty (remote-manually operated) and on/off with motor operated with non-integral starter.	All MOVs/Dampers are proposed with integral Starter.	Non-Integral starter philosophy shall be adopted for this project. Tender terms and condition prevails.
10	Vol II	Section 2		2.13.12 (iii) c)	Acoustic furnace temperature measurement system	Acoustic pyrometers are not envisaged due to unsatisfactory performance feedback in our earlier power plants installations. Accordingly, Acoustic Furnace temperature measurement system using acoustic pyrometer at economizer, furnace exit zone etc. are excluded from Bidder's scope of supply	Bidder may consider K type thermocouple for FEGT measurement.
11	Vol III	Part C		3.11.01	Acoustic Pyrometers are to be provided to determine the average flue gas temperatures and complete flue gas temperature profile of Furnace Exit plane and at Economiser outlet.		
12	Vol II	Section 2		2.13.12 (iii) k)	All pneumatic control valves and dampers along with actuators, smart pneumatic positioners, limit switches, hand wheels, solenoid valves, position transmitters and accessories.	Secondary Air dampers (SADC) and Burner tilt power cylinders are provided with conventional (non-smart) positioners in view of the high temperature ambient operating conditions in their proximity. Burner tilt power cylinders are provided with position transmitters. For SADC, pressure switches are provided at the outlet of I/P converters to indicate proper working of SADC power cylinders and to obtain "Dampers modulating" feedback. Hence position transmitters are not envisaged for SADC.	OEM standard philosophy shall be considered.
13	II	2		2.13.12 ff)	CONTROL AND INSTRUMENTATION Supply of all performance test instruments and analyzers.	All the instruments for performance guarantee (PG) test shall be considered as per bidder's standard and proven practice. The same shall be installed temporarily and shall be taken away after PG test. Further Analysers shall be offered as a part of normal instruments as per SWAS specification. No separate analysers are envisaged for performance test. This is as per prevalent industry practice. Kindly confirm.	A) Tender terms and condition shall prevail. B) Noted.

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14	II	2		9.02.44 (ii)	OTHER PLANT AREA AND GENERAL REQUIREMENTS Independent control room along with associated MCC room, UPS room, (one number common for all units of the project) shall be provided for each off-site system.	Kindly clarify the '(one number common for all units of the project)' mentioned against first reference (clause 9.02.44 iii). Bidder propose to place the DCS panels of MRS system and HVAC System in CER and further operation, control, monitoring from CCR . Kindly clarify and confirm.	Noted.
	III	C		3.32.01	The operation of each Air Conditioning system shall be possible through Microprocessor based Distributed Digital Control Monitoring and Information System (DCS) as defined in standalone DCS.		
	III	C		3.32.11	AHU shall be started either locally or from the main control room of AC system by means of Remote / Manual selection facility.		
	III	C		3.03.03	The Operation, control and monitoring of mill rejection system shall be from DCS located at CCR.		
15	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	102	4.40.21	ELECTRICAL SYSTEM INTERFACE i) Electrical system controls a) b)	Bidder would like to clarify controls and Automatic operation like Bus Transfer indicated in referred clauses are generally carried from respective electrical system e.g. Bus transfer Panel etc. Hence, these electrical systems will be interfaced with DCS for monitoring and manual operation as required. Request to confirm.	Confirmed.
16	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	102	4.40.21	ELECTRICAL SYSTEM INTERFACE ii) Electrical parameter monitoring	Bidder would like to clarify electrical parameters mentioned in referred clause shall be monitored at DCS through communication link/hardwired as mentioned as mentioned in Drive interface philosophy. Please confirm.	Confirmed.
17	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	103	4.40.23	FLUE GAS ANALYSIS iii) Continuous Emission monitoring system c) An analyzer shelter located near chimney.....	Bidder would like to clarify Hg analyser may be located at Stack near sampling point or below Stack due to sampling line length limitation of CEMS OEM. Request to confirm. Further CEMS OWS/Operator console is asked to be located in this Shelter in referred clause. However in DCS configuration CEMS console connectivity is shown with FGD control room. Bidder shall consider CEMS OWS at CEMS Shelter. Request to confirm.	A) Confirmed. B) CEMS OWS shall be located in FGD control room.CEMS server shall be placed in main control room for data transmission to state pollution control board.
	VOLUME IV BID DRAWINGS	DCS Configuration Drawing: 24 ETG061-BTG-CI-DCS-CD-001_SHT 1 OF 2	-	-			
18	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	108	4.40.28	CENTRAL CONTROL ROOM LAYOUT CONSIDERATIONS V) The functional area of control room shall have recessed false flooring and for ease of marshalling field and interconnecting cable.	Bidder understand Functional area of control room referred is for operator desk area of Control room. Please confirm. If yes there will be very less field cables in this area. Mostly Ethernet and Power cables will be required in this area. Suitable arrangement shall be provided by Bidder (may not be false floor) for cabling in this area. Please confirm.	Confirmed.
19	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	106	4.40.27	INSTRUMENTATION CABLE AND CABLING ACCESSORIES ii) Junction box shall be provided within transmitter racks.... iii) Signal cable from individual sensor/instrument to Junction Box 1.5 mm2. iv) From Junction Box multi-core overall screened signals cable for binary signals.....	Bidder proposes as follows: ii) Junction box shall be provided with closed transmitter racks (LIE) in outdoor area. Open Area transmitter rack instruments shall be wired to nearest junction box avoid additional junction for instrument signals. Request to confirm. iii) Branch cable size shall be 0.5 sq.mm inline with NTPC and industry practice. Request to confirm. iv) Multi-pair signal cable with overall shield shall be followed for Binary signals extension from Junction Box/LCP/etc. to DCS/PLC. Request to confirm.	ii)Noted. iii) Tender terms and condition prevails. iv) Noted.
20	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	105	4.40.26	x) Instruments shall be grouped together in closed (outdoor area) and in open (indoor area) type racks.	Bidder shall follow the tender requirement. However, in some cases, Bidder may also use instrument stanchion for single instruments wherever there is no density of instruments at particular area. Request to confirm.	Bid specification prevails.
21	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	105	4.40.26	vii) All Field transmitters.....smart type with 4-20mA output superimposed digital device bus signal conforming to Fieldbus foundation or any other internationally accepted protocol	Bidder would like to clarify transmitters shall be SMART type with 4-20mA superimposed digital device bus signal conforming to HART protocol. Request to confirm.	Noted.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
22	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	89	4.40.12	c) For critical controls, controller shall be three fold redundant d) Redundant controller shall be located at different sub-racks, preferably in different panels	c) Three fold redundancy in controller is not envisaged except BPS and TPS. Please confirm. d) Redundant controller installation shall be as per DCS OEM. Please confirm.	C) Noted. D) Noted.
23	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	92	4.40.12	o) Energy management and audit of Plant	The requirement mentioned in referred clause is very generic. Request to provide detailed requirement. Bidder shall consider flow measurements fuel, steam and other parameters as indicated in flow diagram and wherever clearly specified in specification. Please confirm.	Noted
24	VOLUME - II SECTION-II	LEAD TECHNICAL SPECIFICATION	100	4.40.18	Maintenance Management and Stores Management	Bidder wish to inform that a common Maintenance management and stores management shall be required for complete plant, which shall have interface with both BTG DCS as well as BOP DCS for overall operation and maintenance planning of the entire plant. Bidder further wish to inform that this is standalone specialized system and separate contractors for implementation of this specialized system are available in the market and shall not be included in BTG contractor's scope. Hence, Bidder request Customer to remove Maintenance management and stores management from Bidder's scope. Please confirm.	Clause 4.40.18 is deleted. Refer Amendment-7, Sr.no.22
25	VOLUME - II SECTION-II VOLUME - III PART-C	LEAD TECHNICAL SPECIFICATION TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	93 92	4.40.13. iii.e 4.00.00	Performance calculation and optimisation subsystem..... ADVANCED PROCESS CONTROL SOLUTION FOR FLEXIBLE OPERATION, COMBUSTION OPTIMIZATION AND SOOT BLOWING OPTIMIZATION	Please note that most of the features of Performance calculation and optimisation subsystem are available as part of APC system based on technical specification indicated in referred clauses. Therefore Separate performance calculations & optimization package is not envisaged in DCS. Request to confirm.	Bid specification prevails.
26	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	92 94 100	4.40.13 4.40.13 4.40.18	l) Create a preventive and predictive maintenance schedule m) Create a spares inventory management database iii) DCS broadly comprise of following sub-system g) operator stations 3) one terminal each shall be provided for maintenance management..... Maintenance Management and Store management	Bidder to note that requirements mentioned in referred clause shall be available in Maintenance Management and Store management system and it shall not be part of DCS. Therefore, Bidder understand mentioned requirement is not applicable. Please confirm.	Noted
27	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	94	4.40.12	iii) DCS broadly comprise of following sub-system g) operator stations 5) 80" LVS For monitoring of entire plant area.	Bidder wish to clarify that for BoP packages (not in Bidder's scope) monitoring in CCR shall supervisory type and drive level information may not be available. Please confirm.	Bid specification prevails.
28	Vol-II/Section-2	LEAD TECHNICAL SPECIFICATION	100	4.40.19	ROTARY EQUIPMENT MONITORING SYSTEM	Bidder request to clarify the "machine monitoring system" mentioned in referred clause is part of Vibration monitoring system or its separate. Bidder understand this system is Vibration analysis system part of Vibration monitoring system and it shall be applicable for Turbine and only HT drives. Please confirm.	MMS shall be separate . MMS shall be part of VMS and it shall be applicable for turbine as well as for all critical HT drives.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
29	VOLUME II	LEAD TECHNICAL SPECIFICATION		4.40.16	TURBINE CONTROL SYSTEM i) Electro-Hydraulic Governing (EHG) Control System a) The Electro-Hydraulic Governing (EHG) for the main TG shall be implemented in two-out-of-three or Triple Modular Redundant system. If, however, proprietary system is offered, TUV approved TMR/SIL3 system shall be provided, which will interact with the DCS for operation from (by hardwiring) and monitoring (through high speed link) at the Operator's console. b) The EHG shall be a part of coordinated control of the BTG. c) Unit shall be capable to run on FGMO / RGMO mode as per requirement of CERC.	The control & protective function are included as a part of Turbine Control System (TCS) and Turbine Protection System (TPS), they will be configured by our standard practice establishment by our long experience. TCS: Microprocessor based dual redundant. TPS: Microprocessor based triple redundant. It includes all the protective/trip function. However these systems are not TUV/SIL certified. EHG is part of TCS and necessary interfaces will be provided with plant DCS for coordinated control. This is as per OEM standard and proven practice.	Noted
30	VOLUME - II SECTION-II	LEAD TECHNICAL SPECIFICATION	100	4.40.17 (viii-c)	Vibration monitoring of auxiliaries shall be provided from the same family of hardware as the Turbine supervisory system for system integration.	Bidder wish to clarify that Turbine Supervisory system shall be provided as per respective OEM standard practice and from STG OEM approved supplier only. For balance items, Bidder will provide the Vibration monitoring and analysis system from reputed supplier. However, make may not be same as that of Turbine supervisory system. Please confirm.	Bid specification prevails.
31	II	2		4.40.26 v)	Temperature sensors viz. thermocouples and resistance temperature detectors shall be directly connected to DCS without any intermediate conversion.	Bidder understand that temperature transmitters are not applicable for the tender. Kindly confirm.	Noted.
32	II	2		4.40.27 iii)	Signal cables from Individual Instruments/sensors to field junction box, wherever applicable, shall be with conductor size of 1.5 mm ²	Signal cables from Individual Instruments/sensors to field junction box with conductor size of 0.5 mm ² is technically suitable considering the distance between instrument to Junction boxes which will be in the tune of 20 meter (max) . Kindly confirm.	as per application suitably with approval of owner.
33	II	2		4.40.27 iv)	From the junction boxes multi-core overall screened signal cables shall be used for extending binary signals, multi-pair twisted cable shall be used for analogue signals and multi-triads shall be used for extending RTDs to the control room area.	Bidder proposes to provide 2 pair instrumentation signal cables for extending RTDs to control room area. Kindly confirm.	Bid Specification Prevails
34	II	SECTION: 2		11.24.02	All test instrumentation as required for the Performance Guarantee Test shall be provided by the Bidder free of cost. Special / Precision instruments required for Performance Guarantee Test shall, however, be arranged by him and shall be returned to him after successful completion of the tests.	All test instrumentation as required for the Performance Guarantee Test shall be arranged by the Bidder free of cost for conductance of PG test and shall be taken back by the bidder after conductance of the PG test. Please Confirm.	Bid Specification Prevails
35	Vol-II	Section-2	170	11.24.07	All the instruments shall be calibrated by a certified body (an accredited independent test institute) before and after the tests Instruments need to be calibrated before and after the test to identify the drift which is to be used for applying corrections to the calibration which is estimated based on the average of the pre-test and post-test calibrations.	All the instruments including the flow nozzle shall be calibrated by the contractor BEFORE the test. As per past experience the difference between the results calculated by applying pre test and post test calibration are negligible. It will also prevent the unnecessary delay in submission the PG Test Report. In view of the above Post Test Calibration is not envisaged.	If difference between continuous measuring instrument and PG test instrument is negligible, then re-calibration of that instrument is not required, otherwise post test calibration shall be carried out; Except for flow nozzle.
36	Vol-II	Section-2	171	11.24.09	The calibration certificates shall be considered valid for a period of not more than six (6) months from the date of its calibration or as per the guidelines of NABL accredited Calibration agency.	Validity of calibration will be as per standard followed by NABL accredited agency.	Bid Specification Prevails It is already mentioned in the specification
37	Vol-II	Section-2	171	11.24.13	All PG test process parameters shall be made available in DCS.	PG test parameters will be recorded in separate data logger and will not be available in DCS.	Noted

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
38	Volume III, Part A	Section-1	40	3.03.00	Control & Instrumentation 3.03.01 NOX concentration analysers shall be provided in the inlet and outlet of Reactor for controlling and catalyst management so as to monitor the concentration remotely at control room. 3.03.02 Unreacted ammonia concentration indicator shall be installed in the outlet of Reactor for monitoring so as to monitor the concentration remotely at the control room. 3.03.03 Other Instruments (Remote & Local) shall also be provided by bidder as per process requirements as approved by owner	The SCR instrumentation and controls will be as per OEM proven practice	DCS shall be of the same make & Model as TG DCS
39	Volume III, Part C		152	7.10.00	Complete control and Instrumentation for DNOX system shall be under bidder scope of work. The operation, control, & monitoring of entire SCR system shall be done from Unit DCS located at CCR. Bidder shall provide the same family of software and hardware for SCR control system. Bidder shall refer further details in subsequent Mechanical Section		
40	Vol-III	Part A/Section-2	6	2.01.07	Provision shall be made for tripping of the turbine from the unit control room and for local manual trip from the steam turbine front pedestal	Provision for local manual trip from the steam turbine front pedestal is not envisaged. However an emergency trip push button is provided in the TG Hall.	Noted, EPB shall be provided in CCR also.
41	Vol-III	Part A/Section-2	10	2.08.05	A pressure switch shall be provided on the main bearing oil header to provide the necessary interlock for preventing the starting of turning gear until adequate oil pressure has been established. The turning gear motor shall automatically trip on loss of bearing oil pressure.	Pressure switch is not required and applicable in bearing oil header, as adequate oil pressure is ensured in the oil header for turning gear operation by Jacking oil pump which operates during turbine start-up conditions. The motive oil /Jacking oil of hydraulic motor is controlled by the dedicated solenoid valve and supplies the jacking oil to hydraulic turning motor to turn the rotor train. After attaining the speed of 120 RPM, solenoid is energized and stop supplying Jacking drive oil to Hydraulic turning motor. However, Jacking oil pump remain in operation and supply jacking oil to bearing up to 540 RPM. The hydraulic motor is driven by lifting oil during operation of the turning gear at a speed of 60 RPM.	Noted
42	Volume-III	Part A/Section-2	Sheet 11 of 109 (Page 15 of 113)	2.09.03	vi) Steam Admission Valves: Equipped with auxiliary contacts and limit switches for control interlocks and signalling. Additionally, position transmitter shall be provided on control valves for remote indication and control.	As per OEM standard practice in all Supercritical sets, 2 no. Position Transmitters per valve shall be provided. No limit switches are envisaged.	Noted
43	Vol-III	Part A/Section-2	11	2.09.03 (vii)	Each valve to be provided with two additional normally open (NO) potential free direct limit switch contacts in the valve closed position for use by the Employer	Please refer clarification against Cl. 2.09.03 vi)	2 nos. position transmitters per valve shall be provided instead of limit switch
44	Vol-III	Part A/Section-2	12	2.09.06	The tripping of all emergency stop valves, both locally and remotely shall be carried out by means of solenoid trip gear operating on DC supply	Push button for tripping the Turbine is provided at TG floor and in the control room.	Noted
45	Vol-III	Part A/Section-2	12	2.09.09 (v)	Provide two sets of Limit Switches for both open & close position with two changeover contacts.	It is clarified that for CRH NRV, high reliable inductive type limit switches are provided for open, close & test position as per standard practice. For extraction NRVs, limit switches are not used and only position transmitters are used for position feed back.	Noted.
46	Vol-III	Part A/Section-2	15	2.11.07 (v)	Main Oil Tank : High and low level transmitter to be connected to the supervisory control panel annunciation system and <i>overflow type sight flow indicator with symphonic arrester device shall be provided.</i>	Only TG vibration parameters are connected to TSI panel. No other measurements are connected to TSI panel. Instead of supervisory control panel annunciation, system level transmitter annunciation will be provided in DCS and will be on HMI. Sight glass shall be provided for level indications as per BHEL proven practice.	Noted
47	Volume-III	Part A/Section-2	Sheet 22 of 109 (Page 26 of 113)	2.15.00	The turbine shall be provided with built in electronic type speed changer to control its speed or power output within limits remotely from the turbine generator supervisory panel.	Only TG vibration parameters are connected to supervisory/TSI panel.	Noted.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
48	Vol-III	Part A/Section-2	22	2.15.05	<i>Load Limiter & Speed Changer.</i> Remote position indicator shall be provided for indication of the setting of the load limit on the turbine generator in control room.	It may be noted that electronic based high pressure governing system is provided for Turbine Governing. Accordingly these measurements are not applicable . xi) Load limiter position xii) Speed Changer Position	Digital electrohydraulic(DEHC) shall be provided.
49	Vol-III	Part A/Section-2	24	2.17.01 (iii)	Initial Pressure Regulator: Contact to be provided for signaling the device in, "Operation" and "Reset".	Contacts are not applicable since the Initial Pressure limiter is a software function and is part of Turbine Controller.	Noted
50	Vol-III	Part A/Section-2	25	2.22.02	The steam turbine supervisory equipment shall include detection and recording of, but not be limited to the following: i) Bearing & Shaft vibration ii) Shaft eccentricity iii) Differential expansion iv) Axial shift v) Overall expansion vi) Vibrations in the bearing pedestals vii) Steam turbine speed viii) Load ix) Emergency stop and governing valve positions x) Interceptor stop and governing valve positions xi) Load limiter position xii) Speed Changer Position xiii) Inlet steam temperatures and pressures xiv) Metal temperature xv) Cylinder/flange metal temperatures, top and bottom casing temperatures including differentials xvi) Bearing metal temperatures xvii) Body metal temperatures of main and reheat steam stop and control valves. xviii) Oil drain temperature. xix) Turbine stress evaluator capable of maintaining the thermal stresses within allowable limits and suitable integrated in to plant DCS.	The steam turbine supervisory equipment shall as per Collaborator guideline. It may be noted that electronic based high pressure governing system is provided for Turbine Governing. Accordingly these measurements are not applicable . xi) Load limiter position xii) Speed Changer Position	B) shall be part of DEHG. Tsi system shall include vibration parameter. Other paramter shall be part of TG control system. Please refer clarification against Vol-III, Part C, clause no. 3.25.02 (Sr.no. 135)
51	Vol-III	Part A/Section-2	26	2.22.05	<i>The shaft-vibration detector.</i> On line condition monitoring of the systems for the turbine shall also be provided.	Relative shaft vibration measurement as a part of TSI system/online condition monitoring system.	Noted.
52	Vol-III	Part A/Section-2	26	2.22.06	Suitable twin element thermocouples for measurement of temperature of steam in emergency stop valve(s), interceptor valve(s) High pressure Casing (HPC) after Curtis wheel, HPC exhaust bowl, intermediate pressure casing (IPC), inlet bowl, etc., shall be provided. Twin element thermocouples shall also be provided for the measurement of metal temperature of ESV bodies, interceptor valve bodies, IPT steam admission pipes, HPC (upper and lower), HP inner third stage and 2/3 of blading steam path (RSE) metal / steam, IPC (upper and lower), IP bowl (RSE) metal/steam, metal of bearings of turbine etc. Two resistance thermometers each for measurement of temperature of steam in LPC exhaust and of the temperature of drain oil from the bearings of turbine, generator etc. shall be provided	Suitable Twin element thermocouples for measurement of temperature of steam are provided for all mentioned steam turbine components except for HP inner third stage. This is as per BHEL standard practice.	Noted
53	Volume-III	Part A/Section-2	Sheet 26-27 of 109 (Page 30-31 of 113)	2.24.02	The testing shall not cause any unintentional shutdown and shall provide full protection to turbine during testing. It shall cover the following safety devices: i) Trip solenoid valves ii) Over-speed trip. iii) Loss of Vacuum trip. iv) Thrust bearing failure trip (from software) v) Low lube oil pressure trip.	It may be noted that these protective devices are not hydraulic operated rather these functionalities are electronically realized, accordingly testing of same is not envisaged . Moreover, testing Turbine valve and HPT Evacuation valve is done as per OEM standard as a part of AVT (Automatic Valve testing) logic.	Noted
54	VOLUME - III, PART - A, SECTION - 6	TECHNICAL SPECIFICATION COMPRESSED AIR SYSTEM	15	6.01.20	Unless otherwise mentioned in the relevant electrical part/section, automatic motor overload control system shall be included to permit continuous operation of compressors at minimum ambient air without exceeding the name plate rating of the motor.	Please elaborate motor overload control system. Bidder understands that Motor overload protection shall be part of Switchgear electrical circuit. Please confirm.	Noted. Howevr the same feedback shall be considerd in the DCS.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
55	VOLUME - III, PART - A, SECTION - 6	TECHNICAL SPECIFICATION COMPRESSED AIR SYSTEM	14	6.01.09	Auto sequence operation of instrument air compressors & service air compressors has been envisaged through an OEM standard micro-controller located at compressor house	Bidder understand Auto sequence operation indicated in referred clause is for individual compressor sequence which will be part of Compressor mounted machine controller. Please confirm.	Confirmed.
56	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	5	2.11.12	Flame proof enclosure Manual Call point for Main plant area, Transformer yard area, Battery room, Hydrogen storage area, Fuel oil & seal oil areas, FGD area & all miscellaneous buildings, near the exit of each floor.	Please note that Flame proof enclosure shall be provided for MCP installed in Hazardous Area. For other Areas normal MCP shall be provided. Request to confirm.	Bid specification prevails.
57	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	16	4.13.04 4.13.05	Fire Detection and Alarm System The system shall have networked with Main fire alarm panels (FACP) at Central Control Room & similarly with FACP of FGD control room and Repeater panel at Fire Station & Security house. This system shall be interfaced with the FACP panels of BoP Package contractor and Fire Pump House Control and Annunciation Panels (CAP) of BoP Package contractor.	Bidder understands FACP for Bidder scope Area shall be in Bidder scope. For other Areas FACP shall be provided by BoP package contractor as mentioned in clause 4.13.05. Request to confirm. BoP contractor FACP shall be interfaced by BoP contractor with Fire station. Bidder scope FACP panels shall be interfaced with Fire station by Bidder. NO interface envisaged between Bidder FACP and BoP contractor FACP . Request to confirm.	Bid specification prevails.
58	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	17	4.13.07	System shall include the following: xv) UPS for computer and supporting system.	Bidder understands UPS power supply for Fire Alarm System Computer and accessories like printer to be considered. Bidder confirm to provide the same from nearest UPS source. Further Bidder would like to clarify, FACP shall be provided with Non-UPS Power supply inline with NTPC and industry practice as these panels are provided with Battery and Battery charger. Request to confirm.	Bid specification prevails.
59	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	17	4.13.07	System shall include the following: Complete Operator cum engineering work station i.e. PC, VDU & Printer (with latest configuration of reputed make) shall be provided at: a) One no. at Central control room at TG building & b) One no. at Fire Station.	FACP workstation and Printer shall be provided at Main Control room and Fire station. Fire station building is not in Bidder's scope, hence Owner shall provide space and power for workstation and printer located at Fire station. Please confirm. Other FACP of Bidder scope shall not have Workstation and printer. Request to confirm.	Bid specification prevails.
60	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	20	4.13.14	All control cables shall be as follows: i) FRLS cables - Loop cable for signalling line circuit shall be 1pair x1.5mm2 (minimum) as armoured flame retardant low smoke cable (FRLS) type which will be used for connecting detectors, modules, call points and networking of panels & control cables, power cables for Notification appliances	As per Industry, NTPC and State utility boards practice 2 core FRLS cable used for FACP Loop. Bidder propose to use the same instead of Pair cable mentioned in referred clause. Request to confirm. Also request to clarify conductor size for control cables indicated in referred clause.	Confirmed.
61	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	20 12	4.14.02 4.11.02	Control Cum Annunciation Panel (CAP) –Foam Pump House One no. PLC shall be located at control room adjacent to Fire water P/H, which will take care of the control aspects of system at Foam Pump House. vii)The operation of foam system shall be automatic with the aid of fire detection system provided for the fuel oil tanks with a provision for manual operation. Auto/Manual selection switch shall be provided at the local panel.	There is contradiction in referred clause for Foam pump control system. Bidder proposes to follow Local panel as mentioned in clause 4.11.02 for foam system. This panel shall be located in Control room near to Foam pumphouse or on Foam system skid as per Fire protection Vendor (OEM) standard practice. Request to confirm.	Local panel shall only be used with approval of Owner and shall be finalized during detail engg.
62	VOLUME - III PART-A SECTION-10	TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM	18 35	4.16.05 6.00.00 6.01.00 6.01.01 6.01.04 6.01.06 6.01.07 6.01.08	Air Handling Unit (Double Skin Type) ii) A differential pressure indicator & switch across the fine filter shall be indicated in the PLC or fully clogged condition shall be indicated. OPERATION AND CONTROL PHILOSOPHY Air Conditioning and Ventilation System Operation and control of the complete HVAC system shall be through a dedicated/extended PLC/DCS (as specified in the C&I Part).... 2 nos. OWS/EWS comprising 24"monitors, PC, A4 colour laser Printer..... Local start/stop push button station for AC plant auxiliaries linked with central PLC panel would be provided; the stop push button shall be lockable Fire damper controls shall be implemented in AHU local control panel. Fire damper position shall be indicated on LCP with the help of limit switches One collective fault signal from each AC control system shall be hardwired to DDCMIS for annunciation.	In referred clauses there is contradiction to consider PLC or DCS based control system for HVAC system. We understand DCS based control system to be considered inline with C&I technical specification instead of PLC based indicated in Vol-III Part-A. Further number of OWS and Printer of DDCMIS shall be as per DCS Architecture drawing ETG106-SES-CI-DCS-CD-001. Chiller shall have respective machine mounted control unit. This control Unit shall be interfaced with DCS. Number of controllers shall be as per functional grouping guidelines	A) Bidder to follow the C&I part of detailed technical specification. B) Noted. C) Noted.

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63	VOLUME - III PART-A SECTION-10	TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM	36	6.01.11	Control of Ventilation System Common PLC/DCS system shall cover the controls of following ventilation	indicated at clause 2.06.16.	D) Noted.
	VOLUME - III PART-C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	28	6.02.00 6.02.02 2.06.16	Connectivity to DDCIMS i) The connectivity between DDCIMS & PLC system shall be OPC compliant over fibre optic cable and shall be used for monitoring purpose only. Other system DCS functional Block ii) Main Plant AC common Block iii) Main Plant AC Block iii) Service Building AC Block	Also Fire dampers shall be interfaced with respective area DCS. NO separate local control panel for AHU is envisaged in areas where DCS panel is available. Local panel shall be provided for areas where DCS is not available (non plant building, if any) for interfacing of Fire dampers as well as respective area Package AC Units, if applicable. For BOP Areas (not in Bidder scope) like AHP LCR, CHP LCR , WS LCR & Non-plant building the HVAC system shall interface with Owner scope DCS of respective BOP package. Request to confirm.	E) Use of local panel is subject to the approval of Owner. F) BoP area HVAC systems, for eg. AHP, CHP, WS LCRs will be interfaced with BoP DCS system.
64	Volume-III	Part B	Sheet 60-61 of 597 (Page 64-65 of 601)	2.05.00	xiii) iv) Vibration monitoring system (This shall be realized in DDCIMS): At least six (6) numbers of dual axis optical sensor type vibration pickups at each end of over hang portion of the winding shall be provided, symmetrically located around the periphery with connection to Turbine Supervisory system for vibration monitoring and analysis. The connection between the pickups and Turbine Supervisory system for vibration monitoring shall be provided. Also a standalone station for the vibration monitoring system shall be provided.	As Generator winding bars are tightly fitted/bounded with each other and further suitable support has been provided to each bars. Hence, very less vibration seen in tangent direction and vibration always seen in radial direction only. Hence, as per OEM standard practice and to meet tender specification requirements, it is proposed to provide 12 No. single axis (instead of dual axis) optical sensors each side (TE & EE side) for measuring radial vibration only.	Noted
65	Volume-III	Part B	Sheet 61 of 597 (Page 65 of 601) & Sheet 578 of 597 (Page 582 of 601)	2.05.00 & 26.03.00	xiii) vi) Online partial Discharge (PD) monitoring System: The system offered shall be applicable to the turbo Generator of large rating confirming to IEEE-1129, 1434 / IEC60034-27-2. Sensors for to be provided for on-line partial discharge (PD) monitoring complete with all software and hardware. Permanently connected independent sensing unit for each generator shall be provided along with necessary terminal equipment. However, evaluation unit for all generators in each station shall be common and portable. Latest software shall be provided to interpret the PD result. It shall also be suitably connected to TG MMI. A minimum of two Nos. per phase, sensors (e.g. combination of slot coupler and coupling capacitors etc.) shall be located as per the recommendation of supplier of PD Analyser. Also, as per as per technical Specification Volum-III, Part-B, Cl. 26.03.00 LIST OF MINIMUM REQUIREMENTS, Sl. No. 33, quantity specified for this system is 2 no.s. hence, 2 sets of Partial Discharge monitoring system , i.e. 1 no./ unit is requirement as per technical specification.	Online PD monitoring system is not included in our offer as the performance of systems available in the market and their noise cancellation effectiveness is not proven and is not verifiable against any reference.	Bid Specification Prevails
66	Volume-III	Part B	Sheet 346 of 597 (Page 350 of 601)	15.00.00	Electrical Actuators - Non Integral Starter	Electrical motor Actuators in BHEL HWR scope shall be provided with Integral Starter as per Technical Specification Volume-III, Part-C, Cl. 9.10.00. This is also as per standard practice of BHEL for all supercritical sets.	Non-integral starter philosophy has been adopted for all electrical motor driven actuators in this project. In respect of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-Integral Type only. Please refer BTG C&I amendment 7, Sr.no.8
67	Volume-III	Part B	Sheet 348 of 597 (Page 352 of 601)	15.06.00	15.06.01 ii) The actuator enclosure shall be totally enclosed, dust tight, weather proof (NEMA-6/IP-68) suitable for outdoor use without necessity of any canopy.	Please refer clarification regarding Electrical actuators above. Additionally, actuator enclosure shall be suitable to IP-65 as per standard practice of BHEL.	Bid Specification Prevails
68	III	B		15.06.03 v)	The motor actuators shall have 2 nos. potentiometric type transmitters of 100 ohm rating.	Bidder understand that clause 15.06.03 mentioned against first reference is applicable for modulating/inching type motorised valves as mentioned in second reference (clause 15.06.03) also. Further one potentiometric type transmitter shall suffice the requirement. Kindly confirm.	Tender terms and condition shall prevail.
	III	C		9.14.02	Position Transmitter (For Modulating/Inching Type)		

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
69	III	B		15.06.04 i)	Motor actuators shall be provided with clearly visible local position indicators mounted on the operator assembly itself. Suitable transducers shall be provided for remote indication of the position.	Bidder understand that clause 15.06.04 mentioned against first reference is applicable for modulating/inching type motorised valves. Kindly confirm.	Noted
70	Volume-III	Part C	Sheet 2-3 of 352 (Page 6-7 of 356)	1.02.02	Similarly, all other C&I equipment/systems/sub-systems/ instruments and accessories in the power cycle shall also be of make and model whose guaranteed and trouble-free performance has been proven at least for one year for one reheat type pulverized coal fired units of unit size of 500 MW or above.	For Instruments in Steam Turbine & Generator Applications, it will be ensured that make and family offered to the extent possible are guaranteed and trouble-free performance has been proven at least for one year for any power plant of unit size of 200 MW or above as on the date of opening of Bid	Tender terms and condition shall prevail.
71	Volumelll,Part C		3	1.03.03	To ensure availability, adequate redundancy in system design shall be provided at hardware, software and sensor level to satisfy the availability criterion mentioned above. For the protection system, independent sensing devices shall be provided to ensure adequate safety of plant equipment. For Turbine protection system, BFP Turbine protection system & HP LP Bypass system, sensing device as per Bidder standard and proven practice shall be provided.	Bidder clarify that redundancy criteria will be considered for critical control loops of Boiler.	Tender terms and condition shall prevail.
72	Volumelll,Part C		3	1.04.00	The bidder shall ensure that various C&I instruments / equipment like vibration monitoring system, electronic transmitters/ transducers, Temperature elements and other instruments/ local devices etc. that are being furnished by the bidder, are of the same make, series and family of hardware so as to ensure smooth and optimal maintenance, easy inter changeability and efficient spare parts management.	Bidder clarify that Model, series, make of various C&I instruments /equipment like vibration monitoring system, 4-20mA electronic transmitters / transducers, Temperature elements and other instruments/ local devices etc will not be same as manufacturers are totally different.	Tender terms and condition shall prevail.
73	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	3	1.04.01	The bidder shall ensure that various C&I instruments / equipment like vibration monitoring system, electronic transmitters/ transducers, Temperature elements and other instruments/ local devices etc. that are being furnished by the bidder, are of the same make, series and family of hardware so as to ensure smooth and optimal maintenance, easy inter changeability and efficient spare parts management. For the instruments that are proposed to be connected to Bidder's Steam Turbine Generator integral controls and other Skid Mounted instruments, Bidder's standard and proven instruments are acceptable.	Bidder wish to clarify that for Boiler, Turbine and skid mounted instruments, C&I instruments/ equipment/ system shall be provided as per respective OEM standard practice. For balance packages, Bidder will endeavour to consider same make of instruments, to the extent possible. Please confirm.	Bid specification prevails.
74	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	5	1.05.06	All software and firmware user licenses shall be valid for entire life of power plant. User should not have to pay any recurring license fee during the usage period of the system. License will be provided on permanent basis and for <u>any upgradation of software (for operating system & Firmware) for minimum fifteen years without any financial implication to the owner.</u>	Bidder wish to inform that latest version of hardware and software for DDCMIS available at the time of design freeze shall be provided. Further, software updates shall be provided without any implication up to completion of three years Annual Maintenance Service (AMS) period. Further, after completion of AMS period, Customer may directly enter in to a separate Annual maintenance contract with the selected vendor for all services including software update/ upgrade. Please confirm.	Bid specification prevails.
75	III III III III	C C C C		1.06.02 1.06.03 1.06.04 1.06.05	All equipment / instruments envisaged for sea water applications,..... For coastal areas, all equipment / instruments/ accessories shall be provided with durable epoxy coating,..... For coastal areas, all impulse piping / air supply piping For coastal areas, all conduits / cable sub trays / cabling accessories shall be provided with	As per bidder undersatanding, these clauses shall not be applicable for this tender. Kindly Confirm.	Noted

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76	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	7	1.08.02	CONTROL AND MONITORING FROM CCR i) Fire water & Booster system for this project is envisaged to be controlled mainly from the Large Video Screens (LVS) in association with the operator workstation (OWS) mounted on the Unit Control Desk (UCD) located in the Central Control Room (CCR) under all regimes of operation.	There is contradiction in referred clauses regarding Fire water system and Foam system control system. Bidder understands Control Cum Annunciation Panel (CAP) for Fire Water Pumps shall be provided by BOP package Contractor as per clause 4.13.05 of Vol-III/Part-C and clause 4.40.20 of Vol-II/section-2. Hence, CAP as well as annunciation panel in Fire water pumphouse mentioned in 4.13.10 is not in Bidders scope. Please confirm, Further Bidder request to clarify Why Fire water pumps related requirements are indicated in clause 4.14.03 of Control Cum Annunciation Panel (CAP) –Foam Pump House. Bidder understands Control Cum Annunciation Panel (CAP) for Fire Water Pumps shall be interfaced by BOP contractor with Main Plant DCS to achieve remote monitoring of Fire water and Booster system from Main control room LVS as mentioned in clause 1.08.02. Please confirm.	Fire water system for BTG scope of supply shall be under BTG vendor's scope. Fire water pump house amd Main Fire Water Pumps shall be under BOP package scope. Fire Water Booster Pumps (if required) will be in BTG bidder's scope.
	VOLUME - II / SECTION-2	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	101	4.40.20	d) there shall also be following off site plants (which is not considered in bidder's scope and will come under BoP package contractors scope..... 6) Fire water Pump House Equipments This system shall be interfaced with Fire Pump House Control and Annunciation Panels (CAP) of BoP Package contractor In addition, an annunciation panel shall also be provided in firewater pump house. This panel shall indicate status of pumps, system pressure, hydrant system in operation, water spray system in operation, etc. The central monitoring station shall give audio-visual annunciations for fire in each of the risk areas, status of protection systems such as water spray on, gas system injected, status of fire water pumps, trouble status of detector cabling for detection associated with spray systems, etc. Status of drives and critical parameters shall be provided for interfacing with DDCMIS.		
	VOLUME - III / PART - A/SECTION - 8		16	4.13.05	Control Cum Annunciation Panel (CAP) –Foam Pump House Control panel shall be having following features: i) Indication Lamps/Ammeter a) Tripped, ON/OFF indication for motor driven hydrant pumps, spray pumps, jockey pumps, air compressors & ON/OFF Indication for diesel engine driven hydrant & spray pumps. b) Control Supply ON Indication. c) Ammeter for motor driven hydrant pumps, spray pumps & jockey pumps.		
			19	4.13.10			
				4.14.00 4.14.03			
77	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	7	1.08.05	As per contractor's proven practise, A back-up panel shall house annunciator lamps, remote level indicators etc. In addition, hardwired push button stations shall be provided on operation desk /console to provide to ensure fast and reliable tripping of the unit and major auxiliaries in case of emergency.	Unit control Desk with hardwired pushbuttons and indicators shall be provided as per process requirement. Alarm Annunciation shall be LVS based. There is no drum , hence Remote level indicators are not envisaged.	Hard wired pushbuttons,indications with Annunciation shall be provided for all critical equipment and shall be decided DDE
78	III	C		1.08.07	DRIVE CONTROL PHILOSOPHY All Drives shall have its local control station comprising of start and emergency stop pushbutton and with a local & remote selection switch in SWGR/MCC (Refer electrical volume of the specification). Local stop pushbutton shall always be active. During the trial run of drives from local, safety permit and protection shall be ensured.	Bidder understand that signal exchange between DCS and drives (LT/BID/HT/SOL/PNEU etc) shall be in line with Clause 1.08.07 mentioned against first reference. Accordingly facility of only emergency stop PB in local push button station shall be provided. Hence safety permit and protection signal for local operation shall not be applicable. Kindly confirm.	Tender terms and condition shall prevail.EPBS operation feedback shall be considered separately in DCS.
	III	C		10.01.16			
79	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	9	1.08.07	2. DCS/ PLC INTERFACE FOR BIDIRECTIONAL LT DRIVE Open Torque switch feedback Close Torque switch feedback	Torque switch feedback is not recommended to be wired to DCS/PLC. The same shall be part of Actuator Fault considering industry practice followed in NTPC projects and other state utility projects. .	Bid specification prevails.
80	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	10	1.08.07	6. DCS/PLC INTERFACE FOR PNEUMATIC DRIVE Open limit switch feedback Close limit switch feedback	Open / Close limit switch feedback shall be considered as applicable and indicated in Tender P&ID.	Bid specification prevails.
81	VOLUME - III / PART - C	-	10	2.01.02	Same make DCS software and hardware is to be provided for all DCS systems indicated above including control system for SG, TG & Auxiliaries systems of Unit DCS defined above	Bidder wish to clarify that Control and protection system for Boiler and Turbine shall be provided as per respective OEM standard practice. TG-BOP, FGD and other BTG systems shall be implemented in same make of DCS. SG Control system and TG control system shall be suitably interfaced with BTG DCS. Please confirm.	Bid specification prevails.
82	VOLUME - III / PART - C	-	10	2.01.02 (h)	Makeup water system (MUWS) DCS (one set common for all generating unit)	As per Cl. No. 2.01.14 of Part-A, Bidder understands that make-up water system is part of BOP contractor's scope and hence control system for make-up water shall also be supplied by BOP contractor. Make-up water system DCS indicated in Cl. No. 2.01.02 (h) of part-C is not in BTG contractor's scope. Please confirm.	Control system scope of make -up water shall be inline with mechnical scope.
			27	2.06.16 (xi)	Make up Water System DCS a) This system has one process block for Make-up water.		
	VOLUME - III PART-A	TECHNICAL SPECIFICATION CW & ACW SYSTEM	3	2.01.14	Make-up will be in BoP contractor's scope, based on the signal from the CW sump/fore-bay level transmitters which is in BTG scope		

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83	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	12 14	2.03.06 2.03.07	i) All the signal exchange between various functional groups of each control group (i.e. within SG - C&I, TG - C&I and BOP - C&I) shall be implemented through redundant main system bus (the main bus connecting various subsystems) and local system bus within a sub-system as per the standard practice of the contractor iii) Control & protection signal exchange between SG- C&I, TG-C&I and BOP - C&I shall be hardwired only V.d) In case inputs/outputs are required from one logic to another, they can be soft wired provided, they are on same processor. For those inputs outputs resident on other processors, the same shall be hardwired	There is contradiction between two referred clauses. Bidder proposes to follow clause 2.03.06.i inline industry practice followed in NTPC projects and other state utility projects.	Bid specification prevails.
84	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	13	2.03.07	REDUNDANCY AND PARTITIONING i.) f) Critical drive related modules	Request to elaborate critical drives	Shall be finalized during detail engg.
85	VOLUME - III / PART - C Vol-II/Section-2	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION LEAD TECHNICAL SPECIFICATION	15 90	2.03.07 4.40.12.ii 4.40.12.vi	VII) Critical inputs shall be supplied with redundant sensors/transmitters with each input connected to different input cards. 2 out of 3 redundancies for critical close loops as mentioned in Vol-III/Part-C, clause 3.29.00 All switches and sensors for tripping of Boiler and Turbine auxiliary equipment (like BFP), which in turn cause Boiler and/ or Turbine Trip, shall be implemented with 2 out of 3 philosophy.	Bidder shall follow 2 out of 3 redundancies for critical close loops as mentioned in Vol-III/Part-C, clause 3.29.00 and for open loop as per Vol-II/Section-II, clause 4.40.12.vi . Request to confirm.	Shall be finalized during detail engg.
86	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	14	2.03.07	V.b) The same inputs shall not be used for both control and interlock (either binary or analog) vide if process signals are independently available	Separate instruments for Control and Interlock is not envisaged. Hence, stated requirement is not applicable. Please confirm.	Separate instruments for Control and Interlock is not envisaged.
87	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	14	2.03.07	V.d) Output cards shall be independent for each control loop 1) Each HT motor and unidirectional drives shall have dedicated output cards. No other drive shall be combined with HT motor drive output card. 2) Not more than two bidirectional drives shall share one output card 3) For unidirectional drives, not more than one drive will be allotted to one output card. For back up instruments on the panel or outputs, not more than two devices shall be driven by one output card.	Bidder proposes to assign outputs of redundant drives / valves in separate output cards inline with industry practice followed in NTPC projects and other state utility projects. Please confirm.	Bid specification prevails.
88	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	13 15	2.03.07 2.03.07	The following shall be completely redundant: V. f) Critical drive related modules V.iii)The use of redundant outputs driving the same final element or equipment shall generally be avoided in favor of failsafe design and redundancy of the plant equipment.	There is discrepancy in referred clause. Bidder proposes to follow Cl. no. 2.03.07. Please confirm.	Both the clause are different. f) Redundant DO module shall be used for critical drives. VII) The use of redundant outputs driving the same final element or equipment shall generally be avoided in favor of failsafe design and redundancy of the plant equipment.
89	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	16	2.03.08	i) The on/off status of HT drives of Unit DCS will be wired to DI modules in parallel. The open/ close status of sync type electrical breakers of Unit DCS will be connected in parallel to DI and DISOE modules. For these types of drives in other DCS systems the status will be connected to only one DI module. ii) Status of remaining signals (other than On/Off as defined above) of HT drives & sync type electrical breakers of the DCS are to be connected to DISOE module; for HT drives & sync type electrical breakers in DCS these will be connected to DI module	Requirement indicated in referred clauses is not clear. Bidder proposes to consider as below, inline with executed projects for central and state utilities: UNIT DCS ON/OFF status of HT drive of UNIT DCS will be wired to two DI modules in parallel. Other HT Drive signals of Unit DCS will be connected to DI SOE module. OPEN / CLOSE status of UNIT SYNC BKR will be wired to 1DI and 1DISOE modules in parallel in Unit DCS. Other signals will be wired to normal DI module OTHER DCS For HT drive of other DCS ON/OFF status as well as other signals will be wired to normal DI module. For SYNC BKR of other DCS Open/ Close status as well as other signals will be wired to normal DI module. Request to confirm.	Bidder to follow the following philosophy for Unit DCS and Other DCS: ON /OFF status of HT drive of UNIT DCS will be wired to two DI modules in parallel. Other HT Drive signals of Unit DCS will be connected to DI SOE module. OPEN / CLOSE status of UNIT SYNC BKR will be wired to 1DI and 1DISOE modules in parallel in Unit DCS. Other signals will be wired to normal DI module.

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90	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	15	2.03.08 (b)	a) 10% spare channels in each of the functional groups, fully wired upto marshalling cabinets. b) Ten percent (10%) installed spare I/O modules which shall be capable of hot swapping	Bidder wish to inform that as per industry standard practice 10% spare channels are sufficient. Separate 10% spare I/O modules are not required. Hence, Bidder request customer to delete the requirement of additional 10% spare I/O modules. Please confirm.	Bid specification prevails.
91	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	18	2.04.06	SEQUENCE OF EVENTS RECORDING SYSTEM (SOE) vi) SOE in other subsystems of DCS shall also be integrated into this system.	Bidder understand SOE is applicable for Unit DCS Only. Request to confirm.	Bidder to consider SOE in other DCS (Except Unit DCS) for Critical HT Drives of other systems.
92	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	19	2.04.08 (i)	The master clock shall synchronize DCS of all the units and stand-alone common system and other DCS subsystems at suitable intervals to maintain uniform time throughout the power station	Bidder request customer to inform the number of time synchronization signals and type of protocol required for time of synchronization of Customer scope systems with Bidder's Master clock system.	Bid specification prevails.
93	Volumelll,Part C		19	2.05.02	ANALOG SIGNAL CONDITIONING & PROCESSING	Analog I/O modules will be as per proven DDCMIS OEM standard from Customer approved vendors.	Bid specification prevails.
94	Volumelll,Part C		21	2.05.03	BINARY SIGNAL CONDITIONING & PROCESSING	Binary I/O modules will be as per proven DDCMIS OEM standard from Customer approved vendors.	Bid specification prevails.
95	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	21	2.05.03	The changeover type contacts (i.e. 'NC' + 'NO' together) shall be wired to the control system for all the binary inputs required for control purposes, except for inputs from MCC/switchgear, actuators and inputs related to hardwired signal exchange among various functional group for which non-changeover type contacts ('NC' or 'NO') shall be wired to the control system.. The binary inputs required for information purposes only shall be wired to control system in the form of non-changeover type contacts.	Bidder request to clarify/ elaborate requirement changeover type contacts for all the binary inputs required for control purposes, except for inputs from MCC/switchgear, actuators and inputs related to hardwired signal exchange among various functional group.	Bid specification prevails.
96	Volumelll,Part C		23	2.06.00	Functional Grouping of Controller	Bidder recommends to follow standard functional grouping as per OEM proven practice which is executed and running successfully in projects in India / World wide.	Bid specification prevails.
97	VOLUME - III / PART - C 03 ETG061-BTG-ME-SG-LDO-PFD-001	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION LDO SYSTEM FLOW DIAGRAM	23	2.06.00	Functional Grouping of Controller	As per LDO system flow diagram, Bidder understands the scope of BTG contractor is from existing fuel oil storage tanks / Unloading header onwards. Note-10 of flow diagram indicates "COMPLETE CONTROL IS IN THE SCOPE OF BIDDER'S DDCIMS.". However, fuel oil system is not mentioned in DCS functional grouping described under clause 2.06.00. Bidder request to include controls of equipments located at existing area in existing DCS or request to provide space & power for installation of Standalone DCS RIO panels in existing FOPH I&C room/LCR. For Equipments located in New plant plot area, Bidder proposes to implement in Standalone DCS as separate process block for LDO system. Request to confirm.	Bidder to consider the instrumentation as per mechanical scope for Fuel oil system.
98	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	24 55	2.06.13 3.04.00	SG SYSTEM FUNCTION BLOCK ESP Control System comprising of Fly ash handling system including deashing from ESP hoppers, precipitator management system, T/R set controllers, rapper controllers APH hoppers & SCR system hoppers, etc. shall be implemented in this DCS. ESP Control System	ESP control system is mentioned under DCS functional grouping under clause 2.06.13, however the same is indicated as EPMS microprocessor based system under clause 3.04.00. Bidder shall consider ESP control system as per clause 3.04.00. Request to confirm.	Bidder may consider DCS-RIO/ PLC based system.
99	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	24	2.06.14	TG SYSTEM FUNCTION BLOCK: ii) The functionality of Gland steam system controls, Turbine and Generator Auxiliaries including Oil System, Vacuum system , seal oil system, stator water system, Turbine Extraction NRV system etc can be implemented in the above block or a separate block.	Bidder proposes to implement Vacuum system and Extraction NRVs in another FGs of TG system like BFP Drive Turbine-A block or BFP Drive Turbine-B block. Request to confirm.	Bidder to consider the controller grouping and redundancy philosophy as per tender specificatin. However, functional grouping shall be decided during detail engineering as per OEM philosophy.
100	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	25	2.06.14	TG SYSTEM FUNCTION BLOCK: v) BFP Drive Turbine-A block: This block will consist of BFP Drive Turbine-A OLCS and CLCS controls, including EHTC/protection of Drive Turbine-A and auxiliaries of Drive Turbine-A. vi) BFP Drive Turbine-B block: This block will consist of BFP Drive Turbine-B OLCS and CLCS controls, including EHTC/protection of Drive Turbine-B and auxiliaries of Drive Turbine-B	Bidder wish to clarify that BFPT Governor control and Overspeed protection controls shall be implemented in BFPT OEM standard and Proven Control system. Rest of the controls indicated in referred clause will be implemented in Unit DCS respective BFP Drive Turbine block. Request to confirm.	Bidder to consider the controller grouping and redundancy philosophy as per tender specificatin. However, functional grouping shall be decided during detail engineering as per OEM philosophy.

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101	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	26	2.06.16	2.06.16 STAND-ALONE DCS vii) Cooling Tower Fan System a) Separate FG shall be assigned for Cooling tower fan	As per Flow diagram "16 ETG061-BTG-ME-CW&ACW-FS-001_CW & ACW SYSTEM", the cooling tower is in BOP contractor scope. However, in referred clause 2.06.16, functional grouping Cooling tower is in Bidder scope Standalone DCS. Please confirm whether DCS block for cooling tower is in Bidder scope or not. If yes, please provide IO count for Cooling Tower Fan System. Separate FG shall be considered for each Unit Cooling tower fans (i.e. One FG for each Unit cooling tower fans. Please confirm.	Cooling tower fan control system shall be under BTG vendor's scope. IO count will be finalized DDE. For bidding purpose bidder to consider I/O count based on prior experience
102	III	C		2.06.16 vii)	STAND-ALONE DCS Separate FG shall be assigned for Cooling tower fan.	Bidder understand that the Cooling tower fans are not part of tender, hence control system shall not be envisaged. Kindly confirm.	The operation, control and monitoring of Cooling tower fans are under BTG packages.
103	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	27 42	2.07.00 2.20.00	Binary Controls /Open Loop Control System (OLCS) 2.07.02 The sequence control shall provide safe and automatic start up and shutdown of plant and of plant items associated with a plant group Automatic Unit Start-up & Shutdown with Single Command	Bidder request to clarify , Plant Automatic Start-up and Shutdown is not implemented and in operation for any supercritical/Ultra supercritical plant. Therefore, Group/Sub-group level Automation will be implemented. Request to confirm.	Bidder to implement Group/Sub-group level Automation with Master Sequencing. However Group & Sub-groups shall be decided during detailed engineering.
104	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	28	2.07.06	For the drives, the command shall be provided through O/P module to the coupling relays in MCC/SWGR/Actuator/Relay Cabinets as applicable.....(Redundancy in drive outputs shall be provided for drive.)	Redundancy in drive output shall be provided inline with Redundancy criteria specified elsewhere in specification. Request to confirm.	Bid specification prevails.
105	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	30 of 352	2.10.03	The Hard disk capacity shall be sufficient to store at least One (1) year data Suitable facility for retrieval of data shall also be provided.	Bidder would like to clarify that the Hard disk capacity to store 90 days of data will suffice and a suitable facility for retrieval of data shall be provided as per general practice based on bidder's past project experience. Kindly confirm.	Bid specification prevails.
106	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	34	2.11.08	ii) The HMI/PLC shall include c) Server: 2 no's Server cum information work station in redundant mode for each DCS /redundant EWS..... d) Programmer cum documentation station: 14 Programmer station for the unit	Requirement mentioned in clause (c) is clear. However, requirement mentioned in clause (d) is contradictory and seems typo. Request to clarify.	(d) Bidder shall consider 14 nos of MIS stations. Locations shall be as per clause number 2.11.08 .
107	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	34	2.11.08	f) Servers/Workstations: ... Operator workstations/ Other workstations: Redundant hot swappable power supply: 2 Nos	Please note that Redundant hot swappable power supply is not available in workstation machines. Therefore request to re-check requirement.	Bid specification prevails.
108	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	34 of 352	2.11.08 (iii)	Servers/Workstations 1. CPU: Min Intel Xeon, Turbo, DDR4 Or Better	Bidder wish to clarify that DCS Servers, Operator workstations/other workstations hardware specification shall be provided as per latest proven and validated hardwares tested and released by DCS OEM. Please confirm.	Bid specification prevails.
109	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	36	2.11.08.v	Min Number of MIS Station	Admin Building is not in Bidders scope. Therefore Owner shall provide space and power for MIS workstations to be located at Admin building. Request to confirm. Also Owner shall clarify distance between Main Plant control room to Admin building to consider FO cable for connectivity. Request to confirm.	MAHAGENCO shall provide space and power for MIS workstations and shall be finalised DDE. MAHAGECO shall provide the required information.
110	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	40	2.12.14	A redundant station-wide LAN for connecting the unit and other sub systems of DCS, PLCs (as applicable), PC stations etc. as well for connecting to the other off-line services of the Station & connecting to IT LAN. This shall include all cables and accessories required for connecting contractor's system upto the Employer's systems such as ERP , etc.	Bidder request to clarify in which buildings interface with Contractors ERP system is envisaged. Bidder terminal point shall be Ethernet switch of Employer ERP system. Request to confirm.	Tender terms & condition shall prevail. Interfacing shall be with ERP which is located in the existing service building of the plant.
111	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	40 of 352	2.12.14	A redundant station-wide LAN for connecting the unit and other sub systems of DCS, PLCs (as applicable) , PC stations etc. as well for connecting to the other off-line services of the Station & connecting to IT LAN.	Bidder request Customer to clarify "other off-line services of the Station & connecting to IT LAN".	No other off-line system is required.

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112	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	41 of 352	2.15.01	The programming station shall be equipped with a system/software to calculate the tuning constants i.e. P, I and D values of control loops automatically.	PID tuning is part of commissioning activity and will be done by Bidder's personnel. Once PID is tuned and plant handed over then, parameters are not required to be adjusted. Hence, auto-tuning software shall not be considered. Please confirm.	Bid specification prevails.
113	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	43 of 352	2.22.04	The redundant buses shall be physically separate and shall be routed separately.	Bidder wish to clarify that redundant buses shall be routed on separate routes to the extent feasible. Please confirm.	Bid specification prevails.
114	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	44	2.25.00	Marshalling, Relays & Relay Cabinets	Tender specification does not indicate cabling scheme for interfacing of Switchgear/MCC/MOV signals with DCS/PLC. Bidder proposes to consider Single common philosophy as indicated below for switchgear/MCC interface inline with philosophy followed in NTPC project and state utility projects. Please confirm.	Shall be finalised DDE
115	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	44	2.25.06	ii) Minimum 4 pair Instrumentation Cables shall be used for connection between field / JB and DCS marshalling cabinet and all the cores of 4 pairs or its multiples to be terminated in the marshalling panel (including spare cores) sequentially as per color coding philosophy indicated in the corresponding Tender Drawing	Bidder could not found Tender drawing referred in clause. Bidder request to provide tender drawing.	No tender drawing has been issued . Bidder to confirm Minimum 4 pair Instrumentation Cables shall be used for connection between field / JB and DCS marshalling cabinet and all the cores of 4 pairs or its multiples to be terminated in the marshalling panel (including spare cores) sequentially.
116	III	C		3.01.03	Triple Modular Redundant (TMR) TUV & SIL 3 processors for BMS (FSSS) & Boiler protection with fail safe design cards shall be provided by the bidder.	Request MAHAGENCO to accept BMS (FSSS) & Boiler protection with SIL 2 or above instead of TUV & SIL 3 certified System.	Noted
117	VOLUME - III	Page 56 Doc no.: ETG061-BTG-C&I-TS		Clause No: 3.04.03	hopper heaters, (Hi & Low) Level sensor for each Buffer Hopper and NOGS based level sensor each ESP Hopper (First to Third Field)	The NOGS type / radar type level transmitter is yet to be commissioned and proven for ESP hopper applications. The cost is higher than the cost of conventional Ash level indicators, and the vendor availability is limited. Hence, owner may kindly consider conventional ash level indicators instead of NOGS / radar type level transmitter for ESP first three field hopper applications. Owner may kindly review and confirm	Tender Terms and Conditions prevail.
118	VOLUME - III	Page 125 Doc no.: ETG061-BTG-C&I-TS		Clause No: 7.01.18	In Bunker, silos and first field of ESP radar type level transmitter (minimum two numbers at each measurement location) shall be provided. Level switches shall be provided at each hopper		
119	VOLUME - III	Page 149 Doc no.: ETG061-BTG-C&I-TS		Clause No: 7.09.04	NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System for ESP hopper		
120	Vol III	Part C		3.07.02	Flame Monitoring System Flame monitoring system shall be provided for the following: viii) Early warning of flame instability, flame-out condition and diagnosis of Burner Malfunction. ix) Pre selectable "Flame Off" response time. xi) Automatic shutter closure/ retraction on high temperature.	Microprocessor based BHEL's standard BHELSCAN model flame scanners are offered for flame sensing in visible light spectrum. This is a proven system for coal fired boilers. In the bidder envisaged flame scanner system, Flame intensity signal (4-20 mA) is connected to DCS through which flame instability, flame out can be detected. Also, Scanner fault output is available & connected to DCS. As per NFPA standard, On loss of an individual burner flame, that individual burner's safety shutoff valve shall be automatically closed immediately. Hence Flame off response time is not applicable to the system. Also, electronic portion is mounted away from the furnace at ambient temperature zone and hence automatic shutter closure/ retraction on high temperature arrangement is not required.	Tender terms and condition shall prevail.
121	Volumelll,Part C		61	3.11.03	Acoustic Pyrometers The measuring range should be sufficient to cover the entire regime of boiler operation and shall not be less than 1900°C. The mean temperature and profile temperature accuracy shall be ± 2%, & ± 4% of reading respectively or better. Full colour visual display and colour printer output shall be provided. The system shall also provide 4-20mA DC output for boiler C&I and station BOP C&I part of DCS.	Bidder clarify that acoustic pyrometer will be linked to DCS through OPC and provide signal through OPC link. As this system is used only for monitoring , hardwired 4-20mA DC signal to DCS is not required	Tender terms and condition shall prevail.

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122	Vol III	Part-C		3.13.01 3.13.07 3.13.09 3.13.11 3.13.12 3.13.13 3.13.14 3.13.15	Furnace and Flame Viewing System Two numbers of cameras shall be included to view the furnace flame. Camera Module: Features: ☐ IP camera (high resolution camera system – Full HD (1920x1080), communication interface, connector) Control unit (Media supply & Monitoring) The control unit switchboard (IP65) contains the media control and the electrical control of the camera system: Signal transfer to EUvis converter unit (Ethernet, loss-free) The images of the camera and all signals are transferred to a high performance visualization server via Ethernet. ☐ User Station (one unit) - Workstation (PC) Visualisation and Control Software Thermographical Analysis Video Monitoring ☐ The images of the camera are displayed on a high performance video monitor. ☐ LED color television monitor (one unit) ☐ Resolution 1920 x 1080 Communication Module Communication module allows exchange of system status with DCS (plant process data interface) ☐ Digital communication (DI/DO) ☐ Bus Communication (OPC)	As per Cl 3.13.01-Vol III-Part C, Furnace flame viewing system with 2 visible light cameras are provided for viewing the furnace flame. The system comprises of Retract mechanism, Local control box, Monitor & Digital video recorder Thermographic analysis system including IP camera, Control unit, visualisation server, visualisation & control software, thermographical analysis, video monitoring, communication module are not offered due to limited availability.	Tender terms and condition shall prevail.
123	Vol V	Annexure 3		4.00.00	1.1.1 (B) Furnace & Flame Viewing System i) IP Camera (high resolution camera, communication interface connector & Retractable Unit) - 1 No ii) Service kit consisting of various optical, electrical and pneumatic spare part set -1 No		
124	Volume-III	Part-C		3.17.02.iv	ID FAN iv) For vibration monitoring in X & Y directions at driving and non-driving ends, vibration monitors shall be provided with digital and analog 4 – 20 mA outputs..	FD, ID & PA Fan bearing housings are mono-block type with all the bearings located in single housing. Hence, two vibration probes per Fan are provided on the mono-block bearing housing for X- & Y- direction vibration monitoring in Fans. However, two vibration probes each on DE & NDE side are provided for Motor vibration monitoring. This practice is followed by BHEL in all Axial Fans across all sub-critical & super-critical TPP's. This is in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package. MAHAGENCO is requested to accept the same.	Noted.
125	Volume-III	Part-C		3.17.03.iii	FD FAN iii) For vibration monitoring in X & Y directions at driving and non-driving ends. Vibration monitors shall be provided with digital and analog 4 – 20 mA outputs...		
126	Volume-III	Part-C		3.17.05.iv	PA FAN iv) For vibration monitoring in X & Y directions at driving and non-driving ends. Vibration monitors shall be provided with digital and analog 4 – 20 mA outputs...		
127	VOLUME - III	PART - C/TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION		3.18.02	Turbine Related Control System Turbine Protection and Trip system (TMR – Triple modular redundant philosophy) shall be TUV & SIL 3 certified system. All other controllers shall be dual redundant. The control system shall be adequate for the check-out, initial start-up, commissioning and maintenance / trouble shooting, normal operation of the set including starting, run-up, synchronizing, loading, run-back, run-down, normal and emergency shut-down etc.	The control & protective function are included as a part of Turbine Control System (TCS) and Turbine Protection System (TPS), they will be configured by our standard practice establishment by our long experience. TCS: Microprocessor based dual redundant. TPS: Microprocessor based triple redundant. It includes all the protective/trip function. However these systems are not TUV/SIL certified. This is as per OEM standard and proven practice.	Noted
128	III	C		3.18.02	Turbine Protection and Trip system (TMR – Triple modular redundant philosophy) shall be TUV & SIL 3 certified system.	Request MAHAGENCO to accept Turbine Protection and Trip system with SIL 2 or above instead of TUV & SIL 3 certified System.	Noted
129	Vol-III	Part C/Section-2	74	3.20.03	Turbine Governing System: The speed/load changer provided shall be capable of adjusting the speed of the turbo set to any value in the range of 94% to 106% of rated speed for manual /auto synchronization of the generator with the bus.	The Steam Turbine Controller provides an adjustment range from 95% to 103%. Turbine speeder gear function is realized in the electronic governing system.	Noted.
130	Vol-III	Part C	74	3.20.05	Load limiting Device The governing system shall be equipped with a load limiting device capable of being operated both locally as well as remotely from unit control room. Contacts shall also be provided on the load limiter for signalling load limited operation in Unit Control Room	High pressure governing with electronic Turbine controller is provided. Load limiting function is realised in electronic governing system, accordingly load limiting functionality and its status will be available in control system software and respectively in control room . Hence, no contacts are envisaged. Local operation is not included since the operation concept for the whole turbine is based on remote operation.	Noted.

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131	Vol-III	Part C	75	3.20.06	<u>Steam Control valve position control loop.</u> (iv) Controller shall be able to detect for any open and short circuit condition of servo valve coil and stuck valve condition. (v) Controller can perform calibration of Servo valve and valve testing	As Servo coil is integrated part of hydraulic actuator, no separate open or short circuit status of same (Servo) is available. Controller will issue command to Servo for regulating Control Valve. Online testing of Turbine valve is done through Automatic Valve test program. No separate testing of internal component of Turbine Valves eg Servo coil for its fault (Open and short circuit) status as such is separately required and not done.	Noted.
132	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	77 78 25	3.22.01 3.22.02 2.06.15	The LP Bypass control shall be implemented through a set of redundant controller modules, I/O modules etc..... HP Bypass system shall be implemented through a set of redundant controller modules, I/O modules etc..... TG SYSTEM FUNCTION BLOCK viii) Balance control implementation: a) The remaining controls envisaged in the scope of the work such as HP/LP bypass system,.....can be implemented in any of the above process blocks or separately as per the contractor's standard and proven practice.	Requirement referred in clause 3.22.01 & 3.22.02 is not clear. Bidder would like to clarify that HP/LP Bypass system shall be implemented in TG System DCS inline with clause 2.06.15. Request to confirm.	Noted. However, Bidder shall follow the tender requirement for redundancy of controller and I/O modules.
133	Vol-III	Part C	78	3.23.04	Automatic Turbine Tester for the "Safety Devices" shall not be limited to the following sub-tests: i) Remote Trip ii) Over-speed Trip iii) Low Vacuum Trip iv) Thrust Bearing Trip v) Control oil Trip vi) Lube oil Trip vii) Axial shift Trip.	ATT is carried out for Main Stop & Control Valves, Overload Valve, HP Dump Valve and CRH NRV as per Collaborator's guideline.	Noted.
134	Vol-III	Part C	78	3.23.05	An alternative trip oil circuit shall be established during the testing of the. "Safety Devices" to isolate the trip oil circuit from the "Safety Devices"	Alternate trip oil circuit is not applicable, as no hydraulic safety device are applicable for subject project. Safety functions are being realized electronically in the Turbine controller.	Noted.
135	Volume-III	Part C	Sheet 79 of 352 (Page 83 of 356)	3.25.02	Following measurements shall be provided as minimum. i) Shaft eccentricity detection. ii) Absolute as well as relative shaft vibration measurement, of each bearing in both X & Y directions. iii) Differential expansion of rotor and cylinder for HPT, IPT and LPT. iv) Overall expansion of HPT and IPT. v) Absolute bearing vibration measurement of each bearing in both X & Y directions. vi) Shaft vibration measurement in both X and Y directions.	Please refer clarification against Vol-III, Section-A Cl. 2.22.02., which mentioned that TSI shall be as per OEM standard practice. Further, as per Bidder's standard and proven practice following shall be followed:- i) At low speeds, shaft vibration is an indication of eccentricity. Separate eccentricity probe is therefore not provided. ii) Shaft vibration measured is relative shaft vibration and absolute measurement is not done iii) Differential expansion at only HPT front and LPT rear end are provided. iv) Refer point (ii) above v) Absolute Bearing vibration measurement shall be provided at bearing pedestal in either X or Y direction vi) Relative shaft vibration is measured in both X&Y direction This is in line with OEM standard practice and followed in all supercritical BHEL projects.	i) Noted. ii) Noted. iii) Noted iv) Noted v) OEM recommended not required.. vi) Noted.
136	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	83 84	3.26.00 3.30.00	BFP Turbine Governing System BFP Turbine Governing System	Requirement mentioned in referred clause is specific. Bidder would like to clarify, BFP Turbine Governing system shall be proven system of BFPOT OEM. Request to confirm.	Noted.
137	III	Part -C	82 & 84	3.27.01 vii) & 3.31.01	The supervisory equipment shall include detection, indication and recording of the following as a minimum stop valve metal temperature	Stop valve metal temperature monitoring is not applicable for BFP drive Turbine as per BHEL standard design.	Noted
138	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	83	3.29.01	For closed loop controls with 2 out 3 sensors / transmitters shall be provided with 2 out of 3 compensation signals if required. xiii) HPBP pressure & temperature: 1 out of 2 xiv) LPBP pressure & temperature: 1 out of 2	The highlighted requirements are contradictory. Bidder proposes to follow 2 out of 3 transmitters for HP-LP Bypass close loop controls. Request to confirm.	Bidder understanding is correct. However, Bidder shall considered 2 out of 3 philosophy for clause no. 3.29.00 Critical Closed Loop Controls of Boiler and Turbine

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139	III IV	C		3.29.01 iii) ETG061-BTG-ME-ST-PFD-001	Redundancy in Measurements Main stream flow (LHS & RHS): 2 out of 3 TURBINE CYCLE FLOW SCHEME	No flow measurement is indicated in main steam line in tender PID mentioned against second reference. As per bidder's standrad and proven practice main steam flow measurement is done through turbine first stage pressure. Flow measurement in main steam line is also not envisaged in 1X660 MW Bhusawal project of MAHAGENCO. Kindly confirm.	Noted.
140	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	93	5.01.04	PADO system shall be calculate GCV of the coal in online mode.	Bidder wish to clarify that Coal Handling plant is not in Bidder's scope. Online GCV measurement (if required) shall be part of Coal Handling plant contractor's scope. This information can be interfaced with BTG DCS and can be displayed in BTG DCS operator station. Please confirm.	Bid specification prevails. However, bidder to consider the provision of signal interface between CHP & PADO .
141	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	100 of 352	5.04.08	The system shall have facility to store bulk data for 5 years' duration with facility for retrieval of the same. The system shall have facility to share all the data in the hard disk/ back up media and provide user friendly utilities to retrieve and analyse stored data.	Bidder would like to clarify that the Hard disk capacity to store 90 days of data will suffice and a Suitable facility for retrieval of data shall be provided as per general practice based on bidder's past project experience. Kindly confirm.	Bid specification prevails.
142	VOLUME - III	PART - C		7.01.18	In Bunker, silos and first field of ESP radar type level transmitter (minimum two numbers at each measurement location) shall be provided. Level switches shall be provided at each hoper.	Bidder understands the following: 1. RF type level switch (low and high level) is to be considered for each ESP dust hopper as per VOLUME - III, PART - C, Clause No 7.01.18. 2. Radar type level transmitter (1 No) is to be considered for first field of ESP hoppers as per VOLUME - III, PART - C, Clause No 7.01.18. 3. NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System for ESP hopper is not applicable. We have never installed NPGS based level scanner in past executed projects. Owner to please confirm Bidder's understanding.	1) Noted 2) Noted 3) Bid specification prevails. Please note that for coal bunker, Ash silo & limestone silo level measurement, 3D Radar Level Transmitter to be used as per clause no. 7.09.05
	VOLUME - III	PART - C		7.09.04	NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System for ESP hopper 4-20 mA signal shall be hardwired to corresponding DCS for displaying Avarage Level of each Buffer hopper and each ESP Hopper in the First to Third Field of ESP Controller shall provide all required hardware and software to display. EPMS shall accept the feedback analog signals like It shall also control, monitor and display the status of each stream i.e. status of TR Controllers, Rapper Controllers, hopper heaters, (Hi & Low) Level sensor for each Buffer Hopper and NOGS based level sensor each ESP Hopper (First to Third Field), ...		
	VOLUME - III	PART - C		3.04.02	EPMS shall accept the feedback analog signals like It shall also control, monitor and display the status of each stream i.e. status of TR Controllers, Rapper Controllers, hopper heaters, (Hi & Low) Level sensor for each Buffer Hopper and NOGS based level sensor each ESP Hopper (First to Third Field), ...		
143	VOLUME - III	PART - C		7.01.18	In Bunker, silos and first field of ESP radar type level transmitter (minimum two numbers at each measurement location) shall be provided. Level switches shall be provided at each hoper.	Bidder understands the following: 1. RF type level switch (low and high level) is to be considered for each ESP dust hopper as per VOLUME - III, PART - C, Clause No 7.01.18. 2. Radar type level transmitter (1 No) is to be considered for first field of ESP hoppers as per VOLUME - III, PART - C, Clause No 7.01.18. 3. NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System for ESP hopper is not applicable. We have never installed NPGS based level scanner in past executed projects. Owner to please confirm Bidder's understanding.	Tender terms & condition shall prevail. Please note that for coal bunker, Ash silo & limestone silo level measurement, 3D Radar Level Transmitter to be used as per clause no. 7.09.05
	VOLUME - III	PART - C		7.09.04	NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System for ESP hopper 4-20 mA signal shall be hardwired to corresponding DCS for displaying Avarage Level of each Buffer hopper and each ESP Hopper in the First to Third Field of ESP Controller shall provide all required hardware and software to display. EPMS shall accept the feedback analog signals like It shall also control, monitor and display the status of each stream i.e. status of TR Controllers, Rapper Controllers, hopper heaters, (Hi & Low) Level sensor for each Buffer Hopper and NOGS based level sensor each ESP Hopper (First to Third Field), ...		
	VOLUME - III	PART - C		3.04.02	EPMS shall accept the feedback analog signals like It shall also control, monitor and display the status of each stream i.e. status of TR Controllers, Rapper Controllers, hopper heaters, (Hi & Low) Level sensor for each Buffer Hopper and NOGS based level sensor each ESP Hopper (First to Third Field), ...		
144	Volume-III	Part C	Sheet 125 of 352 (Page 129 of 356)	7.01.19	For measurement of level of tanks/vessels/sumps containing oil, chemicals or water, Ultrasonic type level transmitters shall be provided. Bidder can also provide Radar type transmitter in place of ultrasonic transmitter as per process requirement subject to approval by Owner during detailed Engineering. However, other type of level transmitters, if any, shall be acceptable only if there are constraints on account of process/ equipment/ device for having an effective measurement using the above. The acceptability of the same shall be subject to Owner's approval.	For Main Oil Tank, Main HPSU, i.e. Hydraulic Power Supply Unit (CF) Tank for Turbine Valves & LP Bypass System Hydraulic Power Supply Unit (CF) Tank, 3 no. Guided Wave radar Typr Level Transmitters shall be provided for Level Measurement as per Standard practice. For Dirty Oil Tank & Waste Oil Tank, as per standard practice, variable capacitance type level switches are being provided.	Shall be as per process requirement subject to approval by Owner during detailed Engineering.

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145	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	125	7.01.20	Bidder shall also provide instrument and flow elements on process lines, tanks, equipment etc even when process lines/ tanks/equipment not in bidder scope if process demand for the same.	Bidder would like to clarify if tank/equipments/lines are not in Bidder scope then instruments/flow elements associated with these will not be in Bidders scope. Request to confirm.	As this specification is a complete for the BTG package so any instruments is required to be installed using any exiting facility if applicable in line with mechanical requirement for process then the same shall be bidder's scope.
146	Volumelll,Part C		126	7.03.01	For Pressure, Diff Press And DP Based Flow / Level Measurements Accuracy, Turndown Ratio	Bidder clarify that accuracy and turndown ratio for specific application like very low pressure or draft ranges will be as per market availability	Tender terms and condition shall prevail.
147	Volumelll,Part C		128	7.05.01	Thermocouple Response time- < 20 seconds for measurement < 10 seconds for control	Bidder clarify that thermocouple response time with thermocouple , response time is approximately 30 seconds. The response time with thermowell is subject to market availability	Tender terms and condition shall prevail.
148	Volumelll,Part C		129	7.05.02	RTD Response time- < 20 seconds for measurement < 10 seconds for control	Bidder clarify that RTD response time with thermocouple , response time is approximately 30 seconds. The response time with thermowell is subject to market availability	Tender terms and condition shall prevail.
149	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	128, 129 of 352	7.05.01, 7.05.02	Protecting Tube O.D 8 mm	Thermocouple are tip sensing device and RTD are length sensitive device. Sheath OD of 6mm is also proven and widely used in industry. Same shall be acceptable. Kindly, confirm this understanding.	Bid specification prevails.
150	VOLUME - III	Page 129 Doc no.: ETG061-BTG-C&I-TS		Clause No: 7.05.02	Resistance Temperature Detector (RTD) 4.WIRING: 3/4 WIRE	Bidder understands that both Four wire and Three wire Pt-100 RTDs are acceptable based on the standard proven practice being followed by the bidder. Owner may kindly note.	Tender Terms and Conditions prevail.
151	Volumelll,Part C		130	7.05.03	Metal Temperature Thermocouples Thermocouple wire gauge: 16 AWG Protective sheath :SS 321 Protective sheath dia : 4 mm OD (minimum)	Metal Temperature Thermocouples wire gauge, protective sheath material, sheath dia, mounting accessories / material etc. shall be suitably selected by Bidder as per process conditions and to suit easy installation and maintenance	Tender terms and condition shall prevail..
152	VOLUME - III PART-C VOLUME - II/SECTION-II	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION LEAD TECHNICAL SPECIFICATION	132 105	7.05.05 4.40.26	TEMPERATURE TRANSMITTER a. Single Input Head mounted Temperature Transmitter b. Single Input DIN-rail mounted Temperature Transmitter c. Dual-input Temperature Transmitter with Indicator v) Temperature sensors.....shall be directly connected to DCS without any intermediate conversion.	In referred clause of Lead technical specification direct wiring of temperature sensors without temperature transmitter is mentioned. However, in Technical specification of Control and Instrumentation Temperature transmitters are mentioned. Bidder shall follow Temperature sensors interface with DCS/PLC with temperature transmitter. Request to confirm. Further, Three type of temperature transmitters with its technical requirement are indicated in referred clause of Technical specification of Control and Instrumentation. However, criteria to select type of Transmitter (Head mounted/Single Input DIN-Rail Mounted/Dual Input Field Mounted) is not available in specification. Request to clarify the same.	A) Use of temperature transmitter shall be subjected to Owner's approval. It shall be finalized during detail engg. B) Use of temperature transmitter shall be subjected to Owner's approval. It shall be finalized during detail engg. C) Use of temperature transmitter shall be subjected to Owner's approval. It shall be finalized during detail engg.
153	III	C		7.08.01	ORIFICE PLATE Root valve size 1 inch	Since Flow Orifices operate at lower design pressure and temp. Hence we propose 1/2" Root Valves for Flow Orifices. Kindly confirm.	Tender terms and condition shall prevail.
154	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	141 of 352	7.08.01	ORIFICE PLATE: Root valve material: 316 SS	Root valve shall be part of mechanical design and its material shall be as per piping design, and not necessarily SS316. Kindly, confirm this understanding.	Bidder shall provide SS316 wherever possible as per process requirement.

Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
155	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	142	7.08.03	VENTURI (For Liquid applications) 3 pairs of tappings for each Venturi as per ISO 5167-4:2003, However for some areas like CPU, DM & PT plant- 2 Pairs of Tappings shall be provided as minimum	Bidder would like to clarify Venturi is not used in application for CPU plant. Therefore request to re-check requirement of Venturi for referred applications. Further type of flow element (Orifice/Flow Nozzle/Venturi) shall be as indicated in P&ID or as per process requirement. Request to confirm.	a) Noted b) Tender terms and conditions prevail
156	VOLUME - III / PART - C VOLUME - III / PART - A /SECTION - 5	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION TECHNICAL SPECIFICATION CW & ACW SYSTEM	143 3	7.08.04 2.01.16	ULTRASONIC FLOW METER suitable for Cooling water for Transducer One number Annubar flow element shall be provided on each CW line (2 nos. for each unit) for total flow measurement to each condenser	Bidder would like to clarify Annubar shall be considered for CW flow measurement inline with 2.01.16 instead of Clamp-on Ultrasonic flow meter mentioned in clause 7.08.04. Request to confirm. Further note that Accuracy of Annubar for large pipe line applications will be as per Instrument Vendor OEM. Request to confirm.	Bid specification prevails.
157	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	154 of 352	7.11.02	13) Contractual condition for CEMS system: Availability of Valid Data: At 90 % of time during warranty AMC period . For this purpose contractor may take necessary steps to ensure Availability.	Bidder understands that Annual maintenance contract (AMC) is not applicable for CEMS system. Please delete the requirements mentioned for AMC in the referred clause.	Bid specification prevails.
158	Volumelll,Part C		152	7.11.02	Common Requirements for all Analysers Compliance standards- USEPA, TUV QAL-1, MCERTS or equivalent standards	Bidder clarify that this clause is applicable only for analyser used for pollution monitoring purposes. This is not applicable for O2/CO analysers used for combustion monitoring purposes	Tender terms and condition shall prevail.
159	Volumelll,Part C		154	7.11.03	Specific requirements for Hot-extractive / Hot-Wet extractive sampling type SO2, NOx, CO2 & CO analysers	Bidder clarify that accuracy, repeatability , span drift, zero drift are subject to market availability	Tender terms and condition shall prevail.
160	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	160 of 352	7.12.01	Bidder shall supply an on-line Machinery Monitoring System (MMS) that shall automatically acquire data related to the mechanical health of rotating equipment, perform analysis of the acquired data in a proven software platform and display vibration and other machine data for Turbine, Generator, Boiler Feed Pumps and Motors, Condensate Extraction Pumps and Motors, Auxiliary Cooling Water Pumps and Motors, Circulating Water Pumps and Motors and ID Fans, FD Fans, PA Fans & their motors. All the HT motors/ pumps/fans within the BTG & HT auxiliaries of FGD area shall cover under this vibration monitoring system. The MMS shall exchange data with the DCS for viewing, trending, alarming of machine parameters and system diagnostic.	a) Bidder proposes to consider Vibration sensors for Motor DE & NDE and Fan/Pump DE/ NDE bearing for Major HT drives as per OEM's standard and proven practice. b) Bidder proposes to consider keyphasors for ID, FD, PA, BFP, CEP, ACW, ECW, CW drives as a minimum. For other drives keyphasors shall be provided as per OEM recommendation.	Noted.
161	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	161	7.12.03	All the alarm and trip relay contact shall be hardwired to the respective control system. Potential free wired contact shall be available for the same. For 2 out of 3 voting philosophy each trip channel shall be configured in separate cards	Bidder would like to clarify 4-20mA for each Vibration measurement shall be considered from VMS system to respective DCS/PLC. Further alarms/trip shall be generated in DCS/PLC logic through LVM inline with industry practice followed in NTPC projects and other state utility projects.	Bid specification prevails.
162	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	162	7.12.10	For other Machines with Journal & Thrust bearing i) Shaft Vibration: Non-contact proximity transducers using amounting position referenced to the bearing. ii) Casing Vibration: Seismic vibration transducers using a mounting position as close as shaft vibration transducers.	Bidder would like to clarify Machines with Fluid film bearing like BFP will be provided with Shaft vibration measurements and for machines with Ball bearings (non fluid film bearing) Casing vibration measurements will be provided. Use of Velometer / Accelerometer for Casing Vibration measurement shall be as per Proven Practice of VMS system OEM. Request to confirm.	Bid specification prevails.
163	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	171 228	7.13.00 13.18.00	OTHER TG RELATED SPECIAL MEASURING INSTRUMENT STEAM AND WATER ANALYSIS SYSTEM (SWAS) SPECIFICATION OF ANALYSERS	Ph, Conductivity, Silica and Sodium analyzer requirements are mentioned in referred clause 7.13.0. Also the same are indicated in SWAS section of specification clause 13.18.00 Bidder will provide all required analyzers under SWAS package inline with clause 13.18.00 only. Analyzers mentioned elsewhere in tender document for similar process applications shall not be provided under SWAS. Requirements mentioned in clause 7.13.00 will be followed for CPU package analysers. Please confirm.	Analyser which are already included in SWAS, is not to be duplicated in other TG packages.
164	Volume III	PART-C		7.14.00	CONTINUOUS MONITORING AMBIENT AIR SYSTEM (CAAQMS)	Kindly clarify the quantities of CAAQMS along with number of analyzers in each station. We understand that 04 number AAQMS station shall be required along with one number weather monitoring station.	Minimum 4 number of AAQMS station shall be considered.

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165	VOLUME - III / PART - C	-	176	7.14.00	AMBIENT AIR QUALITY MONITORING STATION (AAQMS)	a) Bidder wish to inform that Ambient Air Quality Monitoring Station (AAQMS) (4 Sets) and climatic & meteorological monitoring system are not linked to BTG contractor's works .	A) Tender terms & condition shall prevail. B) Noted.
	VOLUME - II SECTION-II	LEAD TECHNICAL SPECIFICATION	44	2.13.12 (u)	Complete Ambient Air Quality Monitoring Station (AAQMS) (minimum at four locations), climatic & meteorological monitoring system as mentioned in detailed technical specifications	Hence, Bidder request Customer to remove Ambient Air Quality Monitoring Station (AAQMS) (4 Sets) and climatic & meteorological monitoring system from Bidder's scope and include the same in BOP contractor's scope.	
	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	176	7.14.02	AAQMS shall be provided to check upon the ambient air quality inside and around the power plant and capable of generating required periodic reports for submission to relevant Central & State regulatory agencies by Owner	b) Bidder understands that total 4 sets of AAQMS are required which shall be installed inside power plant. Please confirm.	
166	VOLUME-III, PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	178	7.14.13 (k)	Facility to interface exiting plant AAQMS shall be envisaged	a) Bidder request customer to inform the type of protocol and number of signals to be considered for interfacing. b) Terminal point for interfacing shall be Bidder's AAQMS panel located in proposed unit's central control room. Please confirm	Bid specification prevails.
167	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	189	8.01.03	(iii) Local Indicators/Gauges shall also be suitably grouped in Local Instrument Racks	Local Indicators/Gauges are proposed to be direct mounted considering industry practice followed in NTPC projects and other state utility projects. If direct mounted gauges are not accessible, then the same shall be mounted on LIR / LIE depending installation location indoor/outdoor. Request to confirm.	Bid specification prevails.
168	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	189	8.01.05	Local Instrument Enclosures (LIEs) and Local Instrument Racks (LIRs) complete with all fittings, mountings & accessories, drains and Utility Lighting , Cable & Grounding cable etc. shall be provided by the Contractor on as required basis .	Bidder would like to clarify Utility lighting shall not be applicable for LIR, as these are open racks. Please confirm.	Bid specification prevails.
169	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	191	8.02.04	For Pr./D. P gauges in fluid application two / five valve manifold on each impulse line to the instrument and in Air / Flue gas application two valve manifold on each impulse line to the instrument shall be provided near the instrument. These shall be in addition to the three ways gauge cock provided along with the pr./D.P gauges.	Bidder wish to inform that as per process requirement Manifold is sufficient and it meets the functional requirement. Separate gauge cock is not required and will not be considered. Please confirm.	Noted
170	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	191	8.03.03	For individual supply line and control signal line to control valve, 1/4-inch size light drawn tempered copper tubing conforming to ASTM B75 shall be used.	Bidder proposes to use SS 316 tubing for Instrument air line to control valves philosophy followed in NTPC project and state utility projects. Also it is observed that Copper tubing is prone to theft. Request to confirm use of SS 316 tubing.	Bid specification prevails.
171	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	197	9.06.01	The valve actuators shall be capable of operating at 600C continuously.	Bidder understand 600C is typo. Please clarify.	The valve actuators shall be capable of operating at 60 deg.C continuously.
172	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	202 214	9.19.00 12.07.00	ii) Coil voltage rating : 24V DC /48V DC (in general) other 220V DC/ 240V AC /110V AC as required Output modules shall be rated to switch on/off coupling relays of 3VA at 24V DC and solenoid valves at 110 V AC. Coupling relays shall be provided in HT/LT Switchgears.	Please confirm 240 VAC Solenoids can be considered by Bidder instead of 24VDC.	Bid specification prevails.
173	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	205	10.01.13	End positions of manually operated suction valves of critical pumps and all other manual operated critical isolation valves shall be monitored & interlocked.	(a) Bidder request to clarify critical pumps application. (b) Bidder do not recommend to include interlock based on Manual valve limit switch. Request to confirm.	Bid specification prevails.
174	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	205 294	10.01.17 18.00.00	Furniture shall include documentation racks, tables for laydown etc.	Requirement is not clear. Bidder will provide necessary furniture for Control rooms (i.e. Consoles for workstations, Tables for printer and chairs for the workstations). Any other furniture, which is not specified in the tender shall not be provided. Please inform incase any other furniture is required. Further, Bidder would like to clarify Bidder will supply furniture for Bidder supplied equipments/ systems only. Please confirm.	Bidder shall provide (i.e. Consoles for workstations, Tables for printer and chairs for the workstations) for central control room.

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175	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	219	11.22.12	CONTROL DESKS / PANELS Ammeters will be provided on control panel for all motors rated 30KW and above. Further, HT/LT switchgear voltmeters shall be provided on control desk for HT/LT feeders. Ammeters and voltmeters shall be suitable for 4-20mA DC signals derived from Analog Output cards of PLC.	Current and Voltage signals referred in clause shall be available on PLC HMI. Separate ammeters and Voltmeters on control panel / Control Desk will not be provided. Please confirm.	Bid specification prevails.
176	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	216	12.17.00	OWS / EWS & printers Operator workstations (OWS) shall perform control, monitoring and operation of all auxiliaries / drives interacting with PLC based control system. It shall be possible to use the same system as EWS. The quantity of PCs, its associated peripherals and printers shall be finalized during detailed engineering.	Bidder request to mention number of OWS/EWS and printer to be considered for each PLC system. This information is required at pre-bid stage for proper estimation. This OWS/EWS quantity will not be applicable for PLC with hardwired annunciation, Push-button, Switches etc. Please confirm.	For HMI hardware, Bidder to follow as per clause 2.11.08
177	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	222 224	13.01.04 13.05.01	Each sample stream with the required flow rate and pressure of 2 kg/cm2 shall be finally cooled to 25°C±1°C or to a preset temperature required by the Analyser through an individual secondary cooler before passing the sample to the respective measuring cells..... ISOTHERMAL BATH Each sample stream shall be finally cooled from approximately 39°C to 25°C ±1°C, required by the Analyser, in an isothermal bath by counter current heat exchanger of each sample against the flow of chilled water at about 20°C.	Bidder wish to clarify that as per industry standard practice secondary cooler shall be considered for cooling of sample lines up to required temperature using chilled water from chiller. Isothermal bath is not required. Please confirm.	Noted.
178	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	228-241	13.18.00	SPECIFICATION OF ANALYSERS Silica Analyzer Sodium Analyzer Chloride Analyzer Iron Analyzer Phosphate analyzer	Bidder request to consider Analyzer with external sequencer for referred wet chemistry analysers inline with industry practice including NTPC projects and State utility board projects.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analysers shall be considered for Silica, Sodium and Chloride.
179	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	246	14.00.00	INSTRUMENTATION CABLES b) Overall and triad shielded armoured triad cables for RTD signals.	As per specification temperature transmitters to be used for all RTD / TC signals. Therefore Bidder proposes to use analog pair cable for wiring of RTD signals from RTD to TT JB / Field mounted TT. Request to confirm.	Bid specification prevails.
180	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	250	14.01.02	Cables near high temperature zone shall be capable of withstanding high temperature and terminated in junction box / panel in normal temperature zone.	Bidder do not envisage high temperature cables in TG applications outside turbine deck and TG-BOP application.	Noted
181	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	254	14.03.02	Fiber Optic Cables shall be installed on cable tray, duct bank, cable trench, as necessary. For outdoor applications the cable shall be armoured.....	Bidder understand for indoor application Fibre optic cable can be unarmoured. Inline with referred clause for outdoor Armoured cable shall be installed on cable tray, duct bank, cable trench directly (without any conduit). Request to confirm.	Bid specification prevails.
182	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	260	14.07.05	The cables emanating from redundant equipment/devices shall be laid through different routes.	Bidder would like to clarify cables emanating from redundant equipment/devices shall be laid through different routes to the extent possible. Request to confirm.	Bid specification prevails.

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183	VOLUME - III / PART - C VOLUME - II SECTION-II	- LEAD TECHNICAL SPECIFICATION	264 44 108	15.00.00 15.10.01 2.13.12.(t) 4.40.31	CLOSED CIRCUIT TELEVISION (CCTV) SYSTEM The complete system shall be divided into the following zones: - One Zone for Each of the Generating Unit., One Zone for Common Plant System, One Zone for Coal Handling Plant, One Zone for Distant Plant. Complete CCTV and Plant Surveillance System as mentioned in detailed technical specifications Provision to integrate with balance of plant CCTV system with the main plant CCTV system shall be provided , so that the whole plant can be monitored from the CCR, Security and administrative buildings by senior plant officials	a) Bidder wish to inform that as per Cl. no. 15.00.00 & 15.10.01 of Volume-III Part-C, a common CCTV system is envisaged with separate zones for BTG and BOP areas. However, as per Cl. no. 4.40.31 of Volume-II Section -2, separate CCTV systems are indicated for BTG and BOP. Bidder understand that common CCTV systems are envisaged for complete plant including BTG and BOP. Please confirm. b) Bidder understands that common CCTV systems are envisaged for complete plant including BTG & BOP areas. In this case, readiness of BOP works is a major bottleneck for CCTV equipment installation and making this system operational. Hence, Bidder request Customer to remove CCTV system from Bidder's scope and include the same in BOP contractor's scope. Please confirm.	Bid specification prevails. Common CCTV systems are envisaged for complete plant including BTG & BOP areas, same (Complete) is under BTG bidder's scope.
184	VOLUME - III / PART - C VOLUME - II SECTION-II	- LEAD TECHNICAL SPECIFICATION	274 274 44	15.11.00 15.11.03 2.13.12.(t)	PERIMETER INTRUDER DETECTION SYSTEM PASSIVE RADAR BASED TRACKING SYSTEM Complete CCTV and Plant Surveillance System as mentioned in detailed technical specifications	Bidder wish to inform that Perimeter intrusion detection requires cameras mounted on plant perimeter. Hence, same is not linked to BTG contractor's works . Hence, Bidder request Customer to remove Perimeter Intrusion detection system (including Passive radar based tracking system) from Bidder's scope and include the same in BOP contractor's scope.	Bid specification prevails.
185	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	271	14.08.00	2. Work Stations with Monitor, External Speaker (min. 5 W) Keyboard & Joystick: One no for each zone and Six (6) nos. for plant common area (see note-2 below). Note-2. Common areas shall include Office of Head of the Project, Office of O & M In-charge, Erection In-charge's Office, Central Fire Station, FGD control room, Water System Control Rooms, Ash Handling System Control Room, Plant Security Control Room, Main Gate of the Plant, Safety control room, Service Building and any other locations to be decided during detail engineering.	The count of locations indicated under note-2 is 11, however note-2 mentioned in table refers to 6 number workstation. Request to clarify final quantity of Workstations to be considered.	Bidder may consider the work station qty as per locations indicated in Note-2
186	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	270 of 352	15.06.02	All the cameras and accessories are to be housed in Weather Proof IP 65 environmental housing made of aluminium and Sun shroud. The housing, with heater and blower installed, shall provide protection for camera/lens assemblies in the ambient temperature range of – 0 deg. C to 50 deg. C.	Bidder would like to clarify that, camera housing is not required for inside building like TG building, Admin & service building etc. and where ambient / surrounding temp is below than camera designed temp. Kindly confirm our understanding.	Bidder understanding is correct.
187	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	271 of 352	15.09.00	Note: 2. Common areas shall include Office of Head of the Project, Office of O & M In-charge, Erection In-charge's Office, Central Fire Station, FGD control room, Water System Control Rooms, Ash Handling System Control Room, Plant Security Control Room, Main Gate of the Plant, Safety control room , , Service Building and any other locations to be decided during detail engineering.	Bidder understands that Safety Control room is not applicable for this project. Please delete the requirements mentioned for Safety Control room in the referred clause.	Bidder shall supply and install IP based CCTV system along with IP based announcement system which shall be used for monitoring safety during construction from Safety control room. Refer Addendum-4
188	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	272 of 352 271 of 352	15.10.03 14.08.00	Unit Areas 3) Seal Oil Skid: 1 (Refer Note-1) NOTES: 1. Cameras & its accessories shall be Explosion proof.	Bidder wish to clarify that Note-1 is not available in the referred clause. However, Note-1 is indicated in clause 14.08.00. Bidder understands that the Note-1 indicated in 14.08.00 is to be followed for referred area. Please confirm.	Bidder shall consider the Note as below for Clause no 14.09.03: 1. Cameras & its accessories shall be Explosion proof.

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189	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	271 of 352 237 of 352	15.10.01 15.10.06	CAMERA QUANTITIES The complete system shall be divided into the following zones: - One Zone for Generating Unit., One Zone for Plant System, One Zone for Coal Handling Plant, One Zone for Distant Plant Distant plants (Common Plant Areas) 1) Make Up Water Pump House: 02 3) Miscellaneous applications: 2	a) Bidder request to clarify details of distant plant: 1) Location/ distance from Main Plant to Distant Plant 2) Wireless or Cable to be considered for interfacing of distant plant CCTV Zone. Please confirm. b) Bidder requests customer to inform the specific system and its location for the term "Miscellaneous applications"	a) Confirmed. Bidder to consider 2 nos camera for Make up water pump house and 2 nos for FOPH (including LDO). Plot plan(Autocad) has been shared to bidder. Bidder may calculate the distance accordingly. b) Bidder to consider 1 number of camera as mentioned area wise for 'Miscellaneous application' which shall be considered for any critical equipment/ subsystem, electrical panel, local panel etc. The exact location shall be finalized during detail engg.
190	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	297	18.02.18	1) Modular work station furniture, suitable for mounting servers & historians, programmer stations, PC based systems, printers (inkjet or A4 laser) etc. is to be provided. 2) Server rack shall be provided to mount programmer stations, PC based systems (of rack type and tower type), Matrix KVM switcher, Mini UPS etc. in Programmer room. Suitable arrangement for Ventilation and cooling shall be built in.	As per referred clauses, Servers are intended to be installed in Workstation furniture (i.e. not in server rack). Please confirm.	All the server shall be installed in separate server rack.
191	Volume III	PART-C		7.14.15	NOX Analyser Range: 0-20 PPM	Revision in NOX analyzer ranges is proposed as below Range: 0-10 PPM Above proposed range is adequate for ambient air measurement. CPCB and NTPC, in their tenders for AAQMS, specify above ranges for NOX analyzer.	Noted. Refer BTG C&I amendment 7, Sr.no.(2)
192	Volume III	PART-C		7.14.17	Continuous Particulate Matter(PM10 & PM2.5) Analyser Type:Tapered Element Oscillating micro-balance	Revision in Continuous Particulate Matter(PM10 & PM2.5) Analyser type is proposed as below: Type:Tapered Element Oscillating micro-balance/Beta Attenuation CPCB and NTPC, in their tenders for AAQMS, specify above type/Principle for PM10/PM2.5 analyzer. The same is also notified by CPCB as per NAAQM Standards.	Noted. Refer BTG C&I amendment 7, Sr.no.(3)
193	Volume III	PART-C		7.14.27	Carbon Monoxide (CO) Analyser Range: 0-1,000 PPM	Revision in CO analyzer ranges is proposed as below Range:0-100 PPM Above proposed range is adequate for ambient air measurement. CPCB and NTPC, in their tenders for AAQMS, specify above ranges for CO analyzer.	Noted. Refer BTG C&I amendment 7, Sr.no.(4)
194	Volume III	PART-C		7.14.28	Carbon Dioxide (CO2) Analyser Range: 0-10,000 PPM selectable	Revision in CO2 analyzer ranges is proposed as below Range:0-1000 PPM Above proposed range is adequate for ambient air measurement. CPCB and NTPC, in their tenders for AAQMS, specify above ranges for CO2 analyzer.	Noted. Refer BTG C&I amendment 7, Sr.no.(5)
195	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	190 of 352	8.02.01	Stainless steel tube shall be provided inside enclosures & racks from tee connection to valve manifold and then to instrument. For high pressure/temperature the material shall be ASTM A 213 TP 316H it and for other applications material shall be ASTM A 213 TP 316L.	SS316H is not used above 500°C applications, and SS316L is not used above 425°C applications. SS316 is best suitable for all high temperature steam services and same can be applied in all services to keep uniform inventory for plant. Please confirm.	Noted
196	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	190 of 352	8.02.02	The source shut-off (primary process root valve) and blow down valve shall be of 1/2-inch size globe valve type for all applications except for air and flue gas service wherein no source shut-off valves are to be provided.	Primary process root valve is provided at process end for process isolation. We understand root valve indicated in referred clause is same. Kindly, confirm our understanding.	Noted

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197	Volume-III	Part C	Sheet 193 of 352 (Page 197 of 356)	8.07.02	LIEs / LIRs shall be of different sizes depending on the number of transmitters located in it. These dimensions along with the number of instruments shall be as finalized during detailed engineering stage without any price repercussions.	As per BHEL- Haridwar standard practice 2 Types of LIRs are supplied for Steam Turbine C&I field Pressure Instruments i.e.- 1. Type A – Size – 1800(W)X650(D)X2200(H) -Size in mm.- This LIR usually accommodate 11 Instruments 2. Type B – Size – 1000(W)X650(D)X2200(H) -Size in mm.- This LIR usually accommodate 6 Instruments Instruments are grouped based on application in general. Same shall be included in Technical offer.	Noted.
198	VOLUME - III / PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	192	8.06.01 Hydrostatic Testing / Instruemnt piping	All instrument piping/ tubing shall be hydrostatically tested upon completion of erection. The test pressure shall be 1.5 times the maximum process pressure.	Bidder would like to clarify that Instrument piping will be Hydro tested at shop	Bid Specification Prevails
199	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	195 of 352	9.02.03	Thus for cavitation/ flashing service, only valve with anti cavitation trim shall be provided.	Anti-cavitation trims are not applicable for flashing services. Rather, hardened trims are applicable. Kindly, confirm this understanding.	Bidder's understand is correct.
200	VOLUME - III	Page 199 Doc no.: ETG061-BTG-C&I-TS		Clause No9.10.01	The actuators shall have integral starters along with over load relays with built in SPP (Single Phasing Preventer)	In section 15.00.00 of Electrical specification, non integral electrical actuators are mentioned for Valves, dampers and gates.	Non-integral starter philosophy has been adopted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer BTG C&I amendment 7, Sr.no.8
201	VOLUME - III	TECHNICAL SPECIFICATION ELECTRICAL		15.00.00	ELECTRICAL ACTUATORS - NON INTEGRAL STARTER	Owner may kindly review and confirm whether to consider electrical actuators with integral starters or not.	
202	III	C		9.12.00	Four nos. (2 each in open and close position) position limit switches and two nos. (One in open and other in close direction) torque switches each having two nos. NO and two nos. NC contacts shall be provided. A single shaft shall actuate all contacts of limit switches at each position.	Bidder understand that actuators shall be provided in line with first reference i.e. clause 9.12.00 of Sec C of Vol III. Kindly confirm.	Non-integral starter philosophy has been adopted for all electrical motor driven actuators in this project. Irrespective of references under different clauses for Electrical motor driven actuators, all Electrical motor driven actuators shall be Non-integral Type only. Please refer BTG C&I amendment 7, Sr.no.8
	III	B		15.06.03	i) Each motor actuator shall have Six (6) rotary drum position limit switches..... ii) Each motor actuator shall also have two (2) torque limit switches with four (4) normally opened and four (4) normally closed contacts each.....		
203	VOLUME-III	PART-C TECHNICAL SPECIFICATION FOR CONTROL & INSTRUMENTATION/ 9.00.00 CONTROL VALVE ACTUATORS AND DAMPERS -> 9.17.00 CONTROL DAMPER DRIVES (Page 201 & 202 of Doc no: ETG061-BTG-C&I-TS)		Clause No: 9.17.01	9.17.00 CONTROL DAMPER DRIVES 9.17.01 Pneumatic and motor actuator type, located in flue gas/air area with damper shaft bearings mounted externally. Bearings are grease lubricated. Blades (SS) shall be linked together.	For Control Dampers located at Hot Air to each Mill, Cold Air to each Mill and Economizer Bypass Duct, damper Blades are made of Carbon Steel and not SS. Also, it shall be noted that the corresponding duct is also made of Carbon Steel. This is in-line with Control dampers supplied by the bidder for the above referred applications for all projects till date. Please accept.	For Control Dampers located at Hot Air to each Mill, Cold Air to each Mill and Economizer Bypass Duct, damper Blades made of Carbon Steel are acceptable.
204	VOLUME-III	PART-C TECHNICAL SPECIFICATION FOR CONTROL & INSTRUMENTATION/ 9.00.00 CONTROL VALVE ACTUATORS AND DAMPERS -> 9.19.00 SOLENOID VALVE (Page 202 of Doc no: ETG061-BTG-C&I-TS)		Clause No: 9.19.00	9.19.00 SOLENOID VALVE (v) Body: SS Bar Stock	Please inform whether Solenoid Valve Body made of Brass is also acceptable, in addition to SS Bar Stock.	Bid Specification Prevails
205	VOLUME - III / PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	203	9.20.05 / Control Valves	CV Test: CV test shall be carried out as type test on each size, type and design of the valves as per ISA 75.02 standard and test report shall be furnished for Owner's approval.	Bidder understand that Type test report of similar valve size, type shall be submitted	Bid Specification Prevails
206	VOLUME-III	PART-C CONTROL & INSTRUMENTATION		12.09.00	Two (2) nos. 415V AC feeders shall be provided for each PLC control panel / desk and remotely located I/O panels. 2. 24 V DC power supply system for PLC shall comprise of 2 x 100% power supply unit (power pack) along with 1 x 100% sealed maintenance free lead acid batteries for 30 minutes back up and DC distribution board, the whole assembly housed in a single panel. Power supply unit shall be capable of charging the batteries and feeding the load simultaneously. The DC distribution board shall have redundant feeders for critical loads.	24V DC power pack with battery shall be applicable for main plant DCS only. As per standard practice all PLC panels including the panels for machines like Lime sampling Unit. shall be powered with UPS supply 240V. Redundant SMPS shall be used in the PLC panel to convert to 24V DC. This is standard practice used in all projects.	Noted. Refer Amendment 7- BTG C&I, Sr.no. (23)

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207	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	221 of 352	13.01.01 13.01.02	Unit-wise SWAS panels viz. Primary Sample conditioning rack (at Boiler Floor and Deaerator Floor), Secondary Sample conditioning panel (Wet panel in SWAS Room) and Analyser panel (Dry panel in SWAS Room) complete with valves, fittings, wiring etc. The above panels shall be physically separate from each other and shall be mounted in the air-conditioned SWAS room located at 0.0m level.	Sample conditioning panel & chiller of SWAS is wet panel, and it does not need air conditioning. Hence air conditioning will not be provided for these panels. Air conditioned environment shall be considered only for Dry panels housing analyzers. Glass partition shall be provided between the wet panel and dry panel. Please confirm.	Noted.
208	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	228 of 352 230 of 352 234 of 352	13.18.00 13.18.02 13.18.03 13.18.06	SPECIFICATION OF ANALYSERS CONDUCTIVITY ANALYZER pH ANALYZER DISSOLVED OXYGEN ANALYZER	Bidder proposes dual channel analyzers for pH, Conductivity, DO as per past project experience. Further multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride. Kindly accept Bidder's proposal.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride.
209	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	243 of 352	13.21.00	SWAS QUANTITIES (d) Cat. Conductivity: Hot Reheated steam (k) Cat. Conductivity: Reheat Steam (p) Specific Conductivity: CPU outlet (u) Specific Conductivity: Condenser Polishing Unit (CPU) outlet	Bidder wish to highlight that the quantity of Cat. Conductivity analyzer & Specific Conductivity analyzer for Hot Reheated steam area and CPU outlet area respectively are indicated twice. Bidder request customer to check and delete the duplicated Cat. Conductivity analyzer & Specific Conductivity analyzer.	Bidder to consider only one.
210	III	C		13.21.00	SWAS QUANTITIES Chloride - Separator water, CPU outlet, CEP discharge	Cation conductivity can indicate the presence of chloride. Hence provision of chloride analyser may be deleted. Kindly confirm.	Tender terms and condition shall prevail.
211	III	C		13.21.00	SWAS QUANTITIES (h) Cation Conductivity : Dematerialized make-up water, (q) Cation Conductivity : DM make-up to condenser	Bidder understand that Cation conductivity Analysers at DM make-up line is repeated, hence only one no. analyser shall be considered at DM make-up water line. Kindly onfirm.	Tender terms and condition shall prevail.
212	III	C		13.21.00	SWAS QUANTITIES (p) Specific Conductivity : Condenser Polishing Unit (CPU) outlet, (u) Specific Conductivity : CPU outlet	Bidder understand that Specific conductivity Anaylsers at CPU outlet is repeated, hence only one no. analyser shall be considered at CPU outlet line. Kindly onfirm.	Bidder may consider one no. analyser at CPU outlet line.
213	III	C		13.21.00	SWAS QUANTITIES (aaa) Dissolved oxygen : FW at Eco inlet, (ddd) Dissolved oxygen : Feed Water at Economizer	Bidder understand that Dissolved oxygen Anaylsers at FW at Eco inlet is repeated, hence only one no. analyser shall be considered at FW at Eco inlet line. Kindly onfirm.	Bidder may consider one no. analyser at FW at Eco inlet line.
214	III	C		13.21.00	SWAS QUANTITIES (j) Specific Conductivity - Stator water	Bidder understand that Stator water specific conductivity measurement is not part of SWAS. Kindly Confirm.	Noted. Bidder to consider the same for sator cooling water system.
215	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	246 of 352	14.00.00	INSTRUMENTATION CABLES i) Generally, the following cable types shall be used a) Overall and pair shielded armoured cables for Analog Signals & overall Shielded armoured cables for Digital Signals b) Overall and triad shielded armoured triad cables for RTD signals. c) Overall and pair shielded armoured compensating cables for T/C Inputs	Bidder proposes that armoured cables shall be considered only for CHP and PA system. For other areas, cables shall be unarmoured and shall be protected by routing in trays/ conduits. Bidder request Customer to accept Bidder's proposal.	Bid specification prevails.

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216	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	246 of 352	14.03.02	Fiber Optic Cables shall be installed on cable tray, duct bank, cable trench, as necessary. For outdoor applications the cable shall be armoured with Poly Ethylene sheathing. Cable shall be routed through suitable grade permanently lubricated HDPE protection pipe as per IS 4984, IS 12235 & TEC.G/CDS-08/01of suitable size @ 53% fill factor.	Optical cables have no signal interference issues with instrumentation cables and no operating temperature issues (instrumentation cables are low voltage circuits). Hence, OFCs can be laid in instrumentation cable trays in a conduit. Please confirm.	Bid specification prevails.
217	Volume-III	Part C	Sheet 261 of 352 (Page 265 of 356)	14.09.00	Junction Boxes: Junction Boxes shall have following features:.....explosion proof.....spring loaded terminals.....4 mm thick fiberglass reinforced polyster	Junction Boxes in Steam Turbine C&I area shall not be explosion proof, shall be with screw/ cage & clamp type terminals and made of Aluminium casting or CRCA sheet.	Noted.
218	VOLUME - III / PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	265	15.00.00 TYPE TEST / C&I equipments	GENERAL REQUIREMENTS : ii) For the rest, submission of type test results and certificate shall be acceptable provided. a) The same has been carried out by the Bidder/ sub-bidder on exactly the same model /rating of equipment.	Bidder would like to clarify that Similar equipment test report shall be submitted for review , And similarity w.r.t Type test report will be established . CEA Guideline shall be followed for validity of Type Test reports	Bid Specification Prevails
219	VOLUME - III / PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	282	16.05.00 TYPE TEST REQUIREMENT FOR C&I SYSTEMS	9. Instrumentation Cables - Type test	Bidder would like to clarify that all the approved manufactures have Type test report available with them , therefore report shall be submitted for review Type test will be specifically conducted, however test certificate shall be submitted	Bid Specification Prevails
220	VOLUME - III / PART C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	283	16.05.00 TYPE TEST REQUIREMENT FOR C&I SYSTEMS	10. DC Power Supply System	Bidder would like to clarify that all the approved manufactures have Type test report available with them , therefore report shall be submitted for review Type test will be specifically conducted, however test certificate shall be submitted	Bid Specification Prevails
221	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	320	19.12.00	Instrument Laboratory	Bidder understands that the requirement indicated herein is for temporary calibration laboratory to be set-up during Construction stage for calibration of BTG instruments before its installation. Please confirm	Bid specification prevails.
222	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	334	20.00.00	C&I MAINTENANCE AND CALIBRATION EQUIPMENTS	Bidder wish to inform that C&I maintenance and calibration equipment are not linked to BTG contractor's works . Hence, Bidder request Customer to remove C&I maintenance and calibration equipment from Bidder's scope and include the same in BOP contractor's scope.	C&I maintenance and calibration lab is under BTG package hence,Tender terms and condition prevails.
223	VOLUME -IV	BID DRAWING	-	09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME	Note-9 All manual valves indicated shall be converted to Motor operated valves based on process requirement during detail engineering	Process does not require valve to be MOV. Bidder request to specify MOVs in flow diagram at Bid stage, else Bidder shall follow as per previous executed projects of NTPC. Request to confirm.	Shall be finalized DDE
224	VOLUME IV BID DRAWINGS	04 ETG061-BTG-ME-GN-ECW-PFD-001_DM CW SYSTEM	-	-		LSO is indicated twice for DMCW pump discharge MOV. Request to clarify.	Bidder to consider only one.
225	VOLUME -IV BID DRAWINGS	04 ETG061-BTG-ME-GN-ECW-PFD-001_DM CW SYSTEM 03 ETG061-BTG-ME-SG-LDO-PFD-001 LDO SYSTEM	-	-	DP switches are indicated across Filters.	Bidder proposes to use DP transmitter against DP switch indicated in drawing. Request to confirm the same.	Confirmed.
226	VOLUME IV BID DRAWINGS	DCS Configuration Drawing: 24 ETG061-BTG-CI-DCS-CD-001_SHT 1 OF 2	-	-	Vibration Analysis Machine (VMAS) is directly interfaced with Unit DCS data highway	We could not find station LAN configuration drawing. Request to share the same. Further in configuration drawing VMAS is indicated as direct interface with Unit DCS, which is technically not correct. Please check.	Noted. However, same shall be finalized during detail engineering.

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227	VOLUME IV BID DRAWINGS VOLUME - II SECTION-2	DCS Configuration Drawing: 24 ETG061-BTG-CI-DCS-CD-001_SHT 1 OF 2 LEAD TECHNICAL SPECIFICATION	- 101	- 4.4.20	d) there shall also be following off site plants (which is not considered in bidder's scope and will come under BoP package contractors scope for which input data acquisition have been envisaged at central control room DCS.	Bidder understands packages mentioned under Vol-II/Section-2, clause 4.40.20.d shall be interfaced with Common DCS through OPC protocol as indicated in DCS configuration drawing Sheet-1. Bidder would like to clarify BoP systems (Not Bidders scope) mentioned under clause 4.40.20 shall be interfaced with Bidder scope station LAN through OPC protocol. Please note under this scenario cross HMI operation mentioned in Vol-III/Part-C/2.11.08 shall be applicable to only Bidder scope DCS (i.e. not for Bop systems DCS of BoP contractor scope). BoP package control systems shall be interfaced with Station LAN for only monitoring from Central control room. Request to confirm. Also Bidder request to provide list communication links with communication protocol and number of signals from Owner/BoP contractor/Others supplied control systems to be interfaced with Bidders scope Station LAN. Terminal point shall be FO port in Bidder scope Station LAN network cabinet located at Central control equipment room.	BoP DCS is a separate package, all interfacing shall be finalised DDE
228	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG-GEN-MS		15.11.1.	Transformer Rectifier Controller set - 2 (two)	Bidder provides ESP controller with innbuilt rapping control. Hence separate rapping controller cards is not applicable. Hence , same may be excluded.	For ESP Controller with innbuilt rapping control Four (4) sets of complete ESP controller shall be provided as mandatory spare.
229	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG-GEN-MS		15.11.2.	Rapper controller complete- 2 (two)	Bidder provides ESP controller with innbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
230	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG-GEN-MS		15.11.3.	Communication controller complete- 2 (two)	Bidder provides ESP controller with innbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
231	VOLUME - V - ANNEXURE - 3	Page 21 Doc no.: ETG061-BTG-GEN-MS		15.11.4	Electronic cards For rapper controller and ESP management system-One (1) set For transformer rectifier controller--Two (2) sets	Bidder provides ESP controller with innbuilt rapping control. Hence separate rapping controller is not applicable. Hence , same may be excluded.	
232	VOLUME - V - ANNEXURE - 3	Page 113 Doc no.: ETG061-BTG-GEN-MS		1.1.8.(I)	Level monitoring system for Coal bunker, fly ash silo and ESP hopper (first field to third field) i)Acoustic 3D Level scanner-2 nos. of each type, make and model	NOGS / Radar is indicated in the technical specifications. Acoustic 3D level scanner is indicated in mandatory spares. A) Kindly clarify whether NOGS / Radar/ acotic 3D level scanner are being indicate for first three field of ESP hoppers. B) Also, based on bidder query regarding the NOGS/ 3D level scanners for ESP applications. Kindly clarify whether conventional ash level indicators can be provided instead of NOGS / radar type level transmitter for ESP first three field hoppers	) NOGS (Naturally Occurring Gamma Sensor) Based Level Scanner System shall be provided each ESP Hopper (First to Third Field). If any special type instrument is supplied and not mentioned in the mandatory spare list. Bidder to supply as mandatory spare i.e 10% or 2no. (Whichever is more) for NOGS each type and model of instrument which are not covered in above list. B) Tender terms & condition shall prevail.

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233	V	Annexure-3		4.00.00 (1.2.1 iii)	Electro-Hydraulic Converter/ Servo unit/ proportional valve for HPBP a. Blocking unit for HPBP (as applicable) b. Position feedback transmitter for HPBP c. Positioner for HPBP	1 set of Spares are offered HP bypass valve, customer to confirm.	1 set of . Items if not applicable as per OEM, can be omitted. However, equivalent/alternative item as applicable shall be provided.
234	V	Annexure-3		4.00.00 (1.5)	CONTROL VALVES, ACTUATORS AND ACCESSORIES	Spares for HP bypass system are included in Annexure-3 2.02.00(13.1 and 13.2) and 4.00.00 (1.2.1 iii) Spares for HP bypass system are not included in this clause. Customer to confirm	Noted. If duplicated for the same equipment of same system, then it need not be provided
235	VOLUME-V	ANNEXURE - 3		4.00.00/1.2.1/i-c	EHC System related instrumentation i) c. Position feedback transmitter of EHC & Position feedback transmitter of Stop Valves & Control Valves for main turbine (as applicable)	1. Against Cl. i) c, Position Transmitters for Main HP Turbine Stop Valves, Control Valve, IP Turbine Stop Valves, Controls are applicable only. As position transmitters for HP Control Valves and IP Control Valves have already been offered against Cl. 2.02.00 (3.4) & 2.02.00 (5.4), respectively. Position transmitters for only HP Turbine Stop Valves and IP Turbine Stop Valves are being offered here. 2. By 1 set it is understood that it specifies Position Transmitters in one assembly, i.e. in one no. valve., i.e. 1 set = 2 no. MAHAGENCO to accept.	1. To be considered in C&I . 2. Noted.
236	VOLUME-V	ANNEXURE - 3		4.00.00/1.2.1/ii-b&c	b. Position feedback transmitter for LPBP c. Positioner for LPBP	1. By 1 set it is understood that it consists of Position Transmitters in one assembly, i.e. in one no. valve., i.e. 1 set = 1 no. 2. Positioner for LPBP is not applicable as per Main supply hence is not being offered. MAHAGENCO to accept.	Noted.
237	VOLUME-V	ANNEXURE - 3		4.00.00/1.2.4	Electrical Actuators	For BHEL HWR, items against this clause are already covered under Cl. 3.00.00, Cl. 6.4, hence are not being offered again here. MAHAGENCO to accept.	Noted
238	VOLUME-V	ANNEXURE - 3		4.00.00/1.11.1	Measuring Instruments	Mandatory spares for all instruments under TG area are being offered against this clause only. MAHAGENCO to record.	Noted. As per serial no-249.
239	VOLUME-V	ANNEXURE - 3		4.00.00/1.11.1/ii	Electronic Cards or PCB's for each type and model of transmitter	These are not offered by any instrument supplier as standard practice, hence are not applicable. MAHAGENCO to accept.	Refer BTG C&I Amendment 7, sr.no. 21
240	VOLUME-V	ANNEXURE - 3		4.00.00/1.11.2/iii	Thermo well for all applications (with head assembly, terminal block and nipple)	These are already included with items specified under Cl. 1.11.2 i) & 1.11.2 ii), hence not separately offered. MAHAGENCO to accept.	BHEL clarified that they will offer thermowell as an assembly with RTD and thermocouple respectively.
241	VOLUME-V	ANNEXURE - 3		4.00.00/1.11.2/iv	Pressure, Differential Pressure, Flow, Level and Temperature Switches	Generator Aux. Level Switches are already offered against Cl. 3.00.00 (1.9.16) & 3.00.00 (1.11.8), hence are not being offered again here. MAHAGENCO to accept.	in one place it shall be considered.
242	VOLUME-V	ANNEXURE - 3		4.00.00/1.11.6	Electrical Actuators	Items against this clause are already covered under Cl. 3.00.00, Cl. 6.4, hence are not being offered again here. MAHAGENCO to accept.	Noted
243	VOLUME-V	ANNEXURE - 3		4.00.00/1.12	PROCESS CONNECTION PIPING	1. For Steam Turbine C&I Local Instrument Racks (LIRs), the mandatory spare quantity specified against Cl. 1.12.1, 1.12.2 & 1.12.3 seems to be on much higher side as compared to actual installed quantity. The mandatory spares included in offer against each item shall be kept same as main installed quantity of respective item, wherever the specified qty. of mandatory spares exceed installed qty. 2. For Steam Turbine C&I Local Instrument Racks (LIRs), the mandatory spares specified against 1.12.4 & 1.12.5 are not applicable, hence not offered. MAHAGENCO to accept.	1.12.3 shall be read as 100% of each type instead of 100 number. Refer BTG C&I Amendment 7, Sr.no 20

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244	VOLUME-V	ANNEXURE - 3		4.00.00/1.14	Control Valve, Actuators and Accessories	Items against this clause are already covered under Cl. 4.00.00, Cl. 1.5.1 to 1.5.6, hence are not being offered again here. MAHAGENCO to accept.	in one place it shall be considered.
245	VOLUME-V	ANNEXURE - 3		4.00.00/1.15	PNEUMATICALLY OPERATED ISOLATION / BLOCK VALVES, ACTUATORS & ACCESSORIES	Items against this clause are already covered under Cl. 4.00.00, Cl. 1.5.7, hence are not being offered again here. MAHAGENCO to accept.	in one place it shall be considered.
246	VOLUME-V	ANNEXURE - 3		4.04.00/1.2.1-i-b	Blocking unit for main turbine (as applicable)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
247	VOLUME-V	ANNEXURE - 3		4.04.00/1.2.1-i-c	Position feedback transmitter of EHC & Position feedback transmitter of Stop Valves & Control Valves for main turbine (as applicable)	Position feedback transmitter of EHC is not applicable. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
248	VOLUME-V	ANNEXURE - 3			General	If any mandatory spare against any main supply item is called at two or more clauses in the tender spec. Spare against only one clause (Max Qty) shall be supplied by the bidder.	Noted. If duplicated for the same equipment of same system, then it need not be provided
249	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever same items have been specified at more than one clauses, mandatory spares shall be included in the offer against the clause specifying the highest quantity only. MAHAGENCO to accept.	Noted
250	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever 1 set has been specified, it is understood that the quantity of item is total no. of that item installed in one no. of assembly/ equipment in the unit. e.g. Position transmitter HP Turbine Stop Valves = 1 set implies that in although there are two no. HPT Stop valves per unit but as in one stop valve assembly, 2 no. position transmitters are installed, then against requirement of 1 set/unit, 2 no. position transmitters as mandatory spares per unit are to be offered. MAHAGENCO to accept.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of %, where clarity is required. In this case, 1 set means 1 identical assembly.
251	Volume-V	Annexure-3		-	Following minimum Mechanical, Electrical & C&I spares shall be provided for each Unit of 660MW i.e. Unit No 11 & Unit No 12	Bidder understands that mandatory spares list provided is common for 2 units & there is no requirement of duplicating the spares for each unit. Bidder understands that each unit mentioned is a typo error. Please confirm.	Listed Mandatory spares are the minimum requirement for each unit.
252	V	ANNEXURE - 4		B (08)	Vibration Monitoring System & Turbo-Supervisory Instruments	BHEL proposes to offer inhouse manufactured Valmet DNA DCS and VMS , Customer to please add the same in Vendor list .	For new vendors, Bidder shall submit all necessary credentials to MAHAGENCO for approval during execution.

MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2X660 MW UNITS - 11 12 PROJECT
RFx No. 3000046202 (BTG Package)
PRE-BID CLARIFICATIONS - BALANCE OF PLANT (BTG PACKAGE)



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1	VOLUME - I	SECTION - 3		2.0	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items:	Pl. note that provenness criteria is not specified for Compressed Air System. Bidder understands that Compressed Air System shall be subjected to bidder approval. Pl. confirm.	Noted
2	Doc. No. P&P/Comm/KRD2x660/BTG/2024 VOLUME - III, PART - A SECTION - 7 TECHNICAL SPECIFICATION MECHANICAL AC & VENTILATION SYSTEM			4 2.02.17	Power consumption at motor input terminals of working units (i.e. excluding stand-by)at its rated duty point of Chilling machines / VAM machine, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, cooling tower fans and other auxiliaries for the Air conditioning system of main plant building, FGD control room, ESP control room of each units, AHP control room, service building, administrative building. Power consumption at motor input terminals of working units (i.e. excluding standby) at its rated duty point of compressor and condenser fans of air cooled condensing unit, Air handling unit (AHU) fans for the Air conditioning system of auxiliary plants like ESP control rooms, FGD control rooms, etc. Power consumption at motor input terminals of centrifugal fans of mechanical ventilation system. The air conditioning plant shall comprise of 1x100% working VAM and 1x100% standby Screw Chilling machines.	Owner to note that Screw Chilling Machine is a standby equipment to VAM machine as per referred specification clause, hence, Bidder understands that only VAM machine shall be considered under auxiliary power consumption. Please confirm Bidder's understanding and amend the clause suitably.	Bidder to consider Screw Chilling Machine or VAM Machine, whichever has higher power consumption, for APC. Thjis will be decided during finalisation of PG test procedure.
3	Doc. No. P&P/Comm/KRD2x660/BTG/2024 VOLUME - III, PART - A SECTION - 7 TECHNICAL SPECIFICATION MECHANICAL AC & VENTILATION SYSTEM			4 2.02.17	Power consumption at motor input terminals of working units (i.e. excluding stand-by)at its rated duty point of Chilling machines / VAM machine, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, cooling tower fans and other auxiliaries for the Air conditioning system of main plant building, FGD control room, ESP control room of each units, AHP control room, service building, administrative building. Power consumption at motor input terminals of working units (i.e. excluding standby) at its rated duty point of compressor and condenser fans of air cooled condensing unit, Air handling unit (AHU) fans for the Air conditioning system of auxiliary plants like ESP control rooms, FGD control rooms, etc. Power consumption at motor input terminals of centrifugal fans of mechanical ventilation system. The air conditioning plant shall comprise of 1x100% working VAM and 1x100% standby Screw Chilling machines.	Owner to note that AHP Control Room and Admin Building are not in BTG Bidder's scope, hence, Bidder understands that AHP Control Room and Admin Building are not applicable under auxiliary power consumption for BTG Bidder. Please confirm Bidder's understanding and amend the clause suitably.	AHP control room and Admin building (including its AC sysstem) is not in bidder's scope; so it need not be included in APC calculation
4	Doc. No. P&P/Comm/KRD2x660/BTG/2024 VOLUME - III, PART - A SECTION - 7 TECHNICAL SPECIFICATION MECHANICAL AC & VENTILATION SYSTEM			4 2.02.22	Power consumption at motor input terminals of working units (i.e. excluding stand-by)at its rated duty point of Chilling machines / VAM machine, Chilled water Pumps, Condenser water Pumps, Air handling unit (AHU) fans, cooling tower fans and other auxiliaries for the Air conditioning system of main plant building, FGD control room, ESP control room of each units, AHP control room, service building, administrative building. Power consumption at motor input terminals of working units (i.e. excluding standby) at its rated duty point of compressor and condenser fans of air cooled condensing unit, Air handling unit (AHU) fans for the Air conditioning system of auxiliary plants like ESP control rooms, FGD control rooms, etc. Power consumption at motor input terminals of centrifugal fans of mechanical ventilation system. Following areas will be air-conditioned by dedicated Air Cooled Ducted Inverter Split Air-Conditioning Plant: i) Service Building	Owner to note that Air Cooled Ducted Inverter Split Air-Conditioning Plant is envisaged for service building and the same will not run continuously, hence, Bidder understands that service building is not applicable under auxiliary power consumption. Please confirm Bidder's understanding and amend the clause suitably.	Suitable Duty factor (0.4) will be considered for service building AC system power consumption

MAHARASHTRA STATE POWER GENERATION CO. LTD.
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2X660 MW UNITS - 11 12 PROJECT
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PRE-BID CLARIFICATIONS - BALANCE OF PLANT (BTG PACKAGE)



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5	Doc. No. P&P/Comm/KRD2x660/BTG/2024			4	Auxiliary Water System Pumps (Working Pumps) ☐ Service water pumps ☐ Potable water pumps	Owner to note that Service and Potable Water pumps are not in BTG Bidder's scope, hence, Bidder understands that Service and Potable Water pumps are not applicable under auxiliary power consumption for BTG Bidder. Please confirm Bidder's understanding and amend the clause suitably.	Will be decided during finalisation of PG test procedure.
6	VOLUME - II	SECTION - 2		2.13.06	2x50% for each unit And 1x50% common standby for both units mounted, oil free, water cooled, rotary screw compressors of adequate capacity and discharge pressure to meet instrument air (IA) requirements of the complete 2x660 MW power plant, except CHP & AHP	The various clauses referred are contradicting. Considering IA compressors of 50% capacity and SA compressors of 100% capacity, identical air compressor are not feasible, as there is huge difference in compressor capacity based on various criteria specified in specification. Bidder request to review the clauses affecting huge difference in IA & SA compressor capacity.	Bidder to refer Note-1 of Flow Diagram of COMPRESSED AIR SYSTEM FLOW SCHEME Drg. No. ETG061-BTG-ME-CAS-SCH-001Rev. A 'N' working +1 standby configuration shall be followed. No. of working IA & SA compressors, will be decided DDE.
7	VOLUME - III	PART – A/ SECTION - 6		2.04.00	Configuration of IA compressors shall be 'NIA' working for each unit and one (1) common standby, with individual ADP and air receiver for each compressor.		
8	VOLUME - IV	TENDER DRAWINGS		ETG061-BTG-ME-CAS-SCH-001	5 nos. of Instrument air compressors along with ADP are shown in the tender drawing		
9	VOLUME - II	SECTION - 2		2.13.06	1x100% for each unit And 1x100% common standby for both units, skid mounted oil free, water cooled, rotary screw compressors of adequate capacity and discharge pressure to meet service air (SA) requirements of the complete 2x660 MW power plant, except CHP & AHP.		
10	VOLUME - III	PART – A/ SECTION - 6		2.06.00	Configuration of SA compressors shall be 'NSA' working for each unit and one common standby, with individual air receiver for each compressor.		
11	VOLUME - III	PART – A/ SECTION - 6		2.07.00	Both IA and SA compressors shall be identical.		
12	VOLUME - III	PART – A/ SECTION - 6		2.08.00	The compressors shall be so arranged such that each service air compressors shall be able to supply air upstream of each adjacent ADP through an isolation valve and a non-return valve and control valve; so that in the event of failure of instrument air compressor, Service air compressor shall be used as standby IA compressor.		
13	Volume-II	Section-2		2.13.02, i, l	3X50% condensate polishing unit..... DM regeneration water tank , effluent disposal system, PLC for control and monitoring.	Bidder would like to clarify that as DM plant is not in bidder scope therefore DM regeneration water tank will be not envisaged by the Bidder, however, DM regeneration pumps for CPU system shall be supplied by the Bidder, for these pump suction will be taken from the Condensate storage tank Kindly confirm.	Noted.
14	VOLUME - II	SECTION - 2		2.13.06	Air Drying Plant a) 2x50% for each unit And 1x50% common standby for both units, Heat of Compression (HOC) Rotary drum type or conventional twin tower type air dryers (with specified margin), to match instrument air compressor capacity, along with all accessories including control panel, flow meter, online digital dew point meter at the outlet of each dryer, etc.	The referred clause are contradictory. Customer to confirm, whether 20% margin to be considered over the compressor capacity. However, it may pl. be noted that, already as per sizing criteria, 26.5% margin is considered in compressor capacity, which also build up in air dryer.	ADP shall be sized 1.2 times of IA compressor capacity.
15	VOLUME - III	PART – A/ SECTION - 6		4.11.08	Nominal flow rate shall be 1.2 times of compressor capacity	Further increasing air dryer capacity by 20%, will result in higher capacity for air dryer. Kindly confirm.	

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16	Volume-II	Section-2		2.13.02, i, n	Industrial gas cylinders 1) Adequate nos. of gas cylinders along with manifold station for various gases (hydrogen, carbon dioxide, nitrogen) shall be supplied. The number of H2, CO2 and O2 cylinders shall be equal to total requirement for one start up and one shut down of two units plus those required to be connected on manifolds of all units plus total requirements for seven days consumption of all units. The Bidder shall supply all gases till completion of trial operation. Filled cylinders shall be handed over to owner, during plant handover.	Detail specification and scope of supply are not available in tender specification. Owner is requested to provide the same to keep all Bidder's at par.	Bidder may provide the same as per their process requirement and inline with current industrial regulations and safety practices. Quantities of each cylinder will be finalized DDE, based on methodology stipulated in the tender. Also Refer Addendum-6
	Volume-III	PART-A section-5		13.01.00			
17	Volume - II	Section - 2 Lead Technical Specification / page 29		2.13.07 AIR CONDITIONING AND VENTILATION SYSTEM	ii) Air Cooled Precision Package Air-Conditioning Plant. (b) 1 Lot of Fine filters (shall be provided in common discharge of each Precision AC).	Since the Precision Package Air-Conditioning units are low static pressure units, thus, it is not feasible to provide fine filters in common discharge of each Precision AC. However, filters as per OEM standard shall be provided for each unit. Kindly review and confirm.	Bid Specification Prevails
18	Volume - II	Section - 2 Lead Technical Specification / page 29		2.13.07 AIR CONDITIONING AND VENTILATION SYSTEM	iii) Ducted Split Air-Conditioning plant b) 1 Lot-Fine filters	Since the Ducted Split Air-Conditioning units are low static pressure units, thus, it is not feasible to provide fine filters for these split units. However, pre-filters as per OEM standard shall be provided for each unit. Kindly review and confirm.	Bid Specification Prevails
19	Volume - II, Section - 2 Lead Technical Specifications	Doc No. ETG061-BTG-GEN-LTS / Page-29		2.13.07	Point l - 2) One No. MS / FRP chilled water expansion tank (of minimum 1m3 capacity) complete with valve, Level Gauge, Level Switches, Make-up connection, overflow and drain etc. The tank shall provide with level gauge glass and shall be completely insulated. Point n) One No. Make up water tank made of MS / FRP complete with valves, level gauge, level switches, make up connection, over flow and drain etc. Point o) One nos. Storage water tank (8m3 capacity) made of MS complete with valves, level gauge, level switch, make up connection, over flow and drain etc. This tank will supply make-up water to cooling towers, expansion tank and humidifier.	It shall be noted that makeup water to HVAC system (i.e. chilled water expansion tank (1 m3), humidifiers and cooling towers) shall be supplied through pressurized make up water system from plant. It may not be feasible to feed the water based on gravity to Cooling tower & Humidifiers. Accordingly any additional Make up water tank (as per point n) and additional storage water tank (as per point-o) are not required. Employer shall provide single point water supply to the BTG and further internal distribution can be completed by Bidder. Further detailing can be finalised during DDE. Please confirm.	Can be finalized DDE
20	Volume - II, Section - 2 Lead Technical Specifications	Doc No. ETG061-BTG-GEN-LTS / Page-29		2.13.07	Point m) One Lot of Drain Water piping out of MS pipes confirming to IS-1239, Part-I, heavy grade and galvanized as per IS:4736, from various equipment like chillers, pumps, AHU, cooling tower area, etc. up to the nearest drain point. (Within the room & for Cooling tower up to the nearest drain point or rain water pipe on the roof) with Thermal Insulation.	Drain piping from cooling tower or cooling water pumps does not need any thermal insulation. Please confirm and update.	Noted
21		Section-2, Lead Technical Specification		2.13.09 (iv) 2.13.09 (v)	Electric Powered and diesel powered Forklifts Miscellaneous handling equipment. Stores	Bidder understand that mentioned scope shall be part of BOP package supplier (Instead of BTG package supplier). Owner is requested to check and confirm.	Bid Specification Prevails
22	VOLUME - II, LEAD TECHNICAL SPECIFICATION	SECTION - 2 ,		2.13.10 ELEVATORS	Two (2) nos., passenger cum good elevators, suitable to carry minimum 3000 kg at a time; one for each boiler.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required. Please confirm.	Bid Specification Prevails

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23	VOLUME - II, LEAD TECHNICAL SPECIFICATION	SECTION - 2 ,		2.13.10 ELEVATORS	e) if passenger cum goods elevator is provided for that building, then separate passenger elevator is not required there.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required. Please confirm.	Bid Specification Prevails
24	Vol II	Section 2		2.13.10 (ii) a)	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler	Customer is requested to clarify & confirm the quantity of elevator in boiler area	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler
25	Vol III	Part A/ Section 1		2.43.01	One (1) no. Passenger elevator having a capacity of 1088 kg (suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator		
26	Vol III	Part A/ Section 10		2.04.01 (i)	Passenger cum goods elevator shall be provided for the following area: i) Boiler- Two (2) nos., one for each boiler, suitable for min. 3000 kgs		This clause is same as above
27	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION,Page 53		BATTERY LIMITS & EXCLUSION 3.02.01(sl. No. 11)	Terminal point (TP) of Cooling water pipe shall be 10M away from cooling Tower.	This is the BTG Package and cooling tower is not a part of this package. Hence, battery limit for CW Return Pipe shall be kept at 10 m away from CW Forebay. Kindly confirm.	Bid Specification Prevails
28	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION,Page 142		OTHER PLANT AREA AND GENERAL REQUIREMENT 9.02.44(sl. No. viii)	ACW booster pump house shall be suitably located near the 'A' row side of the PHB to optimise piping layouts.	Option of locating the ACW pumps inside / outside TG building may also be provided. This is inline with the practice followed in ongoing & executed projects by bidder. Kindly confirm.	Bidder can locate ACW booster pumps and Self Cleaning Filters in TG building ground floor, without making the layout congested, this can be decided DDE.
29	VOLUME - II	SECTION - 2		3.02.00	Battery Limits/Terminal Points Instrument air - 1 point near power house building (Within 3 m from A-row, 1st column of power house building) Service air - 1 point near power house building (Within 3 m from A-row, 1st column of power house building)	Bidder understands that One no. tapping, each for IA & SA shall be provided by Customer within 3 m from A-row, 1st column of power house building for TG & SG distribution by bidder. Piping from Compressor house to Terminal point is not in bidder's scope of supply. Further, IA & SA tapping for Customer scope facilities is not in bidder's scope of supply. Pl. confirm.	IA & SA lines for BoP area shall be terminated 3m away from compressor house, on the south side
30	II	Section 2		3.02.01 sl no. 31	Terminal Point of Fire protection system	Customer is requested to supply the Fire water for hydrant and spray water system at atleast 300NB Pipe and at 7 kg/ sq.cm pressure. Please confirm the same.	For Fire Hydrant and Spray supply piping for BTG area, Tapping shall be provided at respective headers near Fire Water Pump House (BoP scope) , refer Item no. 35 in the plot plan. Pressure at the terminal point will be more than 7 Kg/cm2; actual value will be shared DDE. Pipe size will be finalised DDE
31	Volume-II, Section-2, Lead Technical Specification	-		3.02.01	Outlet flanges of existing fuel oil (LDO) storage tanks of Unit 8, 9,10 and Tapping from Existing LDO Unloading header.	Owner is requested to provide the following inputs :- a) GA drawing of Existing LDO tank with identified location for Pump suction nozzle and its available size. b) LDO unloading header size and its location with identified terminal point location. c) Overall existing fuel oil layout drawing indicating tanker unloading, fuel oil pump house, dyke area etc.	Available drawings shall be provided,further details if necessary shall be obtained at site by bidder

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32	VOLUME - II	SECTION - 2		3.02.01	13. Instrument Air - Terminal point One point near Power house Building Remark- Within 3 M form A row, 1st column of powder house building (PHB)	Bidder understands that the distribution of Instrument air and service air for BTG island will be under Bidder scope, however terminal point for BOP requirement shall be provided 3 meter away from compressor house. Please confirm Bidder's understanding.	IA & SA lines for BoP area shall be terminated 3m away from compressor house, on the south side
33	Volume-II	Section-2		3.06.00	Treated sewage water analysis 4. Total suspended solids	Owner is requested to provide Total suspended solids parameter in treated sewage water analysis. Also, Owner is requested to provide clarified water analysis.	Treated Sewage Water received from Muncipal STP will be filtered to 5 NTU in the Pre-Treatment Plant (BoP Package). This 5 NTU filtered water will be used for following service- CW Make-up Service Water FGD Clear Water APH/ESP Wash Fire Water
34	VOLUME - II	SECTION - 2		4.01.00	The complete plant shall be designed with adequate redundancy. As a rule 100% redundancy shall be followed for all critical/important equipment unless specified otherwise	Reduncancy is not applicable for CAS package. The system shall be provided as per Volume-III, PART – A/ SECTION - 6 - Compressed air system chapter and accepted clarification/ deviation.	Bid specification prevails
35	Volume-II, Section-2 ,Lead Technical Specification			4.40.20 (ii)	Plant Auxiliaries System (within this package): Fuel Oil Pressurizing & Heating System	Bidder understand that Heating system is not applicable only LDO is used as a fuel (Not HFO).	Bidder understanding is correct.
36	Volume - II	Section - 2 Lead Technical Specification / page 187		c) Station Auxiliary Power Consumption	C-(4) Common auxiliaries/system for both units such as Fire Protection System, Illumination and HVAC etc shall be apportioned for individual units during.....	Building and/or equipment has to be considered for Auxiliary Power Consumption for Ventilation system is not clearly mentioned in the specification. However, for Air Conditioning System it is clearly defined under clause C-5. Thus, kindly reviw whether aux power consumption for ventilation equipment has to be considered or not. if it is to be considered then pls furnish list of building and list of ventilation equipment to be considred. Kindly review and confirm.	Yes, it has to be considered. Pls also refer clause 11.31.11, x), c), 6 of Vol-II, Section-2. It will be decided during finalisation of PG test procedure.
37		Part A-Section 2	39	8.14.09	The resin should of CPU grade with uniform coefficient less than 1.1.	Bidder understands that uniformity co-efficient of resins shall be as per OEM standard as followed in NTPC and SUBs Projects. Kindly confirm acceptance.	Noted. Bidder to provide references and proof for our consideration,
38		Part A-Section 2	40	8.13.01 vii)	In addition to the dissolved solids, the influent condensate shall also contain some quantities of suspended solids (crud) derived from the corrosion of water and steam carrying pipe lines, turbine condenser and steam side of the feed water heater. Normally this concentration will not exceed about 25 ppb and the polisher beds shall provide sufficient filtering action to restrict the effluent crud content to less than 5 ppb.	As per CPU tender specification, details of pre filters are not mentioned, hence, Bidder understands that pre filters at the inlet of CPU vessels are not envisaged. Please confirm Bidder's understanding	Prefilters as required to meet the system requirements will be in bidder's scope.
39		Part A-Section 2	42	8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Sodium Analyser and Chloride Analyser shall be of Multi-Channel type inline with NTPC Projects. Please confirm Bidders understanding.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride.

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40	Volume-III	PART-A Section-2		8.08.00	The condensate polishing plant will be full flow, 3x50% capacity mixed bed trains, consisting of full capacity service vessels for each unit. The total capacity of CPU for each unit shall be a minimum of CEP design flow plus a margin of 10%, corresponding to maximum of: VWO condition at 1% make-up and designed condition, OR HP / LP bypass charge condition, OR All HP heaters out of service	Bidder has considered that unit shall have three (3) service vessels (two working & one standby) of 50% capacity designed for condensate flow corresponding to following condition: Valve Wide Open condition at 1% make-up and designed condenser pressure inline with all recent NTPC and SEBs projects and not for other two referred conditions. Please confirm acceptance.	Bid Specification Prevails
41	Volume-III	PART-A Section-2		8.06.00	The regeneration facilities comprising of Regeneration Vessels, Measuring Tanks and Pumps shall be located in a separate place near and outside the TG building. The resins will be transferred to the Regeneration Area from the Condensate Polisher Mixed Beds and vice versa through a pipeline.	In the absence of the information regarding CPU regeneration building structure, Bidder would to recommended that Complete CPU regeneration area shall be kept under structural shed and one-meter height parapet wall shall be provided around this shed inline with all recent NTPC projects. Please confirm acceptance.	Noted
42	Volume-III	PART-A Section-2		8.13.01 vii)	In addition to the dissolved solids, the influent condensate shall also contain some quantities of suspended solids (crud) derived from the corrosion of water and steam carrying pipe lines, turbine condenser and steam side of the feed water heater. Normally this concentration will not exceed about 25 ppb and the polisher beds shall provide sufficient filtering action to restrict the effluent crud content to less than 5 ppb.	The technical details of pre filter are not mentioned in tender specification, bidder understands that pre filter is not envisaged for CPU. Please confirm bidder's understanding. If pre filters are required, Owner is requested to furnish the technical details of the same.	Prefilters as required to meet the system requirements will be in bidder's scope.
43	Volume-III	PART-A Section-2		8.15.14	Silica (dissolved) content at outlet of CPU shall be less than 5 ppb	Bidder would like to clarify that Silica (dissolved) content at outlet of CPU during normal operation shall be limited to 5 ppb up to 50 deg C temperature. For temperature of condensate above 50 deg C, silica content shall be as per CPU supplier recommendation. Please accept.	Bidder to comply with the specification, can be reviewed during detailed engineering.
44	Volume-III	PART-A Section-2		8.15.14	pH value -ppb -8-8.5 (Normal & Start -Up condition)	Since ammonia is almost removed by CPU, pH will be not maintained/guaranteed as specified in the specification at the outlet of CPU. CPU outlet pH will be as per the CPU vendor recommendation. Please confirm acceptance.	PH shall be controlled as per ammonia dosing as per process requirement.
45	Volume-III	PART-A Section-2		8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Chloride Analyser at outlet of CPU vessel is not required separately as the condensate quality will be analysed by pH Analyser, Conductivity Analyser, cation Conductivity Analyser, common channel Sodium Analyser at common inlet and outlet of CPU. Kindly confirm Bidder's understanding.	Bid Specification Prevails
46	Volume-III	PART-A Section-2		8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Sodium Analyser and Chloride Analyser shall be of Multi-Channel type inline with NTPC Projects. Please confirm Bidders understanding.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride.

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47	Volume-III	PART-A Section-2		8.15.04	The pressure vessels in the common external regeneration facility will be provided with adequate freeboards over the top of the settled resins in order to minimise the loss of resin during their use. Minimum freeboards are as follows: Mixed Resin Storage Vessel:- 100% of resin volume Resin Separator Vessel:- 75% of resin volume Cation Regeneration Vessel:- 100% of resin volume Anion Regeneration Vessel:- 100% of resin volume Activated Carbon filter:- 75% of media volume	Bidder want to suggest for free board requirement in CPU regeneration area as follow Mixed Resin Storage Vessel:- 50% of resin volume Resin Separator Vessel:- 75% of resin volume Cation Regeneration Vessel:- 75% of resin volume Anion Regeneration Vessel:- 75% of resin volume Activated Carbon filter:- 75% of media volume These above stated free board requirement for vessel is inline with past executed NTPC project. Kindly confirm.	Bid Specification Prevails
48					Bid Drawing	Condensate polishing system scheme is not found in Bid drawing. Owner is requested to provide same.	Bidder shall prepare his drawing confirming to specification requirements.
49	VOLUME - III	PART – A/ SECTION - 3		3.01.02	Service Air System - shall consist of distributions terminated at hose valves for general housekeeping on the different floors of Power House, boiler galleries and other auxiliary buildings of Main Plant. Distribution scheme shall also include some continuous and intermittent requirement of boiler and Turbine-generator islands. Fundamentally for this project both Instrument air and Service air are considered as instrument quality air.	Pl. note that as per Compressor air system specification, Volume-III, PART – A/ SECTION - 6, the service air compressors are not provided with air dryers. Hence, service air quality is not identical to instrument air quality. Pl. confirm.	Noted, howver compressors will be similar.
50	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE – I Specification for Low Pressure Piping	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB-Stainless Steel as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10	IS 1239 Gr heavy galvanized/IS 3589 Gr 410 galvanized may be allowd as Material of pipe for Instrument Air and Service air .Galvanization shall be to IS- 4736 or equivalent.	Bidder may use 40S schedule as per ASME B36.19, for Stainless steel piping size 50 NB and below. Also, bidder may allow to use pipe MOC for service air application only as per IS 1239 GR heavy galvanized/IS 3589 GR 410 galvanized and Galvanization shall be to IS 4736 or equivalent.
51	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE – I Specification for Low Pressure Piping	Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB-For pipes MOCStainless steel as per ASTM A-312 Gr. 304. Size-upto 150 mm NB as per schedule 10S, ANSI B-36.10.		
52	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB-Fittings ASTM-A-182 F304	For Instrument air and service air-For pipes up to 150 NB, pipe fittings may be supplied with material and dimension conforming to IS 1239 It shall be Galvanised as per IS 4736 or equivalent..For sizes greate than 150 NB fittings will be as per SA234WPB and shall be galvanised as per IS 4736 or equilavant.	Bidder to comply tender specs except for Service air line. For Service air line , Refer Clause 4.13.09, of Vol.-III, Part-A, Section-6
53	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB-Fittings ASTM-A-351-CF8		
54	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Material of construction of valves for Drinking Water(less than or equal to 50 Nb), Instrument air and service air(All sizes) shall be Stainless steel .	Carbon steel valves (Galvanised)may be allowed for for sizes 65 mm NB & above and Gun metal for sizes 50 NB and below for instrument and service air, and drinking water of sizes less than or equal to 50 Nb)	Noted.
55	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Material of construction of valves for Service Water (Clarified/Filtered),Filtered Water,Drinking Water,Inhibited Demineralised Water (for all sizes) shall be Cast iron (body)	Cast Steel valves may also be allowed for the mentioned services and sizes.	Noted.

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56	VOLUME - III	PART - A/SECTION - 5,Page 22 TECHNICAL SPECIFICATION CW & ACW SYSTEM		4.12.03	Shed/canopy shall be provided for valves located outside, for example, recirculation line valves.	Valves located outside buildings shall be suitable for outdoor application and hence shed/canopy shall not be provided. Kindly confirm.	Bid specification prevails
57	Vol-III	Part A/ Section 5		2.01.06	Each intake at the CW sump bay shall be equipped with coarse and fine screens to filter out debris	Bidder informs that as the quality of water is clarified water, so fine screen is not needed and only coarse screen is sufficient. Owner is requested to accept.	Bid Specification prevails
58	Vol-III	Part A/ Section 5		2.01.08	Arrangement shall be provided for a 30% recirculation from discharge of CW pumps to CW fore-bay, through a motor actuated butterfly valve and a manual butterfly valve. Recirculation shall be separate for both units.	Bidder does not envisage a manual butterfly valve and the same is also not shown in the tender flow diagram for CW and ACW system. Owner is requested to accept the same. Besides, Bidder would like to inform that the recirculation line upto the recirculation valve will be separate for both units, but after that both the lines will be combined into a common recirculation line, same is also as per tender flow diagram.	Bid Specification prevails
59	Vol-III	Part A/ Section 5		2.02.04	A 1x100% start-up ACW pump shall be provided in the CWPH to meet the ACW requirement during initial start-up	Bidder would like to inform that as an alternative for Header filling of CW pump, CT make up pump (supplied by Owner) can also be used. Owner to accept the alternative and issue amendment for the same.	Bid Specification prevails
60	Vol-III	Part A/ Section 5		3.00.00	CODES AND STANDARDS Piping - B 31.3	Bidder proposes ASME B31.1 which is applicable for power plant piping design. Owner to accept.	ASME B31.1 is for power piping. Can discussed DDE
61	Vol-III	Part A/ Section 5		4.04.04	The required cooling water flow for the CW system shall be worked out by the Bidder considering the maximum possible thermal load condition encountered in condenser and CW temperature rise.	Bidder will estimate the CW flow considering VWO condition with 1% MU. Owner is requested accept the same.	Noted
62	Vol-III	Part A/ Section 5 Part D		4.04.15 7.14.16	The CW pipes shall be designed for full internal vacuum. ii) The conduit shall also be designed for vacuum pressure inside and overburden pressure outside. The Vacuum pressure shall be based on the surge analysis but in no case less than 0.9 Kg/sq cm for the inlet and outlet pipes from the condenser and the delivery pipes from pump discharge up to the header and 0.5 kg /sq cm for the main inlet and discharge pipes.	Due to discrepancy between the clauses, Bidder proposes to consider full vacuum design for CW pipe only for above ground piping near to CW pump house and condenser. Rest of the CW pipe can be designed for 90% vacuum which is a acceptable engineering practice. Owner is requested to accept.	Noted
63	Vol-III	Part A/ Section 5 Part A/ Section 3		4.04.10 4.03.02	The piping sizing shall be calculated considering the design flow and velocity within 2 to 2.5 m/sec. The velocity of water at any point in the CW& ACW system should not exceed 3.0 and 2.5 m/sec respectively. i) The pipe sizes chosen shall be the next higher size to that calculated by taking velocity of water as 2 m/s	Discrepancy between the clauses, Bidder proposes to consider maximum 2.5 m/s velocity for both CW and ACW system. Owner is requested to Confirm.	Noted
64	Vol-III	Part A/ Section 5		4.05.00 8.01.01	Concrete Volute pump for CW system Type of Pump - Concrete volute casing, wet pit pump	Owner is requested to provide alternative to volute pump for CW as vertical turbine non-pull out type. Owner requested to accept.	Bid Specification Prevails
65	Vol-III	Part A/ Section 5		4.05.19	The pump and motor (complete assembly) should be designed for withstanding the runaway speed attained with reverse rotation caused by reverse flow	Owner to note that the motor is not required to be designed for reverse rotation. Owner requested to accept.	Bid Specification Prevails
66	Vol-III	Part A/ Section 5		4.05.20	To tackle the back flow from pump discharge line Non Reverse ratchet mechanism or other precaution should made for prevent the reverse rotation of pump.	For such big capacity CW pumps, non reverse rachet is not recommended, however, reverse rotation switch and alarm will be provided. Owner is requested to accept the same.	Bid Specification Prevails

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67	Vol-III	Part A/ Section 5		4.05.20 5.00.00	The maximum vibration limits of the pumps set when measured at motor end shall not exceed 25 microns . Vibration & noise level of rotating equipments - As per approved standards	Vibration level shall be as per applicable HI standard instead of 25 micron. Owner is requested to accept.	To be finalized DDE
68	Vol-III	Part A/ Section 5		4.05.25	iv) Performance (I Stage) Tests at Site Performance tests shall be carried out in two stages.	Owner to note that PG test of the CW pump will be done at the manufacturer's shop (as vertical pump is envisaged by Bidder). Owner to note that at all the required tests on the pump will be performed only once and not twice.	Bid Specfication prevails
69	Vol-III	Part A/ Section 5		4.05.25	iv, b) Cavitation test (3% head drop NPSH test) from 0% to 135% of rated flow with flow increment steps of not more than 10%.	Cavitation test is not applicable for the already proven model. Owner is requested to accept the same.	Bid Specfication prevails
70	Vol-III	Part A/ Section 5		4.05.25	i) Performance tests shall be carried out in two stages. After installation of the pump at site, one of the pumps to be chosen by the customer, shall be subjected to performance test at site v), a) Performance guarantee test at site shall be conducted on all the CW pumps	Owner is requested to note that performance test at site shall be conducted on one CW pump as per cl. No. 4.05.25, i). Owner is requested to accept the same.	Bid Specfication prevails
71	Vol-III	Part A/ Section 5 Part A/ Section 3 Part D		4.11.03 4.03.02 7.15.02	CW pipe work from pump discharge header to condenser and from condenser to cooling tower shall be rolled from minimum 22mm thick IS 2062, CS pates. >2500 NB - 20mm The minimum thickness of steel pipes shall be as follows including corrosion tolerance of 2 mm: i) For pipes above 1800 mm upto and including 2300 mm dia - 12 mm ii) For pipes above 2300 mm upto and including 3200 mm dia - 14 mm iii) For pipes above 3200 mm upto and including 3750 mm dia - 16 mm iv) For pipes above 3750 mm upto and including 4000 mm dia - 20 mm However, for ducts running below rail line in transformer yard/road, minimum thickness of CW liner shall be 20 mm.	Discrepancy between clauses, Owner is requested to confirm the thickness of CW pipe considering concrete encasement.	Bid Specfication prevails Can be discussed DDE
72	Vol-III Vol-V	Part A/ Section 5 ANNEXURE – 8		4.11.05 7.00.00	Glass flake based coating shall be provided, on the inside surface of CW Pipes/Ducts. Buried piping(internal) - Solid rigid polyurethane 500µ	a) Internal painting of 900 NB is not feasible. As per power plant industrial practice, Bidder proposes application of internal paint for pipes 1000 NB and above. b) Bidder does not envisaged glass flake lining due to non-corrosive service. Hence bidder proposes a coat of primer followed by hot coal-tar enamel or coal tar epoxy painting (cold) shall be applied ". Owner requested to confirm.	Bid Specification Prevail. PU coating is also acceptable. (Min. 750µ)
73	Vol-III	Part A/ Section 5		8.02.14	Casing - IS 210, G260, 2% Ni Cl (Internal with glass flake based protective coating on all wetted surface and flange face)	Bidder has not considered any glass flake lining as the same is not required due to non-corrosive service (clarified water).	Bid Specfication prevails
74	Vol-III	Part A/ Section 5		6.01.06 8.03.08 2.01.09	The CW pumps with its discharge valve (inching hydraulic butterfly valve).. Actuator - Electric Hydraulic operated butterfly valves shall be provided at the inlet and outlet of condenser.	Due to discrepancies in clauses, Bidder considers hydraulic operated butterfly valve at the CW pump discharge while at the condenser inlet and outlet, motorised valves will be offered. Owner is requested to confirm.	Hydraulic operated butterfly valve as specified shall be provided at the CW pump discharge, while at the condenser inlet and outlet, motorised valves can be offered
75	Vol-III	Part A/ Section 5		8.03.18	External hardware - SS 316	SS hardware is not required for butterfly valve which are of CS body. Instead CS hardwares will be used. Owner is requested to accept the same.	Bid Specification Prevails
76	Vol-III	Part A/ Section 5		4.11.07	i) Thrust blocks shall be provided as per system requirement	For underground pipes, no thrust block will be required.	Bid Specification Prevails

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77	Vol-III	Part A/ Section 5		4.11.13	Underground steel pipes and steel pipes in trenches shall be covered with anti-corrosive tape of minimum 4mm thickness, confirming to IS 10221 and AWWA C 203.	As the CW pipes are encased, no wrapping and coating will be applied. Owner is requested to confirm.	Wrapping coating is not envisaged for CW pipes, since it will be concrete encased.
78		Part A/ Section 5 Part D		4.11.09 7.15.08 7.14.15	600 NB size manholes, with 150 NB size vent valve shall be provided at 125 to 150m interval. Lifting lugs shall be provided to handle manholes. Manholes of minimum 1000mm clear opening shall be provided in each CW duct at a spacing of 200M (approx.) to facilitate maintenance / dewatering of CW ducts. At least one manhole shall be provided at the deepest point for both intake & discharge duct. Manholes shall be provided along the length of pipe at about 150 m centres and near locations of bend in each pipe.	Owner to clarify the manhole size required. Bidder proposes as a good industrial practice the size of 750 NB at spacing of 200 mtr. Owner to check and confirm.	Noted, however spacing can be finalized DDE.
79		Part A/ Section 5		4.12.10 4.12.11	ACW (booster) pump house common/separate for both units shall preferably be located adjacent to PHB AB bay to optimise the piping layout. Self-cleaning strainers can be housed in the ACW (booster) pump house.	Bidder proposes to locate the ACW pumps along with self cleaning strainer in the TG building ground floor. Therefore separate ACW booster pump house is not envisaged. Owner is requested to accept the same.	Bidder can locate ACW booster pumps and Self Cleaning Filters in TG building ground floor, without making the layout congested, this can be decided DDE.
80		Part A/ Section 2		2.13.11	xvi) VFD shall be considered for CEP, ID fans, ACW pumps and conveyor belt motors, as applicable.	VFD is not required for the ACW pumps as it will not provide any benefit during operation either in full load or part load. Owner is requested to accept the same.	Noted
81		Part A/ Section 5 Part D		4.04.16 7.14.01	Then pumps and equipment shall be designed for the tertiary treated sewage water as specified. Filtered / Clarified water shall be used for circulating water system	Owner is requested to confirm the water quality of the CW system. Bidder understand water quality is clarified water.	Filtered tertiary treated sewage water will be used for CW/ACW system.
82		Part D		7.14.04	Dimension of the pump sumps shall be so selected as to prevent dead water areas, reverse currents, flow separation and eddies. Recommendations of British Hydromechanics Research Association (BHRA) and Hydraulic Institute Standards shall be followed	Bidder will follow HIS recommendation for the CW sump design. Owner is requested to accept the same.	Noted
83		Bid drawing Part A/ Section 2		3.02.00	FLOW SCHEME FOR CW & ACW SYSTEM CW/CT blowdown - CW blowdown tank and FGD process water tank - CT blowdown tank shall be in BTG contract scope	Noted. However CT Blowdown tank capacity shall be informed by Owner.	Please refer Clause no. 2.13.05, XVII of lead specification Vol-2, section-2
84	Volume II	Part A/ Section 2		3.02.00	11. Cooling water pipes - 10 mtr away from cooling tower	Bidder understand the cooling water pipes will be terminated 10 mtr away from cooling tower at ground level. Owner is requested to inform the pressure required at the terminal point for CW pump sizing. Also, Bidder understands butterfly valve for cooling tower header isolation is not in Bidder's scope. Owner to confirm.	Bid specification prevails. However, actual details will be shared with bidder DDE.
85		Part A/ Section 2 Part A/ Section 5		2.13.05 2.01.16	xi) ultrasonic flow measurement for CW and ACW One number Annuubar flow element shall be provided on each CW line (2 nos. for each unit) for total flow measurement to each condenser	Ultrasonic flow measurement shall not be provided for the CW line as annubar is envisaged for measurement of CW flow in hot water header (i.e. return line to cooling tower). Owner is requested to accept same.	Bid Specification Prevails
86		Part A/ Section 5		4.11.13	ii) Underground steel pipes and steel pipes in trenches shall be covered with anti-corrosive tape of minimum 4mm thickness, confirming to IS 10221 and AWWA C 203.	Anti corrosive tape is not required for the CW pipes as the pipes are encased. Owner is requested to accept.	Noted

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87		Part A/ Section 5		4.05.15	Epoxy resin based coating shall be provided on the inside surface of CW pump draft tube and casing. v) Similar coating shall be applied for ACW pumps also; inside casing and on flanges.	Bidder does not envisage any coating for CW and ACW pump casing as the service is non-corrosive clarified water.	Bid Specification Prevails
88	General				GA of IDCT with Invert level of cooling water basin and channel	Owner is requested to share the input for downstream engineering for estimation purpose.	For bidding purpose, Bidder to consider the invert level based on his experience, However, actual details will be shared with bidder DDE.
89	General				Auxiliary Cooling water / DM cooling water for BOP equipment	Please specify the terminal point location and elevation for the ACW/DMCW cooling water for the BOP equipment namely AHP compressors, DG set, etc. Also, please provide the flow and pressure requirement at the terminal point for pump sizing.	DMCW cooling water supply and return for BoP package shall be terminated at TG Building 'C' row, near the last column, adjacent to the proposed Service Building.
90	VOLUME - III	PART – A/ SECTION - 6		4.01.00	The plant shall be designed to meet the complete requirements for a 2x660 MW pulverized fuel based thermal power plant taking into consideration the plant location, environmental conditions, meteorological conditions, available input quality considerations to meet continuous, safe, efficient, economic and reliable working of the complete system for a period not less than 30 years.	Pl. note that CAS shall be designed for to meet the complete requirements for a 2x660 MW KORADI TPS - 11 & 12. The system shall be suitable to operate for desired life, however required operation & maintenance, change of spare parts as per OEM schedule/ recommendation, shall be ensured by Customer.	Bid specifcation prevails
91	VOLUME - III	PART – A/ SECTION - 6		4.06.00	Compressor shall have 25% minimum turndown capability (at 45 deg C & 75% RH).	The compressor capacity turndown is applicable only for Centrifugal compressors. Screw compressors runs on fixed capacity and donot have turndown capability. Accordingly same is not applicable for screw compressors. Pl. accept.	Bid Specification Prevails. Especially specification calls for VSD/VFD drive.
92	VOLUME - III	PART – A/ SECTION - 6		4.08.00	The instrument air quality shall confirm to ISO-8573, Class-1 purity standard	Bidder confirmed the instrument air quality shall be as per ISO - 8573, Class-1 for particles and oil content. However, pl. note that water vapour content shall be as per specification clause no. " 4.11.07 Quality of outlet air from ADP shall be in accordance to ISO 8573-1, class 1 as follows: i) Dew point at outlet of the air drying plant will be minus (-) 40°C at atmospheric pressure". Pl. confirm.	Bid Specification Prevails
93	VOLUME - III	PART – A/ SECTION - 6		4.10.15	iii) All regulating/intermittent requirement shall be considered as continuous requirement for purpose of calculation. No diversity factor (i.e. Diversity factor = 1) needs to considered as they are assumed to be simultaneous requirement.	Bidder request to accept a diversity factor of 0.4 for intermittent requiement. Diversity factor -1, will result in abnormal compressor capacity, which will result in higher power consumption and under utlization of compressors and also will impact dew point. Further, as per compressor sizing formula, 26.5% margin is to be considered in compressor sizing. Bidder request to accept diverity factor of 0.4, inline with that followed in all Thermal power projects. Pl. accept.	Bid Specification Prevails
94	VOLUME - III	PART – A/ SECTION - 6		4.10.14	Compressors shall be sized for the following conditions: i) Normal operation of all units ii) Start of one unit and normal operation of other units iii) Worst condition of two units starting simultaneously.	Considering the service air compressor sizing criteria as per specification and also illustrated below, will result in abnormal service air compressor capacity a.) strating two units simultaneoulsy b.) considering Atomising requirement as continious &	Worst condition of two units starting simultaneously can be omitted.

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95	VOLUME - III	PART – A/ SECTION - 6		4.10.15	iv) Atomising air for LDO firing during start-up shall be considered as continuous requirement.	Bidder request not to consider Atomizing requirement as continious and also for starting two units simultaneoulsy, the standby compressor shall also be operate during that period of startup. Pl. accept.	Bid Specification Prevails
96	VOLUME - III	PART – A/ SECTION - 6		2.11.00	However, if due to layout constrains, additional compressors are required to meet the plant compressed air requirements, 2x100% compressors of adequate capacity with associated ADP (as required), receivers and piping shall be provided to meet the plant requirements.	The referred clause is not clear. It is not understood what all requirement will be cater by these IA compressors. Also working & standby is not clear along with sizing criteria. Customer to clarify.	Bid specification prevails.
97	VOLUME - III	PART – A/ SECTION - 6		4.13.09	All interconnecting compressed air piping shall conform to ASTM A 53 Type-E, Gr. B or IS-1239 heavy, galvanized / IS 3589 Gr 410; galvanized to IS- 4736 or equivalent.	The referred clause are contradictory. Bidder have considered IA & SA pipes asper IS-1239 heavy, galvanized / IS 3589 Gr 410; galvanized to IS- 4736 or equivalent. Pl. confirm.	Noted. Refer Clause 4.13.09, of Vol.-III, Part-A, Section-6
98	VOLUME - III	PART – A/ SECTION - 3		ANNEXURE – I	Service and Instrument Air Piping Stainless Steel as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10 Stainless steel as per ASTM A-312 Gr. 304. Size-upto 150 mm NB as per schedule 10S, ANSI B-36.10.		
99	VOLUME - III	PART – A/ SECTION - 6		4.13.17	Selection of Valves shall be as follows: i) Compressed Air Service: a) For compressed air application, valve body material shall be cast carbon steel or forged carbon steel for sizes 65 mm NB & above and Gun metal for sizes 50 NB and below. b) All airline valves shall be ball valve type. For compressed air application, valve material shall be with SS304 internals.	The referred clause are contradictory. Bidder have considered IA & SA valve body material as cast carbon steel or forged carbon steel for sizes 65 mm NB & above and Gun metal for sizes 50 NB and below Pl. confirm.	Noted. Refer Clause 4.13.17, of Vol.-III, Part-A, Section-6
100	VOLUME - III	PART – A/ SECTION - 3		ANNEXURE II	Stainless steel body/ Gate/Globe /Check/Ball Valve - Service and Instrument Air		
101		Part A-Section 6	4	4.10.01	Type of air compressors shall be oil free, multistage rotary screw compressor.	A Screw type compressor is requested in tender specification. Bidder request Owner to allow Centrifugal compressor as an alternative to Screw compressor as is inline with practice followed in NTPC Projects.. Please confirm acceptance on Centrifugal compressor.	Bid Specification Prevails Centrifugal compressors are not envisaged.
102	VOLUME - III	PART - A/SECTION - 6		4.10.15	iii) All regulating/intermittent requirement shall be considered as continuous requirement for purpose of calculation. No diversity factor (i.e. Diversity factor = 1) needs to considered as they are assumed to be simultaneous requirement.	As per standard practice and previously executed NTPC project, the regulating/intermittent requirement of air if any shall be converted into continuous requirement by considering frequency of such requirements or selecting an appropriate diversity factor and such diversity factor shall not be less than 0.4. Please confirm	Bid Specification Prevails

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103	VOLUME - III	PART - A/SECTION - 6		4.10.15	Total air requirement shall be assessed as follows: i) For instrument air requirement $Z = \{[2(A+B) + C + D] \times (1 + mw + ml)\} \times (1 + cd)$ Where; A = Instrument air requirement of SG & Auxiliaries (including FGD, DeNOx & MRHS) of each unit B = Instrument air requirement of TG & auxiliaries of each unit C = Instrument air requirement of WTP and other BoP facilities. D = Station C&I requirement mw = wear & tear losses (5%) ml = margin for leakages (10%) cd = margin for contingency demand (10%) Z = Total instrument air requirement ii) For service air requirement $Y = \{[2(A+B) + C] \times (1 + mw + ml)\} \times (1 + cd)$ Where; A = Service air requirement of SG & Auxiliaries (including FGD, ESP, DeNOx, & MRHS) of each unit B = Service air requirement of TG & auxiliaries of each unit C = Service air requirement of WTP and other BoP facilities. mw = wear & tear losses (5%) ml = margin for leakages (10%) cd = margin for contingency demand (10%) Y = Total service air requirement	Please provide requirement continuous and intermittent instrument/ Service air for below mentioned items. Instrument air for : C = Instrument air requirement of WTP and other BoP facilities.(Along With facility list, Continuous and Intermediate requirement) D = Station C&I requirement Service air for : C = Service air requirement of WTP and other BoP facilities.(Along With facility list, Continuous and Intermediate requirement)	Bid Specification Prevails
104	VOLUME - III	PART - A/SECTION - 6		4.10.25 4.11.01	vii) Temperature of air at outlet of after cooler shall not exceed 8°C above the DMCW inlet temperature. Air-drying plant shall be of 'Heat of Compression (HoC)' desiccant type (conventional or rotary drum type), drying by adsorption process through a desiccant medium. 'Open Through (Blower reactivated)' type is also acceptable.	After coolers are not required for instrument air compressors as the dryer requires high temperature in the tune of 200 degC or so at inlet. However for service air, after coolers will be provided. Please confirm our understanding.	After cooler can be as per OEM & type of dryer.
105	VOLUME - III	PART - A/SECTION - 6		4.12.02 4.12.03 2.09.01 2.09.02	Each air receiver shall be so sized that even in the event of total stoppage of air flow from the compressors, the pressure in the receiver shall not fall below 5.5kg/cm2 within two (2) minutes of such stoppage, while maintaining an outflow of air at a rate equal to the rated capacity of one compressor, during such period. In no case, the size of each air receiver be less than that is arrived from IS 7938. Unit air receivers of min. 10 m3 shall be provided for SG & TG auxiliaries, of each unit. Dedicated air receiver of min. 5m3 shall be provided for FGD area.	As per stated clause. 2.09.01 and 2.09.02, Bidder understands that only 10 m3 Air receiver for SG and TG Auxiliary and 5 m3 Air receiver for FGD area shall be considered. Please confirm.	Bid Specification Prevails
106	VOLUME - III	PART - A/SECTION - 6		4.12.07 8.02.03	Air receivers shall be designed for minimum 1.5 times compressor discharge pressure {13 kg/cm2 (g)} and 50°C respectively. Design pressure & temperature: Minimum 1.5 times compressor discharge pressure (or 12.75 kg/cm2(g) minimum) / 50°C (minimum)	There is an ambiguity in the two clauses specified. Bidder understands that Air Receiver Design pressure shall be 12.75 Kg/cm2 inline with referred clause 8.02.03. Please confirm.	Biidder understanding is correct.
107	VOLUME - III	PART – A/ SECTION - 6		4.10.01	Type of air compressors shall be oil free, multistage rotary screw compressor.	The clauses are contradictory. Bidder request to include the option of Oil free Centrifugal compressors also for the project. Since, the compressors are of higher capacity & there are limited suppliers for such high range capacity compressors, as most of	

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108	VOLUME - III	PART – C		3.33.10	Each compressor shall be in the control panel to operate either in Base duty (Auto Load- Unload) or Standby duty (Auto On-Off) mode in case of Screw and unload/modulate/energy optimization (Auto Dual Mode) in case of centrifugal	suppliers for such high range capacity compressors, as most or manufacturers manufacture oil free screw compressors up to rating of 35 NM3/minute & beyond 35 NM3/minute, multistage centrifugal compressors, to achieve best economics of scale. Bidder once again request to accept Oil free Centrifugal compressors also as an option considering the availability and machine efficiency in this range. The option of centrifugal compressors is provided by Customer in all Thermal power plants of rating 660MW or higher. Pl. accept.	Bid Specification Prevails Centrifugal compressors are not envisaged.
109	VOLUME - III, PART - A, SECTION - 6	TECHNICAL SPECIFICATION COMPRESSED AIR SYSTEM	15	6.01.20	Unless otherwise mentioned in the relevant electrical part/section, automatic motor overload control system shall be included to permit continuous operation of compressors at minimum ambient air without exceeding the name plate rating of the motor.	Please elaborate motor overload control system. Bidder understands that Motor overload protection shall be part of Switchgear electrical circuit. Please confirm.	Noted. However the same feedback shall be considered in the DCS.
110	VOLUME - III, PART - A, SECTION - 6	TECHNICAL SPECIFICATION COMPRESSED AIR SYSTEM	14	6.01.09	Auto sequence operation of instrument air compressors & service air compressors has been envisaged through an OEM standard micro-controller located at compressor house	Bidder understand Auto sequence operation indicated in referred clause is for individual compressor sequence which will be part of Compressor mounted machine controller. Please confirm.	Confirmed.
111	VOLUME - III	PART - A/SECTION - 7		'2.06.00 Ventilation System	2.06.00 Ventilation System 2.05.07 All non air-conditioned areas of the plant have to be suitably ventilated.	Pl. Note that wrt LHP & GHP system, ventilation is only envisaged at following locations:- 1. Supply & Exhaust type ventilation for Underground portion of Limestone Unloading hopper region. 2. Exhaust Fans for Gypsum storage shed and travelling tripper bay.	Noted
112	VOLUME - III	PART - A/SECTION - 7		'2.06.00 Ventilation System	2.06.00 Ventilation System	1. Kindly Specify the Number of Supply and exhaust Air changes to be considered for underground portion. 2. May also specify the Exhaust Air changes to be considered for gypsum storage shed & tripper bay.	minimum 15 air changes per hour for underground areas and minimum 10 air changes per hour for over ground areas to be consider.
113	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 3.		2.02.16	Central Control Room (Common for both the Units), Computer Rooms, Control Equipment Room (CER), Uninterrupted Power Supply (UPS) Room, Shift Charge Engineer's Room (Common for both the Units), C & I Maintenance room, Relay Panel room (if separate), Record room. Automatic Voltage Regulator Room (AVR)/Excitation Room/Cubicle (as applicable) and all office areas in the main plant building/s. Other associated office areas telephone exchange room, library and laboratory etc, if any.	Following type of AC is being proposed for static excitation control rooms (if applicable) 1) static excitation control rooms (if applicable) – Since static excitation panel room is located towards A row side of power house, customer is requested to accept dedicated Split AC/ Ductable split AC/ Package AC based on actual cooling requirement for static excitation control rooms (if applicable) as routing chilled water pipe towards A row of power house from Control tower (Location of AC plant) crossing the C-D-E-F bay is not feasible 2) If any area is located far away where it may not be feasible to route AC duct from AHU, Air conditioning of such areas may please accepted with dedicated FCU (fan coil unit) with at least one (1) no. unit, capacity same as each working unit. Please review & confirm.	Noted. Can be discussed during Detailed Engineering. Same shall be considered in N+1 configuration, i.e. 'N' working +1 stand by units.

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
114	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 3.		2.02.22	Following areas will be air conditioned by dedicated Air Cooled Ducted Inverter Split Air-Conditioning Plant: i) Service Building	Please note the following, 1- In case of the Ducted Split type AC system, control system shall be through local control panel only and no centralized control system being seperate units. 2- Uniform inside temperature and RH conditions are necessary for bldgs such as Service Bldgs due to human occupancy andsame may not be arrived for ducted Split type AC system. In view of the above. type of the AC system to be provided for Service bldg may reviewed and confirm about the type of the AC system is to be considered. Further to above, bidder shall envisage as below, 1- There will not be any room for Ducted split type AC system for service bldg. 2- Redundancy factor for Air Cooled Ducted Inverter Split Air-Conditioning located in various dadicated areas is not available. Same shall be considered as N+1 configrution, i.e. 'N' working +1 stand by units. Please review and confirm	Can be discussed during Detailed Engineering. Same shall be considered in N+1 configrution, i.e. 'N' working +1 stand by units.
115	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 4.		2.02.23	To optimise the components required for ducted split air conditioning and ducting system, floor wise units shall be considered for service and administrative buildings .	We understand that administrative buildings is not applicable. Please review and confirm about the applicability of Admnistrative bldg. and facilitate the type of AC plant applicable for Administrative Bldg. (if applicable)	Admin building is a typo error, it is not applicable.
116	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 4.		2.02.24	Multi-outdoor unit system shall be provided for service building so that optimum cooling is ensured even if one of the outdoor unit fails.	Selection criteria for outdoor units shall be OEM specific. Please review and accept.	VRF/VRV type system have a set of indoor split units works with multiple ODU (Out Door Unit) system. Type of system can be decided DDE. N working & 1 Standby Configuration to be followed
117				2.05.05	ii) Multi-outdoor unit system shall be provided for conference rooms, so that optimum cooling is ensured even if one of the outdoor unit fails.		
118	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 4.		2.05.05	For conference rooms and dining rooms: i) Cassette type indoor units shall be used	Redundancy factor for Cassette type AC to be considered for conference rooms & dining rooms, are not available. Bidder shall consider redundancy factor as 'N+1' where 'N' is number of working units. Please review ad confirm.	Cassette type is also Split AC. Refer clause 2.05.01 of Vol.-III, Part-A, Section-7, for redundancy.
119	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 4.		2.05.05	For conference rooms and dining rooms: i) Cassette type indoor units shall be used	There is contradiction in between both reffered clause regarding type of the AC system for conference rooms Please review and confirm about the type of the AC system for conference room.	Cassette type is also Split AC
120				2.05.06	Split type air conditioning system shall be provided for the following areas: i) All conference rooms in the plant.		Cassette type Split AC to be considered
121	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 5.		2.05.08	ii) Evaporative cooling system by adapting Air washer units (AWU) shall be provided for the ventilation of various floors of Power House Building, switch gear rooms and cable galleries.	Inoder to optimized capacity calculation of the Evaporative Cooling System for Power House bldg. height of AB bay above operating floor of TG bldg shall be considered as 3.0M only . Please review and confirm	Noted
122	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 5.		2.05.08	iv) The hot air from the TG hall shall be exhausted by means of roof extractors.	Bidder shall envisage the exhaust system by roof extractors shall be sized with 60% of quantity of supply air of Evaporative Cooling System for Power House Bldg. Please review and confirm.	Can be discussed DDE

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123	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 5.		2.05.08	vi) With this system the dry bulb temperature within the turbine building shall be maintained at a temperature not exceeding 30 ⁰ C at all times of the year.	a) There is contradiction in both clause regarding inside temperature condition to be maintained for evaporative cooling of TG Hall. b) Further as per general practice, inside temperature for ventilation area catered by evaporative cooling, is kept below the out side dry bulb temeperature during summer.	Clause 2.05.08, vi) of Vol-III, Part-A, Section-7, shall be read as "With this system the dry bulb temperature within the turbine building shall be maintained at a temperature not exceeding 40 deg C at all times of the year." For this purpose, Summer outdoor design conditions @ 0.4% shall be considered as per ASHRAE for Nagpur.
124		Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 11.		4.11.03	DESIGN CRITERIA FOR VENTILATION SYSTEM IS AS BELOW 1. TG Hall & Cable Spreader room: - Inside temperature not exceeding 3 ⁰ C above outside dry bulb temperature during summer.	Customer is requested to review and clarify regarding the inside temperature to be considered for all ventilation area being cattered by evaporative cooling(air washer/ UAF system) and Dry ventilation system.	Inside temperatre shall be maintained min. 3 degrees below ambient outdoor temperature, for areas cooled with evaporative cooling (Air Washer/UAF); however, it should not exceed 40 deg C (DBT) at all times of the year.
125	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 9.		4.11.02	xiii) In air conditioning system the return air shall be through ducts and use of plenum space for return air shall be avoided. However, where various floors are air conditioned and no intermediate or intervening floor are left non air conditioned, the space above false ceiling can be used as return air plenum.	Please note that roof of AC areas of these buildings viz. FGD control room , ESP Control Room, office area in control tower, etc. may be exposed to ambient conditions depending on layout conditions. Also, clear gap between false ceiling and roof is generally less, restricting the usage of return air duct. However, as roof of air-Conditioned Area of these buildings is provided with underdeck insulation to minimize the Air-Conditioned Load, space between the false ceiling and roof for above building / floor shall be used for return air. ~~Please review and confirm~~	Can be discussed during Detailed Engineering.
126	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 27.		4.25.03	i) One (1) No. (100% duty) Centrifugal fan backward inclined, SISW type, complete with electric drive motor, drive Pulleys,, V-belt, belt guards, slie rails and other accessories etc	Customer is requested to review and allow modular type UAF with DIDW type fan.	Noted
127	Volume - III	Part-A / Section-7 / TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM / page 25.		4.24.02 & 03	4.24.02 Each Air Washer of adequate capacity shall be of double skin sheet metal containerized type suitable for placement in open area. 4.24.03 No separate building / room are envisaged for the placement of these units.	For ventilation requirement of TG building, space for installation of Air washer units along with pumps shall be considered in AB & BC bay at suitable elevation. In view of above, multiple containerized Air washer unit shall be placed at different location of power house along A-row and BC bay. However, fan and pump configuration shall be 1x100% to accommodate fan and pump inside sheet metal modular type air washer unit. kindly review and accept.	Can be discussed during Detailed Engineering. Pump configuration shall be 2x100%

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128	VOLUME - III PART-A SECTION-10	TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM	18	4.16.05	Air Handling Unit (Double Skin Type) ii) A differential pressure indicator & switch across the fine filter shall be indicated in the PLC or fully clogged condition shall be indicated.	In referred clauses there is contradiction to consider PLC or DCS based control system for HVAC system. We understand DCS based control system to be considered inline with C&I technical specification instead of PLC based indicated in Vol-III Part-A. Further number of OWS and Printer of DDCMIS shall be as per DCS Architecture drawing ETG106-SESI-CI-DCS-CD-001. Chiller shall have respective machine mounted control unit. This control Unit shall be interfaced with DCS. Number of controllers shall be as per functional grouping guidelines indicated at clause 2.06.16.	A) Bidder to follow the C&I part of deatiled technical specification. B) Noted. C) Noted. D) Noted.
				6.00.00	OPERATION AND CONTROL PHILOSOPHY		
				6.01.00	Air Conditioning and Ventilation System		
				6.01.01	Operation and control of the complete HVAC system shall be through a dedicated/extended PLC/DCS (as specified in the C&I Part)....		
			35	6.01.04	2 nos. OWS/EWS comprising 24"monitors, PC, A4 colour laser Printer.....		
				6.01.06	Local start/stop push button station for AC plant auxiliaries linked with central PLC panel would be provided; the stop push button shall be lockable		
				6.01.07	Fire damper controls shall be implemented in AHU local control panel. Fire damper position shall be indicated on LCP with the help of limit switches		
				6.01.08	One collective fault signal from each AC control system shall be hardwired to DDCMIS for annunciation.		
129	VOLUME - III PART-A SECTION-10	TECHNICAL SPECIFICATION AC & VENTILATION SYSTEM	36		Control of Ventilation System	Also Fire dampers shall be interfaced with respective area DCS. NO separate local control panel for AHU is envisaged in areas where DCS panel is available. Local panel shall be provided for areas where DCS is not available (non plant building, if any) for interfacing of Fire dampers as well as respective area Package AC Units, if applicable. For BOP Areas (not in Bidder scope) like AHP LCR, CHP LCR , WS LCR & Non-plant building the HVAC system shall interface with Owner scope DCS of respective BOP package. Request to confirm.	E) Use of local panel is subject to the approval of Owner. F) BoP area HVAC systems, for eg. AHP, CHP, WS LCRs will be interfaced with BoP DCS system.
				6.01.11	Common PLC/DCS system shall cover the controls of following ventilation		
				6.02.00	Connectivity to DDCIMS		
				6.02.02	i) The connectivity between DDCMIS & PLC system shall be OPC compliant over fibre optic cable and shall be used for monitoring purpose only. Other system DCS functional Block		
	VOLUME - III PART-C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	28	2.06.16	i) Main Plant AC common Block ii) Main Plant AC Block iii) Service Building AC Block		
			85	3.32.00	Air conditioning and Ventilation System The operation of each Air Conditioning system shall be possible through Microprocessor based Distributed Digital Control Monitoring and Information System (DCS) as defined in standalone DCS. Dedicated controllers to be provided by Contractor for each Screw /centrifugal Chiller units with local start / stop & indication for plant A/C system for all BTG & FGD areas including "Service Building".		

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130	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-3		2.02.16 & 2.02.20	2.02.16 : Central Control Room, Computer Rooms, Control Equipment Room (CER), Uninterrupted Power Supply (UPS) Room, Shift Charge Engineer's Room, C & I Maintenance room, Relay Panel room (if separate), Record room. Automatic Voltage Regulator Room (AVR)/Excitation Room/Cubicle (as applicable) and all office areas in the main plant building/s. Other associated office areas telephone exchange room, library and laboratory etc., if any. & 2.02.20 : Zone control thermostats have to be provided for each room in the office area especially those which are not used continuously, i.e. on 24 hr basis.	Bidder understands that any office areas, library and laboratory is not envisage in Main Plant building (TG building). All areas are working continuously and provided with central air conditioning system. Hence clause 2.02.20 i.e. zone control thermostat is not applicable for Main plant building. Please confirm Bidder's understanding	Can be finalized during Detailed Engineering.
131	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-3		2.02.22	Following areas will be air-conditioned by dedicated Air Cooled Ducted Inverter Split Air Conditioning Plant: i) Service Building	Bidder proposes to allow use of AHU with Air cooled condensing units for Service building as an alternative to Ducted Inverter Split Air Conditioning Plant. Please confirm and update.	Noted. However, it can be discussed during Detailed Engineering. . N working & 1 Standby Configuration to be followed
132	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-4		2.02.23 & 2.02.24	To optimise the components required for ducted split air conditioning and ducting system, floor wise units shall be considered for service and administrative buildings. Configuration shall be finalised during detailed engineering (DDE) & Multi-outdoor unit system shall be provided for service building so that optimum cooling is ensured even if one of the outdoor unit fails.	Bidder understands that administration building is not applicable under BTG scope. Please confirm and update. Further, for service building, as per mentioned clauses it is understood that system with multiple working units are required without any standby. Number of working units can be decided during DDE as per layout and load requirement. Please confirm Bidder's understanding.	Admin buildig is not aaplicable. For service building, system can be with multiple working units with minimum one standby. Number of working units can be decided during DDE as per layout and load requirement.
133	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-4		2.05.00	Zone control thermostats have to be provided for each room in the office area especially those which are not used continuously, i.e. on 24 hr basis.	As per mentioned clause, it is understood that for rooms which are operating 24 hours shall be provided with zone control thermostat. In service building majority rooms are offices which does not operate 24 hours and such room does not need zone control thermostat. Please confirm acceptance.	Bid Specification Prevails. Service building will have office rooms as well as open sitting areas; Office rooms which does not operate 24 hours should have thermostat, so that it can be switched-off while not in use and to control the room temperature, when it is in use. Alternatively, Separate Split ACs can be provided for such rooms.
134	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-4		2.05.02	These air-conditions shall be operated with Push Button Station / Remote control type	Split Type Air conditioners shall be provided with standard cordless remote controllers as per OEM standards. Any Push Button Station will not be applicable. Please confirm acceptance.	Bid Specification Prevails
135	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-4		2.05.05	For conference rooms and dining rooms: i) Cassette type indoor units shall be used ii) Multi-outdoor unit system shall be provided for conference rooms, so that optimum cooling is ensured even if one of the outdoor unit fails. iii) Inverter type AC is not envisaged for conference and dining rooms.	It is clear from the clause that Split type air conditioners are to be provided for conference and dining rooms. Bidder considers that "multi-outdoor unit system" here shall be written as "multiple split ac units". In case of Split AC single indoor with multiple outdoor is not possible. Please check and update.	VRF/VRV type system have a set of indoor split units works with multiple ODU (Out Door Unit) system. Type of system can be decided DDE. N working & 1 Standby Configuration to be followed

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136	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-5		2.05.06	Split type air conditioning system shall be provided for the following areas: vii) Ash water recovery pump house control room	As per tender plot plan, Dwg No. ETG061-COM-GEN-PP-001, Bidder understands that complete Ash Handling Plant & associated building are indicated in Employer or BOP Scope. AHP is not in BTG Scope. Accordingly "Ash water recovery pump house control room" shall not be applicable for BTG Scope. Please confirm and update the clause.	Bidder understanding is correct.
137	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-5		2.05.06	Split type air conditioning system shall be provided for the following areas: viii) Elevators (including machine room)	Bidder understands that only elevator machine rooms are to be provided with Split AC units and not the elevator. Please confirm and update the clause.	Bid Specification Prevails
138	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-5		2.05.08	<i>Evaporative Cooling System For Power House Building</i> vi)With this system the dry bulb temperature within the turbine building shall be maintained at a temperature not exceeding 30°C at all times of the year	With evaporative cooling system dry bulb temperature within the turbine building can be maintained as low as +3°C below ambient outdoor temperature. It is not possible to achieve and maintain 30°C. Please check and update the clause suitably.	Inside temperatre shall be maintained 3 degrees below ambient outdoor temperature.
139	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-6		2.05.10 , 2.05.11 & 2.05.12	2.05.10 : For Auxiliary Buildings in various locations dry ventilation with supply and/or exhaust fan is provided. Details of the types of ventilation for each area are furnished in this section 2.05.11 : The hot air from the service space shall be exhausted out through wall / roof mounted axial flow fans / gravity dampers 2.05.12 : The areas to be ventilated by dry mechanical ventilation process in, i.e. using supply air fans and/or exhaust fans / roof extractors / gravity dampers	Bidder understands that type of ventilation system shall be provided as per clause 4.11.03 DESIGN CRITERIA FOR VENTILATION SYSTEM Please confirm Bidder's understanding.	Bid Specification Prevails
140	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-9		4.11.02 (ii) vs 2.05.06	d) For SWAS Room areas: 22 ± 1°C & RH 50% ± 5%. g) Air-conditioned areas, like offices, conference rooms etc., the temperature shall be maintained at 24 ± 1°C & RH 50% ± 5%. h) Relative humidity shall be maximum 60% for areas being air conditioned by High wall split ACs. Specific RH control is not envisaged for this case. & Split type air conditioning system shall be provided for the following areas : vi) SWAS Room (Dry Panel)	For any area with split AC units (Hi-wall / Cassettes / Ductable) RH control is not feasible and hence not applicable. Please confirm.	Bid Specification Prevails Specific RH control is not envisaged for split AC units (Hi-wall / Cassettes).
141	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-9		4.11.02 (ii)	h) Relative humidity shall be maximum 60% for areas being air conditioned by High wall split ACs. Specific RH control is not envisaged for this case.	Both lines of this clause are contradictory. Relative humidity maximum 60% cannot be guaranteed when specific RH control is not envisaged. Please updated.	Bid Specification Prevails Specific RH control is not envisaged for split AC units (Hi-wall / Cassettes).

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142	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-9		4.11.02 (iii)	Fresh air requirement shall be as follows : The Air-conditioning spaces shall be maintained at positive pressure of 2mmWC to avoid any infiltration of dust	For rooms provided with Split type air conditioners (Hi-Wall / Cassettes / Ceiling suspended ducted Units) any room pressurization is not envisaged. Please confirm.	Bid Specification Prevails
143	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-9		4.11.02 (xi)	The air distribution system shall be sized to have a constant frictional drop along its length and velocity through main ducts shall not exceed 7.6 m/sec, for branch duct 4-8 m/sec and 2 m/sec in occupied room zones.	Duct in AC system shall be sized as per "Equal friction method" where in main duct shall be sized for maximum 7.6 m/sec velocity and further branch ducts shall be sized for same frictions rate as main ducts. Please confirm.	Bid Specification Prevails
144	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-11		4.11.03	DESIGN CRITERIA FOR VENTILATION SYSTEM : 1. TG Hall & Cable Spreader room 2. Electrical Rooms (M.C.C. room, Switchgear room in TG Building) 3. Non AC areas of ESP & FGD control Building (MCC/switch gear room) 4. Non AC areas of ESP & FGD control Building (cable spreader rooms) Inside Condition : Inside temperature not exceeding 3°C above outside dry bulb temperature during summer.	For areas served with Air Washer and UAF units (Evaporative cooling system), inside temperature is ideally provided as minimum 3°C below ambient. Please check and update clause.	Noted
145	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-13		4.11.03 (Notes)	ix) The hot air shall be exhausted from positive ventilated areas through wall mounted gravity dampers to maintain an over pressure of 2 to 3mm positive pressure. x) Velocity across gravity back draft damper shall not exceed 5 m/s	Both the clauses cannot be complied. For over pressure of 2 to 3mm positive, velocity across gravity back draft dampers shall exceed upto 5.7 m/sec. To maintain maximum velocity as 5 m/sec across gravity back draft dampers the overpressure in room will be approx. 1.5 mm maximum. Please confirm what clause to be followed.	Room pressure 2 to 3 mm (positive) to be maintained. Velocity across gravity back draft damper shall be decided during DDE.
146	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS		4.11.03 xi)	xi) Online non-chemical type scale inhibitor/preventer shall be used to avoid formation of scale in the Air washer/UAF water circuit to reduce blockage in nozzles.	Bidder understands that in presence of water softening plant, no separate Non-Chemical scale preventer is required. Owner is requested to check & delete the requirement of Non-Chemical scale preventer	Bid Specification prevails
147	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-25		4.23.00 & 4.23.05 i)	Finish F-1 a) Step-1: Wrapping of Poly-Bonded Hessain (PBH-to act as vapour seal) on outer surface of insulation with 50mm overlap stitching and sealing of overlap with synthetic adhesive like CPRX or equivalent compound. b) Step-2: The surface then shall be wrapped with 19 mm mesh 24 SWG GI wire netting, butting all the joints and laced down with 22 SWG lacing wire. c) Step-3: Sand cement (4:1) plaster shall be applied in two layers totalling to 12.5 mm thick, the second layer being brought to a smooth finish. A waterproofing compound shall be added to the cement before its application.	Sand cement plastering is an old practice when better insulation solutions were not available. This practice of providing sand cement plastering over insulation involves high maintenance and erection efforts. It is a tedious application and hence finishing is not proper & not preferred due to poor aesthetics. Bidder proposes to use aluminium cladding as finishing as per finish F-3 as step-3 instead of sand cement plastering. Please confirm	Noted
148	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-23 & 24		4.23.00	Point - 5 : Chiller Insulation - As required and Finishing as per manufacturer's standard Point-8 : Chiller Insulation - Nitrile Rubber (Slab/Roll)	Bidder considers to provide Chiller insulation as per manufacturer's standard with reference to point-5, Please confirm	Noted

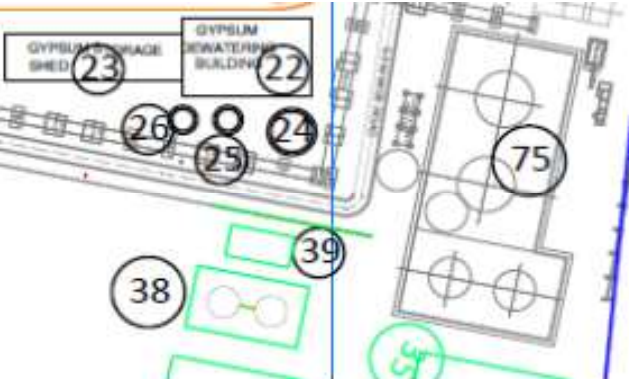
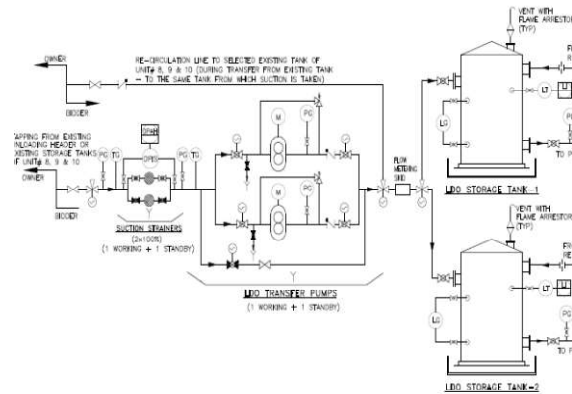
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149	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-27		4.25.00	Unitary Air Filtration Unit 4.25.03 : Each UAF shall comprise of i) One (1) No. (100% duty) Centrifugal fan backward inclined, SISW type, complete with electric drive motor, drive Pulleys, V accessories etc. iii) A spray nozzle system consisting of single bank spray system connected to header, flow regulating valves for controlling flow to spray header. Nozzles shall be of Brass / SS	In recent past project UAF unit is provided as modular unit with centrifugal DIDW fans and double bank spray section for saturation. Bidder proposes to use DIDW fans and double bank spray section for UAF also same as that of Air Washer Units. Please confirm acceptance.	Noted
150	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System	Doc No. ETG061-BTG-ME-HVAC-TS / Page-8		4.11.01	Design Outside Conditions Summer : DBT 50°C / Humidity 18% / WBT 27°C Monsoon : DBT 29.4°C / Humidity 82% / WBT 27.2°C Winter : DBT 15.6°C / Humidity 58% / WBT 11.1°C	Summer outside design conditions indicated as 50°C is too high. Volume II / Section 1 / Project Information / Clause 3.01.00 describes maximum ambient temperature as 47°C. Any coincident wet bulb temperature or RH is not mentioned. For HVAC system design coincident condition of DBT and WBT are to be followed. As per ASHRAE 2021, nearest station to Koradi is Nagpur 918 km) for which Summer outdoor design conditions @ 0.4% are as follows : - Summer DBT @ 0.4% : 44.2 °C - Summer MCWBT @ 0.4% : 22.6°C. Bidder considers to follow ambient design conditions as per ASHRAE 2021 for Nagpur as mentioned above for optimum design of HVAC system. Please confirm.	Bid Specification Prevails
151	Volume - III, Part - A, Section - 7 Technical Specification Mechanical AC & Ventilation System & Plot Plant	Doc No. ETG061-BTG-ME-HVAC-TS / & Dwg No. ETG061-COM-GEN-PP-001		General	Building under scope.	As per specifications and plot plan (Dwg No. ETG061-COM-GEN-PP-001), bidder considers only following buildings /area under BTG HVAC Scope. 1. Main Power House & its control building 2. ESP Control Building 3. FGD Control Building 4. Service Building 5. Boiler & Aux Boiler Switchgear buildings 6. Mill Bunker Bays 7. ACW Pump House 8. DG Building 9. CPU Regeneration Area 10. Limestone Handling Area 11. Gypsum Handling Area 12. Plant Air compressor building 13. CW Pump House 14. CW Treatment & Chlorination Building Any other building not listed above is not considered under BTG HVAC Scope. Please confirm.	Any other building and areas not listed by bidder in this query and is in BTG scope shall be considered in HVAC scope by bidder.

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152					General	Please review and accept type AC machine selection criteria for various others air conditioned areas shall be provided on the following basis. a) For areas where air conditioning load is in the range of upto 15 TR, Non-ductable ceiling mounted (cassette type) or wall mounted (high wall type) split air- conditioners of suitable capacity along with "N+1" redundancy shall be provided where "N" is number of working units. b) Ductable split/package type A/Cs shall only be provided for control rooms where the load varies in the range 15- 25 TR along with "N+1" redundancy shall be provided where "N" is number of working units.. c) Central air conditioning system shall be provided for control rooms where the load varies in the range 25-60 TR along with " 2 x100%" redundancy.	Bid Specification Prevails. However, If required, this can be discussed during Detailed Engineering.
153	plot plan-ETG061-COM-GEN-PP-001 and process flow diagram-ETG061-BTG-ME-SG-LDO-PFD-001				As per plot plan given in tender specification, FUEL OIL PUMP house (Pressurizing Pump House) and existing Fuel oil tanks are nearby 		Bid Specification Prevails
154	VOLUME - III	PART - A SECTION - 1		ii (b& c) of 2.26.02	ii (b) 2x100% LDO transfer pumps including matching suction strainers ii (c) Two (2) nos. Storage cum day oil tank, Filtration and pressurizing unit having 3x100% (1 Working for each unit + 1 common standby) capacity pumps with matching suction strainers	As per plot plan, FUEL OIL PUMP house (area marked as 39) (Pressurizing Pump House) and Existing Fuel oil tanks (terminal points) (area marked as 75) are nearby, hence Day oil Tank along with LDO transfer pumps and simplex strainers can be excluded and LDO suction shall be taken directly from main FO TANKS to Pressurizing pump house (FOPH-I). Please Accept.	
155	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	5	2.11.12	Flame proof enclosure Manual Call point for Main plant area, Transformer yard area, Battery room, Hydrogen storage area, Fuel oil & seal oil areas, FGD area & all miscellaneous buildings, near the exit of each floor.	Please note that Flame proof enclosure shall be provided for MCP installed in Hazardous Area. For other Areas normal MCP shall be provided. Request to confirm.	Bid specification prevails.
156	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	16	4.13.04 4.13.05	Fire Detection and Alarm System The system shall have networked with Main fire alarm panels (FACP) at Central Control Room & similarly with FACP of FGD control room and Repeater panel at Fire Station & Security house. This system shall be interfaced with the FACP panels of BoP Package contractor and Fire Pump House Control and Annunciation Panels (CAP) of BoP Package contractor.	Bidder understands FACP for Bidder scope Area shall be in Bidder scope. For other Areas FACP shall be provided by BoP package contractor as mentioned in clause 4.13.05. Request to confirm. BoP contractor FACP shall be interfaced by BoP contractor with Fire station. Bidder scope FACP panels shall be interfaced with Fire station by Bidder. NO interface envisaged between Bidder FACP and BoP contractor FACP . Request to confirm.	Bid specification prevails.

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157	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	17	4.13.07	System shall include the following: xv) UPS for computer and supporting system.	Bidder understands UPS power supply for Fire Alarm System Computer and accessories like printer to be considered. Bidder confirm to provide the same from nearest UPS source. Further Bidder would like to clarify, FACP shall be provided with Non-UPS Power supply inline with NTPC and industry practice as these panels are provided with Battery and Battery charger. Request to confirm.	Bid specification prevails.
158	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	17	4.13.07	System shall include the following: Complete Operator cum engineering work station i.e. PC, VDU & Printer (with latest configuration of reputed make) shall be provided at: a) One no. at Central control room at TG building & b) One no. at Fire Station.	FACP workstation and Printer shall be provided at Main Control room and Fire station. Fire station building is not in Bidder's scope, hence Owner shall provide space and power for workstation and printer located at Fire station. Please confirm. Other FACP of Bidder scope shall not have Workstation and printer. Request to confirm.	Bid specification prevails.
159	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	20	4.13.14	All control cables shall be as follows: i) FRLS cables - Loop cable for signalling line circuit shall be 1pair x1.5mm2 (minimum) as armoured flame retardant low smoke cable (FRLS) type which will be used for connecting detectors, modules, call points and networking of panels & control cables, power cables for Notification appliances	As per Industry, NTPC and State utility boards practice 2 core FRLS cable used for FACP Loop. Bidder propose to use the same instead of Pair cable mentioned in referred clause. Request to confirm. Also request to clarify conductor size for control cables indicated in referred clause.	Confirmed.
160	VOLUME - III PART-A SECTION-8	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	20 12	4.14.02 4.11.02	Control Cum Annunciation Panel (CAP) –Foam Pump House One no. PLC shall be located at control room adjacent to Fire water P/H, which will take care of the control aspects of system at Foam Pump House. vii)The operation of foam system shall be automatic with the aid of fire detection system provided for the fuel oil tanks with a provision for manual operation. Auto/Manual selection switch shall be provided at the local panel.	There is contradiction in referred clause for Foam pump control system. Bidder proposes to follow Local panel as mentioned in clause 4.11.02 for foam system. This panel shall be located in Control room near to Foam pumphouse or on Foam system skid as per Fire protection Vendor (OEM) standard practice. Request to confirm.	Local panel shall only be used with approval of Owner and shall be finalized during detail engg.
161	III	A , Section -8		4.08.00	Fire water Pumps	Please note that Fire Water Pumps (Motor driven, Diesel engine driven and Booster Pumps) are not in the scope of this BTG package of 2x660MW Koradi tender. Please check and confirm the same.	Booster pumps if required will be in the scope of bidder.
162	III	A , Section -8		4.11.00	Foam System	Foam System is not applicable in the Fire protection system of BTG island. Please confirm the same.	Bid specifcation prevails
163	VOLUME - III	PART – A/ SECTION - 8		8.05.00	Foam Type Fire Tender - 1 no. Water Type Fire Tender-2 Nos. DCP Type Fire Tender-1 no.	Requirement of Fire station building to park these three nos. fire tenders is not specified in "VOLUME - IV, PART - D, CIVIL" part of tender specification. Bidder understands that fire station building required to park these fire tenders is in customer's scope and excluded from bidder's scope. Pls. confirm.	Fire Tender is not envisaged in bidder's scope
164	VOLUME - III	PART – A/ SECTION - 8		8.05.00	Foam Type Fire Tender - 1 no. Water Type Fire Tender-2 Nos. DCP Type Fire Tender-1 no.	Requirement of registration is not mentioned in tender specification. Bidder understands temporary registration is in bidder's scope while permanent registration of these tenders is in customer's scope and excluded from bidder's scope. Pls. confirm.	Fire Tender is not envisaged in bidder's scope

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165	VOLUME - III	PART – A/ SECTION - 8		8.05.00	Foam Type Fire Tender - 1 no. Water Type Fire Tender-2 Nos. DCP Type Fire Tender-1 no.	Scope of insurance of these fire tenders is not mentioned in tender specification. Bidder understands insurance (first year insurance) of these tenders is in customer's scope and excluded from bidder's scope. Pls. confirm.	Fire Tender is not envisaged in bidder's scope
166	VOLUME - III	PART – A/ SECTION - 8		8.05.00	Foam Type Fire Tender - 1 no. Water Type Fire Tender-2 Nos. DCP Type Fire Tender-1 no.	Customer to inform the schedule of supply & handover of these fire tenders at Site. As the Fire tenders are supply items does not any involves erection/ commissioning, the handover of these fire tenders shall be within 15 days of delivery at Project Site.	Fire Tender is not envisaged in bidder's scope
167	VOLUME - III	A / 8		4.12.04 / Page 14	Design Criteria for Storage Containers shall be as follows: vi) All cylinders shall bear the marking as detailed out in NFPA-2001 and shall be duly listed by UL / FM / VDS / LPCB in addition to approval by accredited authority – Bangladesh.	Accredited authority – Bangladesh seems to be typographical error. Kindly check and update.	Bidder understanding is correct.
168	VOLUME - III	A / 8		4.09.09 / Page 9	Hydrant System: For fuel oil storage tank/dykes and fuel oil unloading area, double headed or single headed hydrants and fixed water monitors shall be provided. At least two water monitors and a hydrant valve shall serve each fuel oil storage tank. The monitor provided in the fuel oil handling area shall be dual type suitable for foam injection also. Each of the dual water monitors shall be provided with required foam supply/ apparatus approved suction equipments etc.	As per Dwg No. ETG061-COM-GEN-PP-001, Fuel oil tanks and unloading pump house are existing facilities , hence, the referred clause is not applicable for BTG Bidder. Please confirm.	Bid Specification prevails
169	VOLUME - III	A / 8		4.09.14 / Page 10	Hydrant System: At least three hydrant ring mains shall be provided one ring for the main plant area (from transformer yard to chimney) & other ring for the area other than the main plant. If system requirement calls for additional ring main the same shall also be provided. Isolation valves between various ring mains shall be provided so that ring mains can be interconnected and water from any of the ring main can flow to other mains.	As per specifications, there is no clarity regarding Fire protection hydrant & spray system for BTG area. As per Dwg No. ETG061-COM-GEN-PP-001, Terminal point T-15 indicates "Tapping for BTG areas at header (with Tee & Isolation Valves) near BoP FWPH" As per Volume-II, Section-2_Lead Technical Specifications (Doc No. ETG061-BTG-GEN-LTS), Clause 3.02.01/ Battery Limits & Exclusions / Point - 31 defines terminal point for FPS "within 3 m from A-row, 1st column of power house building (PHB). In view of above discrepancy and non clarity, Owner is requested to confirm and clarify the scope, type & terminal points of Fire Protections system for BTG area to keep all Bidder's at par.	Tapping point for Fire hydrant and spray lines shall be near BoP Filter Water Pump House (FWPH)
170	VOLUME - III	A / 8		4.11.01 / Page 11 & 12	Foam System: Foam Injection system shall be provided for all the fuel oil storage tanks located in dyke. The fixed foam system shall consist of foam concentrate tanks, pumps balancing line with automatic controlling valves, foam makers, discharge outlets, interconnecting piping, valves, fittings, instrumentations etc. The operation of fixed foam system shall be automatic with the aid of dedicated fire detection system provided around the tank. The semi-fixed system shall be operated through the foam hydrants/monitors; portable type foam water monitors, hoses and nozzles for extinguishing spill fire in and around the tank area.	Bidder understands that Fuel oil storage tanks are not in BTG Scope as the same are existing facilities. Hence, referred clause for foam protection system of fuel oil tanks is not applicable for BTG Bidder. Please confirm.	Bid Specification prevails
171	VOLUME - III	A / 8		4.13.05 / Page 16	Fire Detection and Alarm System: This system shall be interfaced with the FACP panels of BoP Package contractor and Fire Pump House Control and Annunciation Panels (CAP) of BoP Package contractor.	From the referred clause, Bidder understands that provision for contacts for BOP packages shall be provided in the main control system of BTG scope. Further completion of interface with BTG main control system shall be done by BOP contractors. Please confirm Bidder's understanding.	Bid Specification Prevails Completion of interface with BTG main control system shall be done by BTG contractor.

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172	VOLUME - III	A / 8		4.14.02 / Page 20	Fire Detection and Alarm System: One no. PLC shall be located at control room adjacent to Fire water P/H, which will take care of the control aspects of system at Foam Pump House.	Foam pump House & Fire Water Pump House both are not in BTG scope of work. Hence, the referred clause is not applicable for BTG Bidder. Please confirm.	Main Fire pump house is in BoP bidder's scope, but foam pump house and booster pumps (as required) will be in BTG bidder's scope.
173	VOLUME - III	A / 8		4.14.03 / Page 20	ii) Controls b) 1 no each Auto/Manual selector switch for jockey pumps, hydrant & spray pumps, air compressors, motorized valves, diesel engine driven hydrant & spray pumps.	Bidder understands that jockey pumps, hydrant & spray pumps, air compressors, motorized valves, diesel engine driven hydrant & spray pumps are not in BTG scope of work. Hence, the referred clause is not applicable for BTG Bidder. Please confirm.	Booster pumps (as required) will be in BTG bidder's scope.
174	VOLUME - III	A / 8		4.14.03 / Page 20	ii) Controls b) 1 no each Auto/Manual selector switch for jockey pumps, hydrant & spray pumps, air compressors, motorized valves, diesel engine driven hydrant & spray pumps.	Since fire water pumps are not in BTG Bidder scope, hence, Bidder understands that sufficient pressure and flow shall be made available at terminal point for BTG area by the Owner and no Booster pump is envisaged in BTG Bidder's scope. Please confirm.	Booster pumps (as required) will be in BTG bidder's scope. Pressure available at terminal point will be confirmed DDE.
175	III	A, Section 9		-	Fire detection and protection system	The secification for Fire Protection and Detection system is general in nature. However Bidder scope is limited to BTG island only. Cuomer to provide Hydrant ans spray pipes at terminal point near Power House building at sufficient pressure and flow. The further distribution of Hydrant and Spray water system is in Bidder scope. Please revise the specification as per actual scope o supply.	Bid specfication prevails. Refer clause 2.01.00, "The fire protection system including alarm and detection systems shall be provided to detect and control any outbreak of fire in the 2 X 600 MW power plant including all its auxiliary plants, covered under this Package. " This is to further clarify that Package referred above refers to BTG package, as mentioned in Clause 1.03.00 of Section-2, Volume-II
176	Volume III	PART A/Section - 9		4.06.08	All electric hoists shall be provided with VVVF drive for Creep speed for hoisting.	Application of such hoists are very limited and can be used only once when maintenance of equipment is required. Electric Hoist with normal drive is sufficient in line with BIDDER practice.	Bid Specificaiton Prevails
177	Volume III	PART A/Section - 9		8.03.07	Hoisting speed : 2.5 to 3.0 m/min	Mentioned hoisting speed shall be provided for hoist with capacity 20 Tons.However, for hoist capacity more than 20 tons it is recommended to have hoisting speed of 1.5 to 2.0 m/min considering safety of heavier equipment to be handled.This is as per standard practice.	We are not envisaging any electric hoist of such high capacity. Single Girder (SG) Under Slung (US) EOT crane shall be used if the equipment to be handled is more than Ten (10) ton
178		Section-9,Technical Specification of Crane and Hoist.		2.04.19	If the equipment to be handled is less than One (1) ton, Chain Pulley block of adequate capacity, along with travelling trolley & monorail should be provided.	Criteria for manual hoist is not specified in tender document. Hence, Bidder is considering manual hoist with travelling trolley for the equipment, which are to be handled during maintenance and having weight of 500 kg to 1000 kg.	Bid Specfication prevails

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
179		Section-9,Technical Specification of Crane and Hoist.		2.3.01 4.04.01	Double Girder (DG) EOT cranes for TG Hall i) Two (2) nos. DG EOTs shall be provided for handling TG Hall equipment ii) Both EOT cranes for TG hall shall be designed to operate in tandem. iii) Handling of Generator Stator is not envisaged Each TG Hall EOT crane sizing shall be done considering the heaviest weight including lifting tackles, to be handled in TG area plus minimum 10% margin or 100T/20T whichever is higher.	Bidder understands that tandem operation in TG hall EOT Crane is not required to be considered, if the single heaviest equipment to be handled during erection / maintenance is less than 100 T (except the generator stator). Owner is requested to confirm bidder's understanding.	Bid Specfication prevails
180		Section-9,Technical Specification of Crane and Hoist.		2.04.00	Electric/Motor Hoists with Trolleys – Electric hoists shall be used for handling all plant equipment, for various plant areas as below.....	Owner has identified various areas for considering the Electrical hoist. However, Bidder understands that separate hoist is not required where component/facility in a particular building/area are already covered by EOT Crane approach. Owner is requested to confirm bidder's understanding.	Bidder understanding is correct.
181		Section-9,Technical Specification of Crane and Hoist.		8.00.00	DATA SHEET – A (FILLED DATA SHEETS)	Owner has identified various technical details for crane and hoist in datasheet-A. However, Bidder understands that mentioned technical details are preliminary and shall be changed by OEM based on relevant design standard and their proven practice. Example : 8 nos. long travel wheels are specified in datasheet. However, The same can be considered as 4 no's for lower capacity of EOT crane based on OEM practice. ~~Owner is requested to confirm bidder's understanding~~	To be finalized DDE
182		Section-9,Technical Specification of Crane and Hoist.		2.03.03 2.03.07	Double Girder (DG) EOT cranes for CW Pump House Single Girder (SG) Under Slung (US) EOT crane for ACW pump house Building; one (1) for each unit.	ACW pumps will be located inside TG building and necessary suitable handling arrangement will be provided. Therefore, Single Girder (SG) Under Slung (US) EOT crane for ACW pump house Building is not envisaged. Owner is requested to confirm bidder's understanding.	Can be discussed DDE, based on the Layout.
183	III	Part D/ Page 35		7.20.01	Service Building: Building should have 2 (two) nos. of passenger elevator (13 passenger)	As per referred clause, number of elevator for service building is not clear. Customer to review the requirement and clarify the quantity of elevator for service building.	Refer clause 2.13.10, i), b), of Vol.- III, Part-A, Section-10; One (1) no. Passenger Elevator each suitable to carry thirteen (13) persons at a time, for service building
184	II	Section 2, Page 36		2.13.10 i) b)	One (1) no. Passenger Elevator each suitable to carry thirteen (13) persons at a time, for service building		
185		Part A-Section 7	6	2.05.12	The areas to be ventilated by dry mechanical ventilation process in, i.e. using supply air fans and/or exhaust fans / roof extractors / gravity dampers. i) All pump houses x) Pantry/kitchen	Bidder understands Ventilation system is to be provided for all pump house, Pantry/Kitchen in the BTG area only. Please confirm Bidder's understanding.	Bidder understanding is correct.
186	Volume - III	PART - A/SECTION - 10		2.02.00	2.02.00 Elevator shall be provided for buildings which has more than, Ground plus two (2) floors or which have floors (where access of personnel/goods is required for operation and maintenance) above 10m height (from ground floor, i.e. FFL).	1. Pl. note that inline with Limestone flow diagram ETG061-BTG-ME-FGD-PFD-001, Rev 01, for Limestone and gypsum handling region , Elevator only considered in Limestone crusher house inline with flow diagram.	Bid Specification Prevails
187	Volume - III	PART - A/SECTION - 10		2.04.01	ii) FGD area structures –one for each building/structure, suitable for min. 1088kgs; if height of operating floors/platforms is more than 10m from ground (FFL).	2. Further its is not clear for LHP & GHP region whether Conventional type (Rope and sheeve) or Rack and pinion type elevator is to be provided. We understand Rope & sheeve type Passenger cum goods elevator of 1088 Kgs Capacity to be provided for Limestone crusher house. may pl. confirm.	Noted

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188	VOLUME - III	CRANES AND HOISTS PART - A, SECTION - 9,Page 2		2.03.07	Single Girder (SG) Under Slung (US) EOT crane for ACW pump house Building; one (1) for each unit.	Electric Hoist (Motor operated) monorail shall be provided for handling ACW Pumps Kindly confirm.	Bid Specification Prevails Can be decided DDE									
189	VOLUME - III, PART-A, SECTION-10	TECHNICAL SPECIFICATION OF ELEVATORS		8.01.00, Page no 6	<table border="1"><tr><th>Sr. No.</th><th>Item</th><th>Requirement</th></tr><tr><td></td><td></td><td>Passenger Elevator</td></tr><tr><td></td><td></td><td>Passenger cum Goods Elevator</td></tr></table>	Sr. No.	Item	Requirement			Passenger Elevator			Passenger cum Goods Elevator	Bidder proposed to provide ventilation fans at car inline with ongoing NTPC/DCV projects. Please confirm.	Bid Specification Prevails
Sr. No.	Item	Requirement														
		Passenger Elevator														
		Passenger cum Goods Elevator														
190	VOLUME - III, PART-A, SECTION-10	TECHNICAL SPECIFICATION OF ELEVATORS		2.03.00, Page no 2	iii) ESP & FGD control building - Three nos.; one (1) no. for ESP control building of each unit and one for FGD control building ; suitable to carry for eight (8) persons at a time. 2.03.02 Other passenger elevator, suitable to carry eight (8) persons at a time, as required; i.e. one (1) for each building, which has more than Ground plus two (2) floors or if floors are above 10m height (above ground floor level / FFL). If a passenger cum goods elevator is provided for that building, then separate passenger elevator is not required there.	FGD control buildings are generally single/double floor buildings. Hance, bidder considered to provide Elevators for the building as per clause no 2.03.02, if height of floors are above 10m height (above ground floor level / FFL).	Bid Specification Prevails									
191	VOLUME - III	PART A SECTION - 1	37	2.43.01	One (1) no of Passenger elevator having a capacity of 1088 kg (Suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator.	Only one number of Goods cum Passenger elevator (3000kg capacity) is specified per Boiler in clause 2.13.10 of Volume II Section 2 & in clause 2.04.01 of Volume III Part A Section 10. Kindly clarify.	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler									
192	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.43.01	One (1) no. passenger elevator having a capacity of 1088 kg. (Suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required. Please confirm.										
193	VOLUME - III/TECHNICAL SPECIFICATION ELEVATORS	SECTION - 10 , PART-A		2.04.01	Passenger cum goods elevators shall be provided for the following area: i) Boiler - Two (2) nos., one for each boiler , suitable for min. 3000kgs.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required. Please confirm.	This clause is same as above									
194		Section-10 , Technical Specification Elevator System Technical Specification civil, structural and Architectural works		2.03.01 (ii) 7.20.01	Service building – One (1) no., each suitable to carry for thirteen (13) persons at a time. The building size shall be suitably decided during detail engineering stage. It will house the facilities as listed below.Building should have 2 (two) nos. of passenger elevator (13 passenger) and 2 (two) staircases.	Due to discrepancy for number of elevator in service building between two clauses, Owner is requested to confirm the quantity of elevator to be considered	One elevator shall be provided for service building, as per clause 2.03.01, ii), of Vol.-III, Part-A, Section-10									
195	VOLUME - III / PART - C 03 ETG061-BTG-ME-SG-LDO-PFD-001	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION LDO SYSTEM FLOW DIAGRAM	23	2.06.00	Functional Grouping of Controller	As per LDO system flow diagram, Bidder understands the scope of BTG contractor is from existing fuel oil storage tanks / Unloading header onwards. Note-10 of flow diagram indicates "COMPLETE CONTROL IS IN THE SCOPE OF BIDDER's DDCIMS.". However, fuel oil system is not mentioned in DCS functional grouping described under clause 2.06.00. Bidder request to include controls of equipments located at existing area in existing DCS or request to provide space & power for installation of Standalone DCS RIO panels in existing FOPH I&C room/LCR. For Equipments located in New plant plot area, Bidder proposes to implement in Standalone DCS as separate process block for LDO system. Request to confirm.	Bidder to consider the instrumentation as per mechanical scope for Fuel oil system.									

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196	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	7	1.08.02	CONTROL AND MONITORING FROM CCR i) Fire water & Booster system.....for this project is envisaged to be controlled mainly from the Large Video Screens (LVS) in association with the operator workstation (OWS) mounted on the Unit Control Desk (UCD) located in the Central Control Room (CCR) under all regimes of operation.	There is contradiction in referred clauses regarding Fire water system and Foam system control system.	Fire water system for BTG scope of supply shall be under BTG vendor's scope. Fire water pump house amd Main Fire Water Pumps shall be under BOP package scope. Fire Water Booster Pumps (if required) will be in BTG bidder's scope.
	VOLUME - II / SECTION-2	TECHNICAL SPECIFICATION FIRE PROTECTION SYSTEM	101	4.40.20	d) there shall also be following off site plants (which is not considered in bidder's scope and will come under BoP package contractors scope..... 6) Fire water Pump House Equipments This system shall be interfaced with Fire Pump House Control and Annunciation Panels (CAP) of BoP Package contractor		
				4.13.05	In addition, an annunciation panel shall also be provided in firewater pump house. This panel shall indicate status of pumps, system pressure, hydrant system in operation, water spray system in operation, etc. The central monitoring station shall give audio-visual annunciations for fire in each of the risk areas, status of protection systems such as water spray on, gas system injected, status of fire water pumps, trouble status of detector cabling for detection associated with spray systems, etc. Status of drives and critical parameters shall be provided for interfacing with DDCMIS.	Further Bidder request to clarify Why Fire water pumps related requirements are indicated in clause 4.14.03 of Control Cum Annunciation Panel (CAP) –Foam Pump House.	
				4.13.10	Control Cum Annunciation Panel (CAP) –Foam Pump House Control panel shall be having following features: i) Indication Lamps/Ammeter a) Tripped, ON/OFF indication for motor driven hydrant pumps, spray pumps, jockey pumps, air compressors & ON/OFF Indication for diesel engine driven hydrant & spray pumps. b) Control Supply ON indication. c) Ammeter for motor driven hydrant pumps, spray pumps & jockey pumps. d) Healthiness of batteries/chargers, low level	Bidder understands Control Cum Annunciation Panel (CAP) for Fire Water Pumps shall be interfaced by BOP contractor with Main Plant DCS to achieve remote monitoring of Fire water and Booster system from Main control room LVS as mentioned in clause 1.08.02. Please confirm.	
				4.14.00 4.14.03			
	VOLUME - III / PART - A/SECTION - 8						
197	VOLUME - III / PART - C	TECHNICAL SPECIFICATION CONTROL & INSTRUMENTATION	143	7.08.04	ULTRASONIC FLOW METER suitable for Cooling water for Transducer	Bidder would like to clarify Annubar shall be considered for CW flow measurement inline with 2.01.16 instead of Clamp-on Ultrasonic flow meter mentioned in clause 7.08.04. Request to confirm.	Bid specification prevails.
	VOLUME - III / PART - A /SECTION - 5	TECHNICAL SPECIFICATION CW & ACW SYSTEM	3	2.01.16	One number Annubar flow element shall be provided on each CW line (2 nos. for each unit) for total flow measurement to each condenser	Further note that Accuracy of Annubar for large pipe line applications will be as per Instrument Vendor OEM. Request to confirm.	
198	Volume-III	PART-D		11.35.01	Roof water tank of adequate capacity depending on the number of users and minimum 8 hours requirement shall be provided for each building and pump house. Separate tanks shall be provided for potable water and service water.	Tank capacity will be decided based on the number of users and requirement of national building code (NBC). Also, Bidder will provide the water requirement and pressure for both potable and service water at given terminal point during engineering. Kindly confirm	Noted. However, minimum capacities mentioned in the specification should be considered. Noted
199	-	-		-	Bid Drawing	CW treatment Scheme is not found in Bid drawing. Owner is requested to provide same.	P&IDs of system will be developed by Bidder based on the requirments of Bid Specification.
200				PLOT PLANT	Building list 43) CW treatment and chlorination (Item No:- 32A)	Bidder would to clarify that only CW chemical treatment system will be in Bidder's scope. Chlorination is excluded from the BTG Bidder's scope Kindly confirm.	Noted

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201	VOLUME - III Flow Diagram of COMPRESSED AIR SYSTEM FLOW SCHEME Drg. No. ETG061-BTG-ME-CAS-SCH-001Rev. A	PART - A/SECTION - 6		2.04.00 2.06.00	Configuration of IA compressors shall be 'NIA' working for each unit and one (1) common standby, with individual ADP and air receiver for each compressor. Configuration of SA compressors shall be 'NSA' working for each unit and one common standby, with individual air receiver for each compressor. Flow diagram: Four (5) number Instrument air compressor are shown Three (3) number service air compressor are shown	Owner to note there is a discrepancy between tender specification and drawing for the numbers of instruments air compressors. Also note that the SA & IA compressors shall be identical, hence, Bidder understands that there shall be 3 nos (2W+1S) IA and 3 nos (2 W+1S) SA compressors are envisaged in line with referred tender specification clauses 2.04.00 & 2.06.00. Please confirm Bidder's understanding.	Bidder to refer Note-1 of Flow Diagram of COMPRESSED AIR SYSTEM FLOW SCHEME Drg. No. ETG061-BTG-ME-CAS-SCH-001Rev. A 'N' working +1 standby configuration shall be followed. No. of working IA & SA compressors, will be decided DDE.
202	Volume - IV, Bid Drawings Volume - III, Part-D, Technical Specification Civil, Structural and Architectural works	ETG061-BTG-ME-SG-LDO-PFD-001		7.19.01	Drain oil collected in surface drain shall be pumped(using 2 x 100% sump pump) to oil effluent collection pit/tank, to be further treated in oil water separator(ows will be BOP contractor scope) The civil works are to be provided for Oil water separator pit.	As per Process flow diagram, Surface drain of pump house shall be pumped to oil effluent collection pit. The same shall be further treated to oil water separator, which is under BOP contractor scope. However, In civil section, oil water separator pit requirement is mentioned in bidder's scope. Based on above, Bidder understands that oily water separator is not in bidder's scope. Further, owner is requested to provide the location for Oil effluent collection pit for discharge the surface drain.	Oil water collection pit and pumps are in BTG contractor scope.
203	VOLUME - III Flow Diagram Drg. No. ETG061-BTG-ME-CAS-SCH-001Rev. A Doc. No. P&P/Comm/KRD2x660/BTG/2024	PART - A/SECTION - 6		2.04.00 2.06.00 4	Configuration of IA compressors shall be 'NIA' working for each unit and one (1) common standby, with individual ADP and air receiver for each compressor. Configuration of SA compressors shall be 'NSA' working for each unit and one common standby, with individual air receiver for each compressor. Flow diagram: Four (5) number Instrument air compressor are shown Three (3) number service air compressor are shown The station auxiliaries that shall be running during the guarantee test for calculating " PS " shall include but not be limited to the following: ☐ Plant Instrument and Service Air Compressors & Air Drying Plant ☐ Instrument Air Compressors (All Normally Running (4 Nos.)) – Duty Factor=0.6 ☐ Service Air Compressors (All Normally Running (2 Nos.)) – Duty Factor=0.35 ☐ ADP Heaters (if applicable) (All Normally Running (4 Nos.)) – Duty Factor=0.5	Owner to note there is a discrepancy between tender specification and drawing for the numbers of instruments air compressors. Also note that the SA & IA compressors shall be identical, hence, Bidder understands that there shall be 3 nos (2W+1S) IA and 3 nos (2 W+1S) SA compressors are envisaged in line with referred tender specification clauses 2.04.00 & 2.06.00. Accordingly, the nos of working IA compressors for Auxiliary Power Consumption shall be considered Please confirm Bidder's understanding.	Clauses 2.04.00 & 2.06.00 of Vol-III, Part-A, Section-6 prevails. Notes in the flow diagram shall also be referred. No. of compressors shall be finalized DDE
204	V	Annexure-2		2.07.00	Data sheet for Fire protection and detection system	Customer is requested to revise the Data sheet of Fire Protection and Detection system based on the applicable items for BTG Island only. Please check and revise the data sheet.	Bid specification prevails.
205	Volume-V	Annexure-3		-	Following minimum Mechanical, Electrical & C&I spares shall be provided for each Unit of 660MW i.e. Unit No 11 & Unit No 12	Bidder understands that mandatory spares list provided is common for 2 units & there is no requirement of duplicating the spares for each unit. Bidder understands that each unit mentioned is a typo error. Please confirm.	Listed Mandatory spares are the minimum requirement for each unit.
206	VOLUME - V	ANNEXURE - 3		2.06.00	COMPRESSED AIR SYSTEM (Applicable for one IA Compressor & one SA Compressor)	Incase, IA & SA compressors are identical, bidder shall consider listed Mandatoy spares of compressors for one compressor only. PI. confirm.	Bid specification prevails.

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207	VOLUME - V	ANNEXURE - 3		2.06.00	1.1.1. HP STAGES OF COMPRESSOR i) HP element One (1) Set ii) Packing Set Four (4) Sets iii) Axial thrust bearing. Two (2) Sets iv) Labyrinth oil seal or radial seals or double acting seals for drive shafts Four (4) Sets v) Bearing for male & female rotors (DE & NDE) Two (2) each vi) Timing Gears One (1) vii) Suction & discharge valves Two (2) each	Pl. note that as per compressor OEMs, the HP stage shall comprise of the various items identified from (i) to (vii). The individual item is not applicable and cannot be provided loose. Pl. confirm.	Bid specification prevails.
208	VOLUME - V	ANNEXURE - 3		2.06.00	1.1.2. LP STAGES OF COMPRESSOR i) LP element One (1) Set ii) Graphitic ring shaft seals for compressor chamber or white metal Four (4) Sets iii) Packing Set Four (4) Sets iv) Axial thrust Bearing Two (2) Sets v) Bearing for male & female rotors {DE&NDE} Two (2) each vi) Timing Gears One (1) vii) Suction & discharge valves Two (2) each	Pl. note that as per compressor OEMs, the LP stage shall comprise of the various items identified from (i) to (vii). The individual item is not applicable and cannot be provided loose. Pl. confirm.	Bid specification prevails.
209	VOLUME - V	ANNEXURE - 3		1.1.12 / 1.1.13	1.1.12. OIL PUMP / MOTOR i) Oil pump complete assembly One (1) ii) Pump impeller/ rotor with shaft One (1) iii) Set of bearings Two (2) Sets iv) Oil pump motor bearing Two (2) 1.1.13. SHAFT DRIVEN OIL PUMP i) Drive gear with shaft One (1) ii) Driven gear with shaft One (1)	The compressors shall have either motor driven oil pump or shaft driven oil pump, the spares for the same shall be provided accordingly. Pl. confirm.	Items if not applicable as per OEM, can be omitted. And alternate item shall be included.
210	V	Annexure-3		2.08.00	Fire Protection and Detection System	Mandatory spares stipulated for Booster Pump, Diesel Engine, Motors, gear box etc. are not applicable. Customer is requested to review the Mandatory spare list for Fire protection and detection system and furnish the applicable items only.	Bid specification prevails
211	VOLUME - V	ANNEXURE - 4		53.14	REFRIGERATED TYPE AIR DRIER FOR COMPRESSED AIR SYSTEM.	Pl. note that as per Compressor air system specification, Volume-III, PART – A/ SECTION - 6, the air drier are of Heat of compression type and not refrigerated type. Pl. confirm.	Noted
212						“Chemical Laboratory equipment”, which is used for offline measurement of Air/Water samples in the plant, is not appearing in tender specification. Kindly confirm that the Chemical Laboratory Equipment is in scope of BTG contract. Also provide the list of items and quantity so that offer could be submitted.	Central Chemical Lab is not in the scope of BTG package, it is considered in BoP package.
213							Additional point - Minimum capacity of effluent sump/pit should be adequate to store effluent generated in 1 hr. Or 16 m3, whichever is higher. And minimum capacity of effluent pump should be sufficient to empty the sump/pit in 1 hr.

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1	I	SECTION: 1		Schedule – 7	GUARANTEE DECLARATION Auxiliary Power Consumption (APC) 36000 KW Maximum (for each unit)	As per Guarantee Declaration, Schedule-7, the Auxiliary power consumption limit is mentioned as 36000 KW for each unit. Bidder understand that this limiting value includes Auxiliary power consumption of one unit+Station Auxiliary proportional(half) to one unit (i.e Unit Aux power+Station Aux power/2) Customer to confirm.	Bidder's understanding is Correct
2	I	-/1		Annexure-X	Recommended spares:	List of Manadatory spares given in tender is exhaustive. Hence, no separete Recommended spares will be provided. Kindly confirm.	Recommmed spares list, has to be submitted by Bidder.
3	Volume I	Section 2A	276 277	3.2.2, 3.2.3 & 3.2.4	The contractor, at least 21 days prior to.....Controller of the quality.	For indigenous supplies, inspection call shall be raised 7 days in advance. In case of waiver from owner, or owner is unable to attend the inspection, or no response from owner, contractor shall carry out inspection as per the approved Quality plan and submit the reports.	Bid Specification Prevails
4	Volume I	Section 2A	277	3.3.3	The contractor immediately after the approval of Quality plans.....fresh list of agencies.	Inspection at foreign / off-shore works is carried out by Third party inspection agencies (LRS/BV/TUV) which are of international repute. Approval of these inspection agencies from owner is not envisaged	Bid Specification Prevails
5	Volume I	Section 2A	278	3.3.4, 3.3.5, 3.3.6	The contractor, at least 45 days before.....to the owner for approval.	For off-shore supplies, tentative inspection call shall be raised 45 days in advance, however, firm date of inspection shall be intimated 15 days in advance. In case of waiver from owner, or owner is unable to attend the inspection, or no response from owner, contractor / IIA shall carry out inspection as per the approved Quality plan and submit the reports.	Bid Specification Prevails
6	Volume I	Section 2A	279	4.1	On completion of tests.....along with the test results	Test certificates as per the approved Quality Plan shall be submitted preferably in soft copies.	Bid Specification Prevails. Can be discussed DDE
7	Volume I	Section 2A	279	4.3	The approval of test reports.....execution of the contact	Despatch clearance shall be granted by owner within 7 working days from the receipt of test certificates	Bid Specification Prevails
8	Volume I	Section 2A	279	4.4	However the test certificates / Inspection reports.....accompany the assignment.	for such non – critical / non vital / minor items, COC shall be submitted by the contractor.	Bid Specification Prevails
9	I	Section: 3	361	2.2.3	Condensate Extraction Pumps rating: Capacity not less than 900 MT/hr and total developed Head not less than 30 Kg/cm2 Or Capacity not less than 770 MT/hr (in case drip pumps are used) and total developed Head not less than 30 Kg/cm2	Request to modify the clause in line with NTPC tender/Project as "Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit". BHEL is already qualified for all NTPC projects/ tenders as above mentioned clause.	Bid specification prevails Can be decided DDE, based on credentials
10	I	Section: 3	361	2.2.3	Boiler Feed Pumps(BFP): Capacity not less than 1100 Ton/hr and total developed Head not less than 320 Kg/cm2	Request to modify the clause in line with NTPC tender/Project as "Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Super-critical Steam Turbine Generator Unit" BHEL is already qualified for all NTPC projects/ tenders as above mentioned clause.	Bid specification prevails Can be decided DDE, based on credentials
11	I	Section: 3	361	2.2.3	Other critical equipment, auxiliaries, systems and bought out items in STG Package: The below mentioned equipment offered by the contractor shall be only from such manufacturer(s) who has previous experience of manufacturing the respective equipment(s) of the type and minimum equipment rating a stipulated below such that the respective equipment(s) should have been in successful operation in at least one (1) plant for a period not less than one (1) year as on the date of bid opening. Cooling Water Pump: Equipment rating: Concrete Volute Type Rating /capacity not less than that supplied for 500 MW unit (2x50% capacity).	BHEL has manufactured and supplied one (1) CV- CW Pump for 1x800MW GSECL Wanakbori TPS, which has been running satisfactorily for more than 3 years now. For 1x660MW Mahagenco Bhusawal, we have manufactured and supplied two (2) CV-CW pumps i.e. one (1) plant for which trial run was completed successfully last year. In view of this, we request you to change the wordings of the PQR spec. as below: Other critical equipment, auxiliaries, systems and bought out items in STG Package: The below mentioned equipment offered by the contractor shall be only from such manufacturer(s) who has previous experience of manufacturing the respective equipment(s) of the type and minimum equipment rating a stipulated below such that the respective equipment(s) should have been in successful operation in at least one (1) plant/Equipment for a period not less than one (1) year as on the date of bid opening.	Bid specification prevails Can be decided DDE, based on credentials

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12	II	-/1		3.05.03	Primary fuel Analysis of coal	Design coal: 1) Total moisture mentioned under Proximate analysis and Ultimate analysis are different. 2) Summation of coal constituents under ultimate analysis is exceeding 100% 3) GCV Variation between quoted value and arrived value based on Dulong formula is very high. Worst coal: 1) No mention of HGI 2) Summation of coal constituents under ultimate analysis is exceeding 100% 3) 3) GCV Variation between quoted value and arrived value based on Dulong formula is very high. Best coal: Best coal analysis is not mentioned. Ash analysis: Ash analysis is not mentioned in tender. Please provide complete coal and ash analysis(with Ash characteristics- Fusion temperatures) by addressing above mentioned observations.	Revised coal analysis (Design & Worst) has been shared with the bidder.
13	Vol. II	1/ Project Information	10	3.11.02	Chimney of adequate Height (150 m) along with ESP, FGD & SCR is considered	Owner may kindly confirm the height of chimney.	The maximum height of Chimney including the projection of Fluecan and Lightning arester shall be 140m.
14	Vol .III	Part-D	28	7.11.01	The height of Chimney/ stack height shall be 140m .		
15	Volume-II	Section-2		2.12.35,	One set of all special tools & tackles required for the maintainance of equipments/system have to be supplied by the bidder.	As per the BHEL standard practice one(1) set of Tools & tackles will be supplied for the contract (applicable for FD, ID, PA & Seal air Fans) complying the clause: 2.12.35. MAHAGENCO to accept the same.	One sets of special tools & gauges required for the maintainance of the plant.
16	Volume-II	Section-2		14.06.01	Two sets of special tools & gauges required for the maintainance of the plant.		
17	Vol-II	Section-2	6	2.12.32	Complete consumables required for the plant till successful completion of trial operation like grease, lubricating oils, chemicals, resins, filters, gases, etc.	Consumables like Grease, FRF & Lub Oil shall be supplied for complete first fill and thereafter for one year topping up (10% of first fill) only.	Bid specification prevails
18	Vol-II	Section-2	18	2.13.02 (1)	HP inner cylinder, IP cylinder and LP cylinder(s) shall be horizontally split.	HP Turbine shal be of barrel type design with axially split. Inner cylinder is vertically split.	Noted
19	Vol-II	Section-2	18	2.13.02 (2)	rotor turning gear preferably hydraulic type and having local / remote operation facility,	Local operation of turning gear is not envisaged.	Bid specification prevails
20	Vol-II	Section-2	18	2.13.02 (2)	Removable type steam strainers for start up and normal operation upstream of emergency stop and reheat stop valves,	Steam strainers integral to Valves are envisaged which wil be used for both start up & normal operation	Noted
21	Vol-II	Section-2	19	2.13.02 (b)-5	Steam turbine control fluid system: waste Fluid Tank	Waste fluid tank is not envisaged	Noted
22	Vol-II	Section-2	19	2.13.02 (b)-6	Steam turbine governing and protection system shall be complete with high pressure electro hydraulic governor with mechanical hydraulic back-up or electro hydraulic system with 100% hot back-up, electro hydraulic converter, hydraulic converter, tracking devices, hydraulic speed governor, electrical speed sensors, speed/load adjusting gear, motor drives, remote trip solenoids, over speed, low condenser vacuum, low lube oil pressure, high axial shift and other trip/protection devices, electrical components associated with electro hydraulic system, test devices and test panel inserts etc. and hydraulic components like accumulator, strainers etc. along with associated piping, valves, fittings and specialties, hangers and supports.	It is clarified that digital electro hydraulic governing system with hot back up is envisaged. Hydraulic speed governor mounted on turbine shaft is not envisaged. A 2oo3 Over speed protection device is integrated in the turbine controller. High Reliability electrical over speed trip circuit is envisaged in place of conventional centrifugal type emergency governors as per our standard practice of our collaborator.	Noted
23	Vol-II	Section-2	21	2.13.02 (b)-11	Steam turbine aesthetic and acoustic enclosure (removable type) with necessary ventilation and lighting system	Acoustic enclosure for Steam Turbine Generator is not required and not envisaged. Required Noise level of 90 dBA for TG set shall be achieved without enclosure.	Noted, provided bidder to cater noise level criteria.
24	VOLUME-II	Section-2 /LEAD TECHNICAL SPECIFICATION/ Sub Section No. 2.00.00 / BROAD SCOPE OF SUPPLY AND SERVICES (Page 14 of Doc no: ETG061-BTG-GEN-LTS)		Clause No: 2.13.01 --> xix) Dampers a)	xix) Dampers a) Isolation dampers with electric drives on all cold air, hot air, seal air, and flue gas ducting before and after equipment on these systems with sealing as per requirement.	For Guillotine dampers (Gates) located at Hot Air to each Mill & Cold Air to each Mill, Pneumatic operation is required for meeting the process requirement of quick isolation. This is in-line with all coal fired boilers including all MAHAGENCO projects supplied by the bidder till date. Please accept.	Noted

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25	VOLUME-II	Section-2 /LEAD TECHNICAL SPECIFICATION/ Sub Section No. 2.00.00 / BROAD SCOPE OF SUPPLY AND SERVICES (Page 14 of Doc no: ETG061-BTG-GEN-LTS)		Clause No: 2.13.01 --> xix) Dampers b)	xix) Dampers b) Electrically operated guillotine type gas tight isolators at inlet and outlet of ESP, inlet and outlet of each ID fan, inlet and outlet of each RAPH for local/remote operation	In the DATA SHEET- A of this technical specification (Page No: 74 of Document No: ETG061-BTG-ME-SG-TS), Clause No: 6.15.06. i) Isolation damper, it is mentioned that "Zero leakage guillotine type – Air pre heater inlet and outlet (flue gas side)". Also, louver damper symbol is shown at Air side Inlet and Outlet of APH in "SCHEME OF AIR AND FLUE GAS SYSTEM, Drawing No: ETG061-BTG-ME-SG-PFD-001" in Volume-IV BID DRAWINGS. However, as per the referred clause: xix) Dampers b) in Page 14 of Doc no: ETG061-BTG-GEN-LTS, it is mentioned that "Electrically operated guillotine type gas tight isolators" at "inlet and outlet of each RAPH". It shall be noted that Guillotine type gas tight isolators can be provided at Inlet and Outlet of each RAPH on Flue Gas side. However, at Air side Inlet and Outlet of RAPH, Bi-plane / multi louver type dampers can only be provided. This is due to layout space restrictions. For installing Guillotine Gates, space is required above the duct for the Guillotine Gate's superstructure, and also horizontal ducting is required at the Gate installation location. This space is not available at Air side Inlet and Outlet of RAPH. This is similar to ducting layout of all projects (including all 660 & 800 MW coal fired boilers & all MAHAGENCO projects) supplied and installed by the bidder till date, where Biplane/multilouver type dampers are only installed at Air side Inlet & Outlet of RAPH. Please accept Biplane/multilouver type dampers at AIR side Inlet & Outlet of RAPH.	Bi-plane / multi Louvers type dampers can be accepted at RAPH air side inlet and outlet and can be discussed DDE.
26	VOLUME-II	Section-2 /LEAD TECHNICAL SPECIFICATION/ Sub Section No. 2.00.00 / BROAD SCOPE OF SUPPLY AND SERVICES (Page 14 of Doc no: ETG061-BTG-GEN-LTS)		Clause No: 2.13.01 --> xix) Dampers b)	xix) Dampers b) Electrically operated guillotine type gas tight isolators at inlet and outlet of ESP, inlet and outlet of each ID fan, inlet and outlet of each RAPH for local/remote operation. inlet and outlet of FGD & bypass; along with 2x100% sealing fans arrangement for each damper.	(i) 2x100% seal air fans are provided at locations where both the temperature and pressure of air/flue gas is above ambient. For Guillotine Gates at ESP Inlet, ESP Outlet, ID Fan Inlet & Flue Gas RAPH Outlet, the pressure of flow medium (flue gas) is negative. Therefore, bidder is providing atmospheric seal air (seal air suction from atmosphere) for these Gates to achieve 100% sealing with atmospheric seal air. This above is in-line with all coal fired boilers supplied by the bidder to all customers (including MAHAGENCO projects) till date up to 800 MW rating. Please accept. Also, it may be noted that as per this technical specification Clause No: 2.25.18 (Volume-III / Part-A / Section-1/ Clause No: 2.25.18 /Page 19 of Doc no: ETG061-BTG-ME-SG-TS), it is indicated that "Pressurisation fans to achieve 100% sealing shall be adopted for dampers at ID fans discharge, APHs air side outlet dampers and mill inlet dampers." In the above locations, negative pressure applications (ESP Inlet, ESP Outlet, ID Fan Inlet & Flue Gas RAPH Outlet) are not mentioned. (ii) However, for ID Fan Outlet, Flue Gas Inlet of RAPH, Hot Secondary Air Outlet of RAPH, Hot Primary Air Outlet of RAPH and FGD Gates & Dampers, 2x100% seal air fans will be provided.	Noted, however finalized DDE.
27	Vol II	Section 2		2.13.10 (ii) a)	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler	Customer is requested to clarify & confirm the quantity of elevator in boiler area	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler
28	Vol III	Part A/ Section 1		2.43.01	One (1) no. Passenger elevator having a capacity of 1088 kg (suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator		
29	Vol III	Part A/ Section 10		2.04.01 (i)	Passenger cum goods elevator shall be provided for the following area: i) Boiler- Two (2) nos., one for each boiler, suitable for min. 3000 kgs		This clause is same as above
30	Vol. II	2 -Lead technical specification	6	2.12.33	Supply of HSD for emergency DG set till 'take over' by the owner will be in bidders scope.	Bidder requests owner to delete supply of HSD for DG set from bidder's scope .	Bid Specification Prevails
31	Vol-II	Section-2	42	2.13.12 (d)	air cool condenser system	Water cooled condenser system is offered.	Noted
32	Vol. II	2 -Lead technical specification	220	15.01.06	The Bidder shall supply the first fill of lubricants for the Plant, and shall provide at the Completion Certificate sufficient lubricants and greases necessary for the efficient operation and maintenance of the Plant at full load 24 hours per day for a period as specified under scope of supply.		

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33	Vol. I	2A	295	15.01.ii)	Supply of paints and consumables: All consumables like, grease, lubricating oils, chemicals, ink & graphs for recorders etc. up to taking over of the unit by owner as stipulated in Cl. No. 41.0, Section 2. The Contractor shall also arrange any additional quantities required specifically for the Performance Guarantee Test.	1)First fill of consumables such as greases, oil, lubricants, servo fluids/control fluids and essential chemicals shall be supplied by Bidder. 2)All raw material Coal/Oil/Diesel / Limestone (for FGD and elsewhere) /Ammonia (for SCR and elsewhere) etc.) shall be in owner's scope. Kindly confirm. 3)Supply of Biomass is not envisaged in scope of bidder. Kindly confirm Biomass will be provided by owner free of charge.	1)Bid Specification Prevails. 2) All raw material Coal/Oil / Limestone for FGD and elsewhere) /Ammonia (for SCR and elsewhere) etc.) shall be in owner's scope. 3) Supply of Biomass is not envisaged in scope of bidder
34	Vol. II	2 -Lead technical specification	220	15.02.00	Chemicals and other consumables 15.02.01 Scope includes the supply (by the Bidder) of all chemicals, reagents, resins, and other consumables required for testing, commissioning and setting to work of each section of the Works. 15.02.02 The Bidder shall provide all chemicals and other consumables required for the efficient operation and maintenance of the plant at full load 24 hours per day for a period as specified under scope of supply and services. 15.02.03 The Bidder shall prepare a list of these consumables giving quantities necessary for each section of the works and the recommended suppliers.		
35	Vol-II	Section-2	59	4.04.00	All items, equipment and systems of the package shall be designed for a lifespan of minimum 40 years.	Steam Turbine Generator shall be designed for 25 yrs as per clause 6.01.02 (xiii) of Vol-II, Sec-2, Pg-12.	All items, Equipment and systems of the package shall be designed for a life span of minimum 30 years.
36	Vol-II	Section-2	60	4.21.00	The complete plant shall be designed with adequate redundancy. As a rule 100% redundancy shall be followed for all critical/important equipment unless specified otherwise	Redundancy of equipment shall be as per standard practice.	Bid specification prevails
37	Volume-II	Section.- 2	66 of 242	4.37.20/(vi)	Oxygen content of condensate leaving condenser hot well will not exceed 0.015 cc per litre over the entire load range.	As per EPRI (Electric Power Research Institute), USA guideline for Oxygenated Treated Cycles Oxygen is dosed in feed water and maintained up to 150 ppb at Economizer Inlet. Since oxygen is dosed in the cycle therefore oxygen level is maintained thru' deaerator by closing vent valves at deaerator and intermittently opening valves against subcritical projects where oxygen is removed by continuous opening of Deaerator Vent Valves. Therefore, specified clause (for maintaining dissolved oxygen to 21 ppb (0.015 cc/ltr)) is not relevance for supercritical projects where oxygen is dosed in cycle. However, values may be shown at start up or up to 40% Load regime when system is not dosed.	The clauses are applicable for sub critical regime.
38	Volume-II	Section.- 2	163 of 242	10.10.06/(ix)/(q)/(2)	Oxygen content in condensate, at Hotwell outlet, shall not exceed 0.015 CC per litre over the entire load range and shall be determined according to calorimetric Indigo - Carmine method		
39	Volume-III	Part A/Section- 2	29 of 109	4.03.00	... the minimum oxygen content in the condensate leaving condenser shall not exceed 0.02cc per litre over the entire load range.		
40	Volume-III	Part A/Section- 2	79 of 109	21.03.15	Oxygen in condensate at hot well outlet from 30% TG MCR toTGVWO (HBs at 1% MU and design CW inlet temp): Not to exceed 0.015cc/ltr		
41	Vol. II	2 -Lead technical specification	121	6.02.11	Overall Unit operation: It is envisaged to start up the complete unit including offsite auxiliaries through single click/pushbutton operator action	Single pushbutton start-up may need some manual intervention to set up boundary conditions and also some intermediate conditions. Many a times manual intervention shall be necessary for some manual drain valves opening like during start-up, for achieving chemistry related parameters etc. Operators intervention may be necessary for ensuring safety of operation also. Hence, with above in view. (a) Request to waive this clause for offsite auxiliaries like CWTP, DM Plant, ETP, STP, PTP, SSF, Fire Fighting system, Mill Reject Handling System etc. More so as the subject tender pertains to BTG only. (b) For BTG, some manual intervention e.g. for manual valves etc. , may be required. Owner is requested to consider this aspect and modify the clause suitably.	Noted

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42	Vol. II	2 -Lead technical specification	163	10.10.06/ix/ (q)/2	Oxygen content in condensate, at hotwell outlet, shall not exceed 0.015 CC per litre over the entire load range and shall be determined according to calorimetric Indigo Carmine method	SC sets are usually equipped with Oxygenated Treatment facilities. Hence, this demonstration cannot be crried out. Request to waive this requirement.	This will be applicable for subcritical regime
43	Vol. II	2 -Lead technical specification	163	10.10.06/ix/ (r)/2	Dissolved O2 content in Deaerator effluent at deaerator outlet without chemical dosing at all loads, not to exceed 0.005 CC/ litre determined as per ASTM-D 5543-09 or Indigo Carmine method	SC sets are usually equipped with Oxygenated Treatment facilities. Hence, this demonstration cannot be crried out. Request to waive this requirement	
44	Vol. II	2 -Lead technical specification	165	10.10.06.z(bb)	Demonstration of the capabilities of the Power Unit to operate at rated voltage and frequency, at power factors and reactive conditions between 0.85 (lag) and 0.95 (lead) start-up tests of the Plant equipment, facilities and systems including checking of automatic change-over of standby facilities	While unit is connected to grid, it is very unlikely that PF variation from 0.85 (lag) and 0.95 (lead) can be achieved. Customer to provide the required permission & boundary conditions for demonstration of this capability before COD/Trial Operation whichever is earlier. Otherwise demonstration is deemed to be completed.	Bid Specification Prevails
45	Vol. II	2 -Lead technical specification	152	10.10.4.7.b.e.2)	Pre commissioning testing: The gas tightness shall include all the components in the Air-Gas path, from the outlet of FD fan, through Steam Generator, ESP, FGD, up to the Stack.	Air/Gas Tightness test of portion of duct connected to stack is not conducted. Instead, Kerosene leak test/DP Test/Soap solution test etc. is conducted for that portion of duct. Request to accept the change and modify this clause suitably	Noted
46	Volume-II	Section.- 2	67 of 242	4.37.20/(x)	The condenser would be spring mounted with rigid connection to the turbine exhaust. Alternatively, condenser may be on solid footing with corrosion resistant flexible metallic bellow connection with the turbine exhaust	Condenser shall be solid supported welded with LP turbine exhaust. There shall be no expansion joint between turbine and condenser. Thermal expansion of Condenser is already being taken care by the relative movement between Turbine outer casing and inner casing. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities including MPPGCL & NTPC.	Bidder informed that no expansion joint and no spring support is being provided. Bidder to ensure that expansion and misalignment between turbine exhaust and condenser is taken care in their design. Bidder to submit supporting documents to prove his design during DDE.
47	Volume-III	Part A/Section- 2	24 of 109	2.19.02	The turbine exhausts shall be suitable for connecting to the condenser through dog bone type stainless steel expansion joint.		
48	Volume-III	Part A/Section- 2	80 of 109	21.03.29	Vertical movement of condenser compensated by: Spring support/expansion bellow		
49	Volume-III	Part A/Section- 2	31 of 109	4.21.00	 steam space can be filled with water up to the expansion bellow for hydraulic test/air leakage ..		
50	Vol. II	2 -Lead technical specification	60	4.22.00	All stand-by auxiliaries shall be designed for auto start up, on failure of running auxiliaries with minimum time delay and without runback on unit load.	CEPs, CWPs, BFPs are to be of 3X50% or 60% capacity as per tender specifications. Moreover, tripping of Mills/Feeders also have significant bearing on operational parameters. Runback may need to be activated especially for tripping of BFP, CWPs, Mills depending upon margin avaibility. Further details can be worked out during detailed engineering. MSPGCL is requested to confirm.	Noted; can be decided DDE
51	Vol. II	2 -Lead technical specification	112	6.01.02(iv)	Automatic run back capability of the unit load on loss of critical auxiliary equipments, ensuring smooth and stable runback of the Steam Generator and Steam Turbine Generator equipments and systems	This clause needs to be reconciled with clause 4.22.00. Please refer the query above .	Noted
52	Volume-II	Section.- 2	67 of 242	4.37.20/(xii)	Both ends of the tubes, through which circulating water flows, are roller-expanded into the tube sheets.....	Roller expanded joint between tube and tube sheet is strong enough to take care of induced stresses at pressure and temperature combination for intended purpose. Seal welding is not required for the water chemistry specified. Please confirm. This has been accepted by various utilities including MPPGCL, NTPC since last 25-30 years and this arrangement is suitable for intended purpose.	Noted
53	Volume-III	Part A/Section- 2	32 of 109	4.27.00	The tubes shall be roller expanded and seal welded. ...		
54	Vol. II	2 -Lead technical specification	112	6.01.02(x)	In case of sudden reduction in demand (load throw off), the unit should get safely unloaded and stabilized for operation at house load with HP-LP bypass open to full capacity. All the components including valve body of HP and LP Bypass valves shall be designed for boiler highest safety valve set pressure due to sudden load throw offender transient conditions.	TG output shall be considered 40 MW or above for house load operation. MSPGCL is requested to confirm. Thi is in line with cl no 6.01.02 (ix).	Noted, However, this can be decided DDE based on actual House load
55	Vol-II	Section-2	113	6.01.04	The plant shall be suitable for load cycling which implies that it should be designed to operate continuously under two shift mode (daily start stop with one shift off). No of Hot Start : 4000	We understand that two shift mode of operation is included in number of Hot starts.	Noted

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56	Vol-II	Section-2	113	6.01.04	The plant shall be suitable for load cycling which implies that it should be designed to operate continuously under two shift mode (daily start stop with one shift off) and load follow mode as specified. The design would cover adequate provision for quick start-up and loading of the unit to full load at a fast rate. The unit shall have minimum rate of loading or unloading of 3% per minute above the control load (i.e. 50% MCR). Plant shall be capable of minimum N1 number of daily load cycles (N1 shall not be less than 2), load variation from 100% to 50 % (and vice versa) of MCR with a minimum ramp rate of 3% per minute without affecting the design life of boiler and turbine-Generator systems. In addition, the plant shall also be capable of minimum N2 number of daily load cycles (N2 shall not be less than 1) from 50% to boiler minimum once through load (and vice versa) with a minimum ramp rate of 1% per minute without affecting the design life of boiler and turbine-Generator systems.	The ramp rate during load cycling shall be as per CEA guideline. We understand that daily start & stop with one shift off is included in the required 4000 Hot Starts. Total expected number of load cycling need to be specified.	Following ramp rates as per CEA guidelines is envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR. 1% per minute from 40% to 55%TMCR. However, Min Power Level shall be - 35% of TMCR.
57	Vol. II	2 -Lead technical specification	161	10.10.06	The fuel (primary and secondary) and start-up power for initial & trial operation, test/commissioning and PG Test shall be provided by the Owner.	1)Bidder understand startup power shall be provided by owner free of all charges.Kindly confirm 2)Understand fuel (primary and secondary) and start-up power for initial and trial operation, test/commissioning and PGTest shall be provided by the Owner WITHOUT ANY COMMERCIAL IMPLICATION. MSPGCL is requested to confirm.	Bid Specification Prevails
58	Vol. II	2 -Lead technical specification	162	10.10.06.ix)(b)	Start-up time (upto full load), and loading capabilities for the Turbine Generator together for cold start conditions (greater than 36 hours shutdown), warm start conditions (between 8 and 36 hours shutdown) and hot start conditions (less than 8 hours shutdown)or as indicated by the Bidder in the offer and accepted by the Owner, shall be demonstrated, ensuring that the various turbine operational parameters like vibration, absolute and differential expansion, eccentricity and steam-metal temperature mismatch etc. are within design limits	Cold start up can be demonstrated. Warm/Hot start up cannot be planned without consideration of overuse of precious natural resources like LDO ,coal and water. Request GSECL to review this clause. Otherwise, request owner to provide opportunity and permission to demonstrate warm and hot start capabilities before COD or Trial operation which ever is earlier. If demonstration of hot and/or warm start demonstration before COD or Trial operation (whichever is earlier) remains pending due to reasons not attributable to bidder, demonstartion activities shall be deemed completed. .	Bid Specification Prevails
59	Vol-II	Section-2	162	10.10.06 b (1)	Cold start conditions (greater than 36 hours shutdown), warm start conditions (between 8 and 36 hours shutdown) and hot start conditions (less than 8 hours shutdown) or as indicated by the BHEL in the offer	The start up curve will be prepared as per following as per BHEL's standard. Cold Start : after about 200 hrs shutdown. Warm Start : after 48 Hrs shut down. Hot Start : after 8 hrs shutdown	Shall be as per Bidder's proven practice.
60	Vol. II	2 - Lead technical specification	167	10.10.06/xiii	Initial and trial Operation: The reliability run of the unit/plant will be established and the trial operation test shall be considered successful if, duringthe trial operation, the complete plant as an integral unit, shall be operated for minimum 720 continuous hours, on designated fuel, at prevailing ambient condition and achieves the followin:....	1. Request to add the condition that any loss of generation, not attributable to bidder, shall be considered generation at 100% PLF. 2. Request to define "designated fuel". Understand that designated fuel means fuel which is suitable as per the design of the boiler. Kindly confirm.	Noted
61	Volume-II	Section.- 2	175 of 242	11.30.01/(i)	... 693 MW output, 0% make up, design CW temperature and design CW flow.	As per Cl. 4.37.20 of Vol.-II, Sec. 2, condenser shall be designed at VWO having 105% MCR steam flow, 1% make-up and same shall be guaranteed and demonstrated. Kindly clarify.	Refer Amendment on Performance Guarantees
62	Volume-II	Section.- 2	204 of 242	11.32.05/(ix)/(b)	Total cooling water temperature rise (°C) in condenser with design cooling water flow and CW inlet temperature of 33 °C under the following condition:1) Unit operating at 100% TMCR condition2)Unit operating at VWO condition3) Unit operating with all HP Heaters out condition and generating 100% TMCR power output.4) Unit operating under house load and HP & LP bypass operating at rated capacity	Cooling water temperature is dependent on CW flow. No correction factor is applicable on Cooling temperature rise with design flow and CW inlet temperature. These demonstration tests under Cat. III are not applicable and not in line with prevailing industry practices. This is as per BHEL practice and has been accepted by various customers including M/s NTPC in the past.	Refer Amendment on Performance Guarantees
63	Volume-II	Section.- 2	204 of 242	11.32.05/(ix)/(c)/(2)	Condenser pressure in mm Hg (abs) measured at 300 mm above the top row of condenser tubes under VWO conditions, 1% make up, design CW temperature and CW flow.	Condenser shall be designed at VWO having 105% MCR steam flow, 1% make-up, and same shall be guaranteed and demonstrated. Test is already called for demonstration in PG tests under Cat-I.	Refer Amendment on Performance Guarantees

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64	Volume-II	Section.- 2	204 of 242	11.32.05/(ix)/(c)/(7)	The capacity of each vacuum pump in free dry air under standard conditions at a condenser pressure of 25.4 mm Hg (abs) and sub cooled to 4.17°C below the temperature corresponding to absolute suction pressure shall not be less than 30 SCFM.	Vacuum pump capacity shall be selected as per the HEI standard. HEI standard is followed in sizing of venting equipments of condenser for all thermal power plants across India & worldwide and accepted by various power producers. BHEL has been following same sizing calculation in all previously executed projects of various customers including MPPGCL, NTPC and other power producing customers. “Capacity of each vacuum pump in free dry air under standard conditions...shall not be less than the capacity obtained from HEI standard.”	As per clause 6.04.00, of Vol-III, Part-A, Section-2, "The design shall be as per latest HEI requirements and the capacity margin shall be as per HEI with 20% margin." Demonstration of vacuump pump capacity can be finalised during finalisation of PG test procedure
65	Vol-II	Section-2	167	xvii	A trial operation report comprising of dates and duration of trial, observations and recordings of various parameters to be measured shall be prepared by the bidder and signed jointly by the owner and the bidder. The report shall have sheets, recording all the details of interruptions occurred, adjustments made and any minor repairs done during the trial operation. If the trial operation is established to be satisfactory, except for some minor adjustments, if any, the bidder shall prepare the plant for performance guarantee test.	All the efforts will be made to make unit ready for perform-mance guarantee test before start of Initial Operation, how-ever CAT-1 performance guarantee test shall be conducted after stabiliziation of Unit as per satisfaction of both parties.	Noted
66	Vol-II	Section-2	169	11.12.00	The Contractor shall make the plant ready for the performance guarantee tests before start of Initial Operation.	PG test will be carried out after sucessful trail operation and establishment of all plant parameters.	
67	Vol-II	Section-2	169	11.14.00	All CAT-1 Performance Guarantee tests shall be conducted along with initial operation.		
68	Vol-II	Section-2	169	11.19.00	All efforts shall be made for successful completion of the PG test along with initial operation of the unit on designated fuel or as per the time frame specified for a particular equipment / plant/ system in the technical specification. Delay in conductance of the test beyond this period will not be normally permitted by the owner. In the event of owner agreeing to conductance of such tests after three months, for reason not attributable to owner, as assessed by the owner, no factor for ageing shall be considered for computing performance of the equipment.	Aging is a physical phenomenon and once steam enters into the cycle the aging of the components starts. Hence the aging period will be considered from the date of first syn-chronization to the conductance of PG test.	Bid Specification Prevails
69	Vol-II	Section-2	170	11.24.01	All instruments including flow nozzles as necessary for conductance of PG tests shall be installed prior to the start of initial operation. No shutdown shall be allowed for installation of PG test instrument/ flow nozzle etc. Any advanced class instrument system such as those using electronic devices or mass flow technique shall be arranged by the contractor, if required. However, same shall be installed before start of initial operation of unit.	PG test instruments are with special accuracy class and shall be calibrated before start of actual PG test and will be installed before PG test. Flow Nozzle shall be installed just before start of TG-PG test to ensure accuracy of flow measurement and its reading will be recorded in separate data logger.	Noted
70	Vol-II	Section-2	170	11.24.07	All the instruments shall be calibrated by a certified body (an accredited independent test institute) before and after the tests Instruments need to be calibrated before and after the test to identify the drift which is to be used for applying corrections to the calibration which is estimated based on the average of the pre-test and post-test calibrations.	All the instruments including the flow nozzle shall be calibrated by the contractor BEFORE the test. As per past experience the difference between the results calculated by applying pre test and post test calibration are negligible. It will also prevent the unnecessary delay in submission the PG Test Report. In view of the above Post Test Calibration is not envisaged.	If difference between continuous measuring instrument and PG test instrument is negligible, then re-calibration of that instrument is not required, otherwise post calibration shall be carried out; Except for flow nozzle.
71	Vol-II	Section-2	171	11.24.09	The calibration certificates shall be considered valid for a period of not more than six (6) months from the date of its calibration or as per the guidelines of NABL accredited Calibration agency.	Validity of calibration will be as per standard followed by NABL accredited agency.	Bid Specification Prevails It is already mentioned in the specification
72	Vol-II	Section-2	171	11.24.13	All PG test process parameters shall be made available in DCS.	PG test parameters will be recorded in separate data logger and will not be available in DCS.	Noted
73	Vol-II	Section-2	173	11.25.02	After the conductance of Performance test, the Bidder shall submit the detailed test evaluation report of Performance test results to Owner promptly but not later than two (2) weeks from the date of conductance of Performance test. Preliminary test reports shall be submitted to the Owner after completing each test run. Six (6) hard copies and soft copies as desired by owner, of each test report of final conducted test on each equipment/plant/system shall be submitted to Owner for approval.	PG test report will be submitted after completion of TG PG test within 4 weeks of MOM of PG test.	Noted

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74	Vol-II	Section-2	178	11.32.11	Variation in power factor, frequency, generator hydrogen pressure and voltage.	Generator is not allowed to operate with variation in Hydro-gen pressure & any variations in pressure shall be taken care during operation from safety aspects. Hence, no correction curve is envisaged for the same. it may be noted that same practice is also followed in all earlier NTPC supercritical projects like Barh, Gadarwara, Mauda, North Kanpura, Khurja, Talcher etc. Hence Hydrogen Pressure Correction Curve is not applicable.	Noted
75	Vol-II	Section-2	179	11.32.11	In case any of the above correction curves are not submitted along with price bid, no negative corrections shall be allowed on turbine Heat rate on this account. Positive corrections if required to be applied, the amount shall be decided by Employer. Further, no positive corrections shall be allowed on turbine output on this account. Negative corrections if required to be applied, the amount shall be decided by Employer.	Correction Curves shall be generated after approval of Heat Balance Diagrams and shall be submitted to Customer for Approval and inclusion in TG-PG test procedure.	Noted
76	Vol-II	Section-2	202	11.32.05	Gross power output (MW) at 100% TMCR and VWO condition after subtracting excitation power and TG integral auxiliaries with following conditions: a) Cycle make-up : 1% make-up b) Cooling water inlet temperature of 33°C c) Generator power factor -0.85 ii) Gross power output (MW) at 100% TMCR after subtracting excitation power and TG integral auxiliaries with following conditions: a) Cycle make-up : 1% makeup b) Cooling water inlet temperature of 33°C c) Generator power factor -0.85 d) All HP heaters out of service iii) Gross power output (MW) at 55% TMCR after subtracting excitation power and TG integral auxiliaries with following conditions: a) Cycle make-up : 1% makeup b) Cooling water inlet temperature of 33°C c) Generator power factor -0.85 d) At 47.5Hz to 51.5 Hz iv) Continuous TG output of 105% of rated load (i.e. 693 MW unit load) under rated steam conditions after subtracting excitation power and TG integral auxiliaries a) Cycle make-up : 1% makeup b) Cooling water inlet temperature of 33°C c) Generator power factor -0.85 d) At 47.5Hz to 51.5 Hz V) Turbine-generator set capability a) The steam turbine generator shall be capable of delivering at generator terminals the output as indicated in the heat balances under the following conditions: 1) Continuous TG output of 100% TMCR under rated steam conditions at 89 mm Hg (a) worst condenser pressure with 1% make up.	TG PG test will be conducted as per conditions specified in Guarantee schedule (i.e. 105% load / 100% Load and 55% Load with 0% MU).	Refer Amendment on Performance Guarantees
77	Vol. II	2 -Lead technical specification	222	17.02.00	Any change in sub-vendor/contractor for all items under this package shall be subject to owner's approval. Bidder shall submit all necessary credentials and other details as sought by owner for the approval of such sub-vendors	1)Bidder has its own robust and exhaustive process to qualify a vendor prior to award of contract. Bidders are meticulously scrutinized by bidder and qualified based on thorough evaluation including Technical as well as financial capability . Hence in order to minimize the ordering time owner may please exempt vendor approval for all type of subcontracting works viz. civil, E & C and site fabrication etc. 2) Bidder requests Owner to include the all those vendors who were already approved by Mahagenco during the execution of 1x660 MW Bhusawal EPC project .	Bid specification prevails Can be decided DDE, based on credentials
78	Vol. II	2 -Lead technical specification	222	17.03.00	Owner reserves the right to accept/reject any sub vendor for the project		
79	Vol. II	2 -Lead technical specification	222	17.04.00	Approval, rejection or addition of makes shall not have any cost implication to the Owner after award of contract.		
80	Vol V	Annexure-4		1.00.00 (1)	BOILER & AUXILIARIES ERECTION		
81	Vol V	Annexure-4			Chimney, CIVIL Construction		
82	Vol-II	Section-2	224	19.01.08	The Owner will not normally require receiving copies of detailed manufacturing drawings but the BHEL shall make these available if requested to do so.	Manufacturing drawings of Steam Turbine and auxiliaries shall not be submitted.	Bid Specification Prevails
83	Vol-II	Section-2	224	19.01.12	It shall be noted that the tender drawings and data sheets submitted along with the specification is only for tender purpose and shows only the minimum requirements for the plant.	We understand that tender drawings related to steam turbine and auxiliaries are only indicative. The requirement shall be as per BHELs standard practice.	Tender drawings are indicative.

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84	Vol-II	Section-2	227	19.01.12	The drawings and documents required for design, manufacture, construction, installation, operation and maintenance of the plant shall be submitted by the BHEL in good time for approval/information	The drawings and documents required for design, calculation, manufacture, procuremet of Steam Turbine components and auxiliaries shall not be submitted. Only engineering documentation as per mutually agreed list shall be submitted.	The drawings and documents required for design, calculation, manufacture, procuremet of Main Turbine components shall not be submitted. Data sheets, GA and cross section shall be provided.
85	Vol. II	2	231	19.04.02	Certification manual	Owner is requested to review and omit the requirement of certification manual . However , construction manual & commissioning manual shall be provided by BTG contractor.	Can be discussed DDE
86	Volume-II	Section.- 2	66 of 242	4.37.20/(iv)	 maintain rated condenser pressure of 76 mm of Hg (absolute).	Design pressure for condenser is mentioned 77mm Hg (abs) (Cl. 21.03.10 V-III P-A, Sec.-2) Bidder understand condenser design pressure to be consider 77mm Hg (abs).Please confirm.	As per clause 21.03.06, Vol-III, Part-A, Section-2, bidder to optimise the condenser design pressure.
87	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION,Page 53		BATTERY LIMITS & EXCLUSION 3.02.01(sl. No. 11)	Terminal point (TP) of Cooling water pipe shall be 10M away from cooling Tower.	This is the BTG Package and cooling tower is not a part of this package. Hence, battery limit for CW Return Pipe shall be kept at 10 m away from CW Forebay. Kindly confirm.	Bid Specification Prevails
88	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION,Page 116		AUXILIARY STEAM LINE FROM EXISTING PLANT 6.02.03	i) Auxiliary steam from existing plant(Unit 8, 9 & 10) will be the dedicated source established in the plant for the auxiliary steam system. ii) Auxiliary steam system during the start up of first boiler in the plant will be supplied from above mentioned source.This source will be common for all the units. The tapping from existing auxiliary steam source is connected to station header.	Bidder requires location of terminal point (TP) of existing Auxiliary steam to be provided for upcoming Unit #11 & 12. In addition to above, Auxiliary steam interconnection pipe shall be routed on existing pipe rack/ structure. Kindly confirm the same.	Bidder may visit site and collect the data for exact location of Auxiliary Steam header terminal point (in Unit 8,9&10)
89	VOLUME - II	SECTION - 2		9.02.38 STEAM GENERATOR AREA	iv) A clear walkway of 1200mm (min) shall be ensured between the mills / its foundation / mill reject conveyors and inner face of mill bay column. Maintenance space shall be provided on either side.	Conveyor shall be located on floor elevation only. So any handrail is not required. 800mm walkway (instead of 1200) shall be available but not near mills. Please Accept.	As per clause 5.03.03, vii) of Vol.-III, Part-A, Section-1, 800 mm clear walkway on both side of conveyor along with hand rail shall be provided for Mill reject conveyor.
90	VOLUME - III	PART - A		SECTION - 1, 5.00.00 MILL REJECT SYSTEM	5.03.03 METALLIC CONVEYORS vii) 800 mm clear walkway on both sides of conveyor along with handrails shall be provided.		Handrail is not required only for conveyor running on ground level, however all inclined portion of conveyor shall be provided with 800 mm clear walkway on both sides of conveyor along with handrails shall be provided. Also, proper safety arrangement shall be envisaged all around the conveyor.
91	VOLUME - III	PART - D		7.07.00 Mill And Bunker Bay Building	7.07.03 In addition to Mill foundations provision has to be made in the Mill bay ground floor for trenches accommodating Mill reject system conveyors.		
92	VOLUME - II	SECTION - 2 LEAD TECHNICAL SPECIFICATION Page No.136		9.02.39 (Point No. vii)	TDBFPs shall be preferably placed at the operating floor, with VIS system.	Bidder understands that the TDBFP(s) on intermediate floor/operating floor is acceptable as per bidder's standard arrangement. Kindly confirm.	Bid Specification Prevails. VIS system is proposed considering BFP foundations are to be supported on PHB (Power House Building) structure. If Bidder establishes that there is sufficient clear space around the equipment for easy maintenance, it can be placed on ground floor or lower floors and rigid foundation can be used. if required bay width will also have to be increased.
93	VOLUME - II	SECTION - 2 LEAD TECHNICAL SPECIFICATION Page No.136		9.02.39 (Point No. ix)	Interconnecting platforms with boiler shall be provided for both the units at a) Operating floor level b) Mezzanine floor level c) PRDS level and d) Deaerator level.	Bidder proposes to provide interconnection platform between boiler & TG Hall at Operating floor & Deaerator/PRDS floor inline with practice followed in currently ongoing other projects of bidder. Kindly confirm.	Bid specification prevails. However can be discussed DDE.
94	VOLUME - II	SECTION - 2, Page 140		9.02.43 (Point -iii)	Trestle height in outlying area shall be 5.0m (BoS).	Bidder proposes height of trestle in outlying area at EL. 2.5M (TOS) and the same practice is being followed in all ongoing projects. Kindly confirm.	Refer clause 11.08.01, vii), viii) & ix) shall be followed for pipe/cable racks.
95	VOLUME - II	SECTION - 2, Page 141		9.02.43 (Point -ix)	A walkway of 800mm width (minimum) with hand rails and toe guards shall be provided all along length of the trestle for maintenance of cables and pipes.	Bidder proposes to provide walkway of 600mm width with hand rails and toe guards in pipe cum cable trestle.The above is also inline with practice followed in currently ongoing BHEL projects. Kindly confirm.	Bid Specification Prevails

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96	VOLUME - II	SECTION - 2, Page 141		9.02.43 (Point -xvi)	Maximum cantilever allowed to route pipes and cables is 1.5m	'C" row catiliver and ESP column supported pipe rack cantiliver requires more than 1.5M span to support the cables along with pipe.The above is also inline with practice followed in currently ongoing projects of bidder. Kindly confirm.	Can be finalised DDE.
97	II	SECTION - 2		11.30.00	Guarantees under category-I (Performance Guarantees under liquidated damages) are as follows: 11.30.02 UNIT HEAT RATE AT 55% TMCR LOAD This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at 77 mmHg(abs) condenser load (i.e. 55% of rated load).	As per Guarantee Declaration, Schedule-7, Guarantee at only 100% TMCR Load is mentioned. So, we understand there is no Heat Rate Guarantee/Liquidated Damages applicable for 55%TMCR Load. Please Clarify.	Refer Amendment on Performance Guarantees
98	I	SECTION: 1		Schedule – 7	GUARANTEE DECLARATION		
99	VOLUME: I VOLUME - II	VOLUME: I SECTION: 1 & 3 VOLUME - II SECTION - 2		VOLUME: I SECTION: 1, Schedule – 7 GUARANTEE DECLARATION, Category-III. VOLUME: I SECTION –3, SPECIAL TERMS & CONDITIONS OF THE CONTRACT VOLUME - II SECTION - 2	VOLUME: I, SECTION: 1 & 3, Page-177, 396. VOLUME - II, SECTION - 2, Page-185. Unit Auxiliary Power Consumption * Mill reject system (0.5) VOLUME: I, SECTION: 1 & 3, Page-181, 399. VOLUME - II, SECTION - 2, Page-185. Station Auxiliary Power Consumption * Mill Reject System * Mill Reject conveying system: Duty Factor – 1.0	Duty factor of 1 is being considered for mechanical conveying type mill reject system under Unitized Auxiliary Power Consumption. Please confirm.	Noted
100	SECTION - 2/LEAD TECHNICAL SPECIFICATION	11.33.00/Guarantees under Category – II		11.31.03	PARTICULATE MATTER EMISSION : It shall be guaranteed that, with one field out of service in each stream/pass, the particulate emission from ESP at TMCR load and worst coal firing shall beless than 27 mg/Nm3. The corresponding ESP efficiency shall be worked out.	Customer may clarify whether ESP guarantee point is TMCR worst coal or TMCR Design coal.	TMCR with worst coal shall be considered for Guarantee. However, ESP shall be designed for BMCR condition with worst coal.
101	VOLUME - III /PART - A /SECTION - 1	6.21.00 Electrostatic Precipitators Datasheet		6.21.03	Guarantee Point Design Coal		
102	SECTION - 2/LEAD TECHNICAL SPECIFICATION	11.33.05.(i)(f)Method of computing test efficiency of ESP		11.31.05.(i)(f)	The performance test on electrostatic precipitator will commence after a minimum period of three thousand (3000) hours of cumulative operation after completion of initial operation.	The performance test on electrostatic precipitator will be conducted soon after completion of trial operation or along with Boiler PG test whichever is earlier.	Noted
					Guarantees under Category – III (Performance Guarantees under compulsory correction) are as follows: x) Primary air fans: a) Capacity (m3/hr) b) Head developed (mWC) c) Fan efficiency (%) d) Power consumption (kW) e) Margins envisaged on capacity and head xi) Induced draft fans a) Capacity (m3/hr) b) Head developed (mWC)	Auxiliary power guarantees for all Fans with its own drive at the switchgear end is already covered against Guarantees under Cat-I: Auxiliary Power Consumption for Station (Plant) Auxiliaries. Fan efficiency and power consumption is not demonstrated in isolation during PG Test. The same is demonstrated against Overall Auxiliary Power guarantees. The same practise is followed in all other Super-critical TPP projects executed by BHEL. MAHAGENCO is requested to accept the same. In addition, margin on capacity and head of Fans as per specification shall be demonstrated at project site during PG Test. MAHAGENCO is requested to accept the same and revise the clause: 11.32.00.04.x as below (by removing Fan efficiency and power consumption): Guarantees under Category – III (Performance Guarantees under compulsory correction) are as follows: x) Primary air fans:	

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102	Volume-II	Section-2		11.32.00.04.x	c) Fan efficiency (%) d) Power consumption (kW) e) Margins envisaged on capacity and head xii) Forced draft fans a) Capacity (m3/hr) b) Head developed (mWC) c) Fan efficiency (%) d) Power consumption (kW) e) Margins envisaged on capacity and head xiii) Seal air fans a) Capacity (m3/hr) b) Head developed (mWC) c) Fan efficiency (%) d) Power consumption (kW) e) Margins envisaged on capacity and head	a) Capacity (m3/hr) b) Head developed (mWC) c) Margins envisaged on capacity and head xi) Induced draft fans a) Capacity (m3/hr) b) Head developed (mWC) c) Margins envisaged on capacity and head xii) Forced draft fans a) Capacity (m3/hr) b) Head developed (mWC) c) Margins envisaged on capacity and head xiii) Seal air fans a) Capacity (m3/hr) b) Head developed (mWC) c) Margins envisaged on capacity and head	Noted, However fan efficiency will be tested at shop.
103	SECTION - 2/LEAD TECHNICAL SPECIFICATION	11.32.00/Guarantees under Category – I		11.30.11(x).(b) .7	The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:- ☐ Power consumption of ESP will be measured pass wise and for one pass/stream (Say ESP-A) at a time with the help of energy meter in ESP MCC. ☐ Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test. ☐ Before starting collection efficiency test, switch off all the TR sets, all hopper heaters, all insulator heaters/pent house fans (if applicable) and rapping systems serving to one pass (ESP A) temporally and note down energy meter readings for period t1 i.e.E1. The power consumption shall be W1=E1/t1. ☐ During the collection efficiency test the total energy.....	The method specified involve shutting down of total ESP fields just before start of emission test to measure external loads connected in ESP LTMSB. It is suggested that such switching off of the fields, heaters, rappers shall not be resorted to just before starting emission test. Hence, no external loads shall be connected to ESP LT Switchgear or (if not) this external load can be measured after completion of emission test i.e. ESP can be switched off after the emission test. Hence the power measurement test shall be taken up after completion of emission test.	This can be finalised DDE, during finalisation of PG test procedure.
104	III	A/1		2.12.01,V	Steam Generator and its auxiliaries shall also be capable of obtaining maximum continuous rating, safely and on sustained basis, when firing up to 30% imported coal, typical data of which is as specified in the Project Information; by weight blended with Indian coal(s) as specified in therein.	Please provide the details of imported coal to be used. Same is not available under project information.	Imported coal analysis, revised coal analysis shall be given to the Bidders along with resolutions of pre-bid clarification meeting.
105	II	-/2		2.13.01,xx,2	One SCR anhydrous ammonia vaporizer per storage tank..electric heater.....shall be provided.	Ammonia handling system will be provided as per Bidder's standard practice. Please confirm.	Bidder shall submit details (PFD/P&ID, GAD) of SCR (of executed project) along with their technical proposal.
106	III	A/1		3.01.02, v	Note: The SCR reagent will be delivered to the site in tank via truck equipped with unloading pumps or compressors as applicable. The bidder shall have proper arrangement for receiving facilities considering the transport management.	Unloading system will be designed and supplied as part of SCR system.	Acceptance will be subject to review of above sought details. It can also be discussed during DDE.
107	III	A/1		2.13.01, 3	Heat Loss due to un-burnt carbon in ash at all loads with Fly Ash (FA) and Bottom Ash (BA) proportion of 80%:20%.:1.5% (Maximum)	Loss due to unburned carbon will considered as 1.0% as per Vol III, Sec 2. Please confirm	Bidder shall consider GCV efficiency loss of 1.25% on account of unburnt carbon loss through bottom and fly ashes.
108	III	-/2		d,2	Loss due to unburnt carbon:unburned carbon loss for SG efficiency at each load shall be taken as 1.0%		
109	III	A/1		6.01.18	Un-burnt combustibles in flue gas:≤ 1.5 of fly ash at economiser outlet		
110	II	-/2		11.30.11, 6	Unburned fuel at all guaranteed efficiency load 1.0% max		

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111	III	A/1		2.13.02 (i) (ii)	The minimum rate of loading or unloading for coal based supercritical units shall be 3% per minute above the MPL. Bidder to indicate the maximum ramp-up rate can be responded by the boiler turbine system without appreciable loss of life. Minimum power level (MPL) means the minimum output power at the generator terminals that the power plant can sustain 35% of TMCR which is equivalent to 30% of BMCR	Following ramp rates as per CEA guidelines will be envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR 1% per minute from Min. OT load to 55%TMCR. Min Power Level - 40% TMCR.	Following ramp rates as per CEA guidelines is envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR 1% per minute from 40% to 55%TMCR.
112	III	A/1		2.30.04	Ramp rate: Minimum ± 1% per minute (below 50% load to minimum boiler once through load) Minimum ± 3% per minute (50% to 100 load)		However, Min Power Level shall be - 35% of TMCR.
113	III	A/1		2.16.06	The working fluid temperature to be considered for design of pressure part tubes starting from water wall bottom ring header up to and including the water wall outlet headers shall be arrived by adding an additional margin of minimum 50 °C to the maximum predicted/expected fluid temperature in these pressure parts/ wall tubes considering part of the furnace wall acts as radiant superheater.	Temperature escalation to the extent of 50 °C at furnace outlet is not expected. It is kept within the safety limits of material by automatically adjusting feedwater demand to maintain desired load based separator outlet temperature. Additionally, fluid temperature in spiral wall outlet is monitored and boiler is tripped if any temperature excursion is observed. Hence GSECL may consider removing the 50 °C margin. Also for all other pressure parts design temperature is based on worst case of all operating conditions and over and above adding margin will increase the thickness of the pressure part components. For cyclic loading design thickness of components should be as minimum as possible and hence margin will be as specified in the IBR.	Bidder to consider Design Temperature or Design Metal Temperature = Maximum Working Fluid Temperature + IBR Margin or Margin specified in the Tender Specification (whichever is more).
114	III	A/1		2.16.07	The working fluid temperature to be considered for design of pressure parts starting from downstream of water wall outlet headers up to first stage of superheater attemperation shall be arrived by adding an additional margin of minimum 39 °C to the maximum predicted/expected fluid temperature in these pressure parts considering primary superheater or LTSH is located in convective zones.		
115	III	A/1		2.16.08	The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived.		
116	III	A/1		2.16.09	i) 10 °C for inlet headers and its connecting tubes, pipes downstream and upstream of attemperators and other pipes in pressure parts. ii) 15 °C for outlet headers and their connecting tubes except at final super heater and final reheater outlet. lii) For final super heater and final reheater outlet and piping, a minimum margin of 8 °C and 15 °C shall be considered.		
117	III	A/1		2.19.09	Suitable wear bars shall be provided above the furnace bottom hopper to avoid tube leakages because of falling of slag.	Wear bars construction not effective on spiral walls and it leads to ash accumulation. Erosion allowance will be provided in thickness calculations.	Noted. Bidder to consider 1.0 mm additional erosion allowance, for furnace tubes above the furnace bottom hopper to avoid tube leakages because of falling of slag
118	III	A/1		2.19.11	The thermo-hydraulic design of the offered evaporator shall be stable under varying heat flux and mass flux conditions as well as other system disturbance that the evaporator may encounter during operation. The stability of the thermo-hydraulic design of the evaporator shall be demonstrated by the bidder by conducting stability analysis (both static and dynamic) of the finalized evaporator design. As a part of the static stability, interalia, the outlet temperature profile for each tube at the intermediate header inlet (if applicable) and vertical wall outlet header be calculated. The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable and vertical wall outlet). Thesethermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere.	Evaporator slection is proven design and this requirement may be waived. Thermocouples as per this clause are not envisaged.	Noted. However, thermo-couples as asked in the Specification shall be considered by the Bidder.

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119	Vol III	Part A/ Section 1		2.19.23	Provide stainless steel expansion markers/indicator on all the four furnace walls to monitor thermal expansion. Predicted thermal expansion at different levels to be indicated. In addition to local indicators, measurement system (4-20 mA output) for remote indication shall also be provided on all the four furnace walls.	Product meeting this specific requirement is not available with contacted vendors & online sources. Hence this system is not offered.	Bid Specification Prevails
120	Vol III	Part A/ Section 1		2.19.27	Suitable temperature monitoring system consisting of 80 nos of thermocouples should be provided for Bottom hopper, Pent House, Economizer, SCR hoppers, APH hopper etc.	Inline with bidder's proven practice, these thermocouples are not provided.	Bid Specification Prevails
121	Vol III	Part A/ Section 1		2.19.28	Insulation skin temperature measuring system consisting of 40 nos. of thermocouples to be provided in critical areas like Burner panel and critical piping areas.		
122	III	A/1		2.19.26	Alarm set point for tube metal temperature shall not exceed the design temperature of respective tube.	Alarm temperature shall be allowed upto material spec limit as per ASME. Limiting Alarm set point upto metal temp will cause boiler operation restriction.	Bid Specifcaiton Prevails
123	III	A/1		2.22.01	The superheater and reheater shall be of proven design, made of seamless tubes and shall be designed to maintain superheat and reheat steam temperatures at superheater and reheater outlet over the entire steam temperature control range (i.e. from 35% to 90% TGMCR rating for SH and 60% TGMCR to 100% BMCR rating for RH) under the following conditions. (The SH and RH shall continue maintain rated steam temperatures under extreme operating conditions like HP heaters out of service, BMCR condition and HP/LP bypass operation. The tubes shall be drainable to the maximum extent).	Superheat and Reheat steam temperatures at superheater and reheater outlet will be maintained from 60%TMCR to 100% BMCR load range.	Bidder shall note that both superheat and reheat steam temperatures at superheater and reheater outlet shall be maintained at rated value (~568 deg.C and ~ 596 deg.C) from 50%TMCR to 100% BMCR load range. Bidder shall submit boiler predicted performances for the load from 35% TMCR to 100% BMCR and Turbine HBDs for load of 35% TMCR to VWO in different vacuum and make-up conditions as asked in Vol-II/Section-2 of the Specification.
124	II	-/2		6.01.04	unit shall have minimum rate of loading or unloading of 3% per minute above the control load (i.e. 50% MCR)		
125	II	-/2		11.32.04, iii, b	The super heater steam temperature at the high pressure (HP) turbine inlet under the following conditions(°C): Steam Generator load 60% TMCR to 100% BMCR under sliding pressure operation		
126	III	A/1		2.22.02	With permissible and normally expected unbalance or stratification in flue gas flow. (Temperature difference between left and right sides inside furnace not more than 15 deg C.)	Maximum gas temperature variation across furnace width and depth will be around 50 Deg.C	Bidder to follow specification. After SOFA imbalance should be limited within 15 deg.C
127	III	A/1		2.23.08	Length of economizer coil shall be designed such that 225 to 250mm mm gap shall be maintained between coil end and water wall tube on front & rear side	As per bidders proven pracitce 150mm shall be mainitaned.	Noted as per OEM standard practice.
128	III	A/1		2.25.02	PA fans FD/SA Fans: Both are provided with SCAPH at common discharge bypass.	SCAPH will be provided in FD fan discharge bypass duct.	Noted.
129	III	A/1		6.17.02	SCAPH Location: Outdoor, in FD fan discharge bypass duct.		
130	III	A/1		2.25.13, XI	The flue gas flow & ash accumulation pat-terns at such part/low loads shall be studied based on the CFD/Physical model test (PMT) of ducts & ESP as part of this specification scope. The same along with bidder's experience of similar cases (boiler/coal & ash type etc.) shall be considered for selecting the final gas velocities.	Physical model test for ducts is excluded.	Noted; However, CFD model test shall be conducted.
131	Vol III	Part A/ Section 1		2.28.04	Coal feeders viii) The mass flow of the coal powder shall be adjustable with online orifice adjustment using micro-wave based flow measurement	The performance of micro wave based pulverized fuel flow measurement system is yet to be proved in Indian power stations. Hence the system is excluded from bidder's supply scope.	The mass flow of the coal powder shall be adjustable with online orifice adjustment flow measurement
132	III	A/1		2.28.05, i	The BIDDER shall note that the minimum stable load without fuel oil support for pulverised fuel burning system shall not be more than 30% of steam generator MCR load with Design coal.		

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133	III	A/1		2.31.01	The design of Steam Generator shall be such that it does not call for any oil support for flame stabilisation beyond 30% BMCR load when firing any coal from the range specified including blending imported coal up to 30% by weight, with Indian coals,	Minimum stable load without fuel oil support for pulverised fuel burning system shall not be more than 40% of steam generator MCR load with Design coal.	Bidder shall consider 35% TMCR load (231 MW) as the minimum load without oil support for the range of coals.
134	III	A/1		6.10.07	Minimum stable load without oil support:30% of BMCR		
135	I	-/1		Category-III, 5	Minimum Continuous Load Operation: It shall be demonstrated that with any combination of mills in service the steam generator does not require oil firing/support for stable boiler operaion at minimum specified load i.e 35%		
136	III	A/1		2.28.05, ii	The BIDDER shall note that the Coal Mill combination shall be (N+3), here, N=7 working and 3 standby (1 under maintenance); i.e. total 10 no. of mills for each unit.	Minuimum no of mill as per CEA guidelines for 660 MW projects are 6. However, total no of mills will be decided after analysing the complete fuel analysis. Customer is requested to furnish complete coal analysis. And spare mills are as mentioned below: 1) 100% TMCR load , Worst coal firing: One 2) 100% BMCR load , Worst coal firing: Nil 3) 100% BMCR load , Design coal firing: One This is being followed in all our supplied boilers. Please confirm.	Bid Specification Prevails. The Coal mill combination shall be (N+2), here N=6 working and 2 standby (1 under maintenance) i.e total 8 Nos. of mill for each unit. However, Capacity of the mills shall be of 90 TPH & above.
137	III	A/1		6.10.01	Coal mills: Maximum permissible mill loading: Medium speed vertical spindle; Coal Mill combination shall be (N+3) where, N=7 working and 3 standby (1 under maintenance); i.e. total 10 no. of mills for each unit at 90% of mill loading, the system shall be able to meet 100% coal firing rate using design coal for TMCR.		
138	III	A/1		2.28.05, iii,d	Coal fineness should be 75% through 200 mesh.		
139	II	-/2		11.32.04, f	not less than 70% through 200 mesh		
140	III	A/1		6.09.03, ii	Coal fineness should be 75% through 200 mesh.	Please specify the fineness requirement.	Bidder shall consider as bellow- Output fineness at rated capacity, not less than: 75% through 200 mesh (75 microns) & 99% through 50 mesh (300 microns)
141	III	A/1		6.10.06	Output fineness at rated capacity, not less than: 75% through 200 mesh (75 microns) & 99% through 50 mesh (300 microns)		
142	III	A/1		2.28.05, iii,d	Pulverized coal piping shall be ceramic lined with the thickness of not less than 15 mm wherever necessary.		
143	III	A/1		6.11.09, i	Thickness of straight coal pipe base material: Wear resistant, weld-able steel and of minimum thickness not less than 12 mm on straight length	Thickness of fuel pipe will be 12.7 mm including erosion allowance. This is the thickness used in all our supplied boilers. Kindly confirm.	Bidder shall consider design basis as described in Clause Nio. 6.11.09 of Vol-III, Part-A, Section-1 (Page 69).
144				6.11.09, iii	Coal pipe lining thickness: 15 (Minimum liner thickness to cover the specified minimum guaranteed life)		
145	III	A/1		2.32.03	The soot blowers shall be capable of selective operation in areas of ash deposition (SMART type) or equivalent.	Conventional type soot blowing system is envisaged.	Bid Specificaiton Prevails
146	III	A/1		6.08.01	Soot Blowing System: Type:Selective operating type control based change in heat flux on the water walls		
147	III	A/1		3.01.01	Sufficient catalyst shall be provided to treat the exhaust gas to meet emission levels specified without requiring cleaning (except soot blowing)	Catalyst cleaning system is inclusive of Sonic horns and ash sweepers as per standard design of bidder. Soot blowing is not applicable.	Tender terms and condition prevails. However Sonic Horn and ash sweepers can be used by the bidder as per their proven practice in previous executed project.
148	III	A/1		3.02.07, viii	Soot blower/ sonic horns shall be provided to clean the catalyst surfaces as required as per standard and proven practice of the bidder.		
149	III	A/1		3.01.02	The flue gas flow from the economizer passes through the SCR catalyst & reactor and subsequently sent to the air heater. The ammonia/air mixture from the dilution skid will be injected through the ammonia injection grid upstream of the SCR catalyst.	Diluted and vaporised ammonia will be injected into flue gas stream through injection points.These injection points will be decided during contract stage based on physical flow model study. Ammonia injection grid is not applicable as per our offered design.	Bidder shall submit details (PFD/P&ID, GAD) of SCR (of executed project) along with their technical proposal. Acceptance will be subject to review of above sought details.
150	III	A/1		3.04.00	Ammonia Injection Grid (AIG)		
151	Vol III	Part A/ Section 1		3.04.01 (viii)	Ammonia Injection Grid (AIG) Local Control Panel with GIU shall also be provided by bidder for AIG system.	As per collaborator practice, Ammonia Injection is controlled from DCS & GIU is part of DCS. Hence, local control panel with GIU is not provided.	Noted.

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152	II	-/2		11.30.11,xv	SCR Catalyst Life: Bidder shall guarantee and demonstrate minimum SCR catalyst life of 16000 hrs. The catalyst shall be deemed to have exhausted its life as and when SCR efficiency for control of NOx emission reaches to a level of 70%, with ammonia slip not exceeding 3ppm at 6%O2 content in flue gas on dry gas basis.	SCR catalyst life will be 16000 hrs and ammonia slip will not exceed 3 ppm. Kindly confirm.	Bidder to consider 20000 hrs. of catalyst life and ammonia slip will not be more then 3 ppm at 6%O2 content in flue gas on dry gas basis.
153	III	A/1		3.01.03, ii	The life of catalyst module shall not be less than 20,000 hrs. of continuous operation under any operating condition and range of coal specified.		
154	III	A/1		3.01.02, iv	Ammonia slippage value shall not exceed 2 ppm under all operating conditions and range of coal specified		
155	III	A/1		3.01.03, vi	Provide suitable transitions and flow straighteners at both ends of the SCR to minimize the pressure loss.	Flow internals shall be as per OEM standard to stream line the gas flow.	Noted.
156	III	A/1		3.01.03, vi	SCR reactor design shall be suitable for accommodating all catalyst types for both current and future catalyst installation. Bidder shall use standard size modules so that alternate catalyst types or manufacturers can be used in the future without adverse effects.	Plate type catalyst modules will be used for high ash coals. Catalyst size depends on the manufacturer.	Noted. Plate type catalyst modules has to be used. Bidder shall submit the details (MOC, pitch, quantity etc.) including Data Sheet along with their technical offer.
157	III	A/1		3.05.02	Electrically heated air to vaporize and dilute ammonia in vaporisation/mixing chamber. Bidder may provide any alternative scheme as per their standard and proven practice.	As per our design, steam coil heater will be used to heat the air. Heated air will be used to vaporize and dilute the ammonia within the safelimits in mixing chamber.	Noted. Bidder shall submit the details of the scheme (PFD/P&IDs, Layout) along with their technical offer.
158	III	A/1		3.05.06, ii	Suction silencer and air filter shall be provided at blower inlet. Provision for detection of excessive pressure drop shall be provided with alarm. The filter shall be cleanable and reusable type.	Suction silencer and filter will be provided at blower inlet. Alarm will be provided for air flow and temperature. Hence, alarm for pressure drop across filter is not provided.	Noted. Bidder shall submit the details of the scheme (PFD/P&IDs, Layout) along with their technical offer.
159	III	A/1		3.07.02	The unloading compressors shall be of double-seal, oil-free, piston type. The system shall be designed to unload ammonia from a truck tank trailer to the storage tank in less than 4 hours.	Unloading time depends on the unloading truck size of ammonia and associated FCV.	Bidder to consider maximum truck size of available in India.
160	III	A/1		Data sheet-A 6.01.02, ii	During integration to renewable energy resources (maximum 10 hours a day): Coal (Boiler load ~30% BMCR equivalent to 35% TMCR)	Minimum technical load shall be as per CEA.	Bidder shall consider 35% TMCR load (231 MW) as the minimum load without oil support for the range of coals.
161	III	A/1		6.01.13	Operation: ii) Extended operation (~10 hours) at lowest technically minimum load without oil firing for renewable integration.		
162	III	A/1		6.01.10	Means of temperature control: Reheater: Tilting of burners / gas biasing / gas recirculation (gas to be tapped off after ID fans), spray water attemperation (utilising water tapped off from inter-stage of BFP)	Excess air also will be used for Reheter temperature control. Please confirm.	Noted.
163	III	A/1		6.01.15	Burner zone heat release rate:1.36x10^6 kcal/hr-m2	Design indices of BZHRR is of 1.5x10^6 kcal/hr-m2 . Pease confirm.	Bid Specificaliton Prevails
164	III	A/1		6.01.20	Ambient temp. for performance test:30oC with 66% of relative humidity.	Ambient temperature (27 Deg.C) and Relative humidity(66%) will be used for efficiency related calculations.	Ambient temperature (27 Deg.C) and Relative humidity (60%) shall be used by the Bidder for efficiency related calculations.
165	II	-/2		11.30.11, ii	Efficiency of the Steam Generator at 660 MW unit load (i.e. 100% of rated load) with 27 degree Celsius ambient temperature and 60% RH, while firing the design coal,		

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166	III	A/1		6.01.10	Materials of Constructions	Materials of Contruction as per industry standard practice as below shall be followed: (i) Upto & including 426°C - Carbon steel to ASME SA-106 Gr. B/C or SA 210 Gr. C or approved equivalent. (ii) Upto & including 550°C - Alloy steel to ASME SA-335: P- 11/P-12/P-22 ASME SA213:T- 11/T-12/T-22/T23/ or approved equivalent. (iii) Upto & including 605°C - Alloy steel ASME SA- 335/213:P-91/T-91 or approved equivalent. (iv) Upto & including 620°C - Alloy steel ASME SA- 335/213:P-92/T-92 or approved equivalent.	Noted.
167	III	A/1		6.01.28, 6.01.31,iv	Economiser tube thickness: Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae	Erosion allowance of 1 mm will be provided over and above IBR requirement.	Bid Specificaiton Prevails
168	III	A/1		2.23.04	Suitable allowance shall be provided for the economiser tubes to counter the erosion (1mm above IBR requirement). Suitable shielding / cassette baffles shall be provided in the leading/top 3 tubes of each bank to avoid erosion.		
169	III	A/1		6.01.29	Evaporator: Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae	A minimum allowance of 0.6 mm over and above the calculated thickness as per IBR will be provided for entire water wall. An additional tube thickness of 1.0 mm over and above the tube thickness of water wall tubes calculated as per above will be provided on all water wall tubes coming within a radius of one meter around each wall blower to guard against premature tube failure due to soot blowing steam erosion..	Bid Specificaiton Prevails
170	III	A/1		6.01.30	Superheater / Reheater: Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae	Erosion allowance will be provided as below: Leading tubes: 1.0 mm (Over and above calculated thickness as per IBR). Erosion allowance (Balance of Tubes): 0.6 mm (Over and above calculated thickness as per IBR) Kindly confirm.	Bid Specificaiton Prevails
171	III	A/1		6.03.04	Air preheater leakage: Shall not exceed 5% of total air requirement.	Air heater leakage will be less than 10% of the Flue gas weight entering airheater. This is being followed in all our supplied boilers. Please confirm.	Air preheater leakage: Shall not exceed 8% of total air requirement.
172	III	A/1		6.03.06	MATERIALS OF CONSTRUCTION: Hot end elements: Cold end elements:	Thickness will be considered as below: Hot end: carbon steel minimum 0.8 mm thickness. Cold end: Corten steel of minimum 1.2 mm thickness. Please confirm.	Noted
173	III	A/1		6.03.06, v	Design ambient temperature and RH	Design ambient temperature : 48 Deg.C and RH: 85%. Kindly confirm.	Design ambient temperature shall be considered as 27 deg.C and 60% Relative humidity.
174	III	A/1		6.04.02, ii	ID fan: Type of coal firing:Design / best / worst, whichever gives maximum flue gas flow	Best coal analysis is not available in Volume 2, Section 1, S.No:3.05.03 PRIMARY fuel. Please provide the same.	Revised coal analysis shall be provided to the Bidder along with Pre-bid clarifications. Design Coal shall be considered as Best Coal
175	III	A/1		6.04.02, v	ID FAN: Pressure required at Chimney: 30% over 100% BMCR requirements Pressure at chimney inlet shall be +25mmwc.	Pressure requirement at chimney inlet to be consideed is 25 mmwc for ID fan sizing. Please confirm.	Bidder's understanding is correct.
176	III	A/1		6.04.02	ID fan: Fan sizing with all following conditions occurring together: Each fan to be sized for 60% BMCR load (one stream in operation) calculated taking into account this.	Since margins are specified over TMCR load, Bidder understands that each fan shall be sized for 60% TMCR load((one stream in operation). Please confirm.	Bid Specificaiton Prevails

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177	III	A/1		6.04.03	ID FAN: Each fan shall also be sized for 60% BMCR flow calculated taking into following conditions occurring together	Since margins are specified over TMCR load, Bidder understands that each fan shall be sized for 50% TMCR flow. Please confirm.	Bid Specificaiton Prevails
178	III	A/1		6.04.03, ii,iii	Margin over 100% TMCR flow Margin over 100% TMCR pressure requirement		
179	III	A/1		6.05.02	FD fan: Fan sizing with all following conditions occurring together: Each fan to be sized for 60% BMCR load (one stream in operation) calculated taking into account this.	Since margins are specified over TMCR load, Bidder understands that each fan shall be sized for 60% TMCR load((one stream in operation). Please confirm.	Bid Specificaiton Prevails
180	III	A/1		6.05.03	FD fan: Each fan shall also be sized for 60% BMCR flow calculated taking into following conditions occurring together	Since margins are specified over TMCR load, Bidder understands that each fan shall be sized for 50% TMCR flow. Please confirm.	Bid Specificaiton Prevails
181	III	A/1		6.05.03	FD fan: Margin over 100% TMCR flow: Margin over 100% TMCR pressure requirement		Bid Specificaiton Prevails
182	III	A/1		6.05.03, vi	FD fan: Fan inlet air temperature: 5°C above maximum ambient temperature or 50°C ambient temperature and 60% relative humidity.	Fan inlet temperature will be considered as 50 Deg.C. Please confirm.	Bidder shall consider 50 deg.C.
183	III	A/1		6.06.05, vi	PA FAN: Air-heater air-in-leakage: 5% air-in-leakage of 8% of flue gas flow entering in case of a tri-sector APH or actual guaranteed whichever is higher	Leakage values are not clear. Please specify the leakage value.	Bidder shall consider 8% air-in-leakage (PA to Gas and SA to Gas) for sizing of PA and FD/SA fans.
184	III	A/1		6.06.05, x	PA FAN: 5°C above maximum ambient temperature or 50 °C & RH 60%; whichever is higher.	Fan inlet temperature will be considered as 50 Deg.C. Please confirm.	Bidder shall consider 50 deg.C.
185	III	A/1		6.09.03, v	Nox limit:Total NOx emission including fuel NOx and thermal NOx shall not exceed 260 grams per giga joule heat input to boiler.	Bidder understands that Nox emission at boiler outlet / SCR inlet shall not be mor than 325 mg/Nm3. Please confirm.	Clause 6.09.03, v), of Volume-III, Part-A, Section-1 prevails Nox limit:Total NOx emission including fuel NOx and thermal NOx shall not exceed 260 grams per giga joule heat input to boiler. (at boiler outlet / SCR inlet)
186	III	A/1		2.28.08, e	The air to fuel ratio around the burner shall be optimized to ensure low emission of NOx. Total NOx emission from the unit at SCR inlet shall not be more than 325 mg/Nm3 at 6% O2 content on dry basis (fuel as well as thermal NOx) from 40% to 100% TMCR load condition for the entire range of coals specified.		Three levels of separated overfire air (SOFA) shall be provided. And, Bidder shall guarantee (Cat-III) NOx concentration of 450 mg/Nm3 at 6%O2 on dry basis at SCR inlet.
187	III	A/1		2.28.02,ii,f	Minimum operating life of burner parts without requiring any maintenance and replacement shall be guaranteed for minimum 8000 hours.	life of burner parts without requiring any maintenance and replacement shall be guaranteed for minimum 8000 hours. Kindly confirm	Guaranteed life of Coal Burner wear parts shall be min. 8400Hrs. (before maintenance/replacement)
188	III	A/1		6.09.04,iii	Minimum guaranteed life wear parts:8400Hrs (minimum)		Life of oil burner tips, before maintenance/replacement: 16000 hrs (min)
189	III	A/1		6.12.10	Life of burner tips, before maintenance/replacement: 16000 hrs (min)		
190	III	A/1		6.11.01	Coal feeder: Type: Rotary Gravimetric (Drum Type).	Gravimetric, belt type with minimum size of 36" will be supplied. Please confirm.	Bid Specificaiton Prevails
191	II	-/2		xviii	Two (2) nos. approved type furnace inspection and maintenance equipment (Similar to sky climber)	Please specify either electrically operated or pneumatically operated furnace inspection and maintenance equipment needed for this project.	Please consider electric operated equipment.

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192	II	-/2		2.13.01,xx	SCR: In case of double stream each stream shall cater the requirement corresponding to 60% BMCR operation.	Since, ducts have been sized for 50% BMCR load. Each stream of SCR will cater the requirement corresponding to 50% BMCR operation. Please confirm.	Bidder shall note that SCR including Ducts, shall be of 2x60% BMCR configuration.
193	II	-/2		6.02.01, i	BOILER WET- DRY STATE CHANGEOVER At around 30% TMCR load, water separator level eventually disappears. The boiler now operates in once through mode and boiler recirculation pump will shut down at approx. 35% TMCR load.	Once though load will be considered as 40% TMCR. Please confirm.	Noted.
194	I	-/1		Schedule7, 2	Steam generator efficiency:100% BMCR	Steam generator efficiency will be guaranteed at 100% TMCR and 55% TMCR load for arriving guarantees mentioned under Category-I guarantees. 1) Unit heat rate: AT 100% TMCR LOAD & 55% TMCR load as specified in Volume II, Section 2, S.No:11.30.00	Refer Amendment on Performance Guarantees
195	II	-/2		11.30.11, ii(2)	Efficiency of the Steam Generator at 660 MW unit load (i.e. 100% of rated load) with 27 degree Celsius ambient temperature and 60% RH, while firing the design coal,at rated steam parameters, rated coal fineness and rated excess air.	Steam generator efficiency will be guaranteed at 100% TMCR for arriving guarantees as per Category-I guarantees. 1) Unit heat rate: AT 100% TMCR LOAD as specified in Volume II, Section 2, S.No:11.30.00. Hence, steam generator efficiency can be excluded. Please confirm.	Refer Amendment on Performance Guarantees
196	II	-/2		11.30.11, XVI	Guaranteed Ammonia consumption rate (in Kg/hr/unit, 99.5 wt %) at 100% TMCR, for firing worst coal shall be demonstrated.	Since, boiler guarantees are based on design coal. Customer is requested to change type of coal from worst coal to Design coal for demonstration of ammonia consumption.	Refer Amendment on Performance Guarantees
197	II	-/2		11.32.04, VIII	Coal consumption at 100% BMCR, and 100% TMCR for design coal and worst coal based on the following (T/h) a) Ambient air temperature 32°C b) Relative Humidity 65%	Steam generator efficiency will be guaranteed at 100% TMCR for arriving guarantees as per Category-I guarantees. 1) Unit heat rate: AT 100% TMCR LOAD as specified in Volume II, Section 2, S.No:11.30.00. Hence, coal consumption at 100% BMCR, 100% TMCR can be excluded. Please confirm.	Refer Amendment on Performance Guarantees
198	II	-/2		11.32.04, XV	Fuel oil firing system: Percentage load for which High Speed Diesel/Light Diesel Oil (HSD/LDO)	HSD analysis is not available under project information. Please confirm the applicability and provide the analysis of HSD.	Refer IS 1460, for HSD Specification
199	III	A/1		3.01.02 (ii), Page 37	The system designed and supplied shall ensure to meet emmission conditions as maximum Nox emmission (thermal as well as fuel) measured as NO2 from steam Generator unit shall not exceed 70 mg/Nm3 (at 6% O2 level and dry basis) during the entire operating range of steam generator for range of coal specified or latest MOEF guideline whichever is more stringent.	The system designed and supplied shall ensure to meet emmission conditions as maximum Nox emmission (thermal as well as fuel) measured as NOx from steam Generator unit shall not exceed 100 mg/Nm3 (at 6% O2 level and dry basis) during the entire operating range of steam generator for range of coal specified or latest MOEF guideline whichever is more stringent.	Bidder to follow specification.
200	III	A/1		3.01.02 (iii), Pg 38	Ammonia Slippage value shall not exceed 2 ppm under all operating conditions and range of coal specified.	Ammonia Slippage value shall not exceed 3 ppm under all operating conditions and range of coal specified.	Noted
201	III	A/1		3.01.03 (ii) ,Pg 38	The life of catalyst module shall not be less than 20000 hrs of continuous operation under any operating condition and range of coal specified.	The life of catalyst module shall not be less than 16000 hrs of operation under any operating condition and range of coal specified.	Bidder to comply to the Specification requirement.
202	III	A/1		3.01.03 (vii), Pg 38	Sample blocks or removable sections of catalyst on the front face shall be provided so that laboratory tests on sample blocks can be used to predict the remaining active life of the catalyst. At least four sample blocks per module shall be provided.	Sample removable sections of catalyst (Catalyst Plates) on the front face shall be provided so that laboratory tests on sample blocks can be used to predict the remaining active life of the catalyst. At least 20 sample catalyst plates per reactor shall be provided.	Noted.
203	II	-/2		xv (a), Pg 192	Bidder shall guarantee and demonstrate minimum SCR catalyst life of 16000 hrs. The catalyst shall be deemed to have exhausted its life as and when SCR efficiency for control of Nox reached to a level of 70%, with ammonia slip not exceeding 3 ppm at 6% oxygen (O2) content in flue on dry gas basis.	Bidder shall guarantee and demonstrate minimum SCR catalyst life of 16000 hrs. The catalyst shall be deemed to have exhausted its life as and when Nox reached to a level of 100 mg/Nm3, with ammonia slip not exceeding 3 ppm at 6% oxygen (O2) content in flue on dry gas basis.	Bidder to consider 20000 hrs. of catalyst life and ammonia slip will not be more then 3 ppm at 6%O2 content in flue gas on dry gas basis.
204	III	A / 4		3.22.10	Cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 8 mm thick (minimum) mild steel base metal.Cladding shall be done to achieve the required quality as per ASTM B 898-11	Normal gas dust is made up of 6 mm carbon steel. FGD to chimney duct shall be made up of Cladded sheet of minimum 2 mm thickness over the the 7 mm thick carbon steel.	Bid Specificaiton Prevails

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205	Volume - III	A /1		2.25.13.18	The suggested material of construction is ASTMA36 for duct plates, vanes, structural shapes, ASTM A 53 for pipies structs. Trusses, ASTM A 307 for erection bolts etc.	Material shall confirm to IS 2062 & SA 106.	With respect referred clause, following is acceptable - IS 2062 / ASTMA36 for duct plates ASTM A 53 / SA 106 for pipes
206	Volume - III	A /1		6.15.08.3	Minimum thickness of 8 mm for flue gas duct and 6 mm for air duct	Minimum thickness of 6 mm for flue gas duct and 5 mm for air duct is sufficient for the design and the same is being used even in 800 MW. Kindly confirm	Bid Specificaiton Prevails
207	Volume III	PART A/Section - 9		4.06.08	All electric hoists shall be provided with VVVF drive for Creep speed for hoisting.	Application of such hoists are very limited and can be used only once when maintenance of equipment is required. Electric Hoist with normal drive is sufficient in line with BHEL practice.	Bid Specificaiton Prevails
208	Volume III	PART A/Section - 9		8.03.07	Hoisting speed : 2.5 to 3.0 m/min	Mentioned hoisting speed shall be provided for hoist with capacity 20 Tons.However, for hoist capacity more than 20 tons it is recommended to have hoisting speed of 1.5 to 2.0 m/min considering safety of heavier equipment to be handled.This is as per standard practice.	We are not envisaging any electric hoist of such high capacity. Single Girder (SG) Under Slung (US) EOT crane shall be used if the equipment to be handled is more than Ten (10) ton
209	Volume II	Section - 2		2.13.01 XVIII	Two (2) nos. approved type furnace inspection and maintenance equipment (Similar to sky climber).	1.Skysclimber shall be electrically operated or pneumaic operated is not clear. 2.Furnace Maintenance Cradle (Sky climber) shall be used rarely during maintenance/inspection work for Boiler. Also, it may be noted two plants shall not be available for maintenance at a time. In the view,above it is proposed to supply quantity as 01 Nos which is sufficient to meet the requirement.	Bidder shall note that Sky climber should be electrically operated. Bidder to follow the specification requirement regarding quantity.
210	Vol III	Part A Section 3 Page 88		5.03.09	For dia. of insulated surfaces above 450mm and for flat surfaces - 16 SWG	For dia. of insulated surfaces above 450mm and for flat surfaces thickness shall be 0.914mm or 20 SWG. Based on BHEL experience 20 SWG will be easy to handle during erection and will serve the purpose.	Bidder to follow specification.
211	Vol III	Part A Section 3 Page 88		5.03.09	For Steam Generator - 16 SWG	As per clause 2.35.03, The steam Generator will be provided with 1.2mm corrugated Aluminium Cladding.	Please consider 1.2 mm thickness for steam generator.
212	Vol III	Part A Section 3 Page 86		5.01.03 (ii)	Insulation thickness shall be computed on the basis of the following data: Surface Wind velocity = 0.25 metre/sec	Wind speed to be considered as 1m/sec in place of 0.25m/sec outside main plant building.	Bidder to follow specification.
213	Vol III	Part A Section 3 Page 88		5.03.08	Binding and lacing wires shall be provided in line with following: Trhickness of wire shall be 20 SWG	Binding wire dia -20SWG agreed, however sewing/Lacing wire size need to be 22 SWG (0.71mm), as lesser wire dia will ease sewing process during erection. It will also provide sufficient rigidity and required performance of Insulation.	Noted based on proven executed project reference.
214	III	A/1		2.28.05 (C)	The classifier design shall be capable of maintaining rated conditions of fineness under all conditions of operation, load changes and specified fuels. Further, the classifier vanes shall be adjustable externally and shall be lined with suitable wear resistant material to ensure the guaranteed wear life.	Offered mill is with Dynamic classifier(rotary classifier). classifier vanes are not applicable. Adjustment shall be done by varying classifier speed.	Noted.
215	III	A/1		2.28.05 (F)	Provision shall be provided in the mill design for future accommodation of rotary classifier.	Offered mill is with Dynamic classifier (rotary classifier).	Noted.
216	III	A/1		2.28.05 (N)	The grinding rings/ race shall be made of material having hardness of minimum 550 BHN at the surface with adequate chilled depth. The grinding rolls shall be of insert type sinter cast rolls with minimum hardness 350 BHN. Minimum difference between hardness of rings/race and rolls shall be 100 BHN.	Grinding rings/ Race is termed as bull Ring segments as per our of-fered design. Material of construction – Rolls' Inserts & Bull Ring Segments shall be of Sintered carbide. The inserts shall be bound with soft grey iron metal for the Rolls. The hardness difference shall be less than 100 BHN, but would not affect the performance of the same.	Noted.
217	III	A/1		6.10.04	Differential pressure across mill bowl - 426mm WC	For the offered mill, initially Bowl DP max set point is recommended upto 450mmwc at normal working condition. However, Bowl DP shall be set during commisioning stage based on coal and site condition.	Noted
218	III	A/1		6.10.10 (I)	Lube oil system - Integral	External lube oil system is offered.	Noted

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219	III	A/1		6.10.10 (II)	Grinding ring/race - Segmental	we understand this is bull ring sements.	Noted
220	III	A/1		6.10.10 (II)	<u>Minimum mill wear parts life</u> 8000Hrs for grinding elements, 20000Hrs for seals, 25000 Hrs for other Wear parts like bull ring segments, classifier, coal pipes etc.	Grinidng elements means both Bull ring segment and grinidng rolls, both are to replaced to gether, hence 8000 hours life is for both grinidng roll and bull ring segment. For the offered mill, Seals are not applicable. Mill discharge valves shall be 15000 hours.	Noted.
221	V	-/3		4.1.1	Rollers/Tyres - 4 sets	set definition not provided.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of set, where clarity is required. In this case, 1 set will be the spares required for 1 equipment
222	V	-/3		4.1.2	Bull ring rsegmenet - 4 sets	set definition not provided.	
223	V	-/3		4.12	Hydraulic loading cylinder	Not applicable for offered mill.	Noted as hydraulic cylinder is not part of pulveriser but it is a tool required for setting of spring tension of grinding rolls. So, this tools to be handover after erection of mill. Qty:02 Nos.
224	V	-/3		4.16	Mill Bottom	Not applicable for offered mill.	Noted.
225	III	PART - D		10.01.07	Design detailing and fabrication of steel structures shall be done as per provisions of IS: 800 with updated version.	Design boiler structures will be as per IS 800 latest using working stress method.	Noted
226	III	A/1		6.01.31	VI) Maximum depth of tube banks/sections in the direction of gas flow:Two (2) m or maximum soot blowing radius, whichever is lower.	Maximum depth of tube banks in the direction of gas flow will be 2.5 mtrs.	Bidder can follow 2.5 meter depth with proper soot blowing.
227	III	A/1		2.28.04	Coal feeders viii) The mass flow of the coal powder shall be adjustable with online orifice adjustment using micro-wave based flow measurement	Mass flow adjustment in the coal pipe using micro wave based flow measurement is not a proven practice. Instead BHEL is proposing a manual variable orifice in addition to the static orifice which can be adjusted during commissioning.	Bidder to follow specification.
228	III	A/1		6.01.19	Excess air at RAPH inlet: 20% max.	Excess Air @ 100% TMCR shall be 20% (maximum) for design as per the clause 2.13.01 of Vol-III/Sec-1.	Bidder shall consider maximum excess air of 20% for the load range of 50% TMCR to 105% TMCR. However, at low load (up to 50% TMCR) excess air may be higher to 20%.
229	III	A/1		2.13.01	Excess air at economiser outlet at Turbine Maximum Continuous Rating (TMCR) (660MW) load: 20% (maximum)	Burner tilt and excess air shall be used for RH temperature control at part loads as per the proven bidder practice. Hence at part loads excess air will be greater than 20%. As heat rate at 55% TMCR is guaranteed, the choice of excess air shall be left to bidder.	
230	III	-/2		11.30.11, ii) a)	4) Efficiency of the Steam Generator at 363 MW unit load (i.e. 55% of rated load) with 27 degree Celsius ambient temperature and 60% RH, while firing the design coal, at rated steam parameters, rated coal fineness and rated excess air.	Bidder also understands that rated excess air means predicted excess air, which is 20% (minimum).	
231	Volume-III	Part-A/Section-1		2.25.12.i	The Fan shafts are to be carried in bearings on either side independent of the cas-ings. The overhung impellers shall be avoided as far as possible. The rotor shall be over speed tested to at least 25% above the maximum operating speed and shall be dynamically balanced.	As the offered FD, ID and PA Fans are of axial reaction type, impellers shall be of overhung type by design. Axial reaction Fans of FD, ID and PA Fans with similar design standard are supplied by the bidder for Super-critical 660 MW/ 800 MW TPP's to various customers including NTPC, TSGENCO, TANGEDCO, MA-HAGENCO, WBPDCI etc. Similar design Fans were already supplied by the bidder for MAHAGENCO Bhusawal 1X660 MW EPC Package. MAHAGENCO is requested to accept the same Since the fans are driven by constant speed HT motors, over speed test is not required and hence not envisaged. We have not performed such tests for any of the Fans supplied for Thermal Power plants so far including MAHAGENCO Bhusawal 1x660 MW EPC. Dynamic balancing of rotor is done at reduced speed complying the applicable standards and BHEL recommendation for Balancing grade.	Noted.
232	Volume-III	Part-A/Section-1		2.25.12.iii	All constants speed Fans shall be designed for under and over frequency operation in range of 47.5 Hz to 52.5 Hz without any reduction in its performance	The offered Fans shall operate continuously for a power supply frequency variation between 47.5 Hz and 52.5 Hz except for Test block point (Design	All constants speed Fans shall be designed for under and over frequency operation in range of 47.5 Hz to 52.5 Hz without any reduction in its performance

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233	Volume-III	Part-A/Section-1		2.25.13.iv	The BIDDER shall furnish the PA, FD and ID Fans operating curves (head vs. flow) indicating efficiency lines, steam generator resistance line for normally fouled conditions both at 50 Hz, and 47.5 Hz., showing the MCR and test block points.	variation between 47.5 Hz and 52.5 Hz except for test block point (Design condition).	Can be decided DDE
234	Volume-III	Part-A/Section-1		2.25.12.vii	Each Fan bearing shall be provided with oil level indicator and a screwed drain plug.	Bearings of Axial reaction Fans (FD, ID & PA) are located in a mono-block bearing housing inside the Fan housing. Hence, oil level indicators are not applicable to these type of axial Fans. However, Oil flow sight glasses are provided in the return oil lines from the bearings to lubricating oil system, through which oil flow can be checked.	Noted
235	Volume-III	Part-A/Section-1		2.25.12.x	The shaft material shall be 15MO3 or better.	FD, ID and PA Fan shaft material shall be 42CrMo4 forged, quenched and tempered steel. This is in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted.
236	VOLUME-III	Part-A/ Section-1 / TECHNICAL SPECIFICATION- MECHANICAL- STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS/ Sub Section No. 2.00.00 / BOILER & AUXILIARIES (Page 19 of Doc no: ETG061-BTG-ME-SG-TS)		Clause No: 2.25.17	2.25.17. As a minimum power operated gas tight dampers shall be provided i.e., guillotine type dampers at hot air duct inlet to mills, inlet & outlet of ESP stream, Before and after ID fans, inlet of APHs on flue gas side, discharge of PA fans, discharge of FD fans, and at inlet & outlets of APHs on air side.	As per boiler layout, the duct at Flue Gas APH Inlet is same as SCR bypass duct (If SCR Bypass Duct is applicable). The Guillotine Gate at Inlet to each of the Air Pre-Heaters on flue gas side is located in the SCR Bypass duct. Upstream duct of each APH will be isolated by closing the SCR Bypass & SCR Outlet Damper/Gate. No separate Gate/Damper is applicable at flue gas APH inlet when SCR bypass duct and SCR bypass gate is applicable. The above is in-line with recent projects supplied by the bidder with SCR reactors like MAHAGENCO Bhusawal 1x660 MW, UPRVUNL Panki 1x660 MW, TSGENCO Yadadri 5x800 MW, WBPDCS Sagardighi 1x660 MW etc.	There will be separate gates/dampers at APH inlet. One will be at SCR outlet and the other will be on the SCR bypass. In addition to this, SCR inlet gate/damper will also be there. The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
237	VOLUME-III	Part-A/ Section-1 / TECHNICAL SPECIFICATION- MECHANICAL- STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS/ Sub Section No. 2.00.00 / BOILER & AUXILIARIES (Page 19 of Doc no: ETG061-BTG-ME-SG-TS)		Clause No: 2.25.17	2.25.17. As a minimum power operated gas tight dampers shall be provided i.e., guillotine type dampers at hot air duct inlet to mills, inlet & outlet of ESP stream, Before and after ID fans, inlet of APHs on flue gas side, discharge of PA fans, discharge of FD fans, and at inlet & outlets of APHs on air side.	In the DATA SHEET- A of this technical specification (Page No: 74 of Document No: ETG061-BTG-ME-SG-TS), Clause No: 6.15.06. i) Isolation damper,, it is mentioned that "Zero leakage guillotine type – Air pre heater inlet and outlet (flue gas side)". Also, louver damper symbol is shown at Air side Inlet and Outlet of APH in in "SCHEME OF AIR AND FLUE GAS SYSTEM, Drawing No: ETG061-BTG-ME-SG-PFD-001" in Volume-IV BID DRAWINGS. However, as per the referred clause: 2.25.17. in Page 19 of Doc no: ETG061-BTG-ME-SG-TS , it is mentioned that " As a minimum power operated gas tight dampers shall be provided i.e., guillotine type dampers" at "inlet and outlets of APHs on air side". It shall be noted that Guillotine type gas tight isolators can be provided at Inlet and Outlet of each APH on Flue Gas side. However, at Air side Inlet and Outlet of APH, Bi-plane / multi louver type dampers can only be provided. This is due to layout space restrictions. For installing Guillotine Gates, space is required above the duct for the Guillotine Gate's superstructure, and also horizontal ducting is required at the Gate installation location. This space is not available at Air side Inlet and Outlet of APH. This is similar to ducting layout of all projects (including all 660 & 800 MW coal fired boilers & all MAHAGENCO projects including Bhusawal 1x660 MW) supplied and installed by the bidder till date, where Biplane/multilouver type dampers are only installed at Air side Inlet & Outlet of APH. Please accept Biplane/multilouver type dampers at AIR side Inlet & Outlet of APH.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
238	VOLUME-III	Part-A/ Section-1 / TECHNICAL SPECIFICATION- MECHANICAL- STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS/ Sub Section No. 2.00.00 / BOILER & AUXILIARIES (Page 19 of Doc no: ETG061-BTG-ME-SG-TS)		Clause No: 2.25.18	2.25.18 Pressurisation fans to achieve 100% sealing shall be adopted for dampers at ID fans discharge, APHs air side outlet dampers and mill inlet dampers .	For Hot Air to Mill Inlet isolation dampers (Hot Air Gates), as per bidder's standard and proven practice followed in all coal fired boilers (upto 800 MW) of all customers (including MAHAGENCO boilers supplied by BHEL), bidder will provide Seal Air from Cold PA bus duct, to achieve 100% sealing for Hot Air Gates (mill Inlet), instead of pressurisation fans. Please accept. It shall also be noted that for Cold Air to Mill isolation dampers (Cold Air Gates), flow medium is cold air, therefore Seal Air is not applicable for Cold Air Gates. This is in-line with all boilers supplied by the bidder till date, for all customers (and boilers for MAHAGENCO supplied by BHEL including Bhusawal 1x660 MW).	Noted. However, PA fan shall be designed considering seal air requirement
239	VOLUME - III	PART - A SECTION - 1		2.28.02 (iv)	Coal bunkers shall complete with lining, inertisation, dust collecting equipments and deblocking devices (e.g. Vibrators)	Request customer to exclude the scope of dust collecting equipment from BHEL scope as in most of the EPC package it is part of CHP vendor scope. Since CHP is not part of this scope, so it will be difficult for us to quote for this system alone on standalone basis.	Noted for dust collecting equipments only.

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240	VOLUME - III / PART - A / SECTION - 1 / TECHNICAL SPECIFICATION	Coal Preparation and Firing System		2.28.02 iv)	Coal bunkers shall complete with lining, inertisation, dust collecting equipments and deblocking devices (e.g Vibrators)	Kindly elaborate requirement of inertisation in coal bunker.	Intertisation in coal bunkers shall be omitted
241	VOLUME - III	PART - A		2.29.00 Coal Bunker	2.29.01 Bidder to provide adequate numbers of coal bunker for each unit and should have 16 hrs storage capacities for 100% BMCR operation, taking 20% filling factor considering Performance Coal as fuel.	Normally no "filling factor" or margin is considered as actual filling profile (alongwith empty spaces) is considered while sizing of coal bunker. Please clarify.	Bid Specification Prevails
242	VOLUME - III	PART - A		SECTION - 1	2.28.00 Coal Preparation and Firing System iii) Coal supply to the mills shall be from the individual coal bunkers having useful storage capacity of minimum 16 hours with the unit operation at 100% BMCR while design coal as specified in general specification.		
243	VOLUME - II	SECTION - 2		2.13.00 Plant & equipment to be supplied are as under: xiv) Coal preparation and burning equipment	g) Adequate numbers of coal bunker for each unit and should have 16 hrs storage capacities for 100% BMCR operation, taking 20% filling factor considering design coal as fuel.		
244	VOLUME - III	PART - D		7.07.00 Mill And Bunker Bay Building	7.07.10 In addition to the above, framing arrangement for structural steel platform at various levels around the bunker shall be provided with proper access ladder, for poking, striking and attending to air cannons.	Vibrators / air cannons have been indicated for deblocking. From design point of view, we would like share our experience based on various coal flowability studies conducted with M/s NMDC (National Mineral Development Corporation, Hyderabad). It is NOT recommended to install any protrusion inside the bunker as it proves to be counterproductive and compounds the very issues for which it was installed to prevent. In coal flowability studies, M/s NMDC proposes different combinations of bunker valley/wall angle and outlet opening based on type of coal and moisture conditions. Our other Customers like NTPC also do not install such devices as after conductance of few studies, it has been concluded that with a 73 degrees valley/wall angle and 914.4 (36 inch) diameter bunker outlet opening, the coal achieves "mass flow" in Indian conditions. Hence, vibrators/air cannons may please be deleted. Please accept.	Air Connons & Vibrators are not envisaged.
245	VOLUME - III	PART - A, SECTION - 1		2.28.00 Coal Preparation and Firing System	iv) Coal bunkers shall complete with lining, inertisation, dust collecting equipments and deblocking devices (e.g. Vibrators)		
246	VOLUME - III	PART - D		11.18.02 STRUCTURAL STEEL	ii) Coal Storage Bunkers shall be provided with 3.15 mm thick stainless steel lining conforming to ASI 409M, IS1570.	There is ambiguity regarding the liner in coal bunker: Type (SS 409M, 316, 304M), thickness (3.15, 3, 5) and extent (Complete bunker, only hopper, 3m in cylindrical portion also). Please clarify.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
247	VOLUME - III	PART - D		18.04.09 STAINLESS STEEL PLATE LINING IN BUNKER HOPPER	i) The hopper portion of the coal bunkers shall be lined with stainless steel plates of 3 mm thickness. The stainless steel shall be of AISI-316 quality. The work includes supply, fabrication, welding and fixing of stainless steel lining plate to bunker M.S. plate as per drawing.		

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248	VOLUME - III	PART - A		SECTION - 1, 2.29.00 Coal Bunker	2.29.02 Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3 mm thick shall be provided in bottom conical portion plus 3 m in cylindrical portion.		
249	VOLUME - III	PART - D		7.07.00 Mill And Bunker Bay Building	7.07.02 Complete hopper (sloped portions) shall be provided with lining of at least 5mm thick SS 304M grade material.		
250	VOLUME - III	PART - D		7.07.00 Mill And Bunker Bay Building	7.07.02 A comprehensive flowability study shall be conducted by the bidder for the coal bunker hopper to ensure smooth flow of coal in all seasons with different moisture contents and different percentage of fines. Geometric parameter of hopper and lining material shall be decided considering the findings of flowability study.	Through various Coal flowability studies by M/s NMDC with different combinations of bunker valley/wall angle and outlet opening based on type of coal and moisture conditions, it has been concluded that with a 73 degrees valley/wall angle, the coal achieves "mass flow" in Indian conditions. In view of same and also as maximum valley angle is already specified, Comprehensive flowability study may be deleted as the study will delay the project as actual coal sample will have to be sent for study leading to delay in submission of bunker related drawings.	Bid Specification Prevails
251	VOLUME - III	PART - A		SECTION - 1, 2.28.00 Coal Preparation and Firing System	v) Comprehensive flow ability study shall be conducted for the coal bunker hopper to ensure smooth flow of coal in all seasons with different moisture contents and different percentage of mill operating configurations. Bunker hopper valley angle shall be considered as 73 deg for bunker sizing in the technical offer or as per coal flow ability study conducted as per specification requirement whichever is maximum.		
252	Volume-III	Part-A/Section-1		2.40.01.ii	ID fans, BFPs, Steam turbine generators shall have vibration isolation system	It is clarified that the offered ID Fans were Constant Speed Axial Fan with Blade pitch control and foundation shall be RCC Block Foundation without Vibration isolation system as per the tender specification of VOLUME - III PART - D , clauses of 7.05.02 , 9.01.01, 9.06.02 ix). This is in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted
253	VOLUME-III	Part-A/ Section-1 / TECHNICAL SPECIFICATION- MECHANICAL- STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS/ Sub Section No. 3.00.00 / DE- NOX SYSTEM (SCR) (Page 37 of Doc no: ETG061-BTG-ME-SG-TS)		Clause No: 3.00.00 DE-NOX SYSTEM (SCR)	3.00.00 DE-NOX SYSTEM (SCR)	a) Please confirm that bidder can consider Biplane type multi louver damper at SCR Inlet duct & SCR Outlet duct. b) Please confirm that bidder can consider atmospheric seal air (seal air suction from atmosphere) to achieve 100% sealing for these SCR Inlet & SCR Outlet Dampers. c) In the Economizer Bypass duct (if required for SCR system), bidder may consider 2 dampers, i.e., 1 no. Biplane type multi-louver damper for Isolation purpose & 1 no. Control damper for regulation purpose. It shall be noted that the above arrangement was provided for recent MAHAGENCO Bhusawal Unit#6 project supplied by the bidder.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout. W.r.t. point b), seal air fans to be considered as per specification.
254	VOLUME - III	PART - A /SECTION - 1		4.07.00	Hoppers shall be provided with minimum 3mm thick SS liners	SS 304 lining of 1.6mm thickness will provided for 1.5m height from the bottom of hoppers. This has been followed in ESPs supplied by BHEL for various projects.PI confirm.	Bid Specification Prevails
255	VOLUME - III	PART - A /SECTION - 1		6.21.07 (vii)	Hopper liners : 3mm (min.) SS, for complete hopper		
256	VOLUME - III	PART - A /SECTION - 1		4.09.00	Emitting electrodes of rigid type (barbed type) may be considered and each ho shall be provided with heating system, to prevent arching of ash during cold conditions.	Emitting electrode of Helical Spring type will be provided as per Bidder OEM design.PI confirm.	Noted. Type of discharge electrode : Spring type/rigid type
257	VOLUME - III	PART - A /SECTION - 1		6.21.08	Type of discharge electrode : Spring type/rigid type		
258	VOLUME - III	PART - A /SECTION - 1		4.11.00	Penthouse/weather enclosures shall be ventilated by electric motor driven fans. The transformer rectifier sets, controls etc., must be kept within acceptable temperature limits under all operating conditions with maximum ambient temperature. The fans shall be wall mounted, exhaust from inside the penthouse to the outside and be protected with rain louvers.	Open penthouse is considered as per Bidder design without fan/exhaust. Same is followed for other projects also. PI confirm.	Bid Specification Prevails
259	VOLUME - III	PART - A /SECTION - 1		4.15.04 (ii)	The hopper shall be of pyramid shape with plate angle of at least 70 horizontal with an access door on each side of baffle.	Hopper valley angle of 60° will be envisaged. pl confirm.	Bid Specification Prevails
260	VOLUME - III	PART - A /SECTION - 1		6.21.07 (v)	Plate angle of dust hopper - Not less than 70 degress		

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261	VOLUME - III	PART - A /SECTION - 1		4.16.02	Each field should have its dedicated TR set. Electrode spacing shall be 400mm with minimum SCA of 180 mg/Nm3.	These clauses are contradictory. Customer may clarify the minimum SCA required with all fields in service by issuing suitable amendment. PI confirm.	Bidder shall consider minimum SCA of 180 m2/m3/s at 400 mm electrode spacing.
262	VOLUME - III	PART - A /SECTION - 1		6.21.05	SCA = 180 mg/Nm3.		
263	VOLUME - III	PART - A /SECTION - 1		6.21.06.(vi)	Specific collection plate area (total collecting plate area/total gas flow) not less than 200 mg/Nm3.		
264	Volume-III	Part-A/Section-1, Rev 0		6.03.04, pg 60/94	Air Preheater leakage - shall not exceed 5% of Total air requirement	Generally, Air preheater leakage will be min 10% of the total air requirement. This is the standard practice being followed in all the power plants. Hence Customer is requested to consider 10% as the max. Air preheater leakage	Air Preheater leakage - shall not exceed 8% of Total air requirement
265	Volume-III	Part-A/Section-1		6.04.05	Fans – (ID) Blade type : Backward curved, aerofoil type	It is clarified that the offered CID Fan are Axial type with Aerofoil bladed type design	Noted.
266	Volume-III	Part-A/Section-1, Rev 0		6.03.06 (iii), pg 61/94	Rotor and Intermediate section elements - Corrosion resistant low alloy steel	With respect to Rotor and Intermediate section elements, the temperature not drops down to below acid dew temperature. Hence Corrosion resistant low alloy steel material is not required.	Bid specification prevails
267	Volume-III	Part-A/Section-1		6.04.10	Fans – ID Material of Construction i) Fan scroll: Lined with abrasion resistant material ii) Suction chamber: IS 1079 / 73 SH. 34 iv) Shaft: SAE 1045 forged normalised and tempered steel v) Sleeves: High grade Babbitt vi) Regulating vane : IS 1079 / 73 viii) Bearing Housing : Grey cast iron	i) Fan scroll applicable for Radial/Centrifugal Fans. As the offered CID Fans are Axial reaction type, Fan scroll is not applicable. ii) Suction chamber shall be provided with IS 2062 with minimum 6mm thickness iv) Fan shaft material shall be 42CrMo4 of forged, quenched and tempered steel. v) Sleeves are envisaged in sleeve bearing design Fans. As the offered CID Fan is of Axial reaction type with antifriction bearings, Sleeves are not applicable. vi) Regulating vane is envisaged for Radial/Centrifugal/ Axial Impulse Fans. As the offered CID Fan is of Axial reaction type with blade pitch control, regulating vane is not applicable. viii) As per the OEM standard, offered bearing housing will be of Alloy Steel All the above were in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted.
268	Volume-III	Part-A/Section-1		6.05.05	Fans – (FD) Blade type : Backward curved, aerofoil type	It is clarified that the offered FD Fan is Axial type with Aerofoil bladed type design	Noted
269	Volume-III	Part-A/Section-1		6.05.10	Fans – FD Material of construction i) Fan scroll: Lined with abrasion resistant material ii) Suction chamber: IS 1079 / 73 SH. 34 iv) Shaft: SAE 1045 forged normalised and tempered steel v) Sleeves: High grade Babbitt vi) Regulating vane: IS 1079 / 73 viii) Bearing Housing : Grey cast iron	i) Fan scroll applicable for Radial/Centrifugal Fans. As the offered FD Fan is Axial reaction type, Fan scroll is not applicable. ii) Suction chamber shall be provided with IS 2062 with minimum 6mm thickness iv) Fan shaft material shall be 42CrMo4 of forged, quenched and tempered steel. v) Sleeves are envisaged in Journal bearing design Fans. As the offered FD Fan is of Axial reaction type with antifriction bearings, Sleeves are not applicable. vi) As the offered FD Fan is of Axial reaction type with blade pitch control, regulating vane is not applicable. viii) As per the OEM standard, offered bearing housing will be of Alloy Steel All the above were in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted.

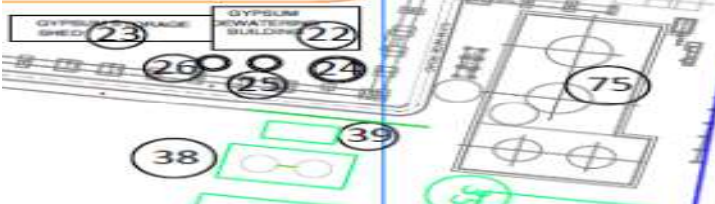
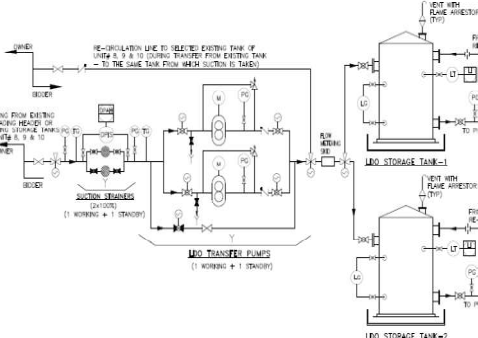
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270	Volume-III	Part-A/Section-1		6.06.10	Fans – (PA) Material of construction iii) Shaft : SAE 1045 or equivalent forged normalized and tempered steel	Fan shaft material shall be 42CrMo4 of forged, quenched and tempered steel. This is in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted.
271	VOLUME-III	Part-A/ Section-1 / TECHNICAL SPECIFICATION- MECHANICAL- STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS/ Sub Section No. 6.00.00 / DATA SHEETS – A (Page 74 & 75 of Doc no: ETG061-BTG-ME-SG-TS)		Clause No: 6.15.00 Dampers -->6.15.06 i)	DATA SHEET-A 6.15.06 DESIGN AND CONSTRUCTION REQUIREMENT i) Isolation damper: Zero leakage guillotine type - Outlet of each FD Fan (double louver type)	These seems to be a contradiction w.r.t. the type of damper to be provided at each FD Fan Outlet (guillotine type (or) double louver type). Please inform whether Guillotine type damper (Gate) OR double louver type damper (Biplane Damper) needs to be provided at each FD Fan Outlet. Generally Guillotine damper (Gate) is preferred for Fan isolation purpose for larger size ducts in super-critical boilers.	Guillotine damper (Gate) shall be provided at for FD Fans
272	Volume-III	Part-A/Section-1, Rev 0		6.17.06, pg 81/94	Material of Construction for Fins - Copper	For all the current executing thermal power projects, we have supplied Aluminium fins instead of copper fins in SCAPH due to light weight, corrosion resistance and cost effective. Request customer to kindly consider Aluminium for Fins material.	For SCAPH tube, bidder shall follow bid specification. For Fins, Aluminium can be accepted
273	VOLUME - III	PART - A /SECTION - 1		6.21.07 (ii)	Casing design pressure: Compatible with furnace design pressure (With two fans operating, it shall be able to meet 120% BMCR flow, at 50 deg C ambient temperature and 47.5 to 52.5 Hz power supply frequency ,guaranteed APH leakag worst coal firing.+ 660mmwc at 67% of yield strength.)	This requirement is not clear.ESP casing shall be designed for ± 660 mm wc at 67% yield strength .	Casing design pressure shall be Compatible with furnace design pressure (With two fans operating @ 120% BMCR flow, at 50 deg C ambient temperature and 47.5 to 52.5 Hz power supply frequency and guaranteed APH leakage while worst coal firing; and + 660mmwc at 67% of yield strength.)
274	VOLUME - III	PART - A /SECTION - 1		6.21.07 (iii)	Casing and hopper: Thickness of steel sheet = Not less than 8 mm	Thickness of ESP casing, funnel and roof shall be 5 mm (min) in line with several ESPs executed by us so far. Pl. confirm	Bid Specification Prevails
275	VOLUME - III	PART - A /SECTION - 1		6.21.10.(iii)	Thermal insulation and 1.1 mm aluminium corrugated cladding	0.71 mm plain aluminium cladding for ESP outer casing will be envisaged as per bidder design which is being used in several projects executed by BHEL.PI confirm.	Bidder to consider 1.1 mm corrugated aluminium cladding
276	VOLUME - III	PART - A /SECTION - 3		5.03.09	Bonded Mattress :-For Steam Generator and ESP casing.....16 SWG corrugated Aluminium for SG and plain for ESP		
277	VOLUME - III	PART - A /SECTION - 3		5.04.08.(vii)	The access doors and inspection doors in the Boiler and ESP shall be lined with refractory material.	As per standard design, ESP access doors and inspection doors will be lined with LRB mineral wool only and not refractory material as the operating flue gas temperature is lower. PI confirm.	Noted.
278	VOLUME - III	PART - A /SECTION - 3		5.05.03	Shot content 5% by weight (max.), size of any shot not to exceed 5 mm in diameter.....	Shot content of Mineral wool will be considered as per IS: 8183. pl confirm.	Which ever is stringent shall be considered
279	III	PART - A SECTION - 2		8.14.13	Adequate resins for each condensate polisher service vessels along with one (1) spare charge of resin in the mixed resin Storage tank. One (1) spare charge of resins during commissioning and one (1) spare charge of resins as mandatory spares. Total charges shall be at least six (6).	Bidder understands that the total resin charge shall be 6 charge for both TG unit service vessel, 1 spare charge in mixed resin storage tank, 1 spare charge for commissioning and 1 spare charge for mandatory spare. Hence total number of resin sharge shall be 9. Please confirm	Noted
280	III	PART - A SECTION - 2		8.15.04	The pressure vessels in the common external regeneration facility will be provided with adequate freeboards over the top of the settled resins in order to minimise the loss of resin during their use	Bidder understands that One (1) common facility for regeneration of the ionexchange resins from the condensate polishers of all the turbo-generator units shall be provided utilizing three (3) tank concepts and consisting of: a) Resin seperation/ cation regeneration vessel (1No.) b) anion regeneration vessel (1 no.) c) mixed resin storage vessel (1no.) Please confirm.	Can be discussed DDE
281	Vol III	Part-A /section 2	61	13.01.00	The number of H2, CO2 and O2 cylinders shall be equal to total requirement for one start up and one shut down of two units plus those required to be connected on manifolds of all units plus total requirements for seven days consumption of all units. The Bidder shall supply all gases till completion of trial operation. Filled cylinders shall be handed over to owner, during plant handover.	Bidder shall supply H2, CO2 cylinders and gases for first filling cycle only as trial operation/COD may get delayed for various reasons not attributable to bidder.	Bid Specification Prevails
282	III	PART - A SECTION - 2		14.02.00	Hydrazine and phosphate is not to be used for feed water treatment.	Bidder understand that Hydrazine dosing is not envisaged in Chemical dosing and hence space shown of Hydrazine dosing skid in TG 0.0M is not	Bidder understanding is right

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283	IV	TG BUILDING 0 METRE LAYOUT		ETG061-BTG-ME-ST-GA-001	As per drawing space for Hydrazine dosing skid is shown in TG 0.0M.	dosing and hence space shown for Hydrazine dosing skid in TG 0.0M is not applicable. Please confirm .	bidder understanding is right.
284	plot plan-ETG061-COM-GEN-PP-001 and process flow diagram-ETG061-BTG-ME-SG-LDO-PFD-001				As per plot plan given in tender specification, FUEL OIL PUMP house (Pressurizing Pump House) and existing Fuel oil tanks are nearby 		Bid Specification Prevails
285	VOLUME - III	PART - A SECTION - 1		ii (b& c) of 2.26.02	ii (b) 2x100% LDO transfer pumps including matching suction strainers ii (c) Two (2) nos. Storage cum day oil tank, Filtration and pressurizing unit having 3x100% (1 Working for each unit + 1 common standby) capacity pumps with matching suction strainers	As per plot plan, FUEL OIL PUMP house (area marked as 39) (Pressurizing Pump House) and Existing Fuel oil tanks (terminal points) (area marked as 75) are nearby, hence Day oil Tank along with LDO transfer pumps and simplex strainers can be excluded and LDO suction shall be taken directly from main FO TANKS to Pressurizing pump house (FOPH-I). Please Accept.	
286	PART - D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.05.00 /Stairs & Ladders		11.05.01.(i)	All steel staircases shall normally have minimum clear width (back to back of stringer) of 1000 mm and inclination with horizontal shall not be more than 35 deg.However, in case of space restriction, minimum clear width up to 750 mm and slope up to 450 may be provided.	Bidder understand that "slope up to 450" to be read as "slope up to 45 degree " . Kindly confirm.	Noted
287	VOLUME - III	PART - A, SECTION - 1		5.00.00 MILL REJECT SYSTEM	5.01.01 The pyrites hopper shall be provided with isolation valves / dampers such that the valve will open automatically after a pre-set weight of the rejects for further conveyance; timer operation should also be provided.	Please note that as per prevalent industry practice, Timer mode is the main mode of operation. Level probe is also available as emergency mode in case a certain level/volume of reject is accumulated. There is no provision to measure weight. Thus, pre-set weight option shall not be available.	Noted
288	VOLUME - III	PART - C, TECHNICAL SPECIFICATION CONTROL &		3.03.00 Mill Rejection Control System	The pyrites hopper shall be provided with isolation dampers such that the valve will open automatically through after a pre-set weight of the rejects for further conveyance.		
289	VOLUME - III	PART - A, SECTION - 1		5.00.00 MILL REJECT SYSTEM	5.01.04 Each pyrite hopper shall be provided with vibrating feeder and metallic belt/chain flight conveyor carry mill reject from hopper to Bucket elevator for final storage at Silo.	Vibrating feeder is not required as conveyor shall be placed directly below pyrite hopper and material shall flow with gravity. Please confirm.	If head room is available to install vibrating feeder, the same shall be provided
290	VOLUME - III	PART - A, SECTION - 1		5.00.00 MILL REJECT SYSTEM	5.03.02 VIBRATING FEEDER (IF APPLICABLE) i) The vibratory feeders shall be electromagnetic / electromechanical type. Each pyrite hopper shall be served by one vibratory feeder. ii) Vibrating feeder tray shall be provided with suitable liners.		
291	VOLUME - III	PART - A, SECTION - 1		5.00.00 MILL REJECT SYSTEM	5.02.00 Design Criteria 4. Design extraction rate of mill reject from pyrite hopper - 20% above rated capacity at 100% BMCR considering worst coal.	Bidder shall 20% margin shall be considered for design of conveyors. Please accept.	Bid Specification Prevails
292	VOLUME - III	PART - A, SECTION - 1		5.00.00 MILL REJECT SYSTEM	5.03.03 METALLIC CONVEYORS At least 25% margin on normal operating capacity shall be provided.		
293	VOLUME - III	PART - A, SECTION - 1		5.02.00 Design Criteria	3. Rated extraction rate of mill reject from pyrite hopper- 1.5% of coal consumption at 100% BMCR considering worst coal.		For mill reject handling system 1.5% of coal consumption at 100% BMCR considering worst coal firing shall be considered

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294	VOLUME - III	PART - A, SECTION - 1		TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	6.10.05 Mill Reject - Maximum 1% (For Worst Coal)	Normally, it is 1% of coal consumption at 100% BMCR considering worst coal in Indian conditions. Kindly confirm.	This is the criteria for Mills and not for Mill Reject System
295	Volume: I	Section: 3		Type Equipment of	Mill Reject Handling Conveyer type mill reject handling system for 1% mill reject		Referred clause is for Proveness Criteria
296	VOLUME - III	PART - A		SECTION - 1, 5.00.00 MILL REJECT SYSTEM	5.03.00 Equipment and System Specification vi) Reliable and proven hydraulic/pneumatic auto take up arrangements, with facility of adjustment of tension. The tension assembly shall be designed to absorb any momentary shock loading.	Reliable manual screw/gravity tensioning arrangement shall also be allowed.	Noted
297	VOLUME - III/ SECTION - 3	PART - A		5.01.03, (Point No. vi) THERMAL INSULATION	Insulation thickness shall be computed on the basis of the following data: vi) Pipe/Equipment wall temperature = Maximum fluid design temperature	Bidder proposes to provide thermal insulation over piping & equipment based on fluid operating temperature inline with practice followed in currently ongoing BHEL projects. Kindly confirm.	Bid specification prevails
298	VOLUME - III	PART-A /SECTION - 3/ PIPING, VALVES & SPECIALITIES AND INSULATION,Page 88		THERMAL INSULATION, 5.03.07	Insulation mattress/section shall be supplied in thickness of 25, 40, 50 and 75 mm.	Bidder proposes to include 60mm thickness of Insulation mattress/section in addition to 25, 40, 50 and 75 mm of insulation thickness. Kindly confirm.	Noted
299	VOLUME - III	PART - A/SECTION - 5,Page 22 TECHNICAL SPECIFICATION CW & ACW SYSTEM		4.12.03	Shed/canopy shall be provided for valves located outside, for example, recirculation line valves.	Valves located outside buildings shall be suitable for outdoor application and hence shed/canopy shall not be provided. Kindly confirm.	Bid specification prevails
300	VOLUME - III	PART-D/ CIVIL		SALIENT FEATURES AND DESIGN CONCEPT,7.01.02(SI . No. 1)	The building sizes shall in no case be less than what is furnished in the table. Power House Building 45 X 265	In order to optimize TG building size, bidder can decide TG Building size, equipment placement, floor levels etc. as per their practice. Please confirm.	Bid Specification Prevails Bidder note that the provided sizes are minimum requirement. However it can be discussed DDE. Bidder shall establish that there is sufficient clear space around the equipment for easy maintenance and movement.
301	VOLUME - Iv	BID DRAWING		BID DRAWING (TG BUILDING LAYOUT AT VARIOUS FLOORS)	BID DRAWING (TG BUILDING LAYOUT AT VARIOUS FLOORS)	We understand that the drawings/layouts furnished for TG building are for reference purpose only. Hence, in order to optimize TG building size, bidder shall be deciding the TG Building size, equipment placement, floor levels etc. as per their standard & proven practice. Please confirm.	Bid Specification Prevails Bidder note that the provided sizes are minimum requirement. However it can be discussed DDE. Bidder shall establish that there is sufficient clear space around the equipment for easy maintenance and movement.
302	III	PART - A/SECTION - 2		11.01.00	HOTWELL MAKE-UP AND EXCESS CONDENSATE DUMP SYSTEM:----- Excess condensate if any, in the condenser hotwell shall be dumped out of turbine cycle by excess condensate dump system to the condensate storage tank, capacity of which about 300 Cum (unitized).	There is mismatch in capacity of Condensate Storage Tank, Please clarify the capacity to be considered.	Condensate Storage Tank shall be as per SI. No. 1, Annexuure-1, SPECIFICATION OF MISCELLANEOUS STEEL TANKS, of, Vol.-III, Part-A, Section-3.
303	III	PART - A/SECTION - 3		ANNEXURE - I	SPECIFICATION OF MISCELLANEOUS STEEL TANKS: 1 Condensate Storage Tank-Nominal Capacity (m3) Min. 500 CUM , 2 Nos		
304	III	PART - A/SECTION - 2		9.30.01	The maximum oxygen content shall not be more than0.005cc per litre measured as per ASTM D888 or Indigo carmine method at all operating conditions.	From 30% TMCR to VWO load, all super critical units operate in oxygenated treatment mode and hence guarantee for maximum oxygen content in condensate and feed water system is not applicable for super critical sets. Please confirm.	This will be applicable for subcritical regime
305	III	PART - A/SECTION - 2		21.07.11	Maximum oxygen content in deaerated feed water from 30% TGMCR to TGVWO with 1% makeup-0.005cc/lit		
306	II	2		11.24.06	Measurements: All the necessary instruments (in duplicate) required for the tests shall be furnished by the bidder so as to meet the accuracies specified in the codes.	Kindly clarify the '(in duplicate)' mentioned against clause 11.24.06. Bidder has considered all the measuments for conductance of performace guarantee (PG) test as per bidder's standard and proven practice. Kindly accept.	As per C&I specification Vol-III, Part-C

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307	Vol-III	Part A/Section-2	2	1.02.01	Stable low load operation (~35% TMCR) shall be applicable	As per CEA guideline, Low load operation ~ 40% TMCR shall be applicable.	Bid Specification Prevails
308	Vol-III	Part A/Section-2	4	1.04.01	(ii) 660 MW output (i.e. 100% TMCR load) under rated steam conditions, at condenser design pressure with zero make-up (GUARANTEED HEAT RATE & OUTPUT).	100% TMCR is guarantee Heat rate condition hence 'output' to be deleted.	Bid specification prevails
309	Vol-III	Part A/Section-2	4	1.04.01	(xiii) VVO output under rated steam conditions at condenser design pressure with 0% makeup & 1% makeup.	105% Load with 0% MU (as max ouput of machine is 693 MW)	Bid specification prevails Referred clause in for submission of HMBD only. Bidder to submit the same as per specification
310	Vol-III	Part A/Section-2	5	1.14.03	All the heat balances shall show turbine output, mechanical and electrical losses in turbine and generator and input to shaft driven auxiliaries, if any. The auxiliary steam drawn off from CRH line shall be treated as loss from the cycle, which in turn shall be made up in the condenser hot well.	Generator efficiency will be given for Guarantee load cases.	Bid specification prevails
311	Vol-III	Part A/Section-2	6	2.01.07	Provision shall be made for tripping of the turbine from the unit control room and for local manual trip from the steam turbine front pedestal	Provision for local manual trip from the steam turbine front pedestal is not envisaged. However an emergency trip push button is provided in the TG Hall.	Noted, EPB shall be provided in CCR also.
312	Vol-III	Part A/Section-2	6	2.02.05	The steam turbine casings shall be horizontally split at the centreline	HP Turbine shall be of barrel type design with axially split. Inner cylinder is vertically split.	Proven practice of the OEM is acceptable.
313	Vol-III	Part A/Section-2	7	2.02.16	All extractions shall preferably be from the lower half of casing and extraction branches should be welded to casings except for LP casing(s) extractions which can be bolted connections	It is clarified that the extraction branches shall be welded / bolted to casing as per collaborator's standard practice	Noted
314	Vol-III	Part A/Section-2	7	2.02.18	Bolts, nuts and studs used for turbine casing flanges and main turbine components shall be with milled threads and of special alloy steel properly treated.	Some threads will also be rolled and not milled, to achieve higher strength values especially for high loaded bolt. Material would be as per manufacturer / collaborator's standard proven practice.	Noted
315	Vol-III	Part A/Section-2	8	2.03.02	The rotor shall be heat stabilized after machining	Heat Stabilization of HP & IP Rotor Forging are done after rough machining. After final machining of the rotors no further heat treatment is envisaged.	Heat Stabilization of HP, IP & LP Rotor Forging to be done after rough machining. After final machining of the rotors no further heat treatment is envisaged.
316	Vol-III	Part A/Section-2	8	2.03.05	The critical speed of the combined turbine and generator rotor shall not lie within a range of + 15% or -20% of the operating speed of 3000 rpm.	Critical speed of the combined turbine and generator rotor shall not lie within ± 10% of the operating speed as per collaborator's in house guidelines. Positive feedback from plants confirms this design approach.	Bid Specification Prevails. However, bidder may submit further evidence to substantiate.
317	Vol-III	Part A/Section-2	8	2.03.06	Maximum permissible shaft vibration measured at bearing housing will be as per zone A of ISO 7919 and maximum permissible bearing vibration measured at bearing housing will be as per zone A of ISO 10816-2.	Maximum permissible shaft vibration and bearing housing will be as per Zone A/B +50% of ISO 7919 and Zone A/B+50% of ISO 10816-2 respectively. Absolute Bearing Pedestal Casing Vibration : 9.3 mm/sec (Alarm) & 11.8 mm/sec (Trip) & Relative Shaft Vibration: 165 microns (pk to pk) Alarm & 240 microns (pk to pk) Trip.	Maximum permissible shaft vibration measured at bearing housing will be as per zone A/B of ISO 7919 and maximum permissible bearing vibration measured at bearing housing will be as per zone A/B of ISO 10816-2.
318	Vol-III	Part A/Section-2	9	2.04.09	L-1 and L-0 LP blades shall be of free standing type.	Only L-0 LP blades shall be free standing type	Noted
319	Vol-III	Part A/Section-2	10	2.06.07	Each bearing shall have the necessary instrumentation of adequate pickups for remote sensing and monitoring of temperatures and vibrations (both horizontal and vertical).	Two Vibration Probes shall be mounted in X or Y direction as per OEM practice.	Two Vibration Probes shall be mounted in X & Y directions.
320	Vol-III	Part A/Section-2	10	2.06.08	At least two probes at 45 degrees apart for vibration measurements and also as input to the package of performance analysis diagnostic optimisation (PADO)	For shaft vibration measurement two probes will be mounted at 90° apart	Noted
321	Vol-III	Part A/Section-2	10	2.08.03	The motive oil for the hydraulic turning gear shall be supplied from an auxiliary AC motor driven oil pump	The motive oil for the hydraulic turning gear shall be supplied from Jacking Oil Pump.	Bidder's proven practice is accepted

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322	Vol-III	Part A/Section-2	10	2.08.05	A pressure switch shall be provided on the main bearing oil header to provide the necessary interlock for preventing the starting of turning gear until adequate oil pressure has been established. The turning gear motor shall automatically trip on loss of bearing oil pressure.	Pressure switch is not required and applicable in bearing oil header, as adequate oil pressure is ensured in the oil header for turning gear operation by Jacking oil pump which operates during turbine start-up conditions. The motive oil /Jacking oil of hydraulic motor is controlled by the dedicated solenoid valve and supplies the jacking oil to hydraulic turning motor to turn the rotor train. After attaining the speed of 120 RPM, solenoid is energized and stop supplying Jacking drive oil to Hydraulic turning motor. However, Jacking oil pump remain in operation and supply jacking oil to bearing up to 540 RPM. The hydraulic motor is driven by lifting oil during operation of the turning gear at a speed of 60 RPM.	Noted
323	Vol-III	Part A/Section-2	11	2.08.06	The turning gear shall be capable of being started both locally and from unit control room.	Local operation of turning gear is not envisaged.	Bid specification prevails Local operation of turning gear is envisaged with interlock and protection.
324	Vol-III	Part A/Section-2	11	2.08.09	To facilitate the turning gear operation, the shaft shall be lifted by means of jacking oil system. Also, provision to check the rotor lift and the jacking oil pressure before and after lifting of the rotor at each bearing shall be made.	To facilitate the turning gear operation, the shaft shall be lifted by means of jacking oil system. Jacking oil pressure shall be established before turning gear operation. There is no seperate provision to check the rotor lift after operation of JOP, as rotor lift and oil pressure at each bearing shall be set during erection phase only.	Bid specification prevails
325	Vol-III	Part A/Section-2	11	2.09.03 (vii)	Each valve to be provided with two additional normally open (NO) potential free direct limit switch contacts in the valve closed position for use by the Employer	Please refer clarification against Cl. 2.09.03 vi)	2 nos. position transmitters per valve shall be provided instead of limit switch
326	Vol-III	Part A/Section-2	11	2.09.03 (ix)	Steam Admission Valves: Provide Temporary & Permanent steam strainers for Emergency stop and Reheat Stop valves. In case there is no provision for temporary strainer, one set of strainers per unit shall be provided in addition to the permanent strainer.	One common strainer is supplied for temporary & permanent use. Valve design for the offered steam turbine has integral strainers in Main Steam & HRH Valves as per specification requirement. After boiler cleaning, the steam quality related to particle is sufficient for start up / normal operation of the steam turbine and the same strainer is used for both startup & normal operation. Hence, supply of additional set of strainer is not envisaged.	Noted
327	Vol-III	Part A/Section-2	12	2.09.06	The tripping of all emergency stop valves, both locally and remotely shall be carried out by means of solenoid trip gear operating on DC supply	Push button for tripping the Turbine is provided at TG floor and in the control room.	Noted
328	Vol-III	Part A/Section-2	12	2.09.09 (iii)	NRVs shall be suitable for on load testing individually ..	Extraction NRVs are controlled through turbine control system. Online testing is not envisaged as per OEM practice.	Noted, however ATT shall be provided for CRH NRV, as noted below- "ATT is carried out for Main Stop & Control Valves, Overload Valve, HP Dump Valve and CRH NRV as per Collaborator's guideline."
329	Vol-III	Part A/Section-2	12	2.09.09 (v)	Provide two sets of Limit Switches for both open & close position with two changeover contacts.	It is clarified that for CRH NRV, high reliable inductive type limit switches are provided for open, close & test position as per standard practice. For extraction NRVs, limit switches are not used and only position transmitters are used for position feed back.	Noted.
330	Vol-III	Part A/Section-2	12	2.09.09 (vi)	Steam line NRVs. Quantity requirements indicated in the Tender drawings are minimum. However, based on TSR analysis to be carried out by the successful BHEL, any additional requirements shall be met by him.	Number of NRVs in steam extraction lines shall be as per BHEL standard proven practice.	The arrangement and quantity of QCNRVs, as described by the Bidder herein, is acceptable. However, the same shall be validated by the Bidder through submission of entarined enegy calculation and integrated IP steam extraction P&ID, during basic engineering stage.
331	Vol-III	Part A/Section-2	12	2.09.03 (x)	Steam Admission valves: Provide hydraulically operated valves, fail safe type & equipped with test device to permit complete closing of one valve at a time while the Unit is carrying load.	Position transmitters will be used instead of switches. Indication will be in the HMI of the TCS and in the DCS.	Noted
332	Vol-III	Part A/Section-2	12	2.09.03 (xi)	Steam Admission valves: Valves to close simultaneously & automatically when the over-speed governor trips and upon the action of other protective devices.	Position Transmitters will be provided, signals can be transferred via the OPC link	Noted
333	Vol-III	Part A/Section-2	14	2.11.01	The system shall supply oil for the lubrication of the turbine and generator bearings, for actuation of various components of governing and control system, seal oil etc.	Lube Oil System is separate from control oil system and generator seal oil system. Lube Oil System is meant to supply lube and jacking oil to turbine-generator bearings.	Noted

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334	Vol-III	Part A/Section-2	14	2.11.04	The system shall include sufficient standby equipment to allow any equipment (except turbine shaft driven main oil pump as applicable) to be taken out of service for maintenance without in any way affecting the output of the steam turbine unit.	Turbine shaft driven main oil pump is not applicable. Instead, 2X100%oil tank mounted centrifugal pumps are provided as per standard and proven practice of BHEL. These are called as main oil pumps. Standby of only MOP, JOP, LO Filter, JO Filter, Oil Mist Eliminator and TOC is provided. Not provided for any other equipment, valves etc. It is not recommended to operate turbine unit while MOP, JOP, LO Filter, JO Filter, Oil Mist Eliminator, TOC are in maintenance.	2X100% oil tank mounted centrifugal pumps is acceptable. Other standby and redundancy requirements shall be as per tender specification.
335	Vol-III	Part A/Section-2	14	2.11.05 (i)	OIL PUMPS One (1) main oil pump driven by the turbine shaft to cater lube oil for bearings and emergency seal oil requirement, when the turbine is running at normal speed.	It is clarified that 2x100% AC Motor driven Main Oil Pump & One DC EOP shall be used to supply lube oil to bearings under all mode of operation, start up & shut down as per collaborator's standard practice. Shaft driven MOP is not envisaged.	2X100% oil tank mounted centrifugal pumps is acceptable. Other standby and redundancy requirements shall be as per tender specification.
336	Vol-III	Part A/Section-2	15	2.11.06 (i)	<u>Oil Piping & Fittings:</u> For the entire lubricating oil inlet piping to the bearings, stainless steel piping (SS 316 seamless) shall be used from lube oil cooler outlet.	For Lube Oil Supply lines, SS piping as per ASTM A312 TP321 shall be offered, which shall be seamless upto & including NPS 8". For >8" size, welded pipes may be offered.	For >8" size, welded pipes can be accepted only for return line. MoC - SS piping as per ASTM A312 TP321 is acceptable
337	Vol-III	Part A/Section-2	15	2.11.06 (ii)	<u>Oil Piping & Fittings:</u> All welded joints must be controlled 100% by means of radiography or by PAUT.	Welded joints shall be subjected to 10% RT for SS pipes. For Jacking Oil lines, 100% RT shall be performed for >DN 20 lines.	Bid specification prevails
338	Vol-III	Part A/Section-2	15	2.11.06 (iv)	Oil Piping & fittings: The return oil piping from bearings shall be provided with illuminated sight fittings and shall seamless carbon steel piping (A 106 Gr. B).	Bhel shall provide "Glass Type View Port Threaded cap fitting" design in the return oil pipe as per standard & proven practice of BHEL.	Noted.
339	Vol-III	Part A/Section-2	15	2.11.07 (iv)	Tank shall be provided with removable stainless steel basket strainers and at least two oil level indicators.	1 No. removable basket strainer with material same as Main Oil Tank i.e. Carbon Steel, shall be provided as per standard and proven practice of BHEL. Oil level indicator shall be provided in Main Oil Tank and same is visible on oil module operating floor.	Removable stainless steel basket strainers shall be provided. Oil level indicator shall be provided in Main Oil Tank and same shall be visible on oil module operating floor.
340	Vol-III	Part A/Section-2	15	2.11.07 (v)	Main Oil Tank : High and low level transmitter to be connected to the supervisory control panel annunciation system and overflow type sight flow indicator with symphonic arrester device shall be provided.	Only TG vibration parameters are connected to TSI panel. No other measurements are connected to TSI panel. Instead of supervisory control panel annunciation, system level transmitter annunciation will be provided in DCS and will be on HMI. Sight glass shall be provided for level indications as per BHEL proven practice.	Noted
341	Vol-III	Part A/Section-2	15	2.11.07 (vii)	<u>Main Oil Tank:</u> The drainage system shall be fool proof against any mal-operation so as not to allow inadvertent oil drainage under any condition. Drain point shall be located at the geometric centre of the tank with necessary slope.	Drain point of tank is provided at suitable location at bottom most point based on experience of Oil Module supplier. This is our standard and proven practice.	Noted
342	Vol-III	Part A/Section-2	16	2.11.07 (ix)	<u>Main Oil Tank:</u> All oil vapour vents shall be provided with oil strainer/oil trap arrangements to prevent oil carry over to the atmosphere.	All oil vapor vents are routed to a common header which is connected to suction side of oil mist eliminator, which is used to trap oil from oil vapor and rest of the air is sent to atmosphere. .	Noted
343	Vol-III	Part A/Section-2	16	2.11.07 (xii)	<u>Main Oil Tank:</u> It should also provide adequate residence time for the oil to release the vapours. Apart from baffles, there should be no other equipment located within the tank.	Pumps, heaters and internal piping, tank stiffeners etc necessary for operation are present inside tank as per standard and proven practice of BHEL.	Noted
344	Vol-III	Part A/Section-2	16	2.11.07 (xiii)	<u>Main Oil Tank:</u> Adequate number of bolted covers shall be provided on top surface of the tank for access to each compartment for cleaning purposes and necessary access rungs shall be provided to permit safe and easy access for this purpose.	Ladder is provided in rising chamber of oil tank. It is not provided in clean chamber, the entry to which is via hole of basket strainer. Since the hole is common for basket strainer and entry into clean chamber, it is not provided by a ladder/rung.	Noted
345	Vol-III	Part A/Section-2	16	2.11.07 (xiv)	<u>Main Oil Tank:</u> The tank shall also be provided with feature like overflow sight glasses etc. to ensure a minimum oil level is maintained in the main oil tank.	Sight glass on tank wall shall be provided to view oil levels. However, the purpose of sight glass is not to ensure minimum oil level. It is ensure visibility of oil.	Noted

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346	Vol-III	Part A/Section-2	16	2.11.07 (xviii)	<u>Main Oil Tank:</u> Switches shall be provided for initiating low level alarms. The switches shall be of the type, which is completely sealed at the mounting point, such that leakage of oil through the switch is not possible.	BHEL shall provide 3 Nos level transmitters for generating the alarm and trip signals. Level swithces are neither envisaged nor required.	Noted. Bidder shall submit the scheme along with their offer for review by MAHAGENCO/STEAG.
347	Vol-III	Part A/Section-2	17	2.11.07 (xxii)	<u>Main Oil Tank:</u> The lubricating oil pressure shall be sensed after each final filter, for the purpose of cutting in and cutting out the standby and emergency pumps.....	There is one duplex lube oil filter provided instead of each final filter. Pressure measurement at the discharge of each pumps shall be provided for the purpose of cutting in and cutting out the standby and emergency pumps.	To be discussed during DDE
348	Vol-III	Part A/Section-2	17	2.11.07 (xxiii)	<u>Main Oil Tank:</u> The lubricating oil filters shall be positioned as close as possible to the feed points of the machine.	Lube Oil Filter is placed on top of Main Oil Tank as per standard and proven practice of BHEL.	To be discussed during DDE
349	Vol-III	Part A/Section-2	18	2.11.10	Polishing Filter	A polishing filter is not envisaged in lube oil system as per standard and proven practice of BHEL. Instead, Duplex Lube Oil Filter, basket strainer in oil tank and Oil Purifier is envisaged.	Polishing filter shall be part of oil purifier.
350	Vol-III	Part A/Section-2	18	2.11.10 i)	Polishing Filter The polishing filter shall be capable of filtering moisture and particle above 2 micron.	There shall be a polishing filter at the outlet of purifier which provide the particle purity at the outlet of polishing filter 15/12 as per ISO4406.	To be discussed during DDE
351	Vol-III	Part A/Section-2	20	2.12.19	The drainage from the turbine cylinders, steam chests, loop pipes shall be controlled by one motorised isolating valve and one manual isolation valve mounted in series.	One manual isolation valve in series to Motorized angle drain valve shall be provided as BHEL standard practive. Mototorized angle drain valve also act as isolation valve between drain header and turbine cylinders/pipes.	Noted
352	Vol-III	Part A/Section-2	22	2.13.06 (iii) 2.15.05	GOVERNOR PERFORMANCE CHARACTERISTICS: Adjustable steady state speed regulation shall be provided between +2% to +7% of rated speed. The speed droop or speed regulation shall be adjustable within 2.5% to 7%.	The droop will be adjusted during commissioning (normal value 5%) and cannot be changed by operators during normal operation.	Bid specification prevails
353	Vol-III	Part A/Section-2	22	2.14.01	The steam turbine shall be equipped with independent safety devices in the form of emergency over-speed governor(s)	It is clarified that Electronic governing system with high pressure valve actuation and with 100% hot back up is envisaged as per the proven practice. Hydraulic Speed governor is replaced with electronic system.	Noted
354	Vol-III	Part A/Section-2	22	2.14.05	The emergency over speed governor shall be provided with means for testing its operation when the machine is on load without exceeding rated speed of the unit. A duplicate governing system shall be provided so that the emergency valve remains active during the test.	It is clarified that Electronic governing system with high pressure valve actuation and with 100% hot back up is envisaged as per the proven practice. Hydraulic Speed governor is replaced with electronic system.	Noted
355	Vol-III	Part A/Section-2	22	2.15.05	<i>Load Limiter & Speed Changer .</i> Remote position indicator shall be provided for indication of the setting of the load limit on the turbine generator in control room.	It may be noted that electronic based high pressure governing system is provided for Turbine Governing. Accordingly these measurements are not applicable . xi) Load limiter position xii) Speed Changer Position	Digital electrohydraulic(DEHC) shall be provided.

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356	Vol-III	Part A/Section-2	23	2.16.03	Essentially the protection system shall include but not limited to the following: ii) Mechanical Overspeed Trip iii) Manual trip lever (lockable) on turbine front pedestal ix) Relative vibration high trip (sensors as applicable) xix) Top and bottom casing differential temperature protection xxi) Top and bottom turbine casing differential expansion protection xviii) Turbine shaft vibration protection (RJB & DJB vibration of HP, IP & LP turbines) xxiii) DCS trip, Rotor Stress Evaluator (RSE) trip xxiv) DEHC - RSE hardware serious malfunctioning	Protection system, Monitoring & Alarms shall be as per Collaborator standard proven practice. All protection mentioned may not be applicable	Protection system, Monitoring & Alarms for the following shall be as below- ii) Mechanical Overspeed Trip - Not applicable iii) Manual trip lever (lockable) on turbine front pedestal - Not applicable ix) Relative vibration high trip (sensors as applicable) - Required xix) Top and bottom casing differential temperature protection - As per OEM proven practice xxi) Top and bottom turbine casing differential expansion protection - As per OEM proven practice xviii) Turbine shaft vibration protection (Vibration of HP, IP & LP turbines) - Relative shaft vibration shall be applicable xxiii) DCS trip, Rotor Stress Evaluator (RSE) trip - TSE shall be inbuilt in DEHG xxiv) DEHC - RSE hardware serious malfunctioning - Not applicable
357	Vol-III	Part A/Section-2	24	2.17.01 (iii)	Initial Pressure Regulator: Contact to be provided for signaling the device in, "Operation" and "Reset".	Contacts are not applicable since the Initial Pressure limiter is a software function and is part of Turbine Controller.	Noted
358	Vol-III	Part A/Section-2	24	2.19.02	The turbine exhausts shall be suitable for connecting to the condenser through dog bone type stainless steel expansion joint.	The turbine exhausts shall be connected to the condenser through rigid weld joints.	Bidder informed that no expansion joint and no spring support is being provided. Bidder to ensure that expansion and misalignment between turbine exhaust and condenser is taken care in their design. Bidder to submit supporting documents to prove his design during DDE.
359	Vol-III	Part A/Section-2	24	2.18.01 & 2.18.04	The steam turbine extraction steam lines to the regenerative feed water heating system shall be provided with pneumatically /hydraulically operated quick closing non-return valves along with motor operated gate valves. One pneumatically/hydraulically operated quick closing non return valve shall be provided in each of the extraction steam lines in series with flap type non-return valve on the closed feed water heaters. The extraction steam line to the deaerator shall be provided with two pneumatically/hydraulically operated non-return valves in series. Differential pressure across the two pneumatically/ hydraulic operated non-return valves shall be monitored for protection purpose.	It is clarified that: 1. One no. power supported (Pneumatic) QCNRV and one no. ordinary NRV for each Steam extraction line (except for extractions from LP Turbine). 2. For each CRH line and extractions from LP Turbine (except for heaters in condenser neck) one power operated QCNRV (Pneumatic) shall be provided. 3. For extraction line to deaerator both the NRVs shall be power supported type (Pneumatic). Differential pressure across the two pneumatically/ hydraulic operated non-return valves are not required and not provided as we have already provided the adequate size drains in the upstream & downstream piping of the Extraction NRV of all systems to remove any unwanted condensate from piping system during start-up and shutdown of the power plant. This is inline with our standard design practice in all supercritical projects.	The arrangement and quantity of QCNRVs, as described by the Bidder herein, is acceptable. However, the same shall be validated by the Bidder through submission of entarined enegy calculation and integrated IP steam extraction P&ID, during basic engineering stage. Differential pressure across the two pneumatically/ hydraulic operated non-return valves may not be required provided, adequate size drains are provided in the upstream & downstream piping of the Extraction NRV.
360	Vol-III	Part A/Section-2	25 25	2.20.01 2.20.02	Pressure Relief Diaphragms: The exhaust hood shall be equipped with pressure relief self closing type disc of sufficient area to pass the MCR condenser flow. These pressure relief self closing type disc shall open if the exhaust hood pressure reaches a predetermined value and closes by its self weight.	Pressure Relief Diaphragms: The exhaust hood shall be equipped with Atmospheric Relief Diaphragm (bursting type rupture disc) in order to protect the turbine against excessive pressure and is sized for flow as per collaborator practice based on VGB guide line. Rapture disc shall burst to excessive pressure & to be replaced subsequently.	Noted
361	Vol-III	Part A/Section-2	25	2.21.01	BHEL shall provide D.C operated device for rapid reduction of vacuum in condenser for turbine rotor to be brought to rest as quickly as possible. It shall be provided with silencer.	Operation of Vacuum Breaker Valve is very rare and for a very short time i.e. during tripping of TG unit. Hence silencer is not envisaged.	Noted

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362	Vol-III	Part A/Section-2	25	2.21.02	Vacuum breaker valves shall be capable of being operated locally and also remotely from the control room.	Local operation of Vacuum breaker valves are not envisaged for safety reasons as per Collaborator guideline. It shall only be operated remotely from the control room.	Noted
363	Vol-III	Part A/Section-2	25	2.22.02	The steam turbine supervisory equipment shall include detection and recording of, but not be limited to the following: i) Bearing & Shaft vibration ii) Shaft eccentricity iii) Differential expansion iv) Axial shift v) Overall expansion vi) Vibrations in the bearing pedestals vii) Steam turbine speed viii) Load ix) Emergency stop and governing valve positions x) Interceptor stop and governing valve positions xi) Load limiter position xii) Speed Changer Position xiii) Inlet steam temperatures and pressures xiv) Metal temperature xv) Cylinder/flange metal temperatures, top and bottom casing temperatures including differentials xvi) Bearing metal temperatures xvii) Body metal temperatures of main and reheat steam stop and control valves. xviii) Oil drain temperature. xix) Turbine stress evaluator capable of maintaining the thermal stresses within allowable limits and suitable integrated in to plant DCS.	The steam turbine supervisory equipment shall as per Collaborator guideline. It may be noted that electronic based high pressure governing system is provided for Turbine Governing. Accordingly these measurements are not applicable . xi) Load limiter position xii) Speed Changer Position	Pls refer clarification at serial number: 135 (C&I Clarifications). B) Shall be part of DEHG. TSI system shall include vibration parameter. Other paramter shall be part of TG control system.
364	Vol-III	Part A/Section-2	26	2.22.05	<i>The shaft-vibration detector.</i> On line condition monitoring of the systems for the turbine shall also be provided.	Relative shaft vibration measurement as a part of TSI system/online condition monitoring system.	Noted.
365	Vol-III	Part A/Section-2	26	2.22.06	Suitable twin element thermocouples for measurement of temperature of steam in emergency stop valve(s), interceptor valve(s) High pressure Casing (HPC) after Curtis wheel, HPC exhaust bowl, intermediate pressure casing (IPC), inlet bowl, etc., shall be provided. Twin element thermocouples shall also be provided for the measurement of metal temperature of ESV bodies, interceptor valve bodies, IPT steam admission pipes, HPC (upper and lower), HP inner third stage and 2/3 of blading steam path (RSE) metal / steam, IPC (upper and lower), IP bowl (RSE) metal/steam, metal of bearings of turbine etc. Two resistance thermometers each for measurement of temperature of steam in LPC exhaust and of the temperature of drain oil from the bearings of turbine, generator etc. shall be provided	Suitable Twin element thermocouples for measurement of temperature of steam are provided for all mentioned steam turbine components except for HP inner third stage . This is as per BHEL standard practice.	Noted
366	Vol-III	Part A/Section-2	26	2.24.02	Automatic Turbine Testing System (ATTS). It shall cover the following safety devices: i) Trip solenoid valves ii) Over-speed trip. iii) Loss of Vacuum trip. iv) Thrust bearing failure trip (from software) v) ~~Low lube oil pressure trip.~~	ATT is carried out for Main Stop & Control Valves, Overload Valve, HP Dump Valve and CRH NRV as per Collaborator's guideline.	Noted
367	Vol-III	Part A/Section-2	27	2.24.04	A local gauge board housing the indicating instruments shall also be provided.	A local gauge board housing the indicating instruments is not envisaged.	Bid Specification Prevails
368	Vol-III	Part A/Section-2	28	3.15.00	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems.	Redundancy of equipment shall be as per standard practice.	Bid specification prevails
369	Volume-III	Part A/Section- 2	30 of 109	4.06.00	... Adequate arrangement and space shall be provided at the rear of the condenser to facilitate the removal of condenser tubes. ...	Space shall be provided for condenser (A-Row side) to facilitate the removal of condenser tubes based on plant layout and available space. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	Noted

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370	Volume-III	Part A/Section- 2	30 of 109	4.07.00	To prevent tube erosion at the points of admissions of drains and vents from equipment/piping system alloy steel plate baffles or alloy steel perforated distribution headers shall be provided.	Extra thickness tubes shall be provided at the top rows of the condenser tube layout to prevent damage to tubes. This is BHEL standard practice for all condenser supplied till date for all previous executed projects of MPPGCL and other customers.	Bid Specification Prevails
371	Volume-III	Part A/Section- 2	31 of 109	4.22.00	At all points where steam and water enters the condenser shell, baffles of SS316 shall be provided to prevent direct impingement on the tubes.		
372	Volume-III	Part A/Section- 2	80 of 109	21.03.31/(xi)	Dummy tubes/ Rods: SS 316		
373	Volume-III	Part A/Section- 2	30 of 109	4.11.00	The water box test pressure shall be at least 1.5 times the design pressure.	Water Box Test pressure shall be 1.3 times the design pressure. This is in line of ASME Sec. VIII, Div.1	Noted
374	Volume-III	Part A/Section- 2	31 of 109	4.19.00	The condenser shell shall be provided with baffles as necessary to ensure proper distribution of steam over the whole of the tube nest with minimum shock load and to eliminate all areas of excessive steam velocity.	The proper distribution of steam shall be achieved through designed Tube layout. This allows uniform steam distribution around the tubes with minimal steam pressure loss, eliminating areas of excessive steam velocity. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities incl. MPPGCL & NTPC.	Shall be as per Bidder's proven practice.
375	Volume-III	Part A/Section- 2	32 of 109	4.26.00	The tubes shall be of stainless steel as per ASTM-A249-TP316 Seamless and meeting the ASME specification	Tubes shall be welded stainless steel without circumferential joint conforming to ASTM-A249 Gr. TP316(Welded). SA249 Grade TP316 (welded) is suitable for intended purpose	Bid Specification Prevails
376	Volume-III	Part A/Section- 2	80 of 109	21.03.31/(v) & (vi)	Tubes in condensing section: Stainless steel tube SA 249 Gr. TP 316, Seamless Tubes in air cooling section: Stainless steel tube SA 249 Gr. TP 316, Seamless	Welded Tubes are annealed and weld joint is Eddy Current and Hydro Tested. Hence, Welded Tubes are in no way inferior to Seamless Tubes. Welded tubes have been used since last 25-30 years and no damage has been reported due to welding. Welded tubes are being used in all other 660 MW / 800 MW sets tubes BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	
377	Volume-III	Part A/Section- 2	32 of 109	4.26.00	 With tube size (OD) as 22.225mm or 25.4 mm and nominal wall thickness of 24 BWG (0.559 mm) for condensing zone and 22 BWG (0.711 mm)	Tube size (OD) shall be minimum 22.225 mm and min. 22 BWG thick. The size of the tube will be finalized as per optimized condenser flow and pressure drop/aux. power requirement. The tubes for condensing zone & air cooling zone shall have same wall thickness of 22 BWG (0.711mm). Higher thickness tubes of 20 BWG (0.899mm) shall be provided for Top two rows of tube layout for protection against direct impingement of steam from turbine exhaust and other vents drains. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	Noted
378	Volume-III	Part A/Section- 2	79 of 109	21.03.20	Tube gauge in condensing zone: 24 BWG		
379	Volume-III	Part A/Section- 2	32 of 109	4.28.00	... Tube plate shall be of carbon steel as per ASTM A285 Gr. C. ..	Tube plate material shall also be in line with support plate and water box material i.e. IS 2062 E250 Gr BR. Physical properties of offered grade is at par with grade specified. Please confirm.	Noted
380	Volume-III	Part A/Section- 2	80 of 109	21.03.31/(iv)	Tube sheets : Carbon steel ASTM A285 Gr. C	BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	
381	Volume-III	Part A/Section- 2	33 of 109	4.30.00	The water boxes shall be hinge supported from condenser shell by a flange connection...	Hinged type water boxes shall be provided. Water box handling arrangement supported on water boxes shell shall be provided for better access to tubes in case of tube replacement. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	Noted
382	Volume-III	Part A/Section- 2	33 of 109	4.30.00	...inner surfaces of water boxes and the partition plates shall be painted with fiber reinforced epoxy painting after the surface is cleaned and degreased.	Water box interiors shall be painted with two coats of corrosion resistant primer and coated with coal tar epoxy paint. This is as per requirement. (Cl. 4.31.00)	Bid Specification Prevails
383	Volume-III	Part A/Section- 2	33 of 109	4.31.00	Tube plate on water side may alternatively be provided with suitable cladding as per standard practice of OEM.	Tube plate on water side shall be painted coated with coal tar epoxy paint. This is as per OEM standard practice. And also in line with Cl. 4.31.00 of Volume-II, Part-A, Sec.- 2, Rev. 0 (Page: 34 of 112)	Considering Cooling water quality i.e. 'Trated Sewage Water', Fiber reinforced epoxy painting shall be applied for inner srfaces of water boxes, Tube plates and Partition plates. Alternatively PU coating @ 750 microns is also acceptable. Refer Addendum for PU Specs
384	Volume-III	Part A/Section- 2	79 of 109	21.03.26	Tube sheet painting on CW side : Suitable cladding as per standard practice of OEM.	BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities	

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385	Volume-III	Part A/Section- 2	34 of 109	6.06.00	Gearbox is to be avoided, for vacuum pump.	Vacuum Pump Packages are provided with or without Gear Box as per the OEM design. BHEL has been following same practice in all its earlier executed projects. No adverse feedback ever received from any plant on account of gear box. Hence, Gear box shall be provided with vacuum pump (if applicable).	Bid Specification Prevails
386	Volume-III	Part A/Section- 2	34 of 109	6.08.00	 discharge muffler (silencer), all valves, instrumentation and controls, as specified...	Discharge muffler (silencer) at separator discharge is not required as the noise level from vacuum pump package is within the permissible noise levels as specified in the specification. This is BHEL/ OEM's standard practice for all Vacuum pump package supplied till date for all previous executed projects of MPPGCL and other customers.	Noted
387	Volume-III	Part A/Section- 2	34 of 109	6.10.00	 The U-tube heat exchanger(s) shall be of removable tube bundle type. All heat exchangers shall use bolted channel covers.	BHEL will provide PHE type heat exchanger for vacuum pump package. Heat transfer Plates shall be of SS316.	Noted
388	Volume-III	Part A/Section- 2	82 of 109	21.04.10 (iii)	Heat Exchangers (for Vacuum Pump):	BHEL has been using above specified in its 660 MW/ 700 MW/ 800 MW sets supplied to MPPGCL, NTPC and other utilities	
389	Volume-III	Part A/Section- 2	47 of 109	9.18.05	All feed water heaters shall be provided with steam relief valves on the shell side and sentinel relief valves on the tube side. ...	LPH-1 & 2 shall be installed in Condenser neck, also NRV is not provided in the extraction line, therefore Shell side relief valve will never operate. Hence shell side relief valve is not applicable for LPHs installed in condenser neck.	Noted
390	Volume-III	Part A/Section- 2	47 of 109	9.18.07	The shell shall be of the longitudinally welded or seamless type and of the two seamless shell is preferred.	The shell shall be welded type in line with ASME guidelines with longitudinal & circumferential weld joints. Please confirm.	Noted
391	Volume-III	Part A/Section- 2	47 of 109	9.18.13	For LP Heaters SS 304L and for HP heaters SS 304N stainless steel shall be considered.	Tubes for LPH-1 & 2 shall conform to ASTM-A-688 TP304 (Welded). SA688 Grade TP304 (Welded) is suitable for intended purpose. Please confirm. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities	Bidder to comply with the specification clause 21.06.14, iii) of Vol-III, Part-A, Section-2
392	Volume-III	Part A/Section- 2	87 of 109	21.06.14/(iii)	Tubes: LP Heaters: SS tube SA 249 TP 304 Seamless		
393	Vol-III	Part A/Section-2	63	16.03.00	The insulated portion of the steam turbines shall be covered with fabricated steel cover, provided with suitable anti-drumming and sound pressure attenuating material inside. The insulation and steel covering should be so designed and erected as to provide easy accessibility to parts requiring frequent inspection.	All parts of steam turbine are not covered with steel cover due to its contour. Wherever possible, aluminium cladding shall be provided as per standard practice. Steel covering / enclosure is not envisaged.	Noted, provided bidder to cater noise level criteria.
394	Volume-III	Part A/Section- 2	71 of 109	21.01.03/(v)	Temperature rise across condenser limited to : Bidder to optimize	As per clause 4.37.20/(ii) of Volume-II, Sec.-2 (Page 66 of 242), Condenser outlet temperature may be maintained within 42 °C (with 33 °C CW inlet temp.). Bidder understand temperature rise to be limited to 9°C across condenser. Please confirm.	Temperature rise across the condenser shall not be less than 10 °C
395	Vol-III	Part A/Section-2	72	21.02.01 (i) c.	Sliding pressure between 35% TGMCR to 90% TGMCR.	It is proposed that Sliding Pressure Operation from rated pressure down to 40% of rated pressure as per CEA guidelines.	Bid Specification Prevails
396	Vol-III	Part A/Section-2	72	21.02.01 (i) e	Extended low load (~35% TMCR) for 8~10 hours in total two phases during renewable energy integration.	Low load operation shall be limited to 40% TMCR as per CEA guidelines.	Bid Specification Prevails
397	Vol-III	Part C/Section-2	74	3.20.03	Turbine Governing System: The speed/load changer provided shall be capable of adjusting the speed of the turbo set to any value in the range of 94% to 106% of rated speed for manual /auto synchronization of the generator with the bus.	The Steam Turbine Controller provides an adjustment range from 95% to 103%. Turbine speeder gear function is realized in the electronic governing system.	Noted.
398	Vol-III	Part A/Section-2	76	21.02.02 (iv)	Overall pressure drop between HP turbine exhaust and IP turbine strainer inlet: 7.5% (maximum) : however Bidder to optimize and indicate	BHEL will optimize the RH Pressure drop as per overall optimization hence max limit to be removed.	Bid specification prevails
399	Volume-III	Part A/Section- 2	78 of 109	21.03.10	Number of Passes : Two	Condenser shall be single/double pass. Same as per cl. 21.03.00 of Volume-II, Part-A, Sec.- 2, Page 81 of 112.	Noted

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400	Volume-III	Part A/Section- 2	78 of 109	21.03.12	Design margin on heat load at TG VWO, 0% MU and design CWT : 5%	Design condition is different from mentioned VWO having 105% MCR flow, 1%MU and design CWT. 5% tube plugging margin has already considered vide different Clauses of technical specification. No additional margin on heat load is required. This is as per standard practice. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	Condenser design heat load shall be at VWO condition with 1% make up. 5% tube plugging margin shall be considered in condenser design.
401	Vol-III	Part A/Section-2	79	21.03.27 (ii)	Steam throw off devices for HP-LP bypass system	Dump tube instead of steam throw off device is envisaged for LP Bypass system.	Noted, as per bidder's proven practice
402	Vol-III Vol-II	Part A/Section-2	79 20	21.03.27 (ii) 2.13.02 (b)-13	HP / LP bypass exhaust: Steam throw-off device / baffles (as required) Steam throw off devices for HP-LP bypass system	Dump tube instead of steam throw off device is envisaged for LP Bypass system.	Noted
403	Volume-III	Part A/Section- 2	80 of 109	21.03.30	Corrosion allowance on ferrous parts : 3.2mm	Corrosion allowance of minimum 3.2mm shall be taken for condenser assemblies e.g. Water boxes, tube plate which are in CW contact. For condenser assemblies in steam side such as Shell, Hot well & Condenser neck, corrosion allowance of 1.6mm shall be taken. This is in line with current industry practice. BHEL has been using above specified in all the 660 MW/ 700 MW/ 800 MW sets supplied to various utilities.	Noted
404	Volume-III	Part A/Section- 2	81 of 109	21.04.01	Number required per STG unit: 2X100% capacity...	Shall be for per condenser shell.	Each condenser shell shall have 2x100% Vacuum pumps
405	Volume-III	Part A/Section- 2	81 of 109	21.04.05/(ii)	Capacity of pump during Hogging: Shall be able to maintain vacuum up to 0.35 kg/sq.cm(a) within 20 minutes with both the vacuum pumps in operation.	During hogging vacuum pumps shall be able to achieve 10" Hg (a) with in 30 mins with both vacuum pumps running. This is as per HEI and BHEL standard practice.	Bid Specification Prevails
406	Vol-III Vol-II	Part A/Section-2	84 238	21.05.11 2.14.03 (iv)	Acceptable noise level at all operating conditions: Not greater than 85 dBA at a distance of 1.5 m from the outline of equipment. Noise level shall not exceed 85 dBA at 1.5 m from equipment surface, except for the following: a) Turbine, generator and pulveriser – 90dBA	The radiated sound level of the turbine-generator train shall not exceed 90 dB(A) as per CEA guidelines as well as Clause 2.14.03 (iv) in Vol-II Sec-2 at page 216	Bid specification prevails
407	Volume-III	Part A/Section- 2	87 of 109	21.06.14/(iv)/(a)	Tube sheet: LP Heaters: CS SA 516 Gr. 70 or equivalent	Tube sheet material shall carbon steel as per ASTM A 516 Gr.70 or SA 350 LF-2 or SA-508 Gr. 3 CL-I.	Noted
408	Volume-III	Part A/Section- 2	88 of 109	21.06.16/(b)	One set of roller expanders for each tube dia. and gauge.	There is no special tools and tackles required for the LP heater-1 &2. Any tools if required can be purchased off the shelf. This is as per BHEL Standard practice.	Noted
409	Vol-III	Part A/Section-2	90	21.07.10	Terminal Temperature difference- HP heater: below 0.3 °C	TTD of HP heaters will be selected as per overall optimization, hence max value to be removed.	Bid specification prevails
410	Volume II	Section- 2	122 (126 of 242)	7.08.00	All materials, components and equipment supplied under the contract shall be subject to inspection by the owner, his authorised representative or any statutory authority like IBR inspector, should they so require during manufacture, construction, erection and after completion.	Inspection shall be as per mutually agreed Quality plan only.	As per mutually agreed Quality Assurance Program
411	Volume II	Section- 2	122 (126 of 242)	7.09.00	No materials/equipment shall be dispatched from the manufacturer's works before the same is either accepted subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by the owner/owner's authorized representatives, or such pre-dispatch final inspection is waived by the Owner and dispatch is authorized after review of test reports.	For agreed QP items, MDCC shall be got issued based on inspection & documentation as per approved QP. For non QP items, MDCC shall be got issued based on BHEL COC.	Bid Specification Prevails
412	Volume II	Section- 2	122 (126 of 242)	7.10.00	All materials used or supplied shall be accompanied by valid and approved material certificates and test and inspection reports and dispatch clearance duly approved by the Owner.	Documentation shall be as per mutually agreed Quality plan only.	As per mutually agreed Quality Assurance Program

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413	Volume II	Section- 2	122 (126 of 242)	7.12.00	All the sub-vendors proposed by the bidder for procurement of major bought out items including castings, forgings, pumps, heat exchangers, semi finished and finished components/equipment - (list of which shall be drawn up by the bidder and finalized with the owner) shall be subject to owner's approval.	All materials shall be procured from BHEL accepted sources as per BHEL control system. No owner approval shall be envisaged.	Bid Specification Prevails
414	Volume II	Section- 2	122 (126 of 242)	7.13.00	Welding procedures shall be submitted to the Owner for approval prior to carrying out qualification test in the presence of Owner's representative.	BHEL being an ISO 9001 certified company has well established systems & procedures, hence approval by the owner is not envisaged. Test results of qualification tests and specimen testing can be shown to inspecting authority during inspection.	Bid Specification Prevails Can be further finalised during execution
415	Volume II	Section- 2	122 (126 of 242)	7.15.00	Test results of qualification tests and specimen testing shall be furnished to the Owner/owner's authorized representative for approval.		
416	Volume II	Section- 2	123 (127 of 242)	7.17.00	The type and extent of inspection of items shall be in accordance with the relevant International/Indian Standards/Indian Boiler Regulations and other standards approved by the owner/owner's representative, supplemented or amended by the requirements of this section of the specification or as specified elsewhere in the Specification.	BHEL standards are intellectual property, which are based on our collaborator standards and hence, cannot be submitted to owner for approval. However, same can be shown at the time of inspection at BHEL/vendor works.	Bid Specification Prevails
417	Volume II	Section- 2	123 (127 of 242)	7.18.00	Wherever owner's/owner's representative's (inspector) witness is required as per approved quality plans or inspection categorisation plans, the owner and owner's representative shall be notified (inspection call) along with all required details including details of item to be inspected, approved MQPs, address/place of inspection, inspection date etc, at least 21 days in advance, prior to the planned inspection date at manufacturer's works. All test reports and supporting documents shall be made available to owner's inspector at the time of inspection; irrespective of whether it has been furnished earlier.	Inspection call shall be provided 07 days in advance.	Bid Specification Prevails
418	Volume II	Section- 2	123 (127 of 242)	7.20.00	The owner/owner's representative, within fifteen days from the date of receipt of such notice/inspection call, shall intimate the bidder, the probable date of visit for the inspection. All efforts shall be taken by the owner to ensure that such date shall not be later than eight days from the date of inspection as intimated by the bidder.		
419	VOLUME-V	ANNEXURE - 3		2.02.00/2.2	Set of all internals required to complete one servo motor assembly excluding body	Internals of ESV servomotor cannot be offered. In lieu of internals, Complete sevomotor assembly (EHA) can be offered. MAHAGENCO to accept.	Bid Specification Prevails
420	VOLUME-V	ANNEXURE - 3		2.02.00/2.3	Set of all internals required to complete one test valve servomotor assembly excluding body	Test Valve is not applicable. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
421	VOLUME-V	ANNEXURE - 3		2.02.00/3.2	Set of all internals required to complete one servo motor assembly excluding body	Internals of HPCV servomotor cannot be offered. In lieu of internals, Complete sevomotor assembly (EHA) can be offered. MAHAGENCO to accept.	Bid Specification Prevails
422	VOLUME-V	ANNEXURE - 3		2.02.00/3.3	Set of all internals required to complete one pilot valve assembly except body	Internals of pilot valve cannot be offered. In lieu of internals, complete servo valve can be offered. MAHAGENCO to accept.	Bid Specification Prevails
423	VOLUME-V	ANNEXURE - 3		2.02.00/4.2	Set of all internals required to complete one servomotor assembly excluding body	Internals of IPSV servomotor cannot be offered. In lieu of internals, Complete sevomotor assembly (EHA) can be offered. MAHAGENCO to accept.	Bid Specification Prevails
424	VOLUME-V	ANNEXURE - 3		2.02.00/4.3	Set of all internals required to complete one test valve assembly except valve body	Test Valve is not applicable. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
425	VOLUME-V	ANNEXURE - 3		2.02.00/5.2	Set of all internals required to complete one servo motor assembly except body	Internals of IPCV servomotor cannot be offered. In lieu of internals, Complete sevomotor assembly (EHA) can be offered. MAHAGENCO to accept.	Bid Specification Prevails
426	VOLUME-V	ANNEXURE - 3		2.02.00/5.3	Set of all internals required to complete one pilot valve assembly except body	Internals of pilot valve cannot be offered. In lieu of internals, complete servo valve can be offered. MAHAGENCO to accept.	Bid Specification Prevails
427	VOLUME-V	ANNEXURE - 3		2.02.00/7.1	Gear internal with shafts, bearing, bushes, lock washers oil seals, 'O' rings	Loose items cannot be offered. In lieu of this, complete Hydraulic turning	

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428	VOLUME-V	ANNEXURE - 3		2.02.00/7.2	25% nozzle segments and moving blades and complete set of sealing strips with caulking material (if hydraulically operated)	gear can be offered against cluase no. 2.02.00/7.1 & 7.2. MAHAGENCO to accept.	Bid Specification Prevails
429	VOLUME-V	ANNEXURE - 3		2.02.00/8.1	Hydraulic speed governor (complete set of internals required to form one speed governor assembly except for outer casing)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
430	VOLUME-V	ANNEXURE - 3		2.02.00/8.2	Electro hydraulic converter for governing system (complete set of internals required to form one convertor assembly except for outer casing)	Electro-hydraulic convertor (EHC) is Not Applicable due to high pressure Governing system. Equivalent item "Servo Valve" of HP/IP/Overload Control Valves Actuator (one no. each) shall be offered. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
431	VOLUME-V	ANNEXURE - 3		2.02.00/8.3	Follow up pistons for governing system (complete replacement in governing system of one turbine)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
432	VOLUME-V	ANNEXURE - 3		2.02.00/8.4	Hydraulic amplifier for governing system (complete set of internals required to form one hydraulic amplifier assembly except for outer casing)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
433	VOLUME-V	ANNEXURE - 3		2.02.00/8.5	Over speed trip testing device (complete set of internals required to form one device assembly except outer body)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
434	VOLUME-V	ANNEXURE - 3		2.02.00/8.6	Main trip valve assembly	Main trip valve assembly is Not applicable. Equivalent item "trip solenoid valve" complete assembly (1 no.) can be offered. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
435	VOLUME-V	ANNEXURE - 3		2.02.00/8.7	Release valve for main trip valve	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
436	VOLUME-V	ANNEXURE - 3		2.02.00/8.9	Emergency governor	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
437	VOLUME-V	ANNEXURE - 3		2.02.00/8.10	Gear for loading device (complete set consisting of gear for loading device and its motor and all other fixing / assembly materials except housing	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
438	VOLUME-V	ANNEXURE - 3		2.02.00/8.11	Gear for start-up device (complete set consisting of bushes, spring motor and all other fixing/assembly materials except housing)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
439	VOLUME-V	ANNEXURE - 3		2.02.00/9.1	Shaft driven main oil pump (complete set consisting of impeller, shaft, key, impeller nut, wear rings, journal bearings thrust bearing, coupling, shaft sleeves, oil seals,' O' rings as required for one pump)	Shaft driven main oil pump is Not Applicable. In lieu of this, Motor Driven Pump (without motor) can be offered. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
440	VOLUME-V	ANNEXURE - 3		2.02.00/10.2	Control fluid vapour exhauster with motor	Control fluid vapour exhauster is not applicable. In lieu of this, Air breather assembly can be offered. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
441	VOLUME-V	ANNEXURE - 3		2.02.00/10.4	Duplex oil filters/ strainers (complete set consisting of cartridges, gaskets, 'O' rings except housing)	Duplex oil filters/ strainers not applicable. In lieu of this,Filter elements along with seal set for HPSU of Turbine valves shall be offered. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
442	VOLUME-V	ANNEXURE - 3		2.02.00/10.5.1	Bearings including motor bearings	Loose bearings of control fluid purification pumps cannot be offered as per vendor's standard practice. MAHAGENCO to accept.	Bid specification prevails, however this may be discussed during detail engineering
443	VOLUME-V	ANNEXURE - 3		2.02.00/10.5.2	Bag filters	Bag filters & Cartridge filter for control fluid purifier are Not Applicable. Equivalent items (Molecular seive & Ion exchanger amberlist) of regeneration circuit can be offered against clause no. 2.02.00/10.5.2 & 10.5.3.	Items if not applicable as per OEM, can be omitted.
444	VOLUME-V	ANNEXURE - 3		2.02.00/10.5.3	Cartridge filters	MAHAGENCO to accept.	Equivalent/Alternative item shall be provided
445	VOLUME-V	ANNEXURE - 3		2.02.00/11.0	TURBINE THRUST BEARINGS TRIP DEVICE (complete set consisting of springs, bellow assembly, limit switch, pilot valve, gasket, latch spindle, pins, 'O' rings)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.

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446	VOLUME-V	ANNEXURE - 3		2.02.00/12.0	AUTOMATIC TURBINE TESTING CHANGEOVER VALVE (complete set of internals required to form one changeover valve assembly except for outer casing)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
447	VOLUME-V	ANNEXURE - 3		2.02.00/14.1.1	Complete set of internals required to form one valve assembly except for outer body	Not Applicable as single stem LPBP system has been envisaged. MAHAGENCO to record	Items if not applicable as per OEM, can be omitted.
448	VOLUME-V	ANNEXURE - 3		2.02.00/14.1.2	Complete set of internals required to form one servomotor assembly except for outer body	Not Applicable as single stem LPBP system has been envisaged. MAHAGENCO to record	Equivalent/Alternative item shall be provided
449	VOLUME-V	ANNEXURE - 3		2.02.00/14.2.2	Complete set of internals required to form one servomotor assembly except for outer body	Internals of LPBP CV servomotor (EHA) cannot be offered. In lieu of internals, complete EHA assembly can be offered. MAHAGENCO to accept.	Bid Specification Prevails
450	VOLUME-V	ANNEXURE - 3		2.02.00/14.2.3	Complete set of internals required to form one pilot valve	Internals of pilot valve cannot be offered. In lieu of internals, complete servo valve can be offered. MAHAGENCO to accept.	Bid Specification Prevails
451	VOLUME-V	ANNEXURE - 3		2.02.00/14.3.2	Complete set of internals required to form one pilot valve assembly except for outer body	Internals of pilot valve cannot be offered. In lieu of internals, complete servo valve can be offered. MAHAGENCO to accept.	Bid Specification Prevails
452	VOLUME-V	ANNEXURE - 3		2.02.00/22.0	STEAM DUMPING DEVICE - (complete set consisting of internals required to form one dumping device assembly except for outer body)	Not Applicable as per applicable design. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
453	VOLUME-V	ANNEXURE - 3		2.03.00/1.1	Low Pressure Piping	MAHAGENCO to inform the pressure range in bar categorizing low pressure piping.	Upto 15 Kg/cm2 shall be considered as Low pressure piping and 15kg/cm2 and above high pressure piping to be considered.
454	VOLUME-V	ANNEXURE - 3		2.03.00/1.2	Power Cycle Piping	MAHAGENCO to inform the pressure range in bar categorizing high pressure piping (power cycle piping).	All piping in Power cycle shall be considered under Power cycle piping.
455	GENERAL					If any mandatory spare is called at two or more clauses in the tender spec, Spare against only one clause (Max Qty) shall be supplied by the bidder."	Noted. If duplicated for the same equipment of same system, then it need not be provided
456	VOLUME-V	ANNEXURE - 3		-	Definition of Set.	Bidder assumes that One "Set" means one complete replacement for an equipment. MAHAGENCO to clarify.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of set, where clarity is required.
457	VOLUME-V	ANNEXURE - 3		-	Definition of percentage (%).	Quantity mentioned in percentage (%) is the % of total installed quantity. MAHAGENCO to clarify.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of %, where clarity is required.
458	VOLUME-V	ANNEXURE - 3		2.02.00/18.1	Shell Side Safety Relief Valve.:One (1)	LPH-1, 2 are installed in Condenser neck. There is no NRV is in the extraction line. Hence shell side relief valve is not applicable for LPH-1 & 2. MAHAGENCO to record.	Items if not applicable as per OEM, can be omitted.
459	VOLUME-V	ANNEXURE - 3		2.02.00/18.6	Tube Plugs: 10%.	MAHAGENCO to review the quantity of tube plugs specified in the mandatory spares list. The quantity exceeds the recommended qty. of 20 No. for each type/size for LPH mandatory spares. MAHAGENCO to accept.	Bid specification prevails
460	VOLUME-V	ANNEXURE - 3		2.02.00/23.6	Condenser Tubes : 10%	MAHAGENCO to review the quantity of condenser tubes specified in the mandatory spares list. The quantity exceeds the recommended 1% of installed quantity. MAHAGENCO to accept.	Bid specification prevails
461	VOLUME-V	ANNEXURE - 3		2.02.00/23.7	Tube Plugs: 10%	MAHAGENCO to review the quantity of tube plugs specified in the mandatory spares list. The quantity exceeds the recommended qty. of 100 No. for condenser tube plugs as mandatory spares. MAHAGENCO to accept.	Bid specification prevails

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462	VOLUME-V	ANNEXURE - 3		2.02.00/23.9	Nozzles for ejector of vacuum pump (set comprising of complete replacement for one vacuum pump): One (1) Set	Ejector is applicable for Single Stage Vacuum Pump. Ejector system is not part of two stage vacuum pump. Accordingly, Same shall be supplied in case of single stage vacuum pump. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted.
463	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever same items have been specified at more than one clauses, mandatory spares shall be included in the offer against the clause specifying the highest quantity only. MAHAGENCO to accept.	Noted
464	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever 1 set has been specified, it is understood that the quantity of item is total no. of that item installed in one no. of assembly/ equipment in the unit. e.g. Position transmitter HP Turbine Stop Valves = 1 set implies that in although there are two no. HPT Stop valves per unit but as in one stop valve assembly, 2 no. position transmitters are installed, then against requirement of 1 set/unit, 2 no. position transmitters as mandatory spares per unit are to be offered. MAHAGENCO to accept.	Refer clauses 13.09.00, Vol-II, Section-2 for definition of %, where clarity is required. In this case, 1 set means 1 identical assembly.
465	VOLUME-V	ANNEXURE - 3		NA	Mandatory Spares	Wherever Unit has not been specified, Unit is being considered as "Number". e.g. Cl. 3.00.00, 1.10.6 at Sheet 89 of 129 MAHAGENCO to accept/clarify.	Noted
466	VOLUME-V	ANNEXURE - 3		2.02.00/3.4	Set of mounting arrangement for position transmitter for one HP control valve (Complete set comprising of bellows, bushes couplers, pins, lock washers, position detector)	Position transmitter for HP Control Valve is being included in offer against this clause. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
467	VOLUME-V	ANNEXURE - 3		2.02.00/5.4	Set of mounting arrangement for position transmitter for one IP control valve (Complete set comprising of bellows, bushes couplers, pins, lock washers, position detector)	Position transmitter for IP Control Valve is being included in offer against this clause. MAHAGENCO to accept.	Items if not applicable as per OEM, can be omitted. Equivalent/Alternative item shall be provided
468	VOLUME-V	ANNEXURE - 3		2.02.00/9.9.5	Dust Seals & O'rings for motors	Being a small items vendors are not offered separately, hence not to being offered here. MAHAGENCO to accept.	Bid specification prevails
469	VOLUME-V	ANNEXURE - 3		2.02.00/10.5.1 & 10.5.5	Bearings including motor bearings Dust Seals & O'rings for motors	Motor bearings against 10.5.1 & Dust seals & O'rings for motors against 10.5.5 are not offered by vendor, being very small sized motors, hence not offered. MAHAGENCO to accept.	Bid specification prevails
470	VOLUME-V	ANNEXURE - 3		2.03.00	PIPING, VALVES & SPECIALITIES AND THERMAL INSULATION	a) Items/ Valves applicable for TG area Local Instrument racks (LIRs) are covered under Cl. 4.00.00, 1.12 Process Connection Piping, hence are not being offered here. b) For TG C&I area, items against sub-clause 1.2.8 are already covered under 1.1.1. MAHAGENCO to accept.	Noted. If duplicated for the same equipment of same system, then it need not be provided
471	VOLUME-V	ANNEXURE - 3			General	If any mandatory spare against any main supply item is called at two or more clauses in the tender spec. Spare against only one clause (Max Qty) shall be supplied by the bidder.	Noted. If duplicated for the same equipment of same system, then it need not be provided
472	Vol-V, Annex ure-8	Part C	---	Painting	Painting & Colour Code	Painting & Colour code of Steam Turbine shall be as per BHEL's standard practice.	Bid Specificaiton Prevails Can be discussed DDE
473	V	Annexure-4	1	1.04	Sub-Vendor List: BOILER FEED PUMP	BHEL has manufactured & supplied Boiler Feed Pump to 1x660 MW Bhusawal Project and trial run for same has successfully completed. Apart from this, BHEL is manufacturing Boiler Feed Pumps for TANGEDCO Ennore, Udangudi, WBPDCS Sagardighi, NTPC Lara, Talcher & Singrauli Projects also. Hence, Customer is requested to add BHEL in the sub-vendor list for Boiler Feed Pump.	Bid specification prevails Can be decided DDE, based on credentials
474	V	Annexure-4	3	1.39	Sub-Vendor List: CONDENSATE EXTRACTION PUMPS	BHEL has manufactured & supplied CEP to 1x660 MW Bhusawal Project and trial run for same has successfully completed. Apart from this, BHEL is manufacturing CEP for TANGEDCO Ennore, Udangudi, WBPDCS Sagardighi, NTPC Lara, Talcher & Singrauli Projects also. Hence, Customer is requested to add BHEL in the sub-vendor list for Condensate Extraction Pump.	Bid specification prevails Can be decided DDE, based on credentials

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475	V	Annexure-3	39	26.2.2	Mandatory Spares: BFP:Sleeve bearings insert and liners	Inserts & liners are not applicable for offered sleeve bearing.	Items if not applicable as per OEM, can be omitted.
476	III	Sec-2, Part-A	44 & 86	9.02.00 & 21.06.06 i)	Regenerative feed heating cycle shall be designed considering VWO loading and 1% make-up condition.	Regenerative feed heating cycle shall be designed considering TMCR loading and 0% make-up condition as per BHEL standard practice for all super critical power plant.	Bid specification prevails
477	III	Sec-2, Part-A	44 & 88	9.03.00 & 21.06.08 i) & ii)	The shell side design pressure shall not be less than maximum conceivable extraction pressure plus a margin of 10%.	The shell side design pressure shall not be less than maximum conceivable extraction pressure plus a margin of 5% as per BHEL standard practice.	Bid specification prevails
478	III	Sec-2, Part-A	47	9.18.06	The supports and removal features for heaters shall be submitted by the bidder for Owner's/Consultant's review.	The supports and removal features for heaters (Part of O & M Manuals) shall be submitted after dispatch of equipment for information.	To be provided during detailed engineering
479	III	Sec-2, Part-A	47 & 87	9.18.13 & 21.06.14 iii)	For LP Heaters SS 304L and for HP Heaters SS 304N stainless steel shall be considered.	Customer is requested to modify the clause as: For LP Heaters SA688 TP304 (Welded SS-U-Tubes) and for HP Heaters SA213 TP304N (Welded SS-U-Tubes) shall be considered. The above is in line with NTPC requirements and as per BHEL standard practice.	Bidder to comply with the specification clause 21.06.14, iii) of Vol-III, Part-A, Section-2
480	III	Sec-2, Part-A	48	9.18.16	The Bidder shall submit his rolling procedure of tube after welding the tube into tube sheet for the Owner's/Consultant's review and acceptance.	BHEL follow Rolling procedure of tube after welding the tube into tube sheet as per international proven practice. Submission of the same to Owner's/Consultant's review and acceptance is not envisaged.	To be decided during detailed engineering
481	III	Sec-2, Part-A	49	9.18.33	Full access covers shall be provided for feed water heaters up to approximately 1400m diameter.	Feed water heaters Manway nozzle shall be of obround shape with ID 356 x 458 mm.	Noted
482	III	Sec-2, Part-A	50	9.19.00	For each heater the heat transfer area shall be calculated considering 10% of the tubes plugged.	Plugging margin will increase surface area in heaters and during part load operation, there is high chance of condensing of steam especially in de-superheating zone which is detrimental to the life of the heaters. Hence BHEL does not recommend any plugging margin for heaters in-line with NTPC Specifications and BHEL design.	Plugging margin will be 3%.
483	III	Sec-2, Part-A	50	9.25.00	Reflex gauge glasses, level indicators with shut off valves, ball checks etc. shall be provided with each heater.	Transparent type level gauge shall be provided for each Heaters as per BHEL standard practice.	Noted
484	III	Sec-2, Part-A	51	9.30.01	The maximum oxygen content shall not be more than 0.005cc per litre measured as per ASTM D888 or Indigo carmine method at all operating conditions. The carbon sioxide measured by APH method shall be non-traceable at all load.	All super critical units operated in oxygenated treatment mode and hence guarantee for maximum oxygen content in feed water system is not applicable for super critical sets.	This is applicable for sub critical regime.
485	III	Sec-2, Part-A	53	9.30.12	Impingement plate of 400 series SS material shall be provided for flashed drains from HP Heaters, BFP re-circulations, start up drains etc.	SS 304 Perforated pipe with end covered shall be used as nozzle for flashed drains from HP Heaters, BFP re-circulations, start up drains etc. as per BHEL standard practice.	This can be as per OEM proven design.
486	III	Sec-2, Part-A	53	9.30.14	Vacuum breaker valve shall be provided for Deaerator.	As Deaerator is designed for full vacuum, Therefore Vacuum breaker valve is not required.	Noted
487	III	Sec-2, Part-A	87	21.06.06 ii) b)	Channel/Channel cover of HP Heaters shall be Carbon steel to SA 266 Grade II or equivalent.	HP Heaters are provided with Hemispherical type heads. The hemi heads are manufactured by pressing the plate. This is in line with all the HP Heaters supplied till date for 250MW and above sets.	Noted
488	II	SECTION - 2	22	2.13.02 -g)-3	Two(2) steam turbine drives for turbine driven boiler feed pump per unit complete with ESV, control valves, Non return valves for single admission drives, permanent & temporary steam strainers	During steam blowing of main steam pipe line (initial operation) to drive turbine, strainer is removed and blanking fixture is used to isolate the drive turbine from steam supply. Hence, drive turbine do not need any strainer (temporary) for initial operation as per BHEL design. This is a proven design of BHEL.	Noted
489	III	PART-A/ SECTION - 2	58	10.40.04	Suitable Gear Box shall be furnished between TDBFP and its booster pump made of proper materials, instrumentation, and bearings etc., designed as per code AGMA 401 or 402.	Gear box between drive turbine and Booster pump shall be designed as per code: AGMA 6011.	Noted
490	III	PART-A/ SECTION - 2	58	10.41.02	The control of HP and LP control valves shall be integral to provide smooth, continuous automatic operation of BFPTD over the entire operating range.	LP control valve is not applicable for BFP Drive Turbine; However the CRH, auxiliary steam sources will have a pipe mounted pneumatic pressure control valve. The speed control of BFP Drive turbine will be done only through integral HP control valve.	Noted

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491	III	PART-A/ SECTION - 2	58	10.41.03	Steam turbine drive shall have a suitable electric motor driven rotor turning gear.	Oil hydraulic barring device is considered for offered BFPDT which is a proven design and the same system has been supplied for all the 660-800 MW BFP Drive turbines by BHEL. Hence, electric motor driven rotor turning gear not applicable.	Noted
492	III	PART-A/ SECTION - 2	59	10.41.07 - iv)	One (1) lubricating oil tank with integral strainer.	Strainers are provided at individual suction of lube oil pumps hence,separate strainer in oil tank is not envisaged.	Noted
493	III	PART-A/ SECTION - 2	59	10.41.09 - v) & 10.41.10 a)	BFPTD shall be equipped with independent trip devices in the form of duplicate emergency over speed governors. These shall be mounted on the BFPTD shaft and shall be arranged to actuate a trip device at a predetermined speed which will be provided for testing the operation of the emergency over-speed governors under simulated over-speed conditions, whilst BFPTD is operating at any load.	Mechanical over speed governor is obsolete and not envisaged for offered BFP drive turbine, However. an Independent dedicated electronic over speed protection system with 2 out of 3 trip logic is considered in addition to over speed trip provided in electronic governor.	Noted
494	III	PART-A/ SECTION - 2	59	10.41.10 c)	Thrust wear trip	Axial displacement measurement probes shall be provided at front bearing housing for thrust bearing protection. Axial displacement alarm and trip is envisaged. Hence, no other mechanism for thrust wear trip is envisaged.	Noted
495	III	PART-A/ SECTION - 2	60	10.41.11 - ii)	The bearings shall be spherically seated, forced feed lubricated type. Lined with Babbitt material or other suitable anti-friction alloy.	Drive turbine journal bearings are cylindrical supported as per BHEL design and the same system has been supplied for all the 660-800 MW BFP Drive turbines by BHEL.	Noted
496	III	PART-A/ SECTION - 2	60 & 95	10.41.11 - iii) & 21.08.02 vii)	The BFP shall be driven through 'disconnect flexible coupling". The disconnect coupling shall be automatically disconnect the driven equipment from the drive turbine so as to permit independent operation of the drive turbine on turning gear.	BFP Drive turbine is coupled to boiler feed pump and to gear box through flexible membrane couplings at drive end and non drive ends respectively. Turning gear can be performed in coupled condition; Disconnect coupling is obsolete and withdrawn, Hence, not considered for offered BFPDT.	Noted
497	III	PART-A/ SECTION - 2	60	10.41.12 i)	The lubricating oil for each BFPTD, drive turbine, booster pump and gear drives will be supplied from the steam turbine drive lubricating oil system.	BHEL has standardized the BFP DT sets with 2nos. AC motor driven (1Working + 1 Standby) lube oil pumps. Hence ,shaft driven MOP/steam turbine drive for lube oil system is not applicable.	Noted
498	III	PART-A/ SECTION - 2	63	16.03.00 & 16.04.00	The insulated portion of the steam turbines shall be covered with fabricated steel cover, provided with suitable anti-drumming and sound pressure attenuating material inside. The insulation and steel covering should be so designed and erected as to provide easy accessibility to parts requiring frequent inspection.	Mineral wool mattress with CAT-9 cement layer cladding is considered as BFP Drive turbine casing insulation (as per BHEL proven design for BFP drive turbines supplied for 660/800 MW projects)	Noted
499	III	PART-A/ SECTION - 2	96	21.08.02 - xiii)	Bursting diaphragm	Bursting diaphragm shall be provided on exhaust piping of drive turbine.	Noted
500	III	PART-A/ SECTION - 2	96	21.08.02 - xvi) a	Lifting tackles, including lifting beams and eye bolts for turbine casing and rotor	Lifting tackles including drive turbine rotor lifting beam shall be provided,However ,lifting beam for drive turbine casing and eyebolts for both casing and rotor are not applicable.	Noted
501	III	PART-A/ SECTION - 2	96	21.08.02 - xvi) c	Lifting gear for ESV governing valves etc.	Lifting gear for ESV governing valves is not applicable.	Noted
502	III	PART-A/ SECTION - 2	96	21.08.02 - xvii)	Codes and standards	BFP drive turbine design code shall be IEC-45	Noted
503	III	Part -A/ SECTION-3	36	2.05.09 - I)	For all steam blown lines temporary strainers shall be installed at the equipment terminals so as to prevent any inflow of particles where that may cause any damage or harmful effect.	During steam blowing of Main steam pipe line (initial operation) to drive turbine, strainer is removed and blanking fixture is used to isolate the drive turbine from steam supply. Hence, drive turbine do not need any temporary strainer for initial operation as per BHEL design. This is a proven design of BHEL.	Noted
504	III	Part -A SECTION-3 Annexure-II	98	sl. No. 9	Turbine (Both Main and BFPT) (Only spray insulation acceptable).	Mineral wool mattress with CAT-9 cement layer cladding is considered as BFP Drive turbine casing insulation	Noted
505	V	Annexure-3	37	20.1 & 20.2	Mandatory Spares Drain Cooler: Level gauge glass with packing & Instrumental source valve	Level gage glass with packing and Instrument source valve is not applicable for Drain cooler.	Items if not applicable as per OEM, can be omitted.

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506	V	Annexure-3	38	2.02.02 Sl. no. 26.1.1	Mandatory Spares: One set of regulating stage blades along with all fastening material, if applicable.	Regulating stage (A-wheel) blades along with applicable fastening material shall be quoted. However, replacement of blades and high speed balancing should be carried at BHEL works only.	Bid specification prevails If high speed balancing is required, it will be decided later.
507	V	Annexure-3	38	2.02.02 Sl. no 26.1.2	Mandatory Spares: One set of LP blades (only last stage) along with all fastening material.	LP blades (Last stage) along with applicable fastening material shall be quoted. However, replacement of blades and high speed balancing should be carried at BHEL works only.	Bid specification prevails If high speed balancing is required, it will be decided later.
508	V	Annexure-3	38	2.02.02 Sl. no 26.1.3	Mandatory Spares: Set of journal bearings and thrust bearing including liners	Bearing liners are not applicable for offered BFP drive turbine and hence not considered. However, complete set (front journal bearing, rear journal bearing and thrust bearing) of drive turbine shall be quoted.	Items if not applicable as per OEM, can be omitted. However, complete set (front journal bearing, rear journal bearing and thrust bearing) of drive turbine shall be supplied.
509	V	Annexure-3	39	2.02.02 Sl. no 26.1.4	Mandatory Spares: Set of emergency over speed governor (in case over speed governor is provided)	Mechanical over speed governor is obsolete and not envisaged for offered BFP drive turbine. Hence, spare emergency over speed governor is not applicable and not envisaged.	Noted
510	V	Annexure-3	41	2.02.02 Sl. no 28.8.2 & 28.8.5	Mandatory Spares: Oil purifier - Bag filters & Dust seats and 'O' rings for motors	Bag filters & Dust seats and 'O' rings for motors are not applicable for BHEL supplied Oil purifiers.	Bid Specification Prevails
511	V	Annexure-4	3	1.40	GEAR BOX FOR BFP	It is requested to include BIDDER Make (BHEL) Gear box for gearbox between drive turbine and booster pump application.	Bid specification prevails Can be decided DDE, based on credentials
512	V	Annexure-4	1	...	SUB – VENDOR LIST	The BHEL approved "Product Material Directory" (PMD) list shall be followed for those items that are not included in the Annexure-4 sub-vendor list. The BHEL PMD vendors are selected scientifically based on our rigorous vendor qualification procedures.	Bid specification prevails Can be decided DDE, based on credentials
513	V	Annexure-4	1	1.13	Sub-Vendor List: GEAR BOX (COAL MILL)	BHEL has manufactured and supplied Planetary Gear Box for Coal Mill to many Super Critical Projects and the planetary gear boxes are running satisfactorily. Customer is requested to add BHEL in the sub-vendor list for Planetary Gear Box.	Bid specification prevails Can be decided DDE, based on credentials
514	V	Annexure-8	14 & 18	6.00.00 - 8 & 7.00.00 sl.no.3	Painting requirements : Turbine	For drive turbine outer casing heat resistant air drying aluminium paint as primer and finish coat with aluminium colour shade (total DFT of 50microns) is considered as per BHEL standard design. Hence, golden yellow shade is not applicable.	To be decided DDE
515	V	Annexure-8		(Page 11) 4.20.23	Steel structures a) Surface preparation: Blast cleaning to Sa 2 1/2 grade b) Primer: One coat of Inorganic Ethyl Zinc Silicate DFT 70µ c) Intermediate Coat: One coat of epoxy Polyamide cured pigmented MIO intermediate paint DFT 100µ d) Finish coat: Aliphatic isocyanate cured acrylic finish paint DFT 70µ Total DFT = 240µ.	Following painting scheme proposed for steel structural components having operating temp <95° C, exposed to atmosphere like Columns, Beams, Structures, Boiler supporting structures, Galleries, Bracings, Buck stays etc. a) Surface Preparation: Blast cleaning to Sa2 1/2. b) Primer: One coat of epoxy zinc phosphate primer to IS13238 - DFT of 30µ. c) Intermediate: One coat of epoxy based MIO coating - DFT 75µ/coat. d) Finish: 1) One coat of epoxy based finish paint to IS14209 DFT of 30µ. 2) One coat of aliphatic isosyanate cured finish paint to IS13213 DFT of 30µ. Total DFT = 165µ.	Bid Specification Prevails

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516	V	Annexure-8		(Page 16) 7.00.00, 2.d)	Other piping hangers & supports a) Surface preparation: Blast cleaning to Sa 2 1/2 grade (Alkyd base) DFT 2x25µ b) Primer: HB Zinc phosphate c) Finish coat: Zinc chrome (epoxy base) DFT 2x25µ Total DFT = 100µ.	It is to clarify that "Blast cleaning is not feasible for these hangers & supports other than CLH/VLH due to the lesser thickness of components." Epoxy base finish paint is not technically compatible over the alkyd base zinc phosphae primer. Hence this specification is not feasible to comply. Following scheme is proposed for hangers & supports in line with standard practise a) Power tool cleaning to SP3. b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat. c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat. Total DFT = 70 microns.	Bid Specification Prevails
517	V	Annexure-8		(Page 17) 7.00.00, 2.e)-ii	<u>Uninsulated valves, Cast/ forged, Design temperature >60 deg.C</u> a) Surface preparation: SP3/SP5, Sa2	<i>It is to clarify that "Power tool cleaning as per SP3 will be followed for these components."</i>	Bid Specification Prevails
518	V	Annexure-8		(Page 19) 6.0	Coal fuel piping a) Surface preparation: Blast cleaning to Sa 2 grade DFT = 1x40µ b) Primer: Ethyl Zinc silicate, c) Finish coat: HR ALuminum paint, DFT 2x20µ Total DFT = 80µ.	<i>Following painting scheme is proposed in line with BHEL Std. Painting system for un insulated Fuel pipes components > 80 to 120°C a) Surface Preparation: SP3 by power tool cleaning. b) Primer paint: Two coats of General purpose Aluminum Paint to IS 2339-DFT 20µ /coat. Total DFT = 40µ.</i>	Bid Specification Prevails
519	V	Annexure-8		(Page 15) 7.00.00, 1.b)	All insulated surfaces with temperature >95 deg.C a) Surface preparation: SP3/SP5, Sa2 resistant Al. (Grades as per IS 13183), 2x20µ. Total DFT = 40µ. b) Paint: Heat	Following painting scheme is proposed in line with BHEL Std.Painting Practice for all insulated components like hot ducts, Furnace Casing sheets, Riser tubes, External piping etc., a) Surface Preparation: SP3 by Power tool cleaning. b) Primer paint: 2 coat of red-oxide zinc phosphate to IS 12744 to DFT of 30µ/coat Total DFT = 60µ	Bid Specification Prevails
520	V	Annexure-8		(Page 12) 4.20.25	<u>Hand railings & ladders</u> All handrails and ladders shall be galvanized at the rate of 610 gm/ sq.m	Following scheme propose for handrails, posts, lad-ders & stairs a) Power tool cleaning to SP3 b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat Total DFT = 70 microns	Bid Specification Prevails
521	III	Part-D		(Page 88) 13.02.00	Painting of steel surfaces embedded in concrete Steel surfaces embedded in Concrete, the surface shall be prepared by Manual Cleaning and provided with Pri-mer Coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron Dry Film Thickness (DFT).	<i>No painting is required for embedded surfaces, as paint will hinder adhesion. Temporary rust preventive fluid can be applied to protect these surfaces until erection.</i>	Noted
522	V	Annexure-8		(Page 20) Note.2)	For valves below 65NB and temperature up to and in-cluding 540 DegC, Parkerizing/zinc phosphate corrosion resistant coating as per ASTM F1137 is also acceptable in lieu of Aluminum paint.	Clarification For forged valves, Phosphating to thickness of 1500mg / Sq.ft will be done.	Bid Specification Prevails
523	V	Annexure-8		(Page 12) 4.20.27	SG membrane walls and other flue gas swept pressure part surfaces shall be applied with appropriate primer for protection of surfaces during transit, storage and erection.	Following schemes are proposed as CLARIFICATION as there is no specific painting scheme is given in tender specification. For Heat exchanger coils coming in the gas path (like Economizer, SH coils, water platens etc). Power tool cleaning followed by one coat of dip-coat paint –Red-oxide Zinc phosphate primer to BHEL Specification. DFT = 35 microns. For components coming in the gas path like ww panels, headers, loose tubes etc Power tool cleaning followed by 2 coats of Red-oxide Zinc phosphate primer.to IS 12744 DFT = 60 microns	Bid Specification Prevails

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524	-	-	-	-	-	CLARIFICATION For all un-insulated components like miscellaneous sheets, plates having thickness <5mm other than boiler supporting structural items mentioned in Sl. no. 1. (Operating temperature up to 90deg.C) Since there is no scheme given in the tender specification, BHEL proposed this scheme as clarification. a) Surface Preparation: SP3 by power tool cleaning. b) Primer coat: One coat of Red oxide Zinc Phosphate primer to IS 12744 to a DFT of 30 µ/coat (min) c) Finish: 2 coats of synthetic enamel to a DFT of 20 µ/ coat (min) Total DFT = 70µ(min)	Bid Specification Prevails
525	VOLUME - II ETG061-BTG -GEN- LTS	SECTION - 2		7.07.00	Routine tests and type test certificates shall be submitted for each item of equipment wherever applicable.	For type tests wherever applicable, If already done for the same design/size, it will not be repeated. Reports will be offered for review.	For electrical scope please refer individual specifications regarding type and routine tests.
526	VOLUME - II ETG061-BTG -GEN- LTS	SECTION - 2		7.13.00	All welding shall be carried out as per welding procedure drawn and qualified in accordance with requirements of ASME Section IX. Welding procedures shall be submitted to the Owner for approval prior to carrying out qualification test in the presence of Owner's representative.	BHEL has very well established welding procedure. All welders used for pressure parts and valves are approved by IBR authorities. Hence, approval of welding procedures and welder's qualifications by owner is not envisaged.	Bid specification prevails
527	VOLUME - II ETG061-BTG -GEN- LTS	SECTION - 2		7.14.00	All welders/welding operators employed on any part of the contract either in the Supplier's works or at site or elsewhere shall be qualified as per ASME Section IX	All welders/welding operators employed on any part of the contract in the Supplier's works will be qualified as per IBR/AWS as per the product requirments.	Bid specification prevails
528	VOLUME - II ETG061-BTG -GEN- LTS	SECTION - 2		7.15.00	Test results of qualification tests and specimen testing shall be furnished to the Owner/owner's authorized representative for approval. However, wherever required by the Owner, tests shall be conducted in presence of Owner's/owner's authorized representative.	BHEL has very well established system for welding procedure and qualification of welders/welding operators as per IBR/AWS code requirments,as applicable. Hence, separate approval of welding procedures and welder's qualifications by owner is not envisaged.	Bid specification prevails
529	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		2.04.06 vii a	The variation in supporting effort between hot and cold condition does not exceed 20% of the load which is higher of the operating condition and cold setting load.	The variation in supporting effort between hot and cold condition does not exceed 25% of the load which is higher of the operating condition and cold setting load.	Bid Specification Prevails
530	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		2.04.06 xxiii	Constant load type spring support/hangers shall be so selected as to permit, for the specific load, an over-travel of at least 25 mm or 20% (whichever is greater) of the specified range of vertical travel.	Constant load type spring support/hangers shall be so selected as to permit, for the specific load, an over-travel of at least 25 mm or 25% (whichever is greater) of the specified range of vertical travel.	Bid Specification Prevails
531	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE – I Specification for Low Pressure Piping	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB-Stainless Steel as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10	IS 1239 Gr heavy galvanized/IS 3589 Gr 410 galvanized may be allowd as Material of pipe for Instrument Air and Service air .Galvanization shall be to IS- 4736 or equivalent.	Bidder may use 40S schedule as per ASME B36.19, for Stainless steel piping size 50 NB and below. Also, bidder may allow to use pipe MOC for service air application only as per IS 1239 GR heavy galvanized/IS 3589 GR 410 galvanized and Galvanization shall be to IS 4736 or equivalent.
532	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE – I Specification for Low Pressure Piping	Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB-For pipes MOCStainless steel as per ASTM A-312 Gr. 304. Size-upto 150 mm NB as per schedule 10S, ANSI B-36.10.		
533	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB-Fittings ASTM-A-182 F304	For Instrument air and service air-For pipes up to 150 NB, pipe fittings may be supplied with material and dimension conforming to IS 1239 It shall be Galvanised as per IS 4736 or equivalent..For sizes greate than 150 NB fittings will be as per SA234WPB and shall be galvanised as per IS 4736 or equilavant.	Bidder to comply tender specs except for Service air line. For Service air line , Refer Clause 4.13.09, of Vol.-III, Part-A, Section-6
534	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE	Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB-Fittings ASTM-A-351-CF8		
535	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Material of construction of valves for Drinking Water(less than or equal to 50 Nb), Instrument air and service air(All sizes) shall be Stainless steel .	Carbon steel valves (Galvanised)may be allowed for for sizes 65 mm NB & above and Gun metal for sizes 50 NB and below for instrument and service air, and drinking water of sizes less than or equal to 50 Nb)	Noted.

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536	VOIII Part A	Sec 6 TECHNICAL SPECIFICATION PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION		ANNEXURE II SERVICES OF VARIOUS CATEGORIES OF VALVE SHALL BE AS FOLLOWS:	Material of construction of valves for Service Water (Clarified/Filtered),Filtered Water,Drinking Water,Inhibited Demineralised Water (for all sizes) shall be Cast iron (body)	Cast Steel valves may also be allowed for the mentioned services and sizes.	Noted.
537	III	Part A Section 2		3.03.00	All control valves shall be designed for maximum shut-off differential pressure acting across the valve. Low noise trim shall be provided to limit the noise level to 95 dBA at a distance of 1.5 m from outline of valve at all operating conditions	The noise level for HP bypass valve will be considered as 115 dBA, as per VOLUME - II, Section 2 Clause 20.14.03 (iv)b	Noted
538	III	Part A Section 2		3.15.00	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems	Control of the oil system will be implemented in the DCS, no separate control cubicle is envisaged.	Bid Specification Prevails
539	V	Annexure-3		2.02.00 (13.1.3)	Complete set of internals required to form one pilot valve assembly except for outer body	Pilot Valve assembly Not Applicable	Noted. Items if not applicable as per OEM, can be omitted. However, equivalent/alternative item as applicable shall be provided.
540	V	Annexure-3		2.02.00 (13.2.2)	Complete set of internals required to form one pilot valve assembly except for outer body	Pilot Valve assembly Not Applicable	Noted. Items if not applicable as per OEM, can be omitted. However, equivalent/alternative item as applicable shall be provided.
541	V	Annexure-3		2.02.00 (13.3)	Bellow for accumulators	Instead of Bellow, bladder for accumulator will be provided	Noted. Items if not applicable as per OEM, can be omitted. However, equivalent/alternative item as applicable shall be provided.
542	V	Annexure-3		Mechanical (1.58)	Approved Vendor List: HP bypass System	Sulzer is the only vendor in the list of approved vendors, however Sulzer is no longer a supplier of HP bypass system. BHEL has manufactured and supplied HP bypass system for various super critical projects. Hence BHEL may be included in the list of approved vendors for HP bypass system.	Can be considered DDE based on credentials
543	V	Annexure-3		Mechanical (55.32)	Approved Vendor List: Hydraulic Powerpack	Hydraulic Powerpack will be from the list of vendors qualified/approved by the OEM of HP Bypass system to suit their systems. Hence these vendor lists are not being considered for HP Bypass system.	Bid specification prevails Can be considered DDE based on credentials
544	V	Annexure-4		F 11.00	Approved Vendor list: HP Bypass Valves	HP Bypass valve will be from the list of vendors qualified/approved for HP Bypass system. Hence these vendor lists are not being considered for HP Bypass system.	Bid specification prevails Can be considered DDE based on credentials
545	V	Annexure-4		F 12.00	Approved Vendor list: Electro – Hydraulic Actuator	Electro-Hydraulic Actuators will be from the list of vendors qualified/approved by the OEM of HP Bypass system to suit their systems. Hence these vendor lists are not being considered for HP Bypass system.	Bid specification prevails Can be considered DDE based on credentials
546	III	PART - A SECTION - 3		2.05.03 TESTING OF VALVES & SPECIALTIES AT WORKS	v) Each relief valve shall be subjected to hydrostatic test, seat pressure test, seat leakage test and test for relieving capacity.	Each valve will be subjected to hydrostatic test, set pressure test and seat leakage test. However test for relieving capacity shall be exempted since it is not practical to test capacity of each valve. Relieving capacity shall be based on type test as per IBR code regulation. This practice is followed by all other OEMs.	Noted
547	III	PART - A SECTION - 3		2.05.03 TESTING OF VALVES & SPECIALTIES AT WORKS	vi) The valve body test pressure shall be at least twice the set pressure.	Valve Body hydrostatic test pressure shall be 1.5 times the valve rated pressure (design pressure) which is inline with IBR/ASME code regulations.	Noted
548	III	PART - A SECTION - 3		2.05.03 TESTING OF VALVES & SPECIALTIES AT WORKS	vii) The seat test pressure should be at least equal to the set pressure.	Seat leakage test pressure shall be maximum possible working pressure (or) 90% of set pressure. These values are based on ASME code regulations.	Will be decided DDE
549	V	Annexure-4		I Mechanical 1.00 BOILER, TURBINE, GENERATOR (BTG)	1.29 SAFETY VALVE BHEL is not appearing in the approved vendor list of Safety valve	BHEL is to be included as approved vendor of Safety valve	Bid specification prevails Can be considered DDE based on credentials

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550	V	Annexure-4		I Mechanical 1.00 BOILER, TURBINE, GENERATOR (BTG)	1.30 PRESSURE RELIEF VALVE BHEL is not appearing in the approved vendor list of pressure relief valve	BHEL is to be included as approved vendor of pressure relief valve	Bid specification prevails Can be considered DDE based on credentials
551	VOLUME - II	SECTION - 1	5	3.05.00	Fuel Analysis of Coal Proximate Analysis Ultimate Analysis	The coal analysis provided is not proper. Proximate Analysis-Fixed Carbon content is not available. Ultimate Analysis-Moisture is not matching with the moisture provided for Proximate analysis, Oxygen content is too high. Owner is requested to review the same.	Revised Coal Analysis will be shared with Bidders
552	VOLUME - I	SECTION - 3	390	6.3	Category-I Steam Generator Efficiency - 87%	Owner to note that with the provided coal analysis the steam generator efficiency of 87% is not achievable. Owner is requested to review the same.	Refer Ammendment on Performance Guarantees
553	Volume-1	Section-1	173	Schedule-7	Guarantees under category-I •Gross Turbine cycle Heat rate @ 100% TMCR, 0%MU, 33 Deg.c CW inlet : Max 1835 kCal/kWh •Steam generator efficiency @ 100% BMCR : 87%	There is discrepancy in the various clauses of tender specifications related to performance guarantees. •As per volume 1, section 1, Separate TG cycle heat rate & Boiler efficiency are required to be guaranteed whereas as per Volume 2, section 2 Unit heat rate is required to be guaranteed •As per volume 1, section 1, TG cycle heat rate guarantee load point is 100% TMCR & Boiler efficiency guarantee load point is 100% BMCR, whereas as per Volume 2, section 2 Unit heat rate @ 100% TMCR & 55% TMCR is required to be guaranteed	Refer Ammendment on Performance Guarantees
	Volume-2	Section-2	175	11.30.00	Guarantees under category-I •Unit Heat rate @ 100% TMCR •Unit Heat rate @ 55% TMCR	We request Owner to fix the performance guarantees at 100% TMCR load conditions & only Unit Heat rate will be guaranteed instead of separate TG cycle Heat rate & Boiler efficiency.	
554	Volume-1	Section-3	390	1	Guarantees under category-I •Turbine cycle Heat rate @ 100% TMCR, 0%MU, 77 mmHg (a)	There is discrepancy in the referred tender clauses related to condenser pressure to be considered for Heat rate guarantee. Bidder recommend Owner to fix the TG cycle heat rate at optimized vacuum corresponding to 33 Deg.c CW inlet temperature & temperature rise across condenser corresponding to cooling tower range (as finalized by the Owner).	Refer Ammendment on Performance Guarantees
	Volume-1	Section-1	173	schedule-7	Guarantees under category-I •Gross Turbine cycle Heat rate @ 100% TMCR, 0%MU, 33 Deg.c CW inlet : Max 1835 kCal/kWh		
555	Volume-III	Part A	71	21.01.03	v) Temperature rise across condenser limited to : Bidder to Optimize	Since Cooling tower is excluded from BTG package scope we request Owner to fix the temperature range across colling tower & communicate the same in BTG Package so that condenser can be designed for the corresponding temperature rise.	Min. 10 °C
556	Volume-II	Section -2	128	9.01.02	A suggestive Plot Plan indicating available area is enclosed as Dwg No. ETG061-COM-GEN-PP-001	Owner is requested to share Auto CAD copy of the Plot Plan Dwg No. ETG061-COM-GEN-PP-001.	It will be shared with bidders
557	VOLUME -IV	BID DRAWING	-	09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME	Note-9 All manual valves indicated shall be converted to Motor operated valves based on process requirement during detail engineering	Process does not require valve to be MOV. Bidder request to specify MOVs in flow diagram at Bid stage, else Bidder shall follow as per previous executed projects of NTPC. Request to confirm.	Shall be finalized DDE
558	VOLUME IV BID DRAWINGS	04 ETG061-BTG-ME-GN-ECW-PFD-001_DM CW SYSTEM	-	-		LSO is indicated twice for DMCW pump discharge MOV. Request to clarify.	Bidder to consider only one.
559	VOLUME -IV BID DRAWINGS	04 ETG061-BTG-ME-GN-ECW-PFD-001_DM CW SYSTEM 03 ETG061-BTG-ME-SG-LDO-PFD-001_LDO SYSTEM	-	-	DP switches are indicated across Filters.	Bidder proposes to use DP transmitter against DP switch indicated in drawing. Request to confirm the same.	Confirmed.
560		Part A/ Section 2		21.12.01	viii) Heat transfer area of PHE shall be selected such that each Sq.M of heat transfer plate shall transfer not more than 6500 Kcal/hr	Owner is requested to allow Bidder to design the PHE based on OEM practice to optimise the PHE design. This will not only reduce the maintenance cost but also optimise the space requirement.	Noted

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561		BID DRAWINGS - Process flow diagram for DMCW system			PT at the suction header of DMCW pumps	PT at the suction header is not required as it is in closed loop. However, PGs will be there for individual pump suction and same will be used for monitoring purpose. Owner is requested to accept.	Bid Specification Prevails
562		BID DRAWINGS - Process flow diagram for DMCW system			MOV at the pump suction header	Motor operated valves at the DMCW pump suction is not required and can be manual, as the valves will always be in open condition and closed for maintenance only. Owner is requested to accept.	Bid Specification Prevails
563		Part A/ Section 2		2.13.05	ix) Debris filter at suitable location	Bidder understand debris filter is not required as the same is not specified in the "TECHNICAL SPECIFICATION CW & ACW SYSTEM" and neither shown in the "PFD FOR DM CW SYSTEM". Please confirm our understanding.	Bid Specification Prevails
564		Part A/ Section 2		2.13.11	xvi) VFD shall be considered for CEP, ID fans, ACW pumps and conveyor belt motors, as applicable.	VFD is not required for the ACW pumps as it will not provide any benefit during operation either in full load or part load. Owner is requested to accept the same.	Noted
565		Bid drawing Part A/ Section 2		3.02.00	FLOW SCHEME FOR CW & ACW SYSTEM CW/CT blowdown - CW blowdown tank and FGD process water tank - CT blowdown tank shall be in BTG contract scope	Noted. However CT Blowdown tank capacity shall be informed by Owner.	Please refer Clause no. 2.13.05, XVII of lead specifation Vol-2, section-2
566	General				Auxiliary Cooling water / DM cooling water for BOP equipment	Please specify the terminal point location and elevation for the ACW/DMCW cooling water for the BOP equipment namely AHP compressors, DG set, etc. Also, please provide the flow and pressure requirement at the terminal point for pump sizing.	DMCW cooling water supply and return for BoP package shall be terminated at TG Building 'C' row, near the last column, adjacent to the proposed Service Building.
567		Technical specification piping, valves & specialties and insulation		2.01.03(vii)	All drain and vent lines shall be conveniently terminated either in Blowdown tank/flash tanks or permanent drain trenches of the Power Station	Bidder proposes to terminate hydrotest drain and vent near the source pipe (at approximate 200 mm).Maintenance drain shall also be terminated near the source pipe(approximate 200 mm).During maintenance activity suitable hose shall be connected and drained to the nearest floor drain.	Noted for hydrotest drain and maintenance drain case only.
568		Technical specification piping, valves & specialties and insulation		2.01.03(vii)a)	All steam and saturated water open drains shall be drained through a water seal in drain funnels/tundish with a water connection in funnels/ tundish for maintaining water seal level in them.	Bidder proposes to terminate steam and saturated water open drains in flash tanks/or in" Sand Gravelled filled pit". Owner is requested to accept.	Bid Specification Prevails
569		Technical specification piping, valves & specialties and insulation		2.01.03(viii)	For the isolation and check valves located on the main steam, hot reheat, cold reheat L.P. bypass and extraction lines, suitable line drains shall be provided just upstream and downstream of each of these valves. No drain is needed at the downstream of L.P. bypass isolation valve. Each of these drains shall be independently led to the condenser with branching off to atmosphere.	Bidder proposes to provide drains as per system design and terminate the drains through manifold arrangement in the flash Boxes /Tanks/Atmospheric tank. Owner is requested to accept.	Bid Specification Prevails
570		Technical specification piping, valves & specialties and insulation		2.01.03(xii)e)	Expansion marker for high temperature steam lines	Expansion details shall be available in Stress analysis report . Separate Expansion markers are not envisaged. This practice is being followed across many executed projects installed across the globe. Owner is requested to accept.	Bid Specification Prevails
571		Technical specification piping, valves & specialties and insulation		2.04.01(vi)a	Corrosion, erosion allowance ('A' of ASME formula) of 1.6 mm shall be considered while calculating the pipe thickness based on ASME B31.1 formula. For pipe thickness calculations as per IBR, corrosion values shall be taken as per IBR.	Bidder understands corrosion allowance is applicable only for carbon steel pipes. The same is not applicable for stainless steel and alloy piping. This practice is being followed across many executed projects. Owner is requested to accept.	Corrossion allowance not applicable to stainless steel piping.

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572		Technical specification piping, valves & specialties and insulation		2.04.01(viii)c	However, regardless of the calculation results, minimum wall thickness for steel piping shall be (i) Sch. 80 for pipe sizes 50 NB& below; (ii) Sch. 40 for pipe sizes above 50 NB but below 300 NB; and (iii) Sch. STD for pipe sizes 300 NB and above.	Bidder understands minimum wall thickness clause is applicable for only carbon and alloy steel piping. Bidder proposes the following for stainless piping Thickness: Stainless steel Piping(DN 50 and below): Minimum wall Thickness: SCH 40S. Stainless Steel Piping (above DN 50) :Minimum Wall Thickness: SCH 10S. This practice is being followed across many executed projects. Owner is requested to accept.	Bidder's understanding is correct. However, for stainless steel, Bidder shall consider the maximum thickness between (a) calculated thickness as per design conditions and (b) thickness as per schedules described below: i) DN15 to DN20 : Sch.80 ii) DN25 to DN50 : Sch.40 iii) DN65 to DN100 : Sch.30 iv) DN150 : Sch.30/40 v) DN200 to DN250 : Sch.20 vi) DN350 and above : Sch.10.
573		Technical specification piping, valves & specialties and insulation		2.04.01(x)	All valves drains in vacuum services shall be provided with screwed cap	Bidder understands Valves subject to vacuum shall have sufficient long deep seated packing to prevent ingress of external air. No separate caps shall be provided. Owner is requested to accept.	Noted
574		Technical specification piping, valves & specialties and insulation		2.04.04(iii)	Unless otherwise specified for all welded lines with pressure above 7kg/ cm2(g). and/or temperature above 200 Deg.C. branch connections for branch sizes up to 25% of welded mains shall be made with special forged steel welded fittings	Bidder proposes to use Standard fittings Sockolet,Weldolet ,Half coupling, Tees for scheduled pipes and special fabricated branches for special thickness pipes. Owner is requested to accept.	Bid Specification Prevails
575		Technical specification piping, valves & specialties and insulation		2.04.04(viii)	Mitred bends and elbows will not be accepted unless otherwise specified. Only forged tees, 90 Deg. elbows and 45 Deg. elbows are acceptable. In case the Bidder wants to deviate from this requirement on the ground of non-availability of such forged items, he may submit his alternative offer for Owner's consideration with sufficient documents to justify the same. In such a case the concerned fittings shall be manufactured with necessary reinforcing pads, bend thinning allowance etc. to satisfy code requirements.	Bidder proposes to use Wrought pipe fittings as mentioned in table 2.04.03 (ii) for Power cycle piping. Owner is requested to accept.	Bid Specification Prevails
576		Technical specification piping, valves & specialties and insulation		2.04.06(iv)	Support spacing shall be as per good engineering practice. However, in no case it shall be less than support spacing stipulated in ANSI B31.1.	Bidder proposes Support span of Analyzed Piping shall be as per Stress analysis.Non analyzed piping support span shall be as per ASME B31.1	Noted
577		Technical specification piping, valves & specialties and insulation		2.04.07(xxix)	The spindles for all valves for use outside the building shall have weatherproof protection covers of approved construction.	Bidder proposes suitable weather proof paint for all valves and accessories located outside building. Owner is requested to accept.	Bid Specification Prevails Weatherproof protection caps/covers of approved construction shall be provided Can be further discussed DDE
578		Technical specification piping, valves & specialties and insulation		2.04.07(xxvii)	The Contractor shall supply with his bid and in addition during the course of the Contract, comprehensive drawings showing the design of valves, test pressure and working pressure/temperatures. They should include a parts list referring to the various materials used in the valve construction.	Since vendor shall be finalised during detail engineering stage, Bidder proposes to submit the valve drawings during project execution stage.	Noted
579		Technical specification piping, valves & specialties and insulation		2.04.07(xliii)	Temp. above 540 Deg C & up to 580 Deg C 65 mm & above ASTM A-217,Gr. WC/C12 Temp. above 580 Deg C to 620 Deg C 65 mm & above ASTM A-217,Gr. WC/C12/ Special	Bidder Proposes to use ASTM A-217,Gr. WC/C12/C12A material. This practice is being followed across many executed projects. Owner is requested to accept our proposal.	Bid Specification Prevails
580		Technical specification piping, valves & specialties and insulation		2.04.07(xlvii)	Check valves shall conform to BS-1868 or approved equivalent and shall be of swing check type.	Alternatively, Bidder proposes to use piston type/swing check valves for bore smaller than or equal to 2". Owner is requested to accept our proposal.	Bid Specification Prevails
581		Technical specification piping, valves & specialties and insulation		2.05.09(xiv)	High pressure drains shall have a screw-down non-return valve at the point of discharge near the manifold of the Flash tank to prevent backflow of flashed steam	Bidder shall design system and provide necessary valves to prevent backflow. Non-return valve at the point of discharge is not envisaged. This practice is being followed across many executed projects. Owner is requested to accept our proposal.	Bid Specification Prevails
582		Technical specification piping, valves & specialties and insulation		3.01.11(vii)	Funnels, tundishes for drips and drains including all miscellaneous drain piping and drain piping from tundish outlet upto drain points. All drain and vent lines shall be conveniently terminated to floor drain points/permanent drain trenches of the Power Station.	Bidder proposes to terminate hydrotest drain and vent near the source pipe (at approximate 200 mm).Maintenance drain shall also be terminated near the source pipe(approximate 200 mm).During maintenance activity suitable hose shall be connected and drained to the nearest floor drain.	Noted for hydrotest drain and maintenance drain case only.

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583		Technical specification piping, valves & specialties and insulation		3.03.14(iii)	All valves shall, unless otherwise stated, have the internal diameter same/as the internal diameter of the pipes to be joined.	Valve port(Internal diameter) shall be as per recommended standards mentioned in tender specification.	Noted
584		Technical specification piping, valves & specialties and insulation		3.03.14(xiv)	All valves shall have outside screwed spindles and screwed thread of spindle shall not pass through or into the stuffing box. Where valves are exposed to the weather, protective covers shall be provided for the spindles which shall be subject to approval	Bidder proposes suitable weather proof paint for all valves and accessories located outside building. Owner is requested to accept our proposal.	Bid Specification Prevails Weatherproof protection caps/covers of approved construction shall be provided Can be further discussed DDE
585		Technical specification piping, valves & specialties and insulation		3.03.14(xvi)	Gate valves, in addition shall be provided with following extra features: a) Bypass valve for larger valves b) Draining arrangement	Bidder proposes the following: a)Integral Bypass for gate valves shall be provided as per system requirements and design. b) Draining arrangement for valves shall be reviewed wrt to requirement as per valve design. Owner is requested to accept our proposal.	Noted
586		Technical specification piping, valves & specialties and insulation		3.03.14(xxii)	The spindles for all valves for use outside the building shall have weatherproof protection covers of approved construction.	Bidder proposes suitable weather proof paint for all valves and accessories located outside building.	Bid Specification Prevails Weatherproof protection caps/covers of approved construction shall be provided Can be further discussed DDE
587		Technical specification piping, valves & specialties and insulation		3.03.15(i)	Hose valves for service water system shall be Gate valves and service air system shall be Globe valves.	Bidder proposes Gate/Globe valves for hose valves of service water.	Bid Specification Prevails
588		Technical specification piping, valves & specialties and insulation		3.04.14	The pipelines shall be sloped towards the drain points	Bidder proposes to provide slope in drains of steam and gravity piping as per layout feasibility and system design, where there is a possibility of condensate/water accumulation	To be finalized DDE
589		Technical specification piping, valves & specialties and insulation		3.04.15	All drips and drains for piping and equipment whether shown in the drawings or not shall terminate on the ground floor up to station drain unless otherwise noted. Leading such drains up to station drainage is also the responsibility of the Contractor.	Bidder proposes to terminate hydrotest drain and vent near the source pipe(at approximate 200 mm).Maintenance drain shall also be terminated near the source pipe(approximate 200 mm).During maintenance activity suitable hose shall be connected and drained to the nearest floor drain.	Noted for hydrotest drain and maintenance drain case only.
590		Technical specification piping, valves & specialties and insulation		Annexure-I C & D	Material of Pipe :Stainless Steel as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10	Bidder proposes 40S schedule as per ASME B36.19 ,for Stainless steel piping size 50 NB and below.	Noted
591		Technical specification piping, valves & specialties and insulation		Annexure-I-D	Standard-MSS-SP-43	Bidder proposes standard ASME B16.9 ,for Stainless steel piping fitting of size greater than 50 NB.	Noted
592		Technical specification piping, valves & specialties and insulation		Annexure-III(2)	a i)IS 780 for 50 mm - 300 mm NB ii) IS2906 for 350 mm NB and above or as per MSS-SP-70 b)MSS SP 85 c) IS 5312/MSS SP 71	Bidder proposes BS 5150/BS 5152/BS 1552 as alternative standards for "Cast Iron Body Gate/Globe/Check Valve"	Noted
593		Technical specification piping, valves & specialties and insulation		Annexure-III(7)- Testing.	a) Gate:i) As per IS - 780 for 50 mm - 300 mm NBii) IS-2906 for sizes equal to and above 350 mm NB b)Globe:Hydrostatic Test as per MSS-SP-85 c) Check:S-5312/MSS-SP-71	Bidder proposes testing as per ASME B16.34/API 598/MSS SP 71 for Gate, Globe and check valves	Noted
594		Part A-Section 2	39	8.14.09	The resin should of CPU grade with uniform coefficient less than 1.1.	Bidder understands that uniformity co-efficient of resins shall be as per OEM standard as followed in NTPC and SUBs Projects. Kindly confirm acceptance.	Noted. Bidder to provide references and proof for our consideration,

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595		Part A-Section 6	40	8.13.01 vii)	In addition to the dissolved solids, the influent condensate shall also contain some quantities of suspended solids (crud) derived from the corrosion of water and steam carrying pipe lines, turbine condenser and steam side of the feed water heater. Normally this concentration will not exceed about 25 ppb and the polisher beds shall provide sufficient filtering action to restrict the effluent crud content to less than 5 ppb.	As per CPU tender specification, details of pre filters are not mentioned, hence, Bidder understands that pre filters at the inlet of CPU vessels are not envisaged. Please confirm Bidder's understanding	Prefilters as required to meet the system requirements will be in bidder's scope.
596		Part A-Section 6	42	8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Sodium Analyser and Chloride Analyser shall be of Multi-Channel type inline with NTPC Projects. Please confirm Bidders understanding.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride.
597	Volume-III	PART-A Section-2		8.08.00	The condensate polishing plant will be full flow, 3x50% capacity mixed bed trains, consisting of full capacity service vessels for each unit. The total capacity of CPU for each unit shall be a minimum of CEP design flow plus a margin of 10%, corresponding to maximum of: VWO condition at 1% make-up and designed condition, OR HP / LP bypass charge condition, OR All HP heaters out of service	Bidder has considered that unit shall have three (3) service vessels (two working & one standby) of 50% capacity designed for condensate flow corresponding to following condition: Valve Wide Open condition at 1% make-up and designed condenser pressure inline with all recent NTPC and SEBs projects and not for other two referred conditions. Please confirm acceptance.	Bid Specification Prevails
598	Volume-III	PART-A Section-2		8.06.00	The regeneration facilities comprising of Regeneration Vessels, Measuring Tanks and Pumps shall be located in a separate place near and outside the TG building. The resins will be transferred to the Regeneration Area from the Condensate Polisher Mixed Beds and vice versa through a pipeline.	In the absence of the information regarding CPU regeneration building structure, Bidder would to recommended that Complete CPU regeneration area shall be kept under structural shed and one-meter height parapet wall shall be provided around this shed inline with all recent NTPC projects. Please confirm acceptance.	Noted
599	Volume-III	PART-A Section-2		8.13.01 vii)	In addition to the dissolved solids, the influent condensate shall also contain some quantities of suspended solids (crud) derived from the corrosion of water and steam carrying pipe lines, turbine condenser and steam side of the feed water heater. Normally this concentration will not exceed about 25 ppb and the polisher beds shall provide sufficient filtering action to restrict the effluent crud content to less than 5 ppb.	The technical details of pre filter are not mentioned in tender specification, bidder understands that pre filter is not envisaged for CPU. Please confirm bidder's understanding. If pre filters are required, Owner is requested to furnish the technical details of the same.	Prefilters as required to meet the system requirements will be in bidder's scope.
600	Volume-III	PART-A Section-2		8.15.14	Silica (dissolved) content at outlet of CPU shall be less than 5 ppb	Bidder would like to clarify that Silica (dissolved) content at outlet of CPU during normal operation shall be limited to 5 ppb up to 50 deg C temperature. For temperature of condensate above 50 deg C, silica content shall be as per CPU supplier recommendation. Please accept.	Bidder to comply with the specification, can be reviewed during detailed engineering.
601	Volume-III	PART-A Section-2		8.15.14	pH value -ppb -8-8.5 (Normal & Start -Up condition)	Since ammonia is almost removed by CPU, pH will be not maintained/guaranteed as specified in the specification at the outlet of CPU. CPU outlet pH will be as per the CPU vendor recommendation. Please confirm acceptance.	PH shall be controlled as per ammonia dosing as per process requirement.
602	Volume-III	PART-A Section-2		8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Chloride Analyser at outlet of CPU vessel is not required separately as the condensate quality will be analysed by pH Analyser, Conductivity Analyser, cation Conductivity Analyser, common channel Sodium Analyser at common inlet and outlet of CPU. Kindly confirm Bidder's understanding.	Bid Specification Prevails

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603	Volume-III	PART-A Section-2		8.18.01	The polisher units shall be provided at common inlet and each outlet unit with a minimum of following analytical on line analysers. i) pH Analyser ii) Conductivity Analyser iii) Cation Conductivity Analyser iv) Sodium Analyser v) Silica Analyser vi) Chloride Analyser	Bidder understands that Sodium Analyser and Chloride Analyser shall be of Multi-Channel type inline with NTPC Projects. Please confirm Bidders understanding.	For pH, Conductivity, DO single channel shall be used. multi-stream/ multi-channel analyzers shall be considered for Silica, Sodium and Chloride.
604					Bid Drawing	Condensate polishing system scheme is not found in Bid drawing. Owner is requested to provide same.	Bidder shall prepare his drawing confirming to specification requirements.
605	Volume-II	Section-2		2.13.02, i, I	3X50% condensate polishing unit..... DM regeneration water tank , effluent disposal system, PLC for control and monitoring.	Bidder would like to clarify that as DM plant is not in bidder scope therefore DM regeneration water tank will be not envisaged by the Bidder, however, DM regeneration pumps for CPU system shall be supplied by the Bidder, for these pump suction will be taken from the Condensate storage tank Kindly confirm.	Noted.
606	Volume-III	PART-A Section-2		8.15.04	The pressure vessels in the common external regeneration facility will be provided with adequate freeboards over the top of the settled resins in order to minimise the loss of resin during their use. Minimum freeboards are as follows: Mixed Resin Storage Vessel:- 100% of resin volume Resin Separator Vessel:- 75% of resin volume Cation Regeneration Vessel:- 100% of resin volume Anion Regeneration Vessel:- 100% of resin volume Activated Carbon filter:- 75% of media volume	Bidder want to suggest for free board requirement in CPU regeneration area as follow Mixed Resin Storage Vessel:- 50% of resin volume Resin Separator Vessel:- 75% of resin volume Cation Regeneration Vessel:- 75% of resin volume Anion Regeneration Vessel:- 75% of resin volume Activated Carbon filter:- 75% of media volume These above stated free board requirement for vessel is inline with past executed NTPC project. Kindly confirm.	Bid Specification Prevails
607	Volume-II, Section-2, Lead Technical Specification Volume - IV, Bid Drawings	- ETG061-BTG-ME-SG-LDO-PFD-001		3.02.01	Outlet flanges of existing fuel oil (LDO) storage tanks of Unit 8, 9 10 and Tapping from Existing LDO Unloading header. Tapping from existing unloading header or existing storage tanks of unit# 8, 9 & 10	As per Clause No.3.02.01 (Volume-II, Section-2) of Lead Technical Specification, Bidder understands that total two number of terminal point to be considered for LDO (One at LDO storage tank and Other at LDO unloading header). However, in bid drawing (ETG061-BTG-ME-SG-LDO-PFD-001), Option is provided either from LDO storage tank OR LDO unloading header. Due to above discrepancy, Owner is requested to confirm the terminal point for Fuel oil system.	Both Provisions to be provided.
608	Volume-II, Section-2, Lead Technical Specification	-		3.02.01	Outlet flanges of existing fuel oil (LDO) storage tanks of Unit 8, 9,10 and Tapping from Existing LDO Unloading header.	Owner is requested to provide the following inputs :- a) GA drawing of Existing LDO tank with identified location for Pump suction nozzle and its available size. b) LDO unloading header size and its location with identified terminal point location. c) Overall existing fuel oil layout drawing indicating tanker unloading, fuel oil pump house, dyke area etc.	Available drawings shall be provided,further details if necessary shall be obtained at site by bidder
609	Volume - IV, Bid Drawings Volume - III, Part-D, Technical Specification Civil, Structural and Architectural works	ETG061-BTG-ME-SG-LDO-PFD-001		7.19.01	Drain oil collected in surface drain shall be pumped(using 2 x 100% sump pump) to oil effluent collection pit/tank, to be further treaded in oil water separator(ows will be BOP contractor scope) The civil works are to be provided for Oil water separator pit.	As per Process flow diagram, Surface drain of pump house shall be pumped to oil effluent collection pit. The same shall be further treated to oil water separator, which is under BOP contractor scope. However, In civil section, oil water separator pit requirement is mentioned in bidder's scope. Based on above, Bidder understands that oily water separator is not in bidder's scope. Further, owner is requested to provide the location for Oil effluent collection pit for discharge the surface drain.	Oil water collection pit and pumps are in BTG contractor scope.

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610	Volume-II, Section-2 ,Lead Technical Specification			4.40.20 (ii)	Plant Auxiliaries System (within this package): Fuel Oil Pressurizing & Heating System	Bidder understand that Heating system is not applicable only LDO is used as a fuel (Not HFO).	Bidder understanding is correct.
611	Volume-II	Section-2		3.06.00	Treated sewage water analysis 4. Total suspended solids	Owner is requested to provide Total suspended solids parameter in treated sewage water analysis. Also, Owner is requested to provide clarified water analysis.	Treated Sewage Water received from Muncipal STP will be filtered to 5 NTU in the Pre-Treatment Plant (BoP Package). This 5 NTU filtered water will be used for following service- CW Make-up Service Water FGD Clear Water APH/ESP Wash Fire Water
612	Volume-III	PART-A section-2 PART-A Section-1		14.06.00 2.36.02 ETG061-BTG-ME-CDS-PFD-001	Ammonia and Oxygen shall be dosed on high purity condensate and feed water to achieve the above targets. Ammonia dosing points shall be upstream and downstream of CPU and BFP suction while oxygen dosing shall be at BFP suction with alternate connection to CPU outlet. Ammonia dosing system shall be provided to ensure chemical conditioning of condensate/ feed water for controlling the alkanities. The ammonia solution shall be injected in to the condensate at the condensate extraction pumps discharge. Process flow diagram for chemical dosing system	There is contradiction between referred clause and P&ID regarding Ammonia dosing point location for condensate polishing unit. In P&ID It is shown as outlet of CPU and in clause 14.06.00 & 2.36.02, It is written as upstream, downstream and condensate extraction pumps discharge respectively. Bidder has considered dosing as per the tender P&ID. Kindly confirm	Noted
613	Volume-III -	PART-A Section-2 -		14.12.00 ETG061-BTG-ME-ST-GA-001	Both oxygen and ammonia dosing skids shall be located in power house 0.0 m floor.....Process P&ID and sizing calculations shall be reviewed during bidding stage. Space for Dosing system area In this area Oxygen dosing skid, Ammonia dosing skid and Hydrazine dosing skid is located.	There is contradiction between referred clause and TG building 0.0 m area layout regarding dosing skid scope. As per clause 14.12.00 oxygen and ammonia dosing skid shall be located at 0.0 m floor , however as per TG building layout, Oxygen, ammonia and hydrazine skid location is indicated Bidder understands that only oxygen and ammonia dosing skids are envisaged and not hydrazine dosing skid. Kindly confirm.	TG building layout is indicative, hydrazene dosing is not required.
614	Volume-III	PART-A section-2		14.02.00	Oxygenated treatment (OT) along with All Volatile Treatment (AVT) is proposed for feed water treatment. AVT is to be adopted for emergency conditions, such as start up, shut down and condenser tube leakage conditions. OT is to be adopted for normal continuous operation. Hydrazine and phosphate is not to be used for feed water treatment.	Bidder would like to clarify that combined water treatment (CWT) and Oxygenated treatment shall be performed for power cycle chemical dosing during normal operation as per the bidder's past experience So that Owner is requested to furnish specification details for Combined water treatment system.	Bidder specification prevails
615	Volume-III	PART-A section-2		14.04.00	The target levels to be guarantees for various water and steam qualities are as follows:	Bidder would like to clarify that targeted values for water and steam qualities shall be followed as per the boiler and turbine OEM's requirement. Kindly confirm Bidder's understanding.	Specified are minimum requirements.
616	Volume-II Volume-III	Section-2 PART-A section-5		2.13.02, i, n 13.01.00	Industrial gas cylinders 1) Adequate nos. of gas cylinders along with manifold station for various gases (hydrogen, carbon dioxide, nitrogen) shall be supplied. The number of H2, CO2 and O2 cylinders shall be equal to total requirement for one start up and one shut down of two units plus those required to be connected on manifolds of all units plus total requirements for seven days consumption of all units. The Bidder shall supply all gases till completion of trial operation. Filled cylinders shall be handed over to owner, during plant handover.	Detail specification and scope of supply are not available in tender specification. Owner is requested to provide the same to keep all Bidder's at par.	Bidder may provide the same as per their process requirement and inline with current industrial regulations and safety practices. Quantities of each cylinder will be finalized DDE, based on methodology stipulated in the tender. Also Refer Addendum-6

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617	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	276	2.3	2.3 The contractor shall ensure that the approved quality plan is followed scrupulously by him/his subcontractors. All the records of checks during manufacturing shall be made available for verification to the owner's representative during the stage inspection/pre-despatch inspection.	Approval of QAPs shall be as per mutually agreed QA Programme i.e. only a) category I items QAPs shall be submitted to client for approval , b) Category II items shall be approved by Bidder & shall be submitted to client for information, c) For Category III items COC shall be submitted, d) For Category IBR QAP shall be approved by Bidder & submitted for clients information. IBR items will be accepted based on IBR certification <u>Note: QA Programme shall be submitted as part of bid submission</u>	Bid Specification prevails
618	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	276	3.2.2	3.2.2 The contractor, at-least twenty one (21) days prior to expected date of attaining the respective stage of manufacturing/readiness of the goods, shall submit the inspection call indicating the date of inspection	The inspection notification shall be provided as per QA Program (submitted along with this bid). Considering EPC Project, bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 days b) Domestic: For stage inspection - 3 days c) Overseas: Final Inspection - 15 days d) Wherever inspection being performed On machine, 2 days notification will be provided. e) In case remote inspection offered, 2 days notification provided	Bid Specification prevails
619	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	277	3.3.1	3.3.1 Inspection at customer hold points shall be carried out by the Independent Inspection Agency (IIA) of international repute and having presence in the country where inspection is to be carried at the offshore works of contractor/subcontractor. Such agency shall be appointed by the contractor on prior approval of the owner. All the costs of appointing such agency shall be borne by the contractor.	Cost of inspection including travel expenses etc. for Owner's personnel/Owner's independent inspection agency (IIA) shall be in Owner's scope. Please confirm.	Refer clause 3.3.2 of Vol-I, Section-2A
620	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	278	3.3.4	3.3.4 The contractor, at least forty five (45) days before the expected date of attaining such stage of manufacturing/readiness of goods, shall intimate the Chief Engineer (P&P).	The inspection notification shall be provided as per QA Program (submitted along with this bid). Considering EPC Project, bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 days b) Domestic: For stage inspection - 3 days c) Overseas: Final Inspection - 15 days d) Wherever inspection being performed On machine, 2 days notification will be provided. e) In case remote inspection offered, 2 days notification provided	Bid Specification prevails
621	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	278	3.4	3.4 Notwithstanding anything contained hereinabove, the pressure parts of the boiler coming under the ambit of statutory inspection (IBR) whether manufactured in India or abroad, shall be carried out by the owner's personnel only.	a) Bidder requests Owner /Owner's representative to conduct inspection only for category I material. Also the inspection for Category I material may be conducted on virtual platform on case to case basis. b) Bidder do not envisage inspection from Owner for all such materials which will undergo inspection based on statutory compliance such as IBR etc. However, Bidder will provide statutory documents to Owner for reference.	Bid Specification prevails However, it can be discussed during finalisation of the Quality Assurance Program.
622	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	278	3.5	3.5 If the Owner/Owner's Representative requires such equipment, materials, design or workmanship to be re-tested, the tests shall be repeated under the same terms and conditions. The contractor shall undertake an additional testing of any material, equipment or the work, if the Owner/Owner's Representative believes the results of earlier tests are not accurate or do not establish the true condition to specification of equipment, material or work being tested.	Bidder would like to clarify that repetition of the tests are not envisaged, if the test are successfully conducted meeting QAP requirements. If Owner insists to repeat any such tests, then the same shall be subjected to Manufacturer acceptance and the extra cost and extra time shall be borne by Owner. The extra cost and additional time will be informed to Owner for their acceptance. Owner shall accept the Extra cost and additional time as per bidder notice and then only the subsequent works will start. Owner to confirm Bidder's understanding regarding the same.	Bid Specification Prevails Also refer Clause 7.25.00 & 7.26.00 of Volume-II, Section-2 Retest will be required, only if owner is not satisfied with the test.
623	Volume: I / Section: 2A	TERMS & CONDITIONS OF THE CONTRACT-SUPPLY	279	4.1	4.1 On completion of tests of equipment/material enlisted in the list as mentioned under Clause No. 2.1 above, at manufacturer's works, the Contractor shall furnish 4 copies of test certificate(s) as required as per the approved quality plan to the Controller of Quality for approval under intimation to the Project Manager. The test report shall invariably indicate identification data, including Model No., Sr. No. etc. of the equipment, method of application and duration of test along with test results	Bidder propose to submit applicable inspection certificates and test certificate in soft copy considering present facilities of Computer data and to promote Green environment with Sustainable Development Goals (SDG) focus	Bid specification prevails. However can be decided DDE

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624	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	121	7.02.00	The bidder including his suppliers and sub-contractors shall prepare their quality plans in line with the requirements of the specification and standard practices and implement it after approval by the owner and owner's consultant. This will include both Manufacturer's Quality Plans (MQPs) and Field Quality Plans (FQPs). MQPs and FQPs shall be submitted well in advance so that the same can be reviewed and approved by owner/owner's consultant well in advance before start of works.	Approval of QAPs shall be as per mutually agreed QA Programme i.e. only a) category I items QAPs shall be submitted to client for approval , b) Category II items shall be approved by Bidder & shall be submitted to client for information, c) For Category III items COC shall be submitted, d) For Category IBR QAP shall be approved by Bidder & submitted for clients information. IBR items will be accepted based on IBR certification Note: QA Programme shall be submitted as part of bid submission	Bid Specification Prevails Also Refer Clause 7.30.00
625	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	122	7.08.00	All materials, components and equipment supplied under the contract shall be subject to inspection by the owner, his authorised representative or any statutory authority like IBR inspector, should they so require during manufacture, construction, erection and after completion.	a) Bidder requests Owner /Owner's representative to conduct inspection only for category I material. Also the inspection for Category I material may be conducted on virtual platform on case to case basis. b) Bidder do not envisage inspection from Owner for all such materials which will undergo inspection based on statutory compliance such as IBR etc. However, Bidder will provide statutory documents to Owner for reference.	Bid Specification Prevails
626	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	122	7.09.00	No materials/equipment shall be dispatched from the manufacturer's works before the same is either accepted subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by the owner/owner's authorized representatives, or such pre-dispatch final inspection is waived by the Owner and dispatch is authorized after review of test reports.	Inspection and test will be carried out as per approved/mutually agreed QA Programme and inspection categorization list. MDCC issuance by Employers manager/authorized representative will be applicable for components under category I mentioned in QA programme. For category II, III & IBR items, MDCC/IRN will be issued by Bidder. Please confirm. Note: QA Programme with categorization is submitted as part of bid submission	Bid Specification Prevails
627	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	122 222	7.12.00 17.00.00	All the sub-vendors proposed by the bidder for procurement of major bought out items including castings, forgings, pumps, heat exchangers, semi finished and finished components/equipment - (list of which shall be drawn up by the bidder and finalized with the owner) shall be subject to owner's approval. 17.00.00 APPROVED SUB-VENDOR / MAKES 17.01.00 Approved sub-vendor list is provided in Annexure – 4, Volume-V.	Bidder understands that the items specified in Annexure 4, Sub Vendor list are non exhaustive and additional vendors can be approved during detail engineering. However, for items not included in Annexure-4, Bidder shall consider vendors based on bidder's internal process and no separate approval is envisaged from Owner. Please confirm Bidder's understanding.	Bid Specification Prevails Also refer Clause 17.02.00
628	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	122	7.13.00	All welding shall be carried out as per welding procedure drawn and qualified in accordance with requirements of ASME Section IX. Welding procedures shall be submitted to the Owner for approval prior to carrying out qualification test in the presence of Owner's representative.	Welding procedure shall be submitted to customer for information/during inspection. For Shop, Welder qualification record shall be shown to customer at the time of inspection. For site, Wherever required, main contractor will qualify welders as per mandatory requirements of ASME Section IX/IBR. If the welder is already qualified and required records are provided to Owner for their records.	Bid Specification Prevails Can be finalised during finalisation of Quality Assurance Program
629	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	123	7.18.00	Wherever owner's/owner's representative's (inspector) witness is required as per approved quality plans or inspection categorisation plans, the owner and owner's representative shall be notified (inspection call) along with all required details including details of item to be inspected, approved MQPs, address/place of inspection, inspection date etc, at least 21 days in advance, prior to the planned inspection date at manufacturer's works. All test reports and supporting documents shall be made available to owner's inspector at the time of inspection; irrespective of whether it has been furnished earlier.	The inspection notification shall be provided as per QA Program (submitted along with this bid). Considering EPC Project, bidder clarifies that following is proposed for inspection notification a) Domestic: For Final Inspection - 7 days b) Domestic: For stage inspection - 3 days c) Overseas: Final Inspection - 15 days d) Wherever inspection being performed On machine, 2 days notification will be provided. e) In case remote inspection offered, 2 days notification provided	Bid Specification Prevails
630	VOLUME - II SECTION - 2 Volume II / Section II	LEAD TECHNICAL SPECIFICATION 10.11.00 Erection	Page 123 Page 145	7.19.00 10.11.15 (v)	All site inspections as per approved FQP shall be notified along with all details including details of item to be inspected, location, inspection protocols etc., at least 5 working days in advance. v) The Bidder has to mark all stages, which are subject to the Owner's acceptance and has to notify at least one (1) week in advance when such inspection for acceptance becomes due.	As the site inspection activities are continuous, bidder proposes for inspection of site activities on daily basis or one day in advance.	Bid Specification Prevails
631	VOLUME - II / SECTION - 2	LEAD TECHNICAL SPECIFICATION	124	10.12.03 / PRE-COMMISSIONING AND INITIAL TRIAL	The list of tests to be performed prior to initial trials shall be mutually agreed and included in the Field Quality Plan by Bidder.	The list of tests to be performed prior to initial trials shall not be covered in FQP. The same shall be part of manufacturer O&M Manual /Commissioning procedure.	Bid Specification Prevails

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632	Volume II / Section II	LEAD TECHNICAL SPECIFICATION	123	7.21.00	7.21.00 If the owner or his representative does not attend on the notified date or in the event the owner grants waiver for such inspection, the test may be proceed as per approved quality plan, unless an alternative date has been requested by the Owner.	Bidder proposes Customer to attend on the proposed date of inspection or waive off the same as the Manufactures will not wait for the inspection delay from the customer. Bidder will complete the inspection as per proposed date and submit the reports to customer in the sub-sequent inspection or during final clearance.	Bid Specification Prevails
633	VOLUME - II SECTION - 2	LEAD TECHNICAL SPECIFICATION	123	7.23.00	In the event, the inspector could not witness the inspection on the scheduled date for the reasons attributable to the bidder/subcontractor; all the costs of deputing the inspector shall be borne by the bidder.	Bidder will put best efforts to ensure that inspection is successfully conducted as per QAP/FQAP. However, in case of any unforeseen circumstances/test failure, the cost of deputing Owner's personnel/Owner's representative shall be Owner's scope. Please confirm.	Bid Specification Prevails
634	Volume II / Section II	LEAD TECHNICAL SPECIFICATION	123	7.25.00	7.25.00 If the inspector is not satisfied with any test and requires a re-test, the tests shall be repeated under the same terms and conditions. If such retesting demonstrate that the work, equipment or material being so tested conforms to the requirements of Contract, then the owner shall bear the cost of such additional Test and the cost of any required uncovering and covering the goods and shall grant the extension of time for completion, if necessary.	Bidder would like to clarify that repetition of the tests are not envisaged, if the test are successfully conducted meeting QAP requirements. If Owner insists to repeat any such tests, then the same shall be subjected to Manufacturer acceptance and the extra cost and extra time shall be borne by Owner. The extra cost and additional time will be informed to Owner for their acceptance. Owner shall accept the Extra cost and additional time as per bidder notice and then only the subsequent works will start. Owner to confirm Bidder's understanding regarding the same.	Bid Specification Prevails Retest will be required, only if owner is not satisfied with the test.
635	Volume II / Section II	LEAD TECHNICAL SPECIFICATION	124	7.27.00	7.27.00 Notwithstanding anything contained hereinabove, the pressure parts of the boiler coming under the ambit of statutory inspection (IBR), shall be carried out by the owner's personnel only	Bidder do not envisage inspection from Owner for all such materials which will undergo inspection based on statutory compliance such as IBR etc. However, Bidder will provide statutory documents to Owner for reference.	Bid Specification Prevails Can be finalised during finalisation of Quality Assurance Program
636	Volume II / Section II	LEAD TECHNICAL SPECIFICATION	145	10.09.11 10.09.12	10.09.11 Misalignment in vertial joints shall not exceed 10% of plate thickness or 1.0 mm which ever is larger 10.09.12 Misalignment in horizontal joints shall not exceed 15% of upper plate thickness with a maximum of 2 mm for plate thickness above 8 mm and a maximum of 1.0 mm for plate thickness less than 8 mm	Tolerance in dimension shall be as per applicable design standard. Bidder request for acceptance of same.	Bid Specification Prevails. It can be decided DDE
637	VOLUME - II SECTION - 2 VOLUME - II SECTION - 2 Volume II / Section II	LEAD TECHNICAL SPECIFICATION 19.00.00 DRAWINGS AND DOCUMENTS LEAD TECHNICAL SPECIFICATION	Page 99 Page 204 Page 147	7.31.04 19.03.00 10.09.18 iv)	Four copies of each document file containing inspection reports and certificates of site erection testing activities of a particular item of plant or system shall be supplied to the Owner prior to commissioning. 19.03.00 Document distribution schedule (of Hard copies, after placement of order) 10.09.18 iv) During inspection all clearance, alignment and improtant measurements and adjustment as may be directed shall b noted by bidder for future reference and guidance. Two (2) copies of such shall be delivered to the owners	 Bidder propose to submit applicable inspection certificates and test certificate in soft copy considering present facilities of Computer data and to promote Green environment with Sustainable Development Goals (SDG) focus	 Bid specification prevails. However can be decided DDE
638	VOLUME - III PART - A SECTION - 1 VOLUME - III PART - A SECTION - 1 VOLUME - III PART - A SECTION - 6	SG & EPS SG & EPS PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 36 Page 80 Page 33	2.40.03 7.18.00 Piping and Valves 2.05.01	Pipe purchase (for Power Piping) 2.40.03 HYDRAULIC TEST i) All the components which are to be subjected to fluid pressure shall be test minimum of 150% of the design pressure ii) Each length of pipe shall be hydro-tested at shop as per the codes /standards ii) Hydrostatic Test a) All piping shall be subjected to the hydrostatic test pressure at shop as required by the IBR or any other applicable standards.	i) Hydro test pressure shall be performed at site as per approved drawing/design requirement/statutory requirement ii) All pipe lengths shall be subjected to either 100% Ultrasonic Examination or 100% Hydrotest as per Material specification meeting statutory requirements.	Bid specification prevails. However can be decided DDE

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639	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 35	2.05.08	iii) Radiography Test a) The Contractor shall carryout radiography tests of all field welded joints coming under IBR the acceptability standard of which shall be as per IBR (latestrevision). For other field welded joints radiography or other ND testing methods shall be employed as per ASME or /equivalent. All radiography shall be carried out in presence of a competent supervisor of the contractor and his certificate of identification of the films of the radiographs shall be given invariably in all cases. f) Hardness test for 10% weld joints for each system of piping.	Bidder propose to perform NDT method and extent of testing meeting IBR requirement. Alternative NDT may (RT/UT/ PAUT) may be adopted meeting statutory compliance.	Bid specification prevails. However can be decided DDE
		PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 35	2.05.08		Hardness of low alloy steels shall be carried out at weld area as follows - 2% for T91, T92 materials irrespective of size - 3% Alloy steel pipes other than P91, P92 - 10% for P91, P92 Bidder also propose hardness measurement by rebound hammer technique also	
640	Volume III / Section I	TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	Page 38	3.01.03	viii) The piping system shall comply with the requirements of ASME B31.1. The piping material shall be of ASTM A106 Gr. B. PWHT of carbon steel piping and tanks shall be done if anhydrous ammonia is used.	Bidder propose to perform PWHT as per requirement of design standard	Bidder to perform PWHT as per statutory requirement.
641	VOLUME - III PART - A SECTION - 2	STEAM TURBINE AND AUXILIARIES	Page 15	2.11.06 OIL PIPING AND FITTINGS	ii) All welded joints must be controlled 100% by means of radiography	Bidder propose to perform 10% RT/UT/PAUTand 100% DPT as per proven practices. Please confirm acceptance.	Bid Specification Prevails
642	VOLUME - III PART - A SECTION - 2	STEAM TURBINE AND AUXILIARIES	Page 30	4.11.00 condenser	4.11.00 The water box test pressure shall be at least 1.5 times the design pressure.	Water fill test shall be performed for condenser water box at site. Please confirm acceptance.	Condenser water fill test shall be at site
643	VOLUME - III PART - A SECTION - 2	STEAM TURBINE AND AUXILIARIES	Page 35	7.05.00 CONDENSATE EXTRACTION PUMPS	NPSH (R) at 3% head break shall be well below NPSH (A).	Considering NPSH Test as type test, test will be performed on one pump. Also in case vendor has already performed the test in the past, the record of same will be submitted to customer for review instead of performing	Considering NPSH Test as type test, test will be performed atleast on one pump of the supply.
644	VOLUME - III PART - A SECTION - 2	STEAM TURBINE AND AUXILIARIES	Page 54	10.03.00	10.03.00 Each boiler feed pump shall have booster pump to meet the net positive suction head (NPSH) requirement of the main pump.	Considering NPSH Test as type test, test will be performed on one pump. Also in case vendor has already performed the test in the past, the record of same will be submitted to customer for review instead of performing	Considering NPSH Test as type test, test will be performed atleast on one pump of the supply.
			Page 85	21.05.25	i) NPSH tests Witnessed x) NPSH available at booster pump centre line (min), Normal operation Shall not be less than three hundred percent NPSH required at 3% head break by booster pump		
			Page 93	21.08.01 Boiler Feed Pump	xi) NPSH available at booster pump centre line (min), Transient operation Shall not be less than one hundred and twenty five percent the NPSH required at 3% head break by booster pump		
645	Volume II / Section II/ Part A	10.00.00 BOILER FEED PUMPS	Page 58	10.23.00	Pump characteristic curve test tolerances shall be limited to: "Flow at guarantee point" - Plus -0% & Minus -0%	0% tolerance is practically not possible. Tolerance shall be as per OEM practice/applicable standard.	No Tolerance in flow point guarantee
646	VOLUME - III PART - A SECTION - 2	STEAM TURBINE AND AUXILIARIES	Page 56	10.27.03	10.27.03 However, if the tests (Pressure Pulsation, Dry Running, Thermal Shock, and Visual Cavitation) are not performed as per manufacturer's standard practice, Bidder shall submit the test results earlier carried out on identical design except dry run test.	Test certificate for Pressure Pulsation, Axial thrust, Visual Cavitation, of similar pump shall be submitted for Owners review. As per OEM's practice, Thermal shock test is not being done as the design is already proven for the approved vendors.	Noted.
				10.27.01	10.27.01 The Boiler Feed Pumps shall be capable of coasting down safely to standstill after it is tripped in the event of a sudden interruption of suction flow. The Bidder shall demonstrate this capability by a suitable dry-running test at his works as per CEA guidelines and shall furnish full details of this proposed test including its duration etc. in the bid.	As per OEM's practice, it is proposed, not to carryout dry-running test, however these pumps are capable of Coasting down safely to standstill after it is tripped in the event of a suction interruption.	
647	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 33	2.05.01	2.05.01 TESTING OF PIPING AT WORKS i) Material Test and Analysis a) All materials shall be furnished in strict accordance with the codes specified and in accordance with the detailed specification. All sources of material shall be disclosed and relevant test certificates for the physical and chemical properties of the material shall be made available to the Owner/Engineer before the final shop inspection.	Bidder propose to submit MTC for customer review considering volume of pipes being inspected. Also bidder will be submitting the IBR document (for IBR piping) meeting statutory compliance. Please confirm.	Bidder to comply with the specification as the spec requirement is the same.

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648	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 33	2.05.01	iii) Gate valves shall be subjected to shop tests in accordance with API-598 including the high pressure closure test. Globe valves shall be tested in accordance with BS-1873 and check valves in accordance with BS-1868.	Bidder propose to use equivalent other standards including ASME as per design requirement	Noted.
649	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 35	2.05.08	b) All piping containing Chromium content exceeding 2.5 % shall be subjected to Post-Weld heat treatment.	Bidder propose to perform PWHT as per requirement of ASME/design standard	Bid Specification Prevails
650	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 36	2.05.08	Hydrotesting shall be conducted for all pressure parts after installation at required pressure irrespective of carrying out 100% radiography of field welded joints. All necessary blanking arrangement required for such hydrotesting shall be furnished by the Contractor. The hydro testing of piping coming under the I.B.R. shall meet the requirements of I.B.R. and all necessary test pump, temporary piping etc. shall be supplied by the Erection Contractor, irrespective of carrying out radiography on 100% basis of the field welded joints..	Bidder propose to perform NDT method and extent of testing meeting IBR requirement. Alternative NDT (RT/UT/ PAUT) may be adopted meeting statutory compliance.	Bidder to comply with the specification as the requirement is after installation at site.
651	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 79	4.06.01	4.05.01 LARGE DIAMETER PIPING i) After complete pipe lines have been laid and joined, the same shall be tested hydrostatically as specified elsewhere in the specification.	Bidder propose to perform either hydro test or RT/UT/PAUT in line with bidder standard practice: Option 1: RT /UT/PAUT 5%; DPT on finished butt welds 10%; Hydro test 1.5 times the design pressure or 2 times the working pressure whichever is higher. Option 2: RT/UT: 100 % RT/UT on circumferential joints in the bottom 1/3 portion of CW liner for weld length and 5% RT on top 2/3 portion of circumferential joints and 5% RT on longitudinal joints DPT on finished butt welds 10% Hydro test: No Hydro test	Bidder to comply with the specification as the requirement is after installation at site.
652	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 79	4.06.01	ii) All the longitudinal and circumferential welded seams shall be subjected to chalk and kerosene test prior to hydraulic testing of the complete pipe line. This shall be done at the presence of the Purchaser/Consultants.	Bidder propose to perform PT in lieu of chalk and kerosene test	Noted.
653	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 79	4.06.01	iii) In addition to this, test coupons shall have to be provided for each longitudinal seams for mechanical tests (tensile and bend), if considered necessary by the Purchaser. The test coupons are to be broken in presence of the Purchaser. Contractor shall satisfy the purchaser that work is being carried out in accordance with the specification drawings and other conditions. Purchaser shall have full access to the Contractor's working area.	Qualified WPS and PQR with Welder Qualification (WPQ) performed as per reference standard. Qualified WPS/PQR/WPQ will be used in lieu of performing Production test coupons As Qualified WPS/PQR/WPQ along with NDT will provide integrity and strength of the material	Test coupons may not be required. To be discussed
654	VOLUME - III PART - A SECTION - 6	PIPING, VALAVES & SPECIALITIES AND THERMAL INSULATION	Page 74	4.05.03	iv) Vacuum Test a) All Expansion Joints shall be subjected to vacuum test at a pressure of 700 mm of Hg for a period of 10 min. under each of the three conditions mentioned above for hydrostatic test.	Vacuum test shall be performed on expansion joints which are subjected to actual vacuum condition during working condition. Other expansion joints shall not be subjected to Vacuum Test. Please confirm.	Noted.
655	Volume II	Section-2: Lead Technical Specification		6.01.02(vii)	Unit shall be capable of increasing the load through condensate flow regulation in order to meet the load cycling requirement. Necessary measurements and logics shall be provided for implementation of the same. During condensate flow regulation condensate tank level may be maintained through excess condensate dump line to condensate storage tank.	Bidder requests to elaborate the requirement to increase the load through condensate flow regulation.	By varying the condensate flow which in turn changes the flow of extraction steam to the heaters, increases the load,bidder to propose their scheme for the same during detailed engineering.

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656	Volume II	Section-2: Lead Technical Specification		6.02.07(iii)	De-aerator pegging pressure for cold, warm, hot start up and during HP-LP bypass operation, shall be as optimized by the bidder and shall be suitable to bypass operation, shall be as optimized by the bidder and shall be suitable to ensure required deaeration and water quality required for boiler. The optimized pressure should be same during warm, hot start up conditions and during HP-LP bypass operation. Steam is supplied from aux. steam header through pressure control valve	Bidder would like to clarify that optimized pressure shall be different based on boiler OEM recommendation during different operating conditions such as warm, hot startup conditions and HP-LP bypass operation. Please confirm.	The pegging steam to Deaerator when kept in service, the pressure remains constant during different operating conditions. However as per Bidder's practice if the pressure for pegging steam varies, the same is also acceptable.
	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		3.04.00	LP bypass shall be designed to condition the incoming steam from re-heater corresponding to parameters resulting from operation as specified in this chapter above to parameters matching with those of LP Turbine exhaust steam. For LP bypass valve sizing, no steam will be extracted for regenerative feed heating except for deaerator pegging at 3.5 ata with only MDBFP in service the capacity shall be commensurate with that of HP bypass system plus the spray water used in HP bypass.		
657	Volume II	Section-2: Lead Technical Specification		6.02.09(ii)a,(ii)b	a) In case when both the TDBFP's are running, MDBFP shall be kept in Hot standby mode. b) In case when one TDBFP trips, runback shall be initiated to 75% Load. Simultaneously MDBFP On command shall be issued. If MDBFP on feedback is not received within 5 sec (adjustable) then runback set point shall be changed to 60% Load. In this case one TDBFP will cater the demand. If MDBFP will come in service then run back command will be stopped and one MDBFP & one TDBFP will cater the load demand of 100%.	As per OEM Feed water to fuel firing ratio is an important parameter to be maintained in OTSC boilers. It is extremely important that minimum required waterwall flow to be maintained at all times when firing is ON in the boiler. Further, single TDBFP operation capability will be checked during detail engineering based OEM pump characteristic envelope. Therefore runback percentage with single TDBFP operation will be decided during detail engineering. Further, load demand of 100% during 1 TDBFP and 1 MDBFP operation shall be reviewed based on final selection of MDBFP capacity.	Bid Specification Prevails
658	Volume II	Section-2: Lead Technical Specification		6.02.09(ii)f	No BFP trip will be initiated on Separator level high-high, BFP shall be run in recirculation mode.	BFP trip is a safety protocol and deviation is not acceptable as per the bidders' operational philosophy. This clause may be modified or deleted as stated below: "Bidder propose that BFP recirculation valve shall be opened at separator level high and BFP to be tripped at separator level high-high ".	Noted
659	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		7.01.00	3x50% condensate extraction pumps (CEP) shall be provided to pump the condensate from the condenser hotwell through the gland steam condenser, drain cooler, deaerator level control valve, low pressure feed water heaters to the deaerator. The condensate extraction pumps and accessories shall meet the requirements indicated in this Section and in Data Sheet-A of this Volume. CEP motors shall be provided with VVVF control especially for efficient operation of a single pump for extended duration during renewable integration.	By VVVF control of CEP, bidder understands that it is Variable Frequency Drive Control. Please confirm Bidder's understanding.	Bidder's understanding is right
660	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		7.05.00 CONDENSATE EXTRACTION PUMPS 21.05.04	The sizing criteria shall be with 10 to 15% margin over highest conceivable flow, 25% margin on head over Deaerator pressure, Two pumps capable of handling 100% TGMCR - HP heaters out- 1% makeup- worst condenser pressure at 47.5Hz. NPSH (R) at 3% head break shall be well below NPSH (A). Design capacity per pump, "Shall be as per the following rounded off to nearest higher 5 m3/hr: [1.1 x (Flow at turbine VWO + sprays + sealing water)] x 0.5	Due to contradictions between two clauses, Bidder will follow clause no. 21.05.04 for CEP Sizing. Please confirm acceptance.	Bidder to consider both the criteria (as per Clause No. 7.05.00 and 21.05.04) for flow rate and go ahead with the conservative results. Discharge pressure criteria as recommended in Clause No. 7.05.00 prevails.
661	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.30.01 Deaerator	The maximum oxygen content shall not be more than 0.005cc per litre measured as per ASTM D888 or Indigo carmine method at all operating conditions. The carbon dioxide measured by APH method shall be non-traceable at all loads.	Bidder request owner to consider below modifications based on its past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects. Please note that ASTM D 5543 is for "This test method covers the rapid determination of low-level (<100µg/L) dissolved oxygen in thermal-cycle steam condensate, deaerated boiler feedwater, boiler water, and deaerated deionized water. "whereas ASTM D 888 is for general application. Maximum oxygen content shall be 0.005cc/litre at deaerator outlet measured as per ASTM D5543 ASTM-D-888 reference method-A or Indigo carmine method at all operating conditions.	Both codes are acceptable.

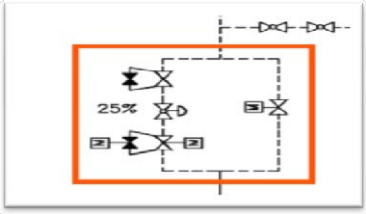
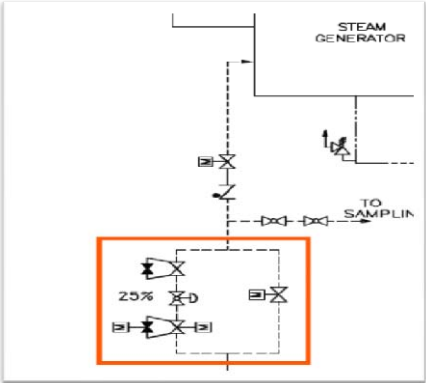
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662	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.05.10 CONDENSATE EXTRACTION PUMPS	NPSH required at 3% percent head break, "Shall not be greater than 80% of NPSH available over the entire range of operation from minimum flow to pump run out"	As per Bidder's standard practice and also as followed in past executed projects including NTPC projects, "NPSH (R) at 3% head drop shall not be more than half the NPSH(A) at design flow with low-low hotwell level and NPSH(R) at 3% head break shall be lower than NPSH(A) under all other conditions." Please confirm acceptance.	Bidders proposal can be accepted at design flow however at run out flow bidder to comply with the specification
663	Volume III Volume II	Part-A, Section-2: Steam Turbine and Auxiliaries Section-2: Lead Technical Specification		1.04.01(ii) 11.30.00	Heat and Mass Balance Diagram: ii) 660 MW output (i.e. 100% TMCR load) under rated steam conditions, at condenser design pressure with zero make-up (GUARANTEED HEAT RATE & OUTPUT). 11.30.00 Guarantees under Category – I 11.30.01 Unit Heat Rate at 100% TMCR Load i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at 77 mmHg(abs) condenser pressure, with zero make-up, at 660 MW load (i.e. 100% of rated load). 11.30.02 Unit Heat Rate at 55% TMCR Load i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at 77 mmHg(abs) condenser pressure, with zero make-up, at 363 MW load (i.e. 55% of rated load). 11.30.03 TG Output i) Continuous TG output of 693 MW unit load (i.e. 105% of rated load) under rated steam condition at 77 mm Hg (abs) condenser pressure, with zero make-up.	There are contradiction in the mentioned clauses regarding Heat Rate and Output Guarantees. Bidder will follow clause no. 1.04.01 for Heat Rate and Output Guarantees. Please confirm acceptance.	Refer Ammendment on Performance Guarantees
664	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		1.04.01	Heat and Mass Balance Diagram: xiv) HP heaters out of service (One string and both strings) under rated steam conditions at condenser design pressure and condenser pressure at worst ambient condition with zero percent make up and 1% make-up and maximum continuous output. xv) 660 MW output (i.e. 100% TMCR load) with all HP heaters out of service under rated steam conditions at condenser design pressure and condenser pressure at worst ambient condition with zero percent make up and 1% make-up and rated output	Due to discrepancies between both the clauses, Bidder understand that in case of all HP heater out condition, maximum continuous output under rated steam conditions at condenser design pressure and condenser pressure at worst ambient condition with zero percent make up and 1% make-up shall be followed. Owner is requested to confirm Bidder's understanding.	660 MW is minimum output requirement during HP heater out of service condition,
665	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		1.04.01 21.03.07	Heat and Mass Balance Diagram: viii) 660 MW output under rated steam conditions at condenser pressure (at worst ambient condition) with 1% make-up. xii) VWO output under rated steam conditions at condenser pressure (at worst ambient condition) with 1% make-up. xiv) HP heaters out of service (One string and both strings) under rated steam conditions at condenser design pressure and condenser pressure at worst ambient condition with zero percent make up and 1% make-up and maximum continuous output. xv) 660 MW output (i.e. 100% TMCR load) with all HP heaters out of service under rated steam conditions at condenser design pressure and condenser pressure at worst ambient condition with zero percent make up and 1% make-up and rated output Worst condenser Pressure,"89 mm Hg(abs)"	Bidder understands that 89 mmHg (abs) mentioned is an typo error & worst condenser pressure should be corresponding to worst ambient condition. Please confirm the bidders understanding.	Bidder's understanding is not correct. Worst condenser pressure of 89 mmHg (abs) as specifieed is correct and the same is in line with worst ambient condition (Ambient temprarure 45~48 deg.C and Relative humidity 30~35% of Koradi site).
666	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.18.05	Shell side relief valves shall be sized for 10% of the feed water flow at 10% accumulation.	As per HEI requirement, Shell side relief valve shall be sized for 10% of the feed water flow, or Flow based on the clean rupture of one heater tube resulting in two (2) open ends discharging , whichever is greater, at 10% accumulation. Please confirm acceptance.	Bidder's understanding is right.

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667	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.30.09	All the parts within the deaerator, coming in contact with concentrated corrosive gases, shall be of stainless steel or alternatively.	For STORK type deaerator only the sprayer will be made from Stainless steel as per the OEM standard & proven practice. Please confirm acceptance.	In case of STORK type deaerator, suitable SS cladding shall be provided inside the deaerator to avoid impact of direct steam impingement on the internal surface as per OEM's practice.
668	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.04.05(ii)	Capacity of pump during hogging, "Shall be able to maintain vacuum up to 0.35 kg/sq.cm(a) within 20 minutes with both the vacuum pumps in operation"	Hogging capacity selection shall be as per HEI for Surface Condenser. Please confirm acceptance.	Bid Specification Prevails
669	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		10.01.00	The boiler feed pump group shall consists of two (2) 50% capacity steam turbine driven main boiler feed pumps (TDBFP) and one (1) 50% capacity electric motor driven standby boiler feed pump (MDBFP) with its electric motor drive and variable speed hydraulic coupling.	Bidder understands that MDBFP is a start-up and hot stand-by pump and it is not required for continuous operation. Considering the reliability of TDBFP, we propose to change the MDBFP configuration to 1x30% instead of 1x50%. Incase of runback, MDBFP will be taken into service and one TDBFP and one MDBFP will cater the load demand of 95%. Please confirm acceptance.	Bid Specification Prevails
670	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.08.01(xiii)	Maximum suction specific speed, "Preferably not greater than 9500 US units"	Bidder request owner to consider below modifications based on it's past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects, "Maximum suction specific speed shall not be greater than 10000 US units and 9500 US units based on 3% head break down of that impeller of main pump and booster pump respectively at their respective design point."	Noted
671	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		10.07.00	The NPSH(R) at 3% head drop for main and booster pump shall be one third of NPSH (A) at design point with lowest de-aerator level and maximum pressure drop across suction strainer.	Bidder request owner to consider below modifications based on it's past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects, "The ratio between NPSH (A) and NPSH (R) at 3% head drop for booster pump and main pump shall be not less than 2.5 at design point corresponding to Low Low level of deaerator.	Bidder to comply with the specification. However, this shall be reviewed further DDE.
672	Volume II VOLUME IV	Section-2: Lead Technical Specification BID DRAWINGS-09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME		6.02.09(i)b	At low load feed water flow is controlled by 1x30% control valve. MDBFP speed will be varied to maintain DP (5 Kg/cm2) across FCV to maintain the water separator level. Above 30% load, 1x100%/2X50% MOV is opened and water flow is controlled by varying the BFP (boiler feed water pump) speed. 	There is a contradiction in mentioned clause and tender drawing regarding 30% feed control valve. Bidder request owner to consider below mentioned configuration for feed control valve: i) 1 x 30% feed control valve ii) 2 x 50% Motor Operated valve Please confirm acceptance.	Feed control valve capacity shall be 30%
673	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		4.11.00	The water box test pressure shall be at least 1.5 times the design pressure.	Water box test pressure shall be considered as 1.3 times the design pressure as per HEI. Please confirm acceptance.	Noted
674	VOLUME IV	BID DRAWINGS-09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME				As per Bidder's standard practice followed in all supercritical power projects, Feedwater flow control valve is being placed at Upstream of HP heaters. Please confirm acceptance.	Bidder's standard practice is accepted for the location of Feed control station. The same can be decided during Detailed Engineering.

The diagram illustrates the HP Heater section, featuring two heaters: HP HEATER NO. 8 and HP HEATER NO. 7. Each heater is equipped with a STARTUP VENT and a CGMT VENT TO DECAERATOR. The system includes spray nozzles for SH and RH attenuators, a HEATER BYPASS SG FILL LINE, and a HEATER BYPASS SG FILL LINE. A SPILL LINE FOR PG TEST is also shown. The diagram uses standard P&ID symbols for valves, pumps, and vessels.

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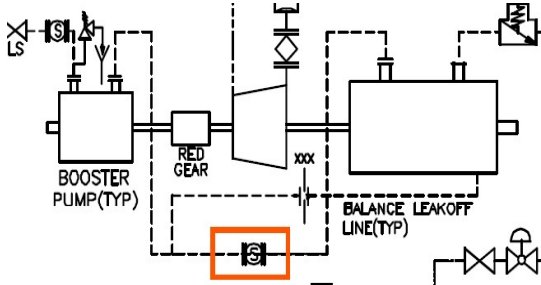
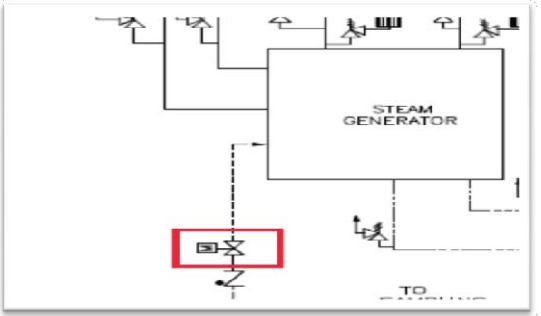
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691	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		10.41.07	A common lubricating / control oil system for each BFPTD and related steam turbine driven boiler feed pumps (TDBFP) shall include but not be limited to the following: i) One (1) AC motor driven main oil pump with drive motor (MOP) ii) One (1) AC motor driven auxiliary oil pump with drive motor (AOP) iii) One (1) DC motor driven emergency oil pump with drive motor iv) One (1) lubricating oil tank with integral strainer, it shall have a retention-time of at least 5 minutes. v) Two (2) AC motor driven vapour extractors with drive motors. vi) Two (2) full capacity oil coolers.	Owner is requested to note that lube oil and control system and their equipment configuration for the BFPT are solely depend on the OEM's proven technology which will be finalized during detail engineering. Owner is requested to accept the same.	Noted, minimum requirement is specified.
692	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		10.41.08	The similar arrangement of lubricating/ control oil system shall be provided for the MDBFP and its drive.	The lube oil system arrangement can not be same for BFPT and MDBFP. For MDBFP, it will as per BFP OEM requirement. Owner is requested to accept the same.	Noted.
693	Volume II	Section-2: Lead Technical Specification		3.02.01(29) Terminal Points	Auxiliary steam interconnection with existing units 8,9 & 10,"Terminal point at Nearest suitable location in Unit 8, 9 & 10"	Owner is requested to note that the present location of Auxiliary Steam header terminal point (in Unit 8,9&10) is approx. 1.5 km away from the proposed 2x660 MW Plant. Therefore it is not feasible to arrange the auxiliary steam from Unit 8,9 & 10 as there will be huge pressure drop as well as temperature drop in the line before it reaches to new proposed unit. Owner is requested to provide separate terminal point for aux steam near proposed expansion units. Bidder requires Aux steam at 16 kg/cm2 & 310 Deg.c at the proposed expansion project.	It should be feasible with adequate pipeline and insulation sizing. Alternatively bidder can offer Auxiliary Boiler, of adequate capacity to meet the auxiliary steam requirements.
	Volume III	Part-A Section-1 SG & Aux., ESP, SCR and MRHS		2.34.07	Auxiliary steam system of the proposed plant shall be interconnected with the Auxiliary steam system of the existing (3x660MW) plant, at a suitable location with isolation valves. Refer Terminal Points / Battery Limits, in Vol. - II, Section-2, for the suggested location.		
	Plot Plan	Terminal/ Tie-in points		T-11	Auxiliary Steam, "Nearest suitable location in Unit 8, 9 & 10 Premises"		
694	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.07.10	Terminal Temperature difference, "Less than 0.3 Deg C."	Considering EPC project, Terminal Temperature difference (TTD) for deaerating feed water heater shall be optimized by bidder. Please confirm acceptance.	Minimum requirement is specified.
695	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		10.27.02	The dry running test shall not be less severe than closing of the isolation valve on the feed pump suction and tripping the pump simultaneously. In this condition, the pump shall be capable of coasting down safely to standstill without any damage and shall be capable of being in normal service.	Dry run test for BFP is not envisaged. However, the offered BFP will be capable of safe coasting down to rest, upon any inadvertent closure of suction valve. Adequate protections & interlocks will be built into the system to prevent dry running of the pump for extended length of time. Boiler feed pumps are not tested for dry run for supercritical power plants, as per OEM recommendations. Please confirm acceptance.	Noted
				10.27.03	However, if the tests (Pressure Pulsation, Dry Running, Thermal Shock, and Visual Cavitation) are not performed as per manufacturer's standard practice, Bidder shall submit the test results earlier carried out on identical design except dry run test.		
696	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.30.04	The feed water storage tank shall have a net storage capacity as specified in Data Sheet-A (6 minutes storage of 100% SGMCR flow) of this Volume at two-thirds level (normal) in the deaerating feed water heater storage tank. The net storage capacity of tank shall be considered as the capacity between normal operating level and low-low level exclusive of the volume of any internal piping, baffles and also excluding the volume of dished ends.	There is contradictions between mentioned clauses regarding feed water storage capacity, Bidder shall consider minimum feed water storage tank capacity based on 6 minutes of feed water outflow based on HBD at TG VWO,1% MU condition with design CWT between normal operating level and low-low level with a filling factor of 0.66. Please confirm acceptance.	Net feed water storage tank capacity at 2/3rd level (Normal) between normal level and low -low level in deaerator exclusive of volume of any internal piping, baffles & excluding volume of dished ends - 6 minutes of feed water outflow based on HBD at TG VWO,1% MU condition with design CWT
				21.07.07	Net feed water storage tank capacity at 2/3rd level (Normal) between normal level and low -low level in deaerator exclusive of volume of any internal piping, baffles & excluding volume of dished ends - 6 minutes of feed water outflow based on HBD at TG VWO,1% MU condition with design CWT		
697	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		4.15.00	Hydraulic butterfly valves , expansion joints and connecting flanges to be installed at inlet and outlet cooling water pipes shall be provided.	Owner to note that, hydraulic operated butterfly valves will be provided in the cooling water pump discharge. Cooling water inlet and outlet pipes connected to the condenser will be provided with Motor operated butterfly valves as it will always be in open condition. Please confirm acceptance.	Noted
698	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		4.25.07	Connections for drains from the steam generator atmospheric drain tank during start-up of the steam generator.	The connections for drains from the steam generator atmospheric drain tank during start up shall be as per the OEM standard and proven practice Please confirm acceptance.	Noted

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699	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		6.04.00	The design shall be as per latest HEI requirements and the capacity margin shall be as per HEI with 20% margin .	Owner to note that, there is no 20% margin defined in the HEI. The capacity will be arrived as per the HEI and will be rounded off to the nearest multiple of 5. Please confirm acceptance.	Bidder to consider 20% margin over the calculated capacity per HEI.
700	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.29.01	The low pressure heater shall have an alternate path to the surface condenser via flash tanks .	Alternatively LP heaters drains can be directly led to Condenser as per Bidder's practice. Please confirm acceptance.	Bid Specification Prevails
701	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		9.30.14	The deaerator shell and storage tank may go under vacuum during certain abnormal conditions and deaerator and storage tank shall be designed accordingly. The storage tank shall have one support leg fixed and other of sliding type to take care of expansion. The Deaerator shall be provided with Drain connection on the storage tank with manual valve and drain pipe to the basement level, Initial fill line with NRV, motor operated valve, gate valve etc. Vacuum breaker valve shall be provided for deaerator.	As per the Bidder standard practice, there is no vacuum breaker valve considered for the Deaerator. The continuous vent from the Deaerators will be connected to the condenser shell. Please confirm acceptance.	Noted
702	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.05.13	Maximum allowable vibration level at all operating conditions - As per ISO 10816-1 Cl II Zone A/B	As per the Bidder standard practice, the maximum vibration level for the CEP at all operating condition shall be as per ISO 10816-7, Category 1, Zone A. Please confirm acceptance.	Noted
703	VOLUME IV	BID DRAWINGS-09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME				Owner to note that strainer is not required in interconnecting pipe as there is already a strainer kept at booster pump suction, extra strainer will unnecessary create extra pressure drop. Please confirm acceptance.	Tender drawing is indicative, Bidder's suggestion is noted.
704	VOLUME IV VOLUME II	BID DRAWINGS-09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME Section-2: Lead Technical Specification		 2.13.01 (iv)b	Feed check valve and isolating valve with motor drive, the feed check valve location to be ahead of isolating valve in the direction of flow. 	Owner to note that as per IBR and ASME BPV I / ASME B31.1, isolating valve is not required if suitable relief mechanism like spring loaded relief valve or 3-way valve across the HP Heater trains is provided as per Bidder's standard engineering practice and followed in past executed projects including Mahagenco & NTPC projects. Please confirm acceptance.	Noted, for economiser inlet.
705	Volume II Volume III	Section-2: Lead Technical Specification Part-A, Section-2: Steam Turbine and Auxiliaries		2.13.02 (i)b-15 6.01.00	Condenser air evacuation system shall be complete with 2 X 100% vacuum pumps, associated motors, all accessories, associated piping, valves & fittings, specialities, duplex filter, instrumentation and control etc. 2 x 100% air evacuation pumps along with all accessories and instrumentation shall be provided for each condenser/shell . Alternatively, 3x50% air evacuation pumps shall also be acceptable in case of two shell condenser/ dual pressure condenser as per standard and proven practice of the OEM.	As per Bidder's standard practice and also as followed in past executed projects including NTPC projects, 2 x 100% air evacuation pumps along with all accessories and instrumentation shall be provided for each condenser shell. Please confirm acceptance.	Bid Specification Prevails, as per clause 6.01.00, Vol-III, Part-A, Section-2

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706	Volume II	Section-2: Lead Technical Specification		2.13.02 (i)g	1) One half capacity (1x50%) motor driven boiler feed pump for each unit complete with booster pump along with it's drives, mechanical seals, flexible couplings, hydraulic coupling, gear box, base plate(s), forced oil lubricating system (including oil pumps, oil tank, lube oil coolers, working oil coolers, duplex oil filters etc.), Automatic recirculation flow control valve, integral piping and valves, temporary and permanent strainers, local instrument racks/enclosures, instrumentation and control etc. shall be provided. One (1) number portable centrifuge of adequate capacity shall also be provided. 2) Two half capacity (2x50%) steam turbine driven boiler feed pumps for each unit complete with booster pump, step down gear box, flexible couplings, mechanical seals, foundation base plates, Automatic low load recirculation flow control valve, integral piping and valves, local gauge boards, instrumentation and control etc.shall be provided. 3) Two (2) steam turbine drives for the turbine driven boiler feed pump per unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers, preferably hydraulic tuning gear, hand barring device, atmospheric relief diaphragm and it's vent piping, all inter connecting piping, foundation base plates, integral gland seal system, complete lube oil and control oil system including oil tank, oil coolers, duplex oil filters, vapour exhausters, 100% capacity centrifuge for each steam turbine driven pump, jacking oil system,	As per Bidder's standard practice and also as followed in past executed projects , 1) No Gear Box anticipated in MDBFP 2) ARC valve is not applicable for this high capacity BFPs and modulating type recirculation control valves will be provided for each BFPs 3) Bidder proposes common 1x100% portable centrifuge per Unit for 2 BFPTs/TDBFPs and 1 MDBFP considering same quality of oil. Please confirm acceptance.	1. Noted for gear box. Other requirements of the Specification for MDBFP prevails. 2. Bid Specification Prevails 3. Noted, common 1x100% portable centrifuge per Unit for 2 BFPTs/TDBFPs and 1 MDBFP
707	Volume II	Section-2: Lead Technical Specification		4.37.05	The turbo-generator set would be designed for a maximum throttle steam flow at turbine Valve Wide Open (VWO) condition of 105% of Turbine Maximum Continuous Rating (MCR) flow.	Bidder understand VWO condition is 105% TMCR load. Please confirm bidders understanding.	Bidder's understanding is right.
708	Volume II	Section-2: Lead Technical Specification		4.37.13	A fully automatic gland sealing steam supply system will be provided for the TG Set and the turbine drives of BFPs. HP & IP turbine shaft glands will be sealed to prevent escape of steam into the atmosphere and the LP turbine glands will be sealed for preventing leakage of atmospheric air into the turbine. Steam will be used for sealing these spring backed labyrinth glands.	Gland sealing and leak-off of BFPTs shall be as per BFPT OEM standard and proven engineering practice. Please confirm acceptance.	Bid Specification Prevails
709	Volume II	Section-2: Lead Technical Specification		6.02.05	i) Normal level in Condenser is maintained by adding make-up water through normal makeup control valve (up to 3% makeup).	Bidder understand that the normal level in Condenser is maintained by adding make-up water through normal makeup control valve (up to 1 % makeup) Please confirm bidders understanding.	Normal make up is 1%
710	Volume II	Section-2: Lead Technical Specification		10.10.06(ix) p-(2)	Maximum continuous output at generator terminals corresponding to both strings of HP heaters out of service, under rated steam conditions, at condenser pressure of 89 mmHg(Abs) and 3% make- up & Aux. Steam requirement tapped from CRH,.....	Bidder understand that it is 1 % Makeup instead of 3% makeup as 1 % is mentioned everywhere in specification. Please confirm bidders understanding.	1% makeup to be considered.
711	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		1.04.01	Following Heat and mass balance diagrams (HMBD or HBD) complete in all respects to be Pressure in bar (a) , temperature in deg C, enthalpy in kcal/kg and flow in tonnes/hr to be indicated at.	Owner to note that unit of pressure is used as kg/cm2(a) everywhere in the specification. Hence bidder will follow the same. Please confirm acceptance.	Noted
712	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.03.06 SURFACE CONDENSER AND ACCESSORIES	Condenser design pressure,"77 mmHg(abs) (however Bidder to optimise and indicate)	Condenser design pressure will be as optimized bidder & it will be lower than 77 mmHg (abs).	Bidder may optimize the condenser pressure (design/ for guarantee) considering CW inlet temperature of 33 deg.C and minimum CW temperature rise of 10 deg.C.
713	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.08.01(xix) Boiler Feed Pump	Maximum vibration level at all operating conditions, "DI 2056 group G degree 'Good' "	As per the Bidder standard practice, the maximum vibration level for the BFP at all operating conditions shall be as per ISO 10816-7, Category 1, Zone A. Please confirm acceptance.	Noted
714	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		21.09.04(ii) Portable Lube Oil Centrifuge Unit	Purpose, "To centrifuge oil in the HP/LP bypass oil system, BFP oil system "	Owner to note that BFP oil shall be purified with separate portable type centrifuge. Please confirm acceptance.	Bid Specification Prevails. Can be discussed DDE.

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715	Volume III	Part-A, Section-2: Steam Turbine and Auxiliaries		7.04.00 CEP 10.23.00 BFP	Pump characteristic curve test tolerances shall be limited to:	Owner to note that Pump characteristic curve test tolerances for both CEP and BFP pumps shall be considered as per HIS requirement. Please confirm acceptance.	Noted
716	Volume II	Section-2: Lead Technical Specification BID DRAWINGS-09 ETG061-BTG-ME-ST-PFD-001_TURBINE CYCLE FLOW SCHEME		6.02.06 (i)	Individual minimum condensate recirculation lines have been envisaged for 3 x 50% capacity condensate pumps at the upstream of the discharge check valves	As per the bidder's engineering practice and past projects, the common recirculation line for the CEP will be provided at the downstream of Gland steam condenser as shown in the Turbine flow scheme. Please confirm acceptance.	Noted
717	Volume III	Part A, Section 1		3.00.00	DE-NOX system (SCR)	Requirement of SCR system to be deleted inline with the ongoing trend followed in all recent projects. Only suitable space provision will be provided in the layout in case SCR system is required to be installed in future	Bid Specification Prevails
718	Volume-1 Volume-2	Section-1 Section-2		1 & 2 11.30.01 & 11.30.02	Guarantees under category-I •Gross Turbine cycle Heat rate @ 100% TMCR, 0%MU, 33 Deg.c CW inlet : Max 1835 kCal/kWh •Steam generator efficiency @ 100% BMCR : 87% Guarantees under category-I •Unit Heat rate @ 100% TMCR •Unit Heat rate @ 55% TMCR	There is discrepancy in the various clauses of tender specifications related to performance guarantees. •As per volume 1, section 1, Separate TG cycle heat rate & Boiler efficiency are required to be guaranteed whereas as per Volume 2, section 2 Unit heat rate is required to be guaranteed •As per volume 1, section 1, TG cycle heat rate guarantee load point is 100% TMCR & Boiler efficiency guarantee load point is 100% BMCR, whereas as per Volume 2, section 2 Unit heat rate @ 100% TMCR & 55% TMCR is required to be guaranteed We request Owner to fix the performance guarantees at 100% TMCR load conditions & only Unit Heat rate will be guaranteed instead of separate TG cycle Heat rate & Boiler efficiency.	Refer Ammendment on Performance Guarantees
719	Volume-1 Volume-1	Section-3 section-1		1 1	Guarantees under category-I •Turbine cycle Heat rate @ 100% TMCR, 0%MU, 77 mmHg (a) Guarantees under category-I •Gross Turbine cycle Heat rate @ 100% TMCR, 0%MU, 33 Deg.c CW inlet : Max 1835 kCal/kWh	There is discrepancy in the referred tender clauses related to condenser pressure to be considered for Heat rate guarantee. Bidder recommend owner to fix the TG cycle heat rate at 68 mmHg (a) Condenser Vacuum.	Category-1 guarantees shall be at 33 Deg C condenser cooling water inlet temperature. Bidder to optimise the condenser vacuum so that the cooling water temperature raise across the condenser shall not be less than 10 Deg C.
720	Volume-III	Part A, Section 1		21.01.03 (v))	Temperature rise across condenser limited to : Bidder to optimize	Since Cooling tower is excluded from BTG package scope, we request Owner to fix the temperature range across colling tower corresponding to temperature rise across condenser for 68 mmHg(a) Condenser vacuum.	As already clarified, cooling water temperature rise across the condenser shall not be less than 10 Deg C. Cooling tower shall be designed accordingly by the other Bidder.
721	Volume-1	Section-1		2	Guarantees under category-I •Steam generator efficiency @ 100% BMCR : 87%	Boiler efficiency value indicated of 87% is not possible to achieve based on the available coal properties. Request Owner to relook into the boiler efficiency values indicated. Also request Owner to provide the complete coal analysis.	Refer Ammendment on Performance Guarantees
722	Volume-III	Section-1		2.28.05 (ii)	Coal Mills ii) The Coal mill combination shall be (N+3), here N=7 working and 3 standby (1 under maintenance) i.e total 10 No of mill for each unit	Bidder propose following changes in working mill requirements. However there is no changes in standby mill requirement from the specification. Bidder may select the number of working mill based on their available mill size / capacity. However, The number of working mill (N) will be 5 or 6 with reference to coal analysis, boiler parameter and selected mill capacity. The number of standby mills will inline with the specification requirement (3 standby (1 under maintenance)).	The Coal mill combination shall be (N+2), here N=6 working and 2 standby (1 under maintenance) i.e total 8 Nos. of mill for each unit considering firing of worst coal at 100% TMCR. However, Capacity of the mills should of 90 TPH and above.

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723	Volume-III	Section-II		11.32.16	Plant availability guarantee of 95% to be provided	Unit availability largely depends on efficient Operation and effective Routine & Preventive maintenance being followed by O&M team, which will be carried out by Mahagenco. In an EPC Contract, major items/ systems for this Project shall be sourced from pre-qualified vendors. However, compliance to defects arising during Warranty/ DLP period shall in any way be adhered by EPC Contractor as per terms of contract. Accordingly Bidder request owner to delete this Plant availability guarantee requirement.	Refer Clause 1.3 of Volume-1, Section-3 for detailed terms & conditions to prove availability.
724	Volume-III	Part A, SECTION-1		2.30.04	Ramp rate : Minimum +/- 1% (below 50% load) Minimum +/- 3% (above 50% to 100% load)	Ramp rates indicated are not possible to achieve & in no Indian plants such high ramp rates are demonstrated till date. We request Owner to modify the ramp rates inline with latest CEA guidelines which are as below : •Minimum ± 1% per minute (55% to 40% load) •Minimum ± 2% per minute (70% to 55%) •Minimum ± 3% per minute (100% to 70% load) load)	Following ramp rates as per CEA guidelines is envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR 1% per minute from 40% to 55%TMCR. However, Min Power Level shall be - 35% of TMCR.
725	Volume-V	Annexure-3		-	Following minimum Mechanical, Electrical & C&I spares shall be provided for each Unit of 660MW i.e. Unit No 11 & Unit No 12	Bidder understands that mandatory spares list provided is common for 2 units & there is no requirement of duplicating the spares for each unit. Bidder understands that each unit mentioned is a typo error. Please confirm.	Listed Mandatory spares are the minimum requirement for each unit.
726	Volume-1	Section-3		3	Auxiliary power consumption (APC) : 36000 KW @ 100% TMCR each unit Total auxiliary power consumption of all auxiliaries including FGD at 660 MW load with zero make up, 76 mm of Hg(a) or lower guaranteed/design back pressure & at 100% TMCR.	Bidder understands that limiting value of 36000 KW provided is for Unit auxiliaries. Request Owner to also provide the limiting values of Auxiliary power consumption for station auxiliaries. Also auxiliary power consumption will be guaranteed at optimized vacuum (as finalized) instead of 76 or 77 mmHg (abs).	The limiting value is inclusive of (50%) BTG station auxiliaries Bidder can prove guarantee at optimised Vacuum.
727	Volume-1	Section-3		-	Station auxiliary power consumption : DM water transfer pump Waste water transfer pump	DM water transfer pump is not part of BTG tender scope. Accordingly request Owner to delete this line item from aux power list. Waste water transfer pump is not an continuous operating pump. Hence request Owner to delete this line item from aux power list.	Bid Specification Prevails Can be decided DDE
728	Doc. No. P&P/Comm/KRD2x660/BTG/2024			4	Auxiliary Water System Pumps (Working Pumps) ☐ Service water pumps ☐ Potable water pumps	Owner to note that Service and Potable Water pumps are not in BTG Bidder's scope, hence, Bidder understands that Service and Potable Water pumps are not applicable under auxiliary power consumption for BTG Bidder. Please confirm Bidder's understanding and amend the clause suitably.	Will be decided during finalisation of PG test procedure.
729	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Condenser : Surface type water cooled for steam turbine generator sets : Condenser(s) heat load should not be less than: i) For single condenser 560 GCal/hr ii) For double condenser 320 GCal/hr per condenser.	Request Owner to modify the provenness requirement for condenser inline with latest industry practice as followed in NTPC & other state utility projects. Condenser of a 500 MW or higher size steam turbine generator unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
730	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Condensate Extraction Pumps (CEP) : Vertical, canister with double suction first stage impeller for steam turbine generator sets : Capacity not less than 900 MT/hr and total developed Head not less than 30 Kg/cm2 Or Capacity not less than 770 MT/hr (in case drip pumps are used) and total developed Head not less than 30 Kg/cm2	Request Owner to modify the provenness requirement for CEP inline with latest industry practice as followed in NTPC & other state utility projects. Condensate Extraction Pump (CEP) rating not less than that supplied for minimum 660 MW size Steam Turbine Generator Unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.

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731	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Condenser Air Evacuation Pump : Liquid ring type for steam turbine generator sets : Free dry air capacity 30 SCFM at 1" of Hg (abs) at 21.1 °C.	Request Owner to modify the provenness requirement for Condenser air evacuation system inline with latest industry practice as followed in NTPC & other state utility projects. Free dry air capacity 20 SCFM at 1" of Hg (abs) at 21.1 deg C.	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
732	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Feed Water Low Pressure Heaters : Horizontal, U-tube Type having condensing and drain cooling zones for steam turbine generator sets : Capacity not less than 1300 MT/hr	Request Owner to modify the provenness requirement for Feed Water Low Pressure Heaters inline with latest industry practice as followed in NTPC & other state utility projects. Feed Water Low Pressure Heater of a 500 MW or higher size unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
733	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Feed Water High Pressure Heaters :Horizontal, U-tube type having integral desuperheating, condensing and drain cooling zones for supercritical steam turbine generator sets : Capacity not less than 800 MT / hour for each string	Request Owner to modify the provenness requirement for Feed Water High Pressure Heaters inline with latest industry practice as followed in NTPC & other state utility projects. Feed Water High Pressure Heater of a 500 MW or higher size unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
734	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: De-aerator : Horizontal, direct contact, spray or spray cum tray design for steam turbine generator sets : Feed water handling capacity not less than 1600 MT/hr	Request Owner to modify the provenness requirement for De-aerator inline with latest industry practice as followed in NTPC & other state utility projects. Deaerator of a 500 MW or higher size unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
735	Volume-1	Section-3		2.2.3	Provenness Criteria for Critical equipment, auxiliaries, systems and bought out items: Boiler Feed Pumps (BFP) : Horizontal centrifugal, Multistage, outer casing barrel type with end rotor removal for supercritical steam turbine generator sets : Capacity not less than 1100 Ton/hr and total developed Head not less than 320 Kg/cm2	Request Owner to modify the provenness requirement for Boiler Feed Pumps (BFP) inline with latest industry practice as followed in NTPC & other state utility projects. Boiler Feed Pump (BFP) rating not less than that supplied for minimum 660 MW size Super-critical Steam Turbine Generator Unit	Bid Specification Prevails If bidder is not able to meet the specific provenness criteria, adequate credentials of minimum 660MW units shall be submitted for owner's review and approval.
736	Volume-II	Section-2		V (A)	Applicable corrections for Heat rate, output & condenser pressure Based on the cycle conditions & covering entire range of operation for Turbine, following correction curves for variation in Turbine cycle Heat rate i.e @105%, 100% & 55% TMCR load & TG output to be furnished along with bid	Bidder understands that wherever 105% & 55% TMCR guarantee mentioned is an typo error & only 100% TMCR guarantee condition is applicable for this project. Please confirm acceptance.	Refer Ammendment on Performance Guarantees
737	Volume II	Section 2 Lead Technical Specifications		4.04.00	All items, equipment and systems of the package shall be designed for a life span of minimum 40 years.	As per prevailing industrial practice from all utilities including NTPC, all items, equipment and systems of the package shall be designed for a life span of minimum 25 years.	All i tems, Equipment and systems of the package shall be designed for a life span of minimum 30 years.
738	Volume II	Section 2 Lead Technical Specifications		5.00.00	CODES AND STANDARDS	Bidder suggests that following standards shall also be applicable: JIS (Japanese Industrial standard), JEM (Japan Electrical Manufacturer's Association), JEC(Japanese Electro technical Committee), IEEE(Institute of Electrical and Electronic Engineers), ISA (Industry Standard Architecture) & Manufacturer's standard	Noted

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739	Volume II	Section 2 Lead Technical Specifications		11.10.00 11.30.11	The parameters indicated under 'Correction' shall be guaranteed by the bidder during the performance tests and if the parameters are not attained during the performance tests, bidder shall make all efforts to achieve the parameters. v) Applicable Corrections for Heat Rate, Output and Condenser Pressure a) Based on the cycle conditions and covering entire range of operation for Turbine, following correction curves for variation in Turbine Cycle Heat Rate i.e. @105%, @100% & @55% TMCR load and TG output to be furnished along with bid: 1) Variation in main steam pressure and temperature 2) Variation in reheater steam temperature 3) Correction curves, if applicable, due to change in reheater spray quantities with respect to coal properties 4) Variation in condenser pressure for main condenser 5) Variation of power factor, frequency, generator hydrogen pressure and voltage. 6) Change in system water storage.	Please note that operating parameters needs to be controlled (controllable parameters) to the best possible limits, however it cannot be fixed and guaranteed. Equipment's shall be designed for the prescribed parameters stated in the Bid document along with capability to take allowable fluctuation for normal operations as per IEC-45 and during performance test these limits shall be brought within the limits prescribed by ASME PTC-6 for accurate evaluation of performance of the machine. The parameters are basically rated parameters specified for designing the TG cycle and cannot be guaranteed.	Variation in operating parameters during PG test shall be as per Table 3.1 of PTC-6
740	Volume II	Section 2 Lead Technical Specifications		11.19.00	In the event of owner agreeing to conductance of such tests after three months, for reasons not attributable to the owner, as assessed by the owner, no factor for ageing shall be considered for computing performance of the equipment.	Ageing correction shall be allowed from first synchronisation as the turbine deterioration starts from the first steam admission itself. As a bidder, such turbine deterioration affects the performance guarantee which cannot be accounted at design stage. In view of the above bidder requests owner to allow ageing correction from first synchronisation. This is also in line to NTPC tenders. Best efforts shall be made to not have any delay in conductance of PG test.	Bid Specification Prevails
741	Volume II	Section 2 Lead Technical Specifications		11.30.01	UNIT HEAT RATE AT 100% TMCR LOAD i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at 77 mmHg(abs) condenser pressure, with zero make-up, at 660 MW load (i.e. 100% of rated load).	Bidder proposes condenser pressure of 68 mm Hg (a) at 100% TMCR guarantee condition instead of 77 mm Hg (a) as 68 mm Hg (a) is a more realistic value.	UNIT HEAT RATE AT 100% TMCR LOAD i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at design condenser pressure at 33 Deg C condenser cooling water temperature, with zero make-up, at 660 MW load (i.e. 100% of rated load).
742	Volume II	Section 2 Lead Technical Specifications		11.30.02	UNIT HEAT RATE AT 55% TMCR LOAD i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at 77 mmHg(abs) condenser pressure, with zero make-up, at 363MW load (i.e. 55% of rated load).	Bidder proposes Heat rate guarantee test at 100 % TMCR only as machines can be designed only at a single point. The machine can be operated continuously at part load without any operating limits. However, bidder does not recommend any part load guarantee.	UNIT HEAT RATE AT 55% TMCR LOAD i) This will be the Guaranteed Heat Rate in kcal/kWhr, under rated steam conditions at design condenser pressure at 33 Deg C condenser cooling water temperature, with zero make-up, at 363MW load (i.e. 55% of rated load).
743	Volume II	Section 2 Lead Technical Specifications		11.30.03	TG OUTPUT Continuous TG output of 693 MW unit load (i.e. 105% of rated load) under rated steam conditions at 77 mm Hg (abs) condenser pressure, with zero make-up.	Bidder proposes condenser pressure of 68 mm Hg (a) at 100% TMCR guarantee condition instead of 77 mm Hg (a) as 68 mm Hg (a) is a more realistic value.	TG OUTPUT Continuous TG output of 693 MW unit load (i.e. 105% of rated load) under rated steam conditions at design condenser pressure at 33 Deg C condenser cooling water temperature, with zero make-up.
744	Volume II	Section 2 Lead Technical Specifications		11.30.11 ii) a)	1) Turbine Cycle Heat rate in kcal/kWhr under rated steam conditions at 77 mmHg(abs) Condenser pressure with zero make up at 660 MW unit load (i.e. 100% of rated load).	Bidder proposes condenser pressure of 68 mm Hg (a) at 100% TMCR guarantee condition instead of 77 mm Hg (a) as 68 mm Hg (a) is a more realistic value.	1) Turbine Cycle Heat rate in kcal/kWhr under rated steam conditions at design condenser pressure at 33 Deg C condenser cooling water temperature with zero make up at 660 MW unit load (i.e. 100% of rated load).
745	Volume II	Section 2 Lead Technical Specifications		11.30.11 ii) a)	3) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 565 deg C / 593 deg C (as selected) at 77 mmHg(abs) Condenser pressure with zero make up at 363 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation.	Bidder proposes Heat rate guarantee test at 100 % TMCR only as machines can be designed only at a single point. The machine can be operated continuously at part load without any operating limits. However, bidder does not recommend any part load guarantee	3) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 565 deg C / 593 deg C (as selected) at design condenser pressure at 33 Deg C condenser cooling water temperature with zero make up at 363 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation.

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746	Volume II	Section 2 Lead Technical Specifications		11.30.11 vi)	b) Unit Heat Rate at 55% TMCR Load	Bidder proposes Heat rate guarantee test at 100 % TMCR only as machines can be designed only at a single point. The machine can be operated continuously at part load without any operating limits. However, bidder does not recommend any part load guarantee	Bid Specification Prevails
747	Volume II	Section 2 Lead Technical Specifications		11.34.01	Performance test for the turbine generator set will be conducted in accordance with the latest edition of ASME PTC-6. Such test shall be binding on the parties to the contract to determine compliance with the guaranteed heat balance conditions at 693 MW (105% TMCR) MW, 660 MW (100% TMCR) & 363 MW (55% TMCR) unit outputs corresponding to the conditions stipulated in the specification.	Bidder proposes only 100% TMCR heat rate guarantee and 105% TMCR output guarantee.	Bid Specification Prevails
748	Volume II	Section 2 Lead Technical Specifications		11.34.04	If due to any unavoidable situation, PG test is delayed, Ageing allowance will be given during evaluation of PG test results and hence guaranteed heat rates shall be increased by the amount calculated as per the formula given in Cl. No. 3.07, Sub-Section-3 of ASME-PTC-6 Report 1985 (Reaffirmed 1991). Period of ageing shall be considered from the date of successful completion of initial operation to the date of conductance of PG test. In calculating the above factor any period(s) during which the turbine has not been in operation at a stretch for more than a week shall not be considered.	Ageing correction shall be allowed from first synchronisation as the turbine deterioration starts from the first steam admission itself. Due to dynamics of the project, there can be delays in between first synchronisation and start of the initial operation which further will delay the PG test also. As a bidder, such turbine deterioration affects the performance guarantee which cannot be accounted at design stage. In view of the above bidder requests owner to allow ageing correction from first synchronisation at least. This is also in line to NTPC tenders. Best efforts shall be made to not have any delay in conductance of PG test.	Bid Specification Prevails
749	Volume II	Section 2 Lead Technical Specifications		14.04.00	The tools, tackles and appliances supplied in general shall not be used for erection purposes by the Bidder and shall be handed over in brand new condition. Damaged tools, tackles and appliances shall be replaced before handing over	New special tools & tackles will be supplied by Bidder. However during Erection & commissioning activities these supplied special tools and tackles will be used by the bidder & same will be handed over to customer. In case, any special tool and tackle is damaged, same shall be replaced with new one..	Bid Specification Prevails
750	Volume III	Part A / Section 2		1.02.03	Over pressure & Over temperature Operations: Turbine shall be capable of accepting variation in steam temperature & pressure as per IEC-45 including over pressure operation (under V.W.O condition).	Over Pressure operation is not applicable for LMTG turbine. Turbine shall be capable of accepting variation in steam temperature & pressure as per IEC-45	Noted
751	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		1.04.00 Heat and Mass Balance Diagram	xi) VWO with over pressurisation corresponding to boiler capability at condenser design pressure with 1% make-up.	Over pressurisation is not applicable for LMTG turbine.	Noted
752	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		2.03.02	The rotor shall be heat stabilized after machining. Ultrasonic, magnetic particle and other methods of test shall be applied to each rotor to ensure homogeneity of the materials and freedom from non-metallic inclusions, voids and cracks.	Only HP and IP rotor will be heat stabilised as they are operated under significantly higher temperature. The thermal stability test for LP turbine rotors are not executed because the LP rotor inlet steam temperature during operation is not so high to cause thermal imbalance. It was confirmed by abundant manufacturing operating experience that the effect on vibration of LP rotor for heat transformation is very small. Hence Heat stability is not required for LP turbine.	Bid Specification Prevails
753	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		2.04.09	The blades along peripheral shall be suitably held with shrouding strips in HP stages. L-1 and L-0 LP blades shall be of free standing type. The free standing blades shall be independently tuned to avoid resonance during rotational frequency of -5% to +3%.	As per OEM design,L-1 & L-0 are integral shrouded type blades instead of free standing type.	Noted
754	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		2.09.04	The HP and IP stop valves, if not mounted on the steam turbine casing, shall be connected to the steam turbine by piping flexible enough to avoid transmission of excessive forces and moments to the steam turbine casing. The piping shall be designed to limit the noise level due to flow of steam to within 85 dBA at 1.0m from the outline of the equipment.	Noise level except for back ground noise will not exceed 90 dB(A) at 1.0 meters horizontal distance from the equipment, and at 1.5 meters above operating floor and the floor on which the equipment is mounted during normal running of the equipment. During unsteady operating conditions like start up, shutdown, trip, etc. and during intermittent operations, the noise will be higher.	Bid Specification Prevails

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755	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		2.11.09 OIL PURIFIER	i) Oil centrifuge having capacity to purify 20% of total oil charge in system per hour. The purified oil from centrifuge shall be with no free moisture and maximum particle size conforming to code 15/12 as per ISO 4406 and moisture content not more than 500 ppm or as per requirement of the turbine manufacturer whichever is more stringent. The above purity shall be achievable with particle size and moisture content of inlet oil conforming to code 21/18 as per ISO 4406.	Coalescer type lube oil purifier is provided instead of centrifuge oil purifier, as per bidder's standard and proven practice.	Noted
756	Volume III	Section 2 TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES		21.02.01 c) Operating mode 6.01 .02 ii) Volume II Section 2 Lead Technical Specifications	i. Constant pressure between 90% TGMCR to 100% SGMCR ii. Sliding pressure between 35% TGMCR to 90%TGMCR Sliding Pressure Operation from rated pressure down to 40% of rated pressure with as well as without any throttle reserve. For modified sliding pressure condition, at any operating load, the throttle reserve shall be sufficient so as to achieve an instantaneous increase in turbine output by 5% of the corresponding load, by opening turbine control valves wide open.	There is a discrepancy in the clauses. Bidder shall follow sliding pressure definition as per clause 6.01.02 ii) of Volume II Section 2 Lead Technical Specifications: Sliding Pressure Operation from rated pressure down to 40% of rated pressure with as well as without any throttle reserve. For modified sliding pressure condition, at any operating load, the throttle reserve shall be sufficient so as to achieve an increase in turbine output by 5% of the corresponding load, by opening turbine control valves wide open.	The requirement of the specification is - i) between 90% to 100% load the pressure at the inlet of turbine shall be constant. ii) between 35% to 90% of load, the pressure shall be varied as per sliding pressure requirement.
757	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION		7.02.00	The bidder including his suppliers and sub-contractors shall prepare their quality plans in line with the requirements of the specification and standard practices and implement it after approval by the owner and owner's consultant. This will include both Manufacturer's Quality Plans (MQPs) and Field Quality Plans (FQPs). MQPs and FQPs shall be submitted well in advance so that the same can be reviewed and approved by owner/owner's consultant well in advance before start of works.	The inspection and test requirements for Steam Turbine, Generators and Auxiliaries are not available in this bid specification. However, we will submit LMTG's Standard Customer QAP based on our manufacturing procedures and drawings for Customer approval (Similar to previously executed Mahagenco Koradi project).	Bid Specification Prevails. "The bidder including his suppliers and sub-contractors shall prepare their quality plans in line with the requirements of the specification and standard practices and implement it after approval by the owner and owner's consultant."
758	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION		7.09.00	No materials/equipment shall be dispatched from the manufacturer's works before the same is either accepted subsequent to pre-dispatch final inspection including verification of records of all previous tests/inspections by the owner/owner's authorized representatives, or such pre-dispatch final inspection is waived by the Owner and dispatch is authorized after review of test reports.	Inspection and test will be carried out as per mutually agreed LMTG's Standard Customer QAP. MDCC issuance by Employer's Engineer/authorized representative will be applicable for components which are listed in the mutually agreed QAP. For Miscellaneous items which are not included in mutually agreed QAP, Certificate of Conformance (COC) issued by LMTG shall be treated as final dispatch clearance.	Refer Clause 7.29.00 & 7.30.00; for Quality Assurance Program
759	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION		7.18.00	Wherever owner's/owner's representative's (inspector) witness is required as per approved quality plans or inspection categorisation plans, the owner and owner's representative shall be notified (inspection call) along with all required details including details of item to be inspected, approved MQPs, address/place of inspection, inspection date etc, at least 21 days in advance, prior to the planned inspection date at manufacturer's works. All test reports and supporting documents shall be made available to owner's inspector at the time of inspection; irrespective of whether it has been furnished earlier.	The notice period for inspection calls is as follows: Local inspections (Within India): 07 days Overseas inspections if any (Outside India): 21 days	Bid Specification Prevails.
760	VOLUME - II	SECTION - 2/ LEAD TECHNICAL SPECIFICATION		7.31.04	Test Certificate and Documentation: Four copies of each document file containing inspection reports and certificates of site erection testing activities of a particular item of plant or system shall be supplied to the Owner prior to commissioning.	In our journey towards Digitalization and Environment friendly initiatives we have switched to submission of "e-Quality dossier" i.e., in the electronic form through Pendrives / email / uploading in customer's portal only. However, the original inspection reports as per approved Quality plan are retained by LMTG.	Bid specification prevails. However can be decided DDE
761	VOLUME - V	Annexure-4, Sub-vendor list		--	List of approved vendor	Vendors for major Steam Turbine and Generator components are not available in the Annexure-4. LMTG approved vendor list shall be applicable for major components listed in Standard Customer QAP.	Bid Specification Prevails Can be decided DDE, based on credentials

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762	VOLUME - II	SECTION - 1	5	3.05.00	Fuel Analysis of Coal Proximate Analysis Ultimate Analysis	The coal analysis provided is not proper. Following are the observations: Proximate Analysis-Fixed Carbon content is not available. Ultimate Analysis-Moisture is not matching with the moisture content provided for Proximate analysis, Oxygen content is too high. Customer is requested to review the same.	Updated coal analysis will be shared with the bidder along with replies to pre bid queries.
763	VOLUME - I	SECTION - 3	390	6.3	Category-I Steam Generator Efficiency - 87%	Customer to note that with the provided coal analysis the steam generator efficiency of 87% is not achievable. Kindly review.	Refer Ammendment on Performance Guarantees
764	VOLUME - III	SECTION - 1	2.28.05	24	Coal Mills ii) The Coal mill combination shall be (N+3), here N=7 working and 3 standby (1 under maintenance) i.e total 10 No of mill for each unit	Bidder propose following changes in working mill requirements. However, there is no change in the standby mill requirement from the specification.	The Coal mill combination shall be (N+2), here N=6 working and 2 standby (1 under maintenance) i.e total 8 Nos. of mill for each unit considering firing of worst coal at 100% TMCR.
765	VOLUME - III	SECTION - 1	67	6.10.01	Maximum permissible mill loading Mill inerting / fire fighting system Coal Mill combination shall be (N+3) where, N=7 working and 3 standby (1 under maintenance); i.e. total 10 no. of mills for each unit at 90% of mill loading, the system shall be able to meet 100% coal firing rate using design coal for TMCR.	Bidder may select the number of working mills based on their available mill size / capacity. However, The number of working mill (N) will be 5 or 6 with reference to coal analysis, boiler parameter and selected mill capacity. The number of standby mills will be inline with the specification requirement (3 standby (1 under maintenance)).	However, Capacity of the mills should of 90 TPH and above.
766	VOLUME - III	SECTION - 1	3	2.11.00	Efficiency of Steam Generator - The guaranteed efficiency shall be based Heat Input GCV of as received coal and other conditions such as design ambient temperature, relative humidity etc.	Bidder presume the boiler efficiency shall be estimated with ASME PTC 4(Latest edition).	Bidder's understanding is correct.
767	VOLUME - III	SECTION - 1	4	2.12.01	v) Blended Coal – a) 70% : 30% indigenous & imported coal b) Steam Generator and its auxiliaries shall also be capable of obtaining maximum continuous rating, safely and on sustained basis, when firing up to 30% imported coal, typical data of which is as specified in the Project Information; by weight blended with Indian coal(s) as specified in therein.	Customer is requested to provide Imported coal analysis in the tender specification.	Imported coal analysis, revised coal analysis shall be given to the Bidders along with resolutions of pre-bid clarification meeting.
768	VOLUME - III	SECTION - 1	6	2.16.02	Design pressure of the Steam Generator pressure parts shall be at least 1.05 times the maximum operating pressure, or as required by IBR/ other international codes, whichever is higher. Further, maximum operating pressure for design of the steam generator parts up to separator(s) inlet shall be arrived at by adding an additional margin for the increased pressure drop in the evaporator tubing due to scaling during operation over a period of time. This additional margin shall be equal to at least 2% of maximum operating pressure with evaporator tubing without scaling or actual expected increase in the pressure drop in water wall/ evaporator section, whichever is higher.	Mahagenco may note that the operating pressure of once through Boiler is different at different section. Hence the Design pressure of the Steam Generator pressure parts shall be at least 1.05 times the maximum operating pressure of that section or as required by IBR/ other international codes, whichever is higher. ."	Noted.
769	VOLUME - III	SECTION - 1	6	2.16.04	In line with IBR, the maximum permissible temperature/ metal temperature for design of different components of the Steam Generator shall be considered as specified in the Data Sheet-A. 485 < T ≤ 535 ASME SA 335: P-11/P-22/P-91 ASME SA 213: T-11/T-22/T-91 P/T-91 is preferred at T> 500 deg.C.	Bidder requests customer to include SA 213: T-12 for this temperature range.	Noted.
770	Volume-III	Part-A; Section-1		6.01.25 VI) Data Sheet-A	<u>580 < T ≤ 620</u> SA 335 P-91/P-92 SA 213 T-23/T-91/T-92/TP-304H/ S30432 shot peened/TP347H Or approved equivalent. <u>620 < T ≤ 650</u> SA 335 P-92/P-122 SA 213 T-92/T-122/TP-321H/TP-347H	Bidder requests customer to include SA213-UNSS30432 for this temperature range.	Noted.

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771	Volume-III	Part-A; Section-1		6.01.25 VI) Data Sheet-A	<u>580 < T ≤ 620</u> SA 335 P-91/P-92 SA 213 T-23/T-91/T-92/TP-304H/ S30432 shot peened/TP347H Or approved equivalent.	Customer is requested to note that the SA-213 UNS S30432 shot peened material is used at SH and final RH outlet in Ultra supercritical (USC) units where the temperature are very high (more than 610 deg C). Mahagenco may note that the Koradi unit shall be with SH Outlet temp of 568 deg C and RH outlet temp of 596 deg C and hence shot peened tubes will not be required. Also, shot peened tube loses its properties once it undergone with the manufacturing process (Bending). We request Customer to kindly accept the bidder's clarification.	Noted. SS30432 (Super 304H) is already accepted.
772	VOLUME - III	SECTION - 1	6	2.16.06	The working fluid temperature to be considered for design of pressure part tubes starting from water wall bottom ring header up to and including the water wall outlet headers shall be arrived by adding an additional margin of minimum 50 °C to the maximum predicted/expected fluid temperature in these pressure parts/ wall tubes considering part of the furnace wall acts as radiant superheater.	As per IBR requirement, following margins are to be considered for sizing of pressure parts 1. Radiant Superheater/Reheater 50 deg C 2. Convection Superheater/Reheater 39 deg C 3. Furnace 28 deg C	Bidder to consider Design Temperature or Design Metal Temperature = Maximum Working Fluid Temperature + IBR Margin or Margin specified in the Tender Specification (whichever is conservative).
773	VOLUME - III	SECTION - 1	6	2.16.07	The working fluid temperature to be considered for design of pressure parts starting from downstream of water wall outlet headers up to first stage of superheater attemperation shall be arrived by adding an additional margin of minimum 39 °C to the maximum predicted/expected fluid temperature in these pressure parts considering primary superheater or LTSH is located in convective zones.	It is noticed that the temperature margin as mentioned in the respective clause are as per IBR requirement. Hence, IBR requirement as specified in clause no 2.16.08 over and above the working fluid temperature is not required. The pressure parts design temperature Design Temperature = Working fluid temperature as predicted by the bidder + IBR requirement or Margin specified in the tender specification	
774	VOLUME - III	SECTION - 1	6	2.16.08	The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived.		
775	VOLUME - III	SECTION - 1	6	2.16.09	For the other pressure parts where no design margin is specified in the IBR and the above specified 50°C or 39 °C margin is not applicable, the working fluid temperature to be considered for design of pressure parts shall be arrived at by adding following margin to the maximum predicted/expected fluid temperature in these pressure parts: i) 10 °C for inlet headers and its connecting tubes, pipes downstream and upstream of attemperators and other pipes in pressure parts..	Bidder request Mahagenco to revise the clause as For the other pressure parts where no design margin is specified in the IBR and the above specified 50°C or 39 °C margin is not applicable, the working fluid temperature to be considered for design of pressure parts shall be arrived at by adding following margin to the maximum predicted/expected fluid temperature in these pressure parts: i) 5 °C for inlet headers and its connecting tubes, pipes downstream and upstream of attemperators and other pipes in pressure parts.	Bid Specification Prevails
776	VOLUME - III	SECTION - 1	7	2.16.09, iii	For final super heater and final reheater outlet and piping, a minimum margin of 8 °C and 15 °C shall be considered.	For final super heater and final reheater outlet and piping, a minimum margin of 5 °C shall be considered.	Bid Specification Prevails
777	VOLUME - III	SECTION - 1	9	2.19.14	Flame impingement on steam/water walls is not permitted. Suitable provisions, including the extent of combustion staging, shall be made to minimize the water wall corrosion. The bidder shall demonstrate that the average thinning of tubes in the burner zone due to corrosion, erosion etc. shall not be more than 0.1 mm/per year.	The requirement of demonstration test is not clear. Customer is requested to clarify the same.	To be decided DDE.
778	VOLUME - III	SECTION - 1	11	2.20.06	To assure the adequate cooling of the furnace tubes of the evaporator during start-up or in low load operation, a minimum flow rate of approximately 35 % TGMCR shall be maintained.	As per Bidder design, min flow of 25%TMCR shall be maintained during the start-up.	Noted.
779	VOLUME - III	SECTION - 1	13	2.22.11	Auxiliary steam tap-off connection for soot blowing shall be either from intermediate superheater header or from cold reheat line or from auxiliary steam header. In case the steam is tapped off from the cold reheat line or from auxiliary steam header, Bidder shall furnish a list of installation where such systems are in vogue and also the same shall be reflected appropriately in the turbine cycle heat balance diagrams. Suitable allowance shall be provided for the super heater and reheater tubes to counter the erosion condition.	Customer is requested to clarify regarding the erosion allowance that needs to be considered for superheater and reheater tubes. Bidder Provide erosion allowance of 1mm (minimum) in addition to thickness calculated as per IBR formulae in the design practice.	Bidder to consider erosion allowance as indicated in the specification after arriving thickness by IBR formula.
780	Volume-III	Part-A; Section-1		6.01.28~31 Data Sheet-A	Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae		
781	Volume-III	Part-A; Section-1	54 of 90	6.01.31.iv	Economisers Economiser tube thickness - Provide erosion allowance of 1.6mm (minimum) in addition to thickness calculated as per IBR formulae.		

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782	Volume-III	Part-A; Section-1	54 of 90	6.01.30	Superheater / Reheater - Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae		
783	Volume-III	Part-A; Section-1	54 of 90	6.01.29	Evaporator - Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae		
784	Volume-III	Part-A; Section-1	54 of 90	6.01.28	Economiser tube thickness - Provide erosion allowance of 1.6 mm (minimum) in addition to thickness calculated as per IBR formulae		
785	VOLUME - III	SECTION - 1	13	2.23.06	Economizer coil shall be design evenly distributed in 3 bank pattern systems , like Upper bank, Intermediate bank and lower bank.	Bidder provides economizer in two passes with one pass having only one bank of economizer. Hence, Customer is requested to modify the clause as "Economizer coil shall be design evenly distributed pattern systems in case of more than 1 bank, like Upper bank, Intermediate bank and lower bank."	Noted.However second pass coils vertical distance to be fixed such that complete coil inspection is possible inside boiler by coil lifting.
786	VOLUME - III	SECTION - 1	22	2.28.02.iii	iii) Coal supply to the mills shall be from the individual coal bunkers having useful storage capacity of minimum 16 hours with the unit operation at 100% BMCR while design coal as specified in general specification.	Coal supply to the mills shall be from the individual coal bunkers having useful storage capacity of minimum 10 hours with the unit operation at 100% BMCR while design coal as specified in general specification.	Bid Specification Prevails
787	VOLUME - III	SECTION - 1	28	2.29.01	Bidder to provide adequate numbers of coal bunker for each unit and should have 16 hrs storage capacities for 100% BMCR operation, taking 20% filling factor considering Performance Coal as fuel.		
788	VOLUME - III	SECTION - 1	25	2.28.05.iii.r	The mill shall be capable of running at part loads and ensure minimum turn-down ratio of 2.5:1 .	There is a mismatch in the tender specification for mill turndown ratio. Customer is requested to modify the same as 3:1.	Noted.
789	VOLUME - III	SECTION - 1		6.09.03.i	Turn Down Ratio- 3:1 / To Match with coal mills		
790	VOLUME - III	SECTION - 1	52	6.01.15	ii) Burner zone heat release rate (BZHRR) kCal/hr/m2 1.36x10 ⁶	For 660 MW units, kindly revise Burner zone heat release rate (BZHRR) - 1.5x10 ⁶ kCal/hr/m2 inline with other state and central utilities technical specifications.	Bidder to comply to the Specification requirement.
791	Volume-III	Part-A; Section-1		2.19.15 & 16	For, vertical tubing arrangement, Minimum 10 mm dia. Wear bars of suitable wear resistant material shall be welded along the full length of first 40 tubes of inclined water wall tubes of S-panel of bottom hopper from each corner up to hopper opening. 2.19.16 In case of spiral tube arrangement, wear bars shall be welded on each of the inclined water wall tubes of S-panel up to a length of 3.3 m from each corner. Alternatively, instead of welding wear bars to the inclined wall tubes as indicated above, in order to take care of tube erosion due to sliding ash, Bidder can also provide 1.0mm additional tube thickness on entire inclined tubes of the 'S' panel over and above the tube thickness calculated as per IBR and other specified requirements.	Bidder understands that Alternative option of 1.0 mm additional tube thickness is also applicable for vertical tubing arrangement. Kindly confirm.	Noted. Bidder to consider 1.0 mm additonal erosion allowance, for furnace tubes above the furnace bottom hopper to avoid tube leakages because of falling of slag
792	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	75 of 90	6.15.08	Minimum thickness of 8mm for flue gas ducts and 6mm for air ducts.	Based on bidder experience and standard design, Bidder proposes to use 5mm thickness for air ducts inline with executed Koradi Project(Unit-8,9&10). Customer to confirm the same.	Bid Specification Prevails
793	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	75 of 90	6.15.08	Minimum thickness of 8mm for flue gas ducts and 6mm for air ducts.	Based on bidder experience and standard design, Bidder proposes to use 6 mm thickness for Flue Gas Ducts inline with LMB executed references. Customer to confirm the same.	Bid Specification Prevails

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794	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	18 of 90	2.25.13 (xviii)	The suggested material of construction is ASTMA36 for duct plates, vanes, structural shapes, ASTM A53 for pipe struts, trusses, ASTM A307 for erection bolts etc.	Based on bidder experience and standard design, Bidder proposes to use Material of construction as per IS standards inline with executed Koradi Project : (i) Duct plates, turning vanes perforated plates : IS2062-E250 Gr A/BR or equivalent (ii) Structural shapes : IS2062-E250 Gr A/BR or equivalent (iii) Pipe struts, trusses, bracing : ASTM A 106 /IS 1161 or equivalent (iv) Erection tools for ducts :IS1367 -Gr 4.6 or equivalent Customer is requested to confirm the same.	With respect referred clause, following is acceptable - IS 2062 / ASTMA36 for duct plates ASTM A 53 / SA 106 for pipes
795	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	18 of 90	2.25.13 (xviii)	All gas and air ducts consist of turning vanes / baffle plates, stiffening devices, expansion joints, interior bracings, access doors and brackets, support structures and hangers as necessary. Duct work should take in to consideration for installation of wet FGD in line with flue gas path of the unit. The design of ducting should consider wind loads, dead weights of material, lining, insulation etc., ash accumulation in case of horizontal ducts, expansion joint reaction	Based on bidder experience and standard practice, Ash loading on flue gas duct shall be designed as per Bidder's standard design inline with executed Koradi Project. Customer to confirm the same.	Bid Specification Prevails
796	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	75 of 90	6.15.07	MATERIALS OF CONSTRUCTION i) Dampers frame-Heavy structural steel channels or plates not less than 10 mm thick ii)Blades-Not less than 10 mm thick made up of 2 x 5 mm thick plates iii)Linkage bolts and pins-Stainless steel	Based on bidder experience and standard design, Bidder proposes to provide material of construction as per OEM standard. Customer to confirm the same.	Bid Specification Prevails
797	VOLUME - III	PART - A SECTION - 1 TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	18 of 90	2.25.13 (xx)	Locking devices shall be provided to permit locking of the dampers in both open and shut positions.	Based on bidder experience and standard design, Bidder proposes to provide locking devices in Isolation dampers only. Customer to confirm the same.	Noted.
798	Volume-III	Part-A; Section-1		2.23.08	Length of economizer coil shall be designed such that 225 to 250mm gap shall be maintained between coil end and back of water wall panel	Clear gap shall be maintained between economizer coils and water walls as per bidder's proven design considering the performance of the boiler.	Noted.
799	VOLUME - II	SECTION - 2	178 of 238	11.30.11.iv	It may be noted that the heat balance diagrams and guarantees shall be furnished considering zero spray water quantity for superheater and reheater spray. During Performance Guarantee Testing, in case water is required for superheater and/or reheater temperature control, the bidder shall be entitled to heat rate correction as per correction curves to be submitted by him with his offer	Customer to note that Superheater spray is taken from economizer outlet for SH Outlet steam temperature control. Hence, SH spray flow will not have any effect on Turbine Heat rate. Customer is requested to modify the clause accordingly.	No correction is required as SH spray water's impact on heat rate depends on location of tapping. Spec recommended tapping is after top HP heater or upstream of Economizer inlet. Correction will be employed if spray water is taken from upstream of flow measurement to economizer/boiler. Bidder shall reconfirm that spray tapping is taken from economizer outlet.
800	VOLUME - III	PART - A SECTION - 1	51	6.01.10	Means of temperature control i) Super heaters Spray water attemperation (utilising water tapped of from downstream side of last /top HP heaters)		
801	VOLUME - II	SECTION - 2	179 of 238	11.30.11.vi	During the PG tests, through heat rates will be calculated for VVO condition / 105% of TMCR; but Category-I guarantees will be applicable to I guarantees will be applicable to -		

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802	VOLUME - II	SECTION - 2	180 of 238	11.30.11.vii	vii) Steam Generator Efficiency 5) Corrected flue gas temperature at air preheater outlet □ @105% TMCR - 129°C or as predicted by the Bidder whichever is higher	Customer to note that Boiler Efficiency and Heat rate test will not be conducted at 105%VVO load condition.	Refer Amendment on Performance Guarantees
803	VOLUME - II	SECTION - 2	182 of 238	11.30.11.ix	ix) Steam generating capacity a) Steam generating capacity in T/hr of steam at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with any combination of mills working as per Owner's discretion) with the coal being fired from within the range specified at the following conditions with heaters out of service condition: 1) BMCR condition 2) TMCR conditions 3) TMCR with all HP heaters out of service condition	The steam generator capacity test shall be conducted at 100%BMCR only.	Bidder shall note that BMCR capacity test shall be covered under Cat-I Gurantee. TMCR capacity test can be ensured while conducting Cat-I Heat Rate Guarantee for TMCR load. Bidder has to demonstrate TMCR capacity at All HPH Out condition.
804	VOLUME - II	SECTION - 2	196 of 238	11.32.01.i	The total attemperation water flow quantity for super heater steam temperature control T/hr a) 100% TMCR condition while firing design Coal b) 100% TMCR condition while firing Worst Coal c) 80% TMCR condition under sliding pressure operation while firing design Coal d) 80% TMCR condition under sliding pressure operation while firing worst Coal	Customer to note that the Superheater and Reheater attemperation test shall be conducted at 100%TMCR load with design coal firing.	Bid Specification Prevails
805	VOLUME - II	SECTION - 2	196 of 238	11.32.01.ii	The total attemperation water flow quantity for reheater steam temperature control with rated excess air a) 100% TMCR condition while firing design Coal b) 100% TMCR condition while firing Worst Coal c) 80% TMCR condition under sliding pressure operation while firing design Coal d) 80% TMCR condition under sliding pressure operation while firing worst Coal e) It shall also be demonstrated that the RH temperature is maintained at the rated value without any spray water requirement under normal operating conditions (100% TMCR)		Bid Specification Prevails
806	VOLUME - II	SECTION - 2	197 of 238	11.32.01.vi.a	Furnace exit gas temperature (FEGT) a) It shall be demonstrated that maximum furnace exit gas temperature (FEGT) shall be as specified. A comprehensive thermal performance test (TPT) shall be conducted for this purpose on one unit only.this purpose on one unit only. FEGT shall be demonstrated through such TPT by indirect measurement, with coal pulveriser combinations of Owner's choice and all other requirement in line with Technical Specification.	Customer to note that Furnace exit gas temperature test shall not be demonstrated considering it's measurement constraints.	Bid Specification Prevails
807	VOLUME - II	SECTION - 2	199 of 238	11.32.01.viii	Coal consumption at 100% BMCR, and 100% TMCR for design coal and worst coal based on the following (T/hr) a) Ambient air temperature 32°C b) Relative Humidity 65%	Bidder shall demonstrate the boiler efficiency test at 100%TMCR load condition and accordingly coal consumption shall be calculated. No separate test shall be conducted for coal consumption.	Noted.
808	VOLUME - II	SECTION - 2	199 of 238	11.32.01.ix.b	Loading of each mill when steam generator operating at 100% BMCR and 100% TMCR condition while firing design coal and worst coal	Customer to note that Bidder shall be demonstrating the mill capacity at new condition and at worn out condition. Hence, Loading of each mill when steam generator operating at 100% BMCR and 100% TMCR condition while firing design coal and worst coal is not required.	Bid Specification Prevails
809	VOLUME - II	SECTION - 2	199 of 238	11.32.01.ix.d	Capacity, efficiency and power consumption of each mill while firing design coal and worst coal (TPH) at: 1) New Condition 2) at 50% wear life 3) at worn out condition	Mill Capacity demonstration test shall be conducted while firing design coal at: 1) New Condition 2) at worn out condition	Bid Specification Prevails

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810	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xv	Fuel oil firing system a) Percentage load for which High Speed Diesel / Light Diesel Oil (HSD/LDO) firing system is designed (% BMCR)	Customer to note that Furnace exit gas temperature test shall not be demonstrated considering boiler operation constraints with 100% oil firing.	Bidder shall comply to specification requirement. Specxification does not ask for 100% BMCR with oil firing.
811	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xvii	CO emission at 100% TMCR at rated excess air for specified range of coal	Bidder will conduct the boiler efficiency test at 100%TMCR. Separate test for CO emission will not be demonstrated.	Noted. However this will be finalized during PG Test Procedure review.
812	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xviii	Flue gas temperature at APH outlet (maximum) while firing design coal at 100% TMCR without considering air leakage, (°C)	Bidder will conduct the boiler efficiency test at 100%TMCR. Separate test for AH Outlet gas temperature will not be demonstrated.	Noted. However this will be finalized during PG Test Procedure review.
813	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xix	Unburnt carbon in bottom ash while firing design coal at 100% TMCR(%)	Bidder will conduct the boiler efficiency test at 100%TMCR. Separate test for Unburnt carbon in bottom ash will not be demonstrated.	Noted. However this will be finalized during PG Test Procedure review.
814	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xx	Unburnt carbon in fly ash while firing design coal at 100% TMCR(%)	Bidder will conduct the boiler efficiency test at 100%TMCR. Separate test for Unburnt carbon in fly ash will not be demonstrated.	Noted. However this will be finalized during PG Test Procedure review.
815	VOLUME - II	SECTION - 2	201 of 238	11.32.01.xxi	Total unburnt carbon loss while firing design coal at 100% TMCR (%)	Bidder will conduct the boiler efficiency test at 100%TMCR. Separate test for Total Unburnt carbon loss will not be demonstrated.	Noted. However this will be finalized during PG Test Procedure review.
816	VOLUME - III	SECTION - 1	37	3.01.02(ii)	The system designed and supplied shall ensure to meet emission conditions as maximum NOx emission (thermal as well as fuel) measured as NO2 from the Steam Generator unit shall not exceed 70 mg/Nm3 (at 6% O2 level and dry basis) during the entire operating range of steam generator for the range of coal specified or latest MOEF guideline whichever is more stringent	Bidder proposes to consider NOx at SCR outlet as 100 mg/Nm3 at 6% O2 on dry basis during the entire operating range of steam generator for the range of coal specified inline with MOEF regulations, instead of 70 mg/Nm3.	Bid Specification Prevails
817	VOLUME - I	SECTION - 3	38	3.01.02(iv)	Ammonia slippage value shall not exceed 2 ppm under all operating conditions and range of coal specified	Bidder proposes to consider ammonia slip value as "Less than or equal to 3 ppm" at SCR outlet inline with other state and central utilities technical specifications.	Noted
818	VOLUME - III	SECTION - 1	38	3.01.03(ii)	The life of catalyst module shall not be less than 20,000 hrs. of continuous operation under any operating condition and range of coal specified.	Bidder proposes to consider catalyst chemical life as "not less than 16,000 hrs" inline with other state and central utilities technical specifications.	Bid Specification Prevails
819	VOLUME - III	SECTION - 1	39	3.01.03(xi e)	SCR reactor design shall be suitable for accommodating all catalyst types for both current and future catalyst installation. Bidder shall use standard size modules so that alternate catalyst types or manufacturers can be used in the future without adverse effects	Please note that the SCR reactor and its supporting system shall be designed with the provided catalyst type i.e. plate type and not with any other alternate type of Catalyst.	Noted. Plate type catalyst modules has to be used. Bidder shall submit the details (MOC, pitch, quantity etc.) including Data Sheet along with their technical offer.
820	VOLUME - III	SECTION - 1	42	3.07.00 3.08.00	Ammonia Unloading Compressors (for truck unloading) (as applicable) Aqueous Ammonia Feed Pumps (as applicable)	Bidder requests to confirm the type of ammonia to be considered for SCR system sizing - Anhydrous or Aqueous, which is not clearly spelt out in the specification. Kindly confirm	Bidder to consider anhydrous ammonia.
821	VOLUME - III	SECTION - 1	22	2.28.03 iii)	The chutes shall be of minimum 12 mm thick SS 410 material and shall be of fully welded construction	The chutes between outlet of bunker valve to inlet of feeder and also from coal feeder outlet to pulverizer inlet shall be of 12 mm thick. However the permanent chute and temporary chute shall be of 6 mm thickness with suitable liner at bend and suitable reinforcement. Please confirm our understanding.	Shall be discussed DDE
822	VOLUME - III	SECTION - 1	23	2.28.04 i)	The raw coal feeders shall be of Rotary gravimetric, drum type.	The feeder will be Gravimetric, belt type with minimum size of 36". Please confirm.	Bid Specification Prevails
823	VOLUME - III	SECTION - 1	30	2.32.01 4	Soot blowing system Air-preheaters : Long retractable multi-nozzle soot blowers for regenerative air preheaters	Semi retractable, multiple nozzle type soot blower shall be provided for Air preheater as per OEM standard practice. Please accept the same.	Bid Specification Prevails

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824	VOLUME - III	SECTION - 1	47	5.02.01	Rated extraction rate of mill reject from pyrite hopper -1.5% of coal consumption at 100% BMCR considering worst coal. Design extraction rate of mill reject from pyrite hopper- 20% above rated capacity at 100% BMCR considering worst coal.	The capacity of mill rejects system shall be at least 1% of mill design capacity for worst coal considering maximum no. of working mills. Please confirm.	Bid Specification Prevails
825	VOLUME - III	SECTION - 1	67	6.10.05	Mill Reject - Maximum 1% (For Worst Coal)		
826	VOLUME - III	SECTION - 1	50	5.03.05 v)	The guaranteed particulate emission rate from the filter shall not be more than 27 mg/Nm3 of air.	The guaranteed particulate emission rate from the filter shall be less than 30 mg/Nm3 of air. Please accept.	Bid Specification Prevails
827	VOLUME - III	SECTION - 1	65	6.08.07 ii)	Nozzle - 18% chromium, 12% Ni stainless steel	MOC of the nozzle shall be as per OEM standard. Please confirm.	Bidder to follow bid specification. However will be discussed DDE.
828	VOLUME - III	SECTION - 1	77	6.17.06	Materials of Construction i) Tubes - 90/10 Cu.Ni ii) Fins - Copper	MOC of the SCAPH tube and fins shall be as per OEM standard. Please confirm.	For SCAPH tube, bidder shall follow bid specification. For Fins, Aluminium can be accepted
829	VOLUME - III	PART D	11	3.02.29	Wherever possible mechanical bolts shall be cast in situ with sleeve for future minor rectification instead of providing pockets this will avoid cutting of main reinforcement for provision of pockets.	As per Bidder practice, For Boiler Structure, Anchor Bolts are cast in situ along with Anchor Frames. Sleeve pipes will not be provided for Anchor Bolts. Seeking deviation for this clause.	Noted.
830	VOLUME - III	PART D	25	7.07.02	Complete hopper (sloped portions) shall be provided with lining of at least 5mm thick SS 304M grade material.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
831	VOLUME - III	PART D	72	11.18.02	ii) Coal Storage Bunkers shall be provided with 3.15 mm thick stainless steel lining conforming to ASI 409M, IS1570.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
832	VOLUME - III	PART D	144	18.04.09	i) The hopper portion of the coal bunkers shall be lined with stainless steel plates of 3 mm thickness.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
833	VOLUME - III	PART D	144	18.04.09	ii) Such plug welding shall be done by drilling 21.5 mm dia. holes at 300 mm centre to centre both ways.	As per Bidder practice, plug welding shall be done by drilling 20mm dia holes. Seeking deviation for this clause.	Noted
834	VOLUME - III	PART D	26	7.08.02	Elevator shaft shall be constructed with colour coated insulated metal cladding system supported on structural steel work.	As per Bidder practice & as per clause 7.06.02 of Volume III Part D Page 25, Cladding for Elevator Shaft (Elevator Enclosure) shall be by single skin troughed profile permanently colour coated sheet. Seeking deviation for this clause.	Bid Specification Prevails
835	VOLUME - III	PART D	73	11.19.01	Handrails and Gratings and Other Requirements: In such a case spacing shall be constructed with kick plates at bottom. It shall consist of 100 mm wide 8mm thick steel plate.	As per Bidder practice & Ongoing Projects / Proposals, Toe guard (Kick Plate) thickness shall be 6mm. Seeking deviation for this clause.	Noted
836	VOLUME - III	PART D	73	11.19.02	Steel grating shall be Black Bitumen Painted to match with specifications. Pressure locked grating.	As per Bidder practice, as per clause 7.07.15 of Volume III Part D Page 26 and as per clause 13.05.01 of Volume III Part D Page 90, Grating shall be galvanised. Also Grating shall be of 32mm thick Electroforged type. Seeking deviation for this clause.	Noted.
837	VOLUME - III	PART D	87	13.01.03	Minimum thickness of metal for any structural steel elements shall be not less than 6 mm where steel is fully accessible for cleaning and repainting and where it is feasible to follow design criteria given in ISO: 12944 part 3.	Minimum thickness of structural steel shall be 4.5mm for the web of ISMB & ISMC sections. Seeking deviation for this clause.	Bid Specification Prevails

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838	VOLUME - II	SECTION 2	10	2.13.01	xi) Supporting and enclosing structure comprising: b) Staircases of minimum 1000mm width with handrails 100cm high and 2 rail safety handrails of 40mm galvanised iron (GI) pipe, on either side of steam generator and toe guards.	As per Bidder practice & Ongoing Projects / Proposals, Handrails shall be constructed by 32NB pipes (42.4 Outer Diameter, 3.2mm Thickness). Seeking deviation for this clause.	Noted.
839	VOLUME - II	SECTION 2	10	2.13.01	xi) Supporting and enclosing structure comprising: g) The steam generator roof shall be provided with an approach ladder and all around hand railing.	As per Bidder practice, access to the steam generator roof will be provided. Walkways will be provided to access the silencers. Handrails will be provided only to these walkways and not all around. Seeking deviation for this clause.	Bid Specification Prevails
840	VOLUME - III	PART A SECTION - 1	37	2.43.01	One (1) no of Passenger elevator having a capacity of 1088 kg (Suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator.	Only one number of Goods cum Passenger elevator (3000kg capacity) is specified per Boiler in clause 2.13.10 of Volume II Section 2 & in clause 2.04.01 of Volume III Part A Section 10. Kindly clarify.	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler
841	Volumelll,PartA	Section-1	18	2.25.12(xix)	Aerofoils shall be provided in the air ducts for the measurement of total air flow.	Bidder have considered the flow measurement as per bidder standard practice as follows: 1. Mill inlet air flow is as per bidder proven practice based on slant orifice flow measurement. This proven OEM design has been successfully executed in Power projects in India and accepted by esteemed customers like NTPC, NLC, RRVUNL, MPPGCL, Mahagenco & Jaypee. 2. FD/ID/PA fans inlet flow based on Pressure measuring Annular pipes at inlet box opening and inlet cone.	Tender terms condition shall prevail.
842	Volumelll,PartA	Section-1	23	2.28.04(viii)	The mass flow of the coal powder shall be adjustable with online orifice adjustment using micro wave based flow measurement	(1) LMB experienced no abnormal combustion due to unbalance among coal pipes, during considerable period of time after plant comes to operation. Replacement of fixed orifices may arise after considerable erosion of orifices / coal pipes / burners which are unavoidable factors (erosion) in plant operation (2) LMB combustion control philosophy does not require any measurement of Air to fuel ratio / Coal density / Coal velocity /Coal mass flow for the operation of Boiler and hence the measurements with CMF&VM system may not add improvement on boiler performance. (3) LMB come to know, there are no quantified specific advantages are demonstrated by the system which are already installed the power plants and no quantified improvement of combustion which yields reduction in unburnt carbon / NOx emission reported by the SG manufactures/operators. LMB technology and current practices adopted for the combustion system will achieve the required Boiler parameters as per contract without the CMF&VM system. The same is already demonstrated in projects like Jaypee Nigrie, Koradi & Rajpura power projects. So, bidder request to exclude the Online fuel flow measurement from bidder's scope of supply.	Tender terms condition shall prevail.
843	Volumelll,PartA	Section-1	31	2.32.03	The soot blowers shall be capable of selective operation in areas of ash deposition (SMART type) or equivalent.	Conventional soot blowers shall be provided as per bidder standard proven practice.	Tender terms condition shall prevail.
844	Volumelll,PartA	Section-1	40	3.03.00	Control & Instrumentation 3.03.01 NOX concentration analysers shall be provided in the inlet and outlet of Reactor for controlling and catalyst management so as to monitor the concentration remotely at control room. 3.03.02 Unreacted ammonia concentration indicator shall be installed in the outlet of Reactor for monitoring so as to monitor the concentration remotely at the control room. 3.03.03 Other Instruments (Remote & Local) shall also be provided by bidder as per process requirements as approved by owner	The SCR instrumentation and controls will be as per OEM proven practice	DCS shall be of the same make & Model as TG DCS
845	Volumelll,Part C		152	7.10.00	Complete control and Instrumentation for DNOX system shall be under bidder scope of work. The operation, control, & monitoring of entire SCR system shall be done from Unit DCS located at CCR. Bidder shall provide the same family of software and hardware for SCR control system. Bidder shall refer further details in subsequent Mechanical Section		

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846	VOLUME - II	PART-A, Section-2		2.13.01 (xxi) (d), Page no. 20 of 242	d) Gas distribution system complete with turning vanes/deflector plates, flow splitter, guide vanes, perforated plates and all necessary gas flow control devices in the inlet and outlet cones and duct, warranted by the results of the model tests	The Gas distribution system will be based on CFD results. Thus, if required as the results outcome all the necessary flow distribution items such as turning vanes/deflector plates, flow splitter, guide vanes, perforated plates will be provided.	Noted.
847	VOLUME - II	PART-A, Section-2		2.13.01 (xxi) (q), Page no. 21 of 242	Water washing system for the ESP and its hoppers along with all tanks, pumps, piping, valves and nozzles etc.	As ESP is connected to ASH evacuation system, during maintenance the waste water from hopper will be drain to nearest drain pit through gravity.	Bidder to follow specification.
848	VOLUME - II	PART-A, Section-2		2.13.01 (xxi) (w), Page no. 21 of 242	For assessment and design of appropriate flue gas flow distribution in the ESP(s) and the duct work connected on the upstream and downstream sides of the ESPs, the Contractor shall conduct comprehensive model testing by developing physical Scale model by fabricating a three dimensional physical model of the Electrostatic Precipitator and it's ducting with a scale not less than 1:10.	We will do CFD study instead of model study as CFD study is more accurate in compare to model study.	Noted.
849	VOLUME - II	PART-A, Section-2		10.10.06 (ix) page no. 170 of 242	hh) ESP 2) Bidder shall demonstrate that the maximum flue gas pressure drop across the ESP under specified guarantee point condition shall not exceed 20 mmwc	Both the mentioned clause are contradictory with each other. Bidder request owner to kindly confirm maximum pressure drop through the ESP at the guarantee point flow condition.	Bidder to consider pressure drop of 25 mmWC.
850	VOLUME - II	PART-A, Section-2		11.31.05 (d) page no. 197 of 242	d) The maximum pressure drop through the ESP at the guarantee point flow condition shall not exceed 25 mmWC , which shall be demonstrated.		
851	VOLUME - III	PART-A, Section-1		4.01.00, Page no. 47 of 94	One electrostatic precipitator (ESP) shall be provided for the steam generator and shall be designed to limit the dust concentration below 27mg/Nm3(at 6% O2 and dry basis) at ESP outlet with the specified range of coal firing and with of each stream out of service.	There is a discrepancy for Guaranteed ESP outlet emission requirement in various clause of tender documents. Bidder understand that the ESP Guarantee point requirement is as follows and same shall be demonstrated by bidder. - The particulate emission from ESP shall not be more than 27 mg/Nm3 under guarantee point condition at 100% TMCR load with design coal firing with all fields of ESP are in service. The corresponding ESP efficiency shall be worked out. Owner is requested to kindly confirm.	Bidder to consider the following: i) Design point: 30 mg/Nm3 @ 6% O2 (dry basis at stack inlet) at BMCR condition with one field in all pasess out of service. li) Guarantee point: 27 mg/Nm3 @ 6% O2 (dry basis at stack inlet) with one field in all pasess out of service. ESP shall be designed on the basis of worst coal of which details shall be shared to the Bidder along with resolutions of pre-bid clarifications.
852	VOLUME - III	PART-A, Section-1		6.21.03	Guarantee point condition - Type of coal blend design coal		
853	VOLUME - III	PART-A, Section-1		6.21.06 (iv)	Dust concentration at outlet of ESP with design and worst coal range.(range of coal whichever gives maximum ash) – with one field out of service of each stream : mg/N m3 : 27(max.)		
854	VOLUME - II	PART-A, Section-2		11.31.05 (b) page no. 197 of 242	The particulate emission from ESP shall not be more than 27 mg/Nm3 under guarantee point condition at 100% TMCR load with worst coal firing . The corresponding ESP efficiency shall be worked out.		
855	VOLUME - IV, Bid Drawings	20231123 2x660MW Koradi U#11 & U#12 Project Plot Plan_RA		Dwg. No. ETG061-COM-GEN-PP-001 (Plot Plan)	Referred layout shows '2 inlet/2 outlet' configuration for each stream/pass of ESP.	Reference layout shows '2 inlet/2 outlet' configuration for each stream of ESP. Bidder has operating references with major Indian power utilities (viz. MAHAGENCO 3x660 MW Koradi, NPL 2x700 MW Rajpura, RRVUNL 2x660 MW Chhabra, MPPGCL 2x660 MW Malwa etc.) having '1 inlet/1 outlet' for each stream of ESP. Bidder wishes to request for option of providing '1 inlet/1 outlet' per stream of ESP against the specified '2 inlet/2 outlet' for each stream of ESP. Kindly confirm.	Noted.
856	VOLUME - III	PART-A, Section-1		6.21.07 (iii), page no. 90 of 94	Thickness of steel sheet : Not less than 8mm	As per standard practice followed by major power utilities, the ESP casing shall be of 6 mm the and ESP hopper shall be of 8 mm the. Owner is requested to kindly confirm.	Bidder to follow specification.
857	VOLUME - III	PART-A, Section-1		6.21.07 (vii), page no. 90 of 94	Hopper liners : 3mm (min.) SS, for complete hopper	SS liners on complete ESP hopper is not required. As per Bidder's past experience, We propose to provide the 1.6mm the SS liner in the bottom 1/3 portion of ESP hoppers. Owner is requested to confirm.	Bidder to follow specification.
858	VOLUME - III	PART-A, Section-1		4.07.00, Page no. 48 of 94	These hoppers shall be provided with minimum 3mm thick SS liners (SS304)		
859	VOLUME - III	PART-A, Section-1		4.14.00, Page no. 48 of 94	The electrical insulation of ESP shall be so designed that the internals of each field may be readily replaced by removing the appropriate roof section, without disturbing the high voltage electrical suspension system.	In our design the DE and CE system are rigid type and need not replacement during the guarantee period.	Bidder to follow specification.

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860	VOLUME - III	PART-A, Section-1		4.01.00, Page no. 47 of 94	One electrostatic precipitator (ESP) shall be provided for the steam generator and shall be designed to limit the dust concentration below 27mg/Nm3 (at 6% O2 and dry basis) at ESP outlet with the specified range of coal firing and with of each stream out of service.	Bidder request owner to kindly review the complete sentence and modify as follows. One electrostatic precipitator (ESP) shall be provided for the steam generator and shall be designed to limit the dust concentration below 25mg/Nm3(at 6% O2 and dry basis) at ESP outlet with the specified range of coal firing and with one field of each stream out of service.	Bidder to consider the following: i) Design point: 30 mg/Nm3 @ 6% O2 (dry basis at stack inlet) at BMCR condition with one field in all pasess out of service. li) Guarantee point: 27 mg/Nm3 @ 6% O2 (dry basis at stack inlet) with one field in all pasess out of service. ESP shall be designed on the basis of worst coal of which details shall be shared to the Bidder along with resolutions of pre-bid clarifications.
861	VOLUME - III	PART-A, Section-1		4.01.00, Page no. 47 of 94	One electrostatic precipitator (ESP) shall be provided for the steam generator and shall be designed to limit the dust concentration below 27mg/Nm3(at 6% O2 and dry basis) at ESP outlet with the specified range of coal firing and with of each stream out of service.	Both the mentioned clause are contradictory with each other. Bidder request owner to kindly confirm the ESP outlet dust concentration for ESP design and guarantee point condition. Also request owner to kindly provide all types of coal which need to be considered for ESP design.	Bidder to consider the following: i) Design point: 30 mg/Nm3 @ 6% O2 (dry basis at stack inlet) at BMCR condition with one field in all pasess out of service. li) Guarantee point: 27 mg/Nm3 @ 6% O2 (dry basis at stack inlet) with one field in all pasess out of service. ESP shall be designed on the basis of worst coal of which details shall be shared to the Bidder along with resolutions of pre-bid clarifications.
862	VOLUME - III	PART-A, Section-1		6.21.06 (iv)	Dust concentration at outlet of ESP with design and worst coal range.(range of coal whichever gives maximum ash) – with one field out of service of each stream : mg/N m3 : 27(max.)		
863	VOLUME - III	PART-A, Section-1		6.21.02	Duty - Continuous, Designed for 100% BMCR, Guarantee point at 30 Deg C ambient air Temperature and 66% RH.	Bidder request owner to kindly provide the Ambient condition to be considered for ESP design and Guarantee point condition separately.	Bidder shall consider ambient temperature of 27 deg.C and 60% RH (MSL-292.5 m).
864	VOLUME - III	PART-A, Section-1		6.21.03 (i)	Type of coal Blend 1. Guarantee point - Design Coal 2. Design point- Worst coal with Max. Ash	Owner has provide only one coal analysis. However in ESP design criteria owner has mentioned Design coal and worst coal. Bidder request owner to furnish the coal analysis of all coal types.	Revised coal analysis shall be shared with the Bidder along with resolutions of Pre-bid clarifications.
865	VOLUME - III	PART-A, Section-1		6.21.05	SCA - Minimum. 180 m2/m3/S	There is a discrepancy in the mentioned clause for SCA requirement for ESP design. Bidder request owner to kindly confirm the SCA value to be considered for ESP design conceding all ESP field in working condition. Bidder understands that SCA requirement mentioned in the referred clause at Design and Guarantee point condition is considering all field in working condition. Please confirm.	Bidder shall design the ESP considering minimum SCA of 180 m2/m3/s at 400 mm electrode spacing at BMCR load with worst coal firing and & one field out of service of each stream.
866	VOLUME - III	PART-A, Section-1		6.21.06 (vi)	Specific collection plate area (total collecting plate area/total gas flow) - Not less than 200 M2/m3/sec		
867	VOLUME - III	PART-A, Section-1		6.21.06 (iv)	Dust concentration at outlet of ESP with design and worst coal range.(range of coal whichever gives maximum ash) – with one field out of service of each stream : mg/N m3 : 27(max.)		
868	VOLUME - III	PART-A, Section-1		6.21.07 (ii)	Casing design pressure - Compatible with furnace design pressure (with two fans operating, it shall be able to meet 120% BMCR flow, at 50 deg C ambient temperature.....+660 mmwc at 67% of yield strength)	Bidder request owner to kindly accept the ESP casing design pressure as ± 660 mmwc at 67% yield strength to keep all bidders at par. Same practice is followed by major power utilities.	Casing design pressure shall be Compatible with furnace design pressure (With two fans operating @ 120% BMCR flow, at 50 deg C ambient temperature and 47.5 to 52.5 Hz power supply frequency and guaranteed APH leakage while worst coal firing; and + 660mmwc at 67% of yield strength.)
869	VOLUME - III	SECTION - 1	66 of 90	6.09.03.v	Coal Burners - NOx limit Total NOx emission including fuel NOx and thermal NOx shall not exceed 260 grams per giga joule heat input to boiler.	Customer is requested to modify the Nox emission limit inline with the other clauses of the tender specification.	Clause 6.09.03, v), of Volume-III, Part-A, Section-1 prevails Nox limit:Total NOx emission including fuel NOx and thermal NOx shall not exceed 260 grams per giga joule heat input to boiler. (at boiler outlet / SCR inlet) Three levels of separated overfire air (SOFA) shall be provided. And, Bidder shall guarantee (Cat-III) NOx concentration of 450 mg/Nm3 at 6%O2 on dry basis at SCR inlet.
870	VOLUME - III	SECTION - 1	27 of 90	2.28.08 ii.f	Minimum operating life of burner parts without requiring any maintenance and replacement shall be guaranteed for minimum 8000 hours.	There is a mismatch in the minimum operatind life requirement of burners.	Guaranteed life of Coal Burner wear parts shall be

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871	VOLUME - III	SECTION - 1	66 of 90	6.09.04.iii	Coal Burners - MATERIALS OF CONSTRUCTION Minimum guaranteed life wear parts - 8400Hrs (minimum)	As mentioned elsewhere in the tender specification, Bidder can opt for lower than 20% EA at 100%TMCR. Customer is requested to modify the excess air requirement as "As per boiler design condition". Kindly confirm.	min. 8400Hrs. (before maintenance/replacement)
872	VOLUME - III	SECTION - 1	63 of 90	6.06.05.vi	Fans (PA) - Design Parameters Air-heater air-in-leakage - 5% air-in-leakage of 8% of flue gas flow entering in case of a tri-sector APH or actual guaranteed whichever is higher	Air-heater air-in-leakage for sizing of PA fans shall be considered on actual AH leakage basis. Kindly confirm.	Bidder shall consider 8% air-in-leakage (PA to Gas and SA to Gas) for sizing of PA and FD/SA fans.
873	VOLUME - III	SECTION - 1	63 of 90	6.06.05.xi	Fans (PA) - Design Parameters Air-heater air-in-leakage - 8% air-in-leakage of flue gas flow entering in case of a tri-sector APH or actual guaranteed whichever is higher		
874	VOLUME - III	SECTION - 1	60 of 90	6.05.02	Fans (FD) - General Fan sizing with all following conditions occurring together - Each fan to be sized for 60% BMCR load (one stream in operation) calculated taking into account this.	Customer is requested to revise the fan sizing criteria to 60%TMCR load condition inline with the practice followed in all ongoing projects.	Bid Specification Prevails
875	VOLUME - III	SECTION - 1	60 of 90	6.05.03	Fans (FD) - General The fans shall also fulfil following sizing criteria in addition to those mentioned above -Each fan shall also be sized for 60% BMCR flow calculated taking into following conditions occurring together		
876	VOLUME - III	SECTION - 1	60 of 90	6.05.02.v	Fans (FD) - General Excess Air - 20% over the stoichiometric air requirement	As mentioned elsewhere in the tender specification, Bidder can opt for lower than 20% EA at 100%TMCR. Customer is requested to modify the excess air requirement as "As per boiler design condition". Kindly confirm.	Bid Specification Prevails
877	VOLUME - III	SECTION - 1	61 of 90	6.05.03.iv	Excess Air- 20% over the stoichiometric air requirement		
878	VOLUME - III	SECTION - 1	58 of 90	6.04.03	Fans (ID) The fans shall also fulfil following sizing criteria in addition to those mentioned above - Each fan shall also be sized for 60% BMCR flow calculated taking into following conditions occurring together	Customer is requested to revise the fan sizing criteria to 60%TMCR load condition inline with the practice followed in all ongoing projects.	Bid Specification Prevails
879	VOLUME - II	SECTION - 2	61 of 238	4.36.10.i	The draft system comprises of two (2) sets of FD fans each set rated for 60% of BMCR capacity . The FD fans will be axial type, blade pitch control arrangement offering an optimum efficiency for regulation purpose.		
880	VOLUME - II	SECTION - 2	61 of 238	4.36.10.ii	Two (2) Induced Draft (ID) Fans each rated at 60% of BMCR flow will be blade pitch control type.. The equipment will be complete with lube oil system, hydraulic regulations and all other accessories required for continuous operation and all equipment would be suitable for outdoor installation.		
881	VOLUME - III	SECTION - 1	58 of 90	6.04.03.iv	Fans (ID) Excess Air- 20% over the stoichiometric air requirement	As mentioned elsewhere in the tender specification, Bidder can opt for lower than 20% EA at 100%TMCR. Customer is requested to modify the excess air requirement as "As per boiler design condition". Kindly confirm.	Bid Specification Prevails
882	VOLUME - III	SECTION - 1	59 of 90	6.04.03.ix	Pressure drop through SCR - 100mmWC, or actual, whichever is higher	Pressure drop through SCR for sizing of ID fans shall be considered on actual SCR pressure drop basis. Kindly confirm.	Bid Specification Prevails
883	VOLUME - III	SECTION - 1	59 of 90	6.04.03.xi	Pressure drop through FGD system - 150mm WC or actual, whichever is higher;	Bidder propose JBR type FGD for this project and hence, Booster fan will be provided instead of Combined ID Fan. Hence such requirement is not required for ID fan design.	Noted
884	VOLUME - III	SECTION - 1	58 of 90	6.04.02.v	Pressure required at Chimney - 30% over 100% BMCR requirements Pressure at chimney inlet shall be +25mmwc.	Bidder propose JBR type FGD for this project and hence, Booster fan will be provided instead of Combined ID Fan. Hence such requirement is not required for ID fan design.	Noted

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885	VOLUME - III	SECTION - 1	58 of 90	6.04.02.viii	Pressure drop through FGD system - 150mm WC or actual, whichever is higher;	Bidder propose JBR type FGD for this project and hence, Booster fan will be provide instead of Combined ID Fan. Hence such requirement is not required for ID fan design.	Noted
886	VOLUME - III	SECTION - 1	57 of 90	6.03.07	RAPH Sector Angles i) Primary Air (PA) sector - 72 deg ii) Secondary Air (SA) sector - 108 deg. iii) Flue Gas (FG) sector - 180 deg.	RAPH sector angle will be decided by RAPH OEM based on their proven design practice..	Bid Specification Prevails.
887	VOLUME - III	SECTION - 1	56 of 90	6.03.04	RAPH Air preheater leakage - Shall not exceed 5% of total air requirement.	RAPH air leakage will not exceed 10% of total flue gas flow requirement. Kindly confirm.	Maximum leakage shall be considered 8%.
888	Volume-III	Part-A; Section-1	53 of 90	6.01.24	Boiler circulation pumps - 2X100%	Customer to note that 1x100% start-up drain recirculation pumps or boiler circulating water (BCW) pumps as per Bidder's standard will be provided and same has been implemented in all bidder's installed projects. Kindly confirm.	Bid Specification Prevails 2x100% BCW is asked considering extended low load operation (8~10 hours). Accordingly, redundancy of BCW will ensure reliability.
889	Volume-III	Part-A; Section-1	11 of 90	2.20.03	2x100% start-up drain recirculation pumps or boiler circulating water (BCW) pumps complete with connecting pipe work between separator/drain collection vessel and the pump and between pump and the feed water supply pipeline along with necessary separator/drain collection vessel level control and isolation valves. Two (2) BCW pumps are required to ensure and enhance reliability/availability of the plant during extended technical minimum low load operation (without oil support) for integration to the renewable energy resources.		
890	Volume-III	Part-A; Section-1	47 of 90	5.02.01.3	Rated extraction rate of mill reject from pyrite hopper - 1.5% of coal consumption at 100% BMCR considering worst coal.	Customer is requested to revise the same as 1% of the 100% BMCR coal consumption	Bid Specification Prevails
891	Volume-III	Part-A; Section-1	28 of 90	2.30.04.iii	Ramp rate - Minimum ± 3% per minute (50% to 100 load)	As per latest CEA gazette the ramp rates shall be as below : 50 to 70% load with 2 % MW/min 70 to 100 % with 3 % MW/min Customer is requested to modify the same.	Following ramp rates as per CEA guidelines is envisaged. 3% per minute from 70% to 100% TMCR. 2% per minute from 55% to 70% TMCR 1% per minute from 40% to 55%TMCR. However, Min Power Level shall be - 35% of TMCR.
892	Volume-III	Part-A; Section-1	26 of 90	2.28.07.iii	The fuel pipe shall preferably have no horizontal run and if horizontal run is necessitated due to layout constraints it shall tilt either towards mills or burners.	Fuel pipe routing will be decided by the bidder based on their experience.	If any layout constraint, same shall be discussed DDE
893	Volume-III	Part-A; Section-1	23 of 90	2.28.04.i	The raw coal feeders shall be of Rotary gravimetric, drum type . Each RC feeder shall be sized for 1.2 times the maximum capacity of coal pulveriser. The feeder casing shall be designed to withstand an explosion pressure of 3.5 kg/cm2(g).	Discrepancy has been observed in the tender specification requirement. Gravimetric belt type coal feeder will be provided	Bid Specification Prevails, Rotary Drum Type
894	Volume-III	Part-A; Section-1	17 of 90	2.25.13.i	The MCR of the fans shall be so determined that with all electrostatic precipitator (ESP) sections in operation and the electrical system frequency at 50 Hz. the steam generator shall meet 100% BMCR condition with sufficient controllability over furnace draft. However the best efficiency point of fans shall be closure to 100%TGMCR condition.	Bidder understands 100%TGMCR is 100% TMCR load condition. Kindly confirm.	Noted, However bidder shall note that best efficiency point shall be at 100% TGMCR condition.
895	Volume-III	Part-A; Section-1	17 of 90	2.25.13.ii	Air and flue gas system and components shall be designed with consideration of SCR and Wet FGD installation in the inline path of the unit. The pressure drop across the wet FGD shall be made accountable for considering the duct design, ID fan sizing.	Bidder will provide separate Boost up fan for FGD and hence pressure drop of FGD will not be considered for ID fan sizing. Kindly confirm.	Noted.
896	Volume-III	Part-A; Section-1	17 of 90	2.25.13.ix	The gas velocities shall be selected considering ash content of the fuel.	The gas velocities shall be as per tender specification requirements.	Noted.
897	Volume-III	Part-A; Section-1	18 of 90	2.25.13.xii	The velocities in ducts shall not exceed the above limits, under the following conditions, all occurring together: a) Design/best/worst coal firing at 100% BMCR load whichever gives maximum flow	Customer is requested to revise the load condition to 100% TMCR in order to avoid ash deposit in the ducts during part load operation.	Bid Specification Prevails

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898	Volume-III	Part-A; Section-1	18 of 90	2.25.13.xv	The gas and air ducts shall be designed for wind loads as specified for the steam generating unit proper and their own weight including fly ash load which may get deposited at the duct bottom, insulation and lining. The top of the ducts shall be crowned to ensure proper drainage. However velocity shall not be more than 14 m/sec to 16m/sec.	The duct velocity specified here is different from the velocity mentioned elsewhere in the tender specification.	Please follow 2.25.13 VI, VII and VIII of Vol-III, Part-A for velocity guideline.
899	Volume-III	Part-A; Section-1	18 of 90	2.25.13.xix	Aerofoils shall be provided in the air ducts for the measurement of total air flow.	Air flow measurement shall be measured at fan inlet.	Bidder to comply to the Specification requirement. Bidder to submit air and flue gas PFD/P&ID along with their offer to review conformity to Specification.
900	Volume-III	Part-A; Section-1	17 of 90	2.25.12.xi	Air flow measuring devices shall be provided at suitable points Viz., inlet to Mills (PA fan), secondary air ducts etc	FD fan Air flow measurement shall be measured at fan inlet.	Bidder to comply to the Specification requirement. Bidder to submit air and flue gas PFD/P&ID along with their offer to review conformity to Specification.
901	Volume-III	Part-A; Section-1	15 of 90	2.25.01	The air and flue gas system shall be designed to meet the requirements from start-up to 100% BMCR conditions as indicated in Data Sheet-A and for range of the fuel characteristics specified in the Project Information. The entire flue gas system including he Boiler flue gas passes shall scope with the explosions and /or implosions, which might occur even at typical or extreme conditions.	The air and flue gas system shall be sized at 100 % TMCR condition. Kindly confirm.	Bid Specification Prevails
902	Volume-III	Part-A; Section-1	15 of 90	2.25.02	The air and flue gas system shall be a balanced draft system and shall consist of PA Fans, FD Fans & ID fans as mentioned herein. i) PA fans - 2x60% BMCR ii) FD/SA Fans- 2x60% BMCR iii) ID Fans - 2x60% BMCR Both are provided with SCAPH at common discharge bypass.	Customer is requested to revise the sizing conditions as 2x60% TMCR for FD and ID fans. PA fans shall be sized for 100%BMCr load condition. Also, Bidder will be supplying tri-sector RAPH and hence, SCAPH shall be provided for FD fan only.	A. Bidder to comply to the Specification requirement for fan capacities. B. Tri-sector RAPH and SCAPH arrangement/ location are acceptable.
903	Volume-III	Part-A; Section-1	15 of 90	2.25.03	2 x 60% capacity trisector rotary regenerative air preheater (RAPH), with associated drive motors, cold air, hot air, tempering and flue gas ducting and dampers to handle the steam generator requirements. The air preheater shall be provided with air motors with air receiver for coasting down operation. The air receiver capacity shall be such that during black out condition the air receiver shall be able to supply adequate air for safe shutdown of RAPH. 2 x 50% Steam coil air preheaters (SCAPH) shall be provided in the bypass air duct (FD fan) so that same can be used when required. Condensate from SCAPH can be led to atmospheric tank (provided for start-up purposes of boiler and collects drainage of evaporator)	Customer is requested to clarify the requirement. Bidder understands that the capacity requirement is on TMCR basis.	Please read as 2 x 60% BMCR requirement for RAPH and 2 x 50% TMCR for SCAPH.
904	Volume-III	Part-A; Section-1	14 of 90	2.24.01	All headers in high temperature gas path shall be located outside the gas path.	Customer to note that few of the headers will be inside the gas path as per bidder's design. Kindly confirm.	Bid Specification Prevails. Refer Cl. 2.19.14, Vol-III, Part A, Section-1.
905	Volume-III	Part-A; Section-1	04 of 90	2.12.03	Also, Steam Generator shall be capable of firing 90% : 10%, indigenous coal & biomass	Bidder understand that this is 90%coal and 10% biomass blending. Customer is requested to provide Biomass analysis.	Noted
906	Volume-III	Part-A; Section-1	11 of 90	2.20.02	A water-steam separator system shall be provided with an adequately dimensioned collecting vessels and cyclone separators for use during steam generator start- up and low loads.	Customer to note that no Cyclone separator will be provided in the water separator.	Noted
907	Volume - II	Section - 2	12 of 238	2.13.01.xiv.d	Rotary Drum type, Gravimetric coal feeders each with variable speed, motor, coupling and coupling guard, base plate, foundation bolts, switches for sensing presence or absence of coal, coal motion monitors, microprocessor based precision weighing & calibration system, strain gauges with all the required instrumentation, complete in all respects. With all the required instrumentation, complete in all respects. With all the required instrumentation, complete in all respects.	Gravimetric belt feeder (mentioned in 2.13.01.xiv.p) will be supplied and no Rotary drum coal feeder	Bid Specification Prevails ie. Rotary drum coal feeder

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908	Volume - II	Section - 2	180 of 238	11.30.11.vii.c.1	Major requirements/methods of steam generator efficiency tests is as below - Test Code- As per PTC 4 / B S EN12952-15,2003 (by loss method)	Boiler efficiency will be calculated in line with ASME PTC 4 in loss method. All losses will be estimated inline with the code requirement with reference to project specific design coal, ambient temperature and relative humidity .	Noted
909	Volume - II	Section - 2	184 of 238	11.30.11.x.b	•Steam Generator and Auxiliaries Boiler circulation pumps	Auxiliary power consumption will be considered for only the continuous running equipment's. Please confirm.	Auxiliary power for steam generator shall be accounted for continuously operating auxiliaries/ drives as well as intermittently operating drives. Power consumed by intermittently operative auxiliaries/drives shall be on hourly average basis. Bidder to furnish the List of Aux power consumers along with their bid. This will be decided during finalisation of PG Test Procedure.
910	Volume - II	Section - 2	184 of 238	11.30.11.x.b	•Steam Generator and Auxiliaries Other Unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)		
911	Volume - II	Section - 2	198 of 238	11.32.04.vi.d	The Bidder through thermal performance test (TPT) as per above shall also demonstrate that the flue gas temperature (Actual/MHVT values) at the entry and exit of various boiler heating surfaces and also the variations across the cross section perpendicular to gas flow do not exceed the values indicated in the data sheets for 100% TMCR (660 MW).	The requirement of Thermal Performance test (TPT) is not clear for the new design boiler and hence not considered by the bidder.	Bidder shall note that the testing is essential to compare the deigned and declared gas velocities at entry and exit of various heat banks (at different points on same plane) and the actual velocities. Accordingly, Bidder shall consider the same in their scope.
912	Volume - II	Section - 2	200 of 238	11.32.04.x	Primary air fans a)Capacity (m3/hr) b)Head developed (mWC) c)Fan efficiency (%) d)Power consumption (kW) e)Margins envisaged on capacity and head	Such test can not be demonstrated at site and same will be conducted in the shop. Kindly confirm.	Bid Specification Prevails. However fan efficiency can be tested at shop.
913	Volume - II	Section - 2	200 of 238	11.32.04.xi	xi) Induced draft fans a)Capacity (m3/hr) b)Head developed (mWC) c)Fan efficiency (%) d)Power consumption (kW) e)Margins envisaged on capacity and head		
914	Volume - II	Section - 2	200 of 238	11.32.04.xii	Forced draft fans a)Capacity (m3/hr) b)Head developed (mWC) c)Fan efficiency (%) d)Power consumption (kW) e)Margins envisaged on capacity and head		
915	Volume - II	Section - 2	200 of 238	11.32.04.xiii	Seal air fans a)Capacity (m3/hr) b)Head developed (mWC) c)Fan efficiency (%) d)Power consumption (kW) e)Margins envisaged on capacity and head		
916	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.25.17, page-19	As a minimum power operated gas tight dampers shall be provided i.e., guillotine type dampers at hot air duct inlet to mills, inlet & outlet of ESP stream, Before and after ID fans, inlet of APHs on flue gas side , discharge of PA fans, discharge of FD fans, and at inlet & outlets of APHs on air side	Specification requirement regarding damper type is not clear. Bidder propose Multi louver type damper for RAPH outlet (on gas side), RAPH inlet & outlet (on air side), PA & FD fan outlet ducts, SCR inlet & outlet ducts, economiser bypass duct, Mill inlet ducts and FGD inlet , outlet & bypass ducts considering layout feasibility and as per existing similar capacity project reference. Please confirm.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.

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917	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		6.15.00	Isolation damper Zero leakage guillotine type -ESP inlet and outlet -ID fan inlet and outlet -GR fan inlet and outlet (if applicable) -Air pre heater inlet and outlet (flue gas side) Outlet of each FD fan (double louver type) Outlet of each PA fan	Specification requirement regarding damper type is not clear. Bidder propose Multi louver type damper for RAPH outlet (on gas side), RAPH inlet & outlet (on air side), PA & FD fan outlet ducts, SCR inlet & outlet ducts, economiser bypass duct, Mill inlet ducts and FGD inlet , outlet & bypass ducts considering layout feasibility and as per existing similar capacity project reference. Please confirm.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
918	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	xix) Dampers a) Isolation dampers with electric drives on all cold air, hot air, seal air, and flue gas ducting before and after equipment on these systems with sealing as per requirement. b) Electrically operated guillotine type gas tight isolators at inlet and outlet of ESP, inlet and outlet of each ID fan inlet and outlet of each RAPH for local/remote operation, inlet and outlet of FGD & bypass; along with 2x100% sealing fans arrangement for each damper.	Specification requirement regarding damper type is not clear. Bidder propose Multi louver type damper for RAPH outlet (on gas side), RAPH inlet & outlet (on air side), PA & FD fan outlet ducts, SCR inlet & outlet ducts, economiser bypass duct, Mill inlet ducts and FGD inlet , outlet & bypass ducts considering layout feasibility and as per existing similar capacity project reference. Please confirm.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
919	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	The arrangement of flue gas system shall allow complete isolation of the absorber from gas side, with the unit in operation. For this purpose, Motorized Guillotine type gates shall be provided at gas inlet, gas outlet of the flue gas and in FGD bypass duct.	Specification requirement regarding damper type is not clear. Bidder propose Multi louver type damper for RAPH outlet (on gas side), RAPH inlet & outlet (on air side), PA & FD fan outlet ducts, SCR inlet & outlet ducts, economiser bypass duct, Mill inlet ducts and FGD inlet , outlet & bypass ducts considering layout feasibility and as per existing similar capacity project reference. Please confirm.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
920	VOLUME - III/TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY	SECTION - 4/PART - A		3.22.29	For this purpose Pneumatic Bi-plane / multi louvers type dampers shall be provided at - a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct .	Specification requirement regarding damper type is not clear. Bidder propose Multi louver type damper for RAPH outlet (on gas side), RAPH inlet & outlet (on air side), PA & FD fan outlet ducts, SCR inlet & outlet ducts, economiser bypass duct, Mill inlet ducts and FGD inlet , outlet & bypass ducts considering layout feasibility and as per existing similar capacity project reference. Please confirm.	The type gate/damper at these locations will be as per bid specification; however, it will be decided DDE, if there is any constraint in duct layout.
921	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.25.17, page-19	The linkage mechanism shall be so designed that the actuators can be mounted on a gallery or floor level and shall be subject to the Purchaser approval.	Damper actuators shall be mounted on floor or on duct stiffener based on the feasibility during detail engineering. Please confirm.	Noted
922	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.28.02, page -22	Bunker hopper valley angle shall be considered as 73 deg for bunker sizing	Considering truncated cone for bunker hopper, slope of the bunker conical portion shall be maintained as 73 degree. Please confirm.	Noted
923	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.40.01	ii) ID fans, BFPs , Steam turbine generators shall have vibration isolation system . For other constant speed motors and fans conventional block / frame type RCC foundation shall be provided	Bidder observed difference in requirement of foundation type for ID fan. Bidder propose block type RCC foundation for ID fans considering existing practice in similar capacity executed project. Please confirm.	Noted
924	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.40.02	iv) Staircases on either side of mills, and ESP with walkways and galleries shall be provided so that all areas of mills and ESP are safely and conveniently accessible for operation and maintenance.	Separate staircase are not considered for mills/mill bay to provide clear access at mill bay ground level. Suitable inter connection from Boiler platform will be considered for mill bay maintenance floors. Please confirm.	Bid Specification Prevails

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925	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.40.02	V) Staircases shall be provided at front and rear of steam generators to quickly approach various floors.	Considering side mill arrangement specified in the contract, provision of staircase at rear side is not feasible. Hence, bidder propose staircases only at front side of boiler on either sides . Please confirm.	Bidder can consider staircase on both LHS and RHS of steam generator.
926	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.40.02	Vi) The minimum width of staircase shall be ~~4000~~ 1200 mm and the minimum width of platforms shall be ~~750~~ 1200 mm . The minimum width of interconnecting walkway between mill maintenance platform and the steam generator gallery shall be ~~4200~~ 1000 mm .	Please confirm clear width requirement of staircase and platform as there are various requirements regarding the same in Volume-III & Volume-II of the specification.	Bid Specification Prevails, for SG & Aux.
927	VOLUME - II, LEAD TECHNICAL SPECIFICATION	SECTION - 2 , ITS STEAM GENERATOR, AUXILIARIES, FGD, SCR, & MRHS		9.02.28	Minimum clear width of all staircases shall be 1000mm	Please confirm clear width requirement of staircase and platform as there are various requirements regarding the same in Volume-III & Volume-II of the specification.	This is the minimum requirement
928	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.40.02	Vi) All platforms and staircases shall be provided with gratings and only operating floor shall be provided with chequered plates	Grating will be provided for all the platform, Chequered platform will be considered only in the areas where there will be possibilities of oil spillage . Please confirm.	Noted.
929	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR &	SECTION - 1/PART - A		2.41.03	Staircases on either side of the steam generator shall be provided. The angle of the staircase shall not be less than 45 degrees with vertical except in very critical areas.	Bidder understand that staircase angle shall be provided between 35 deg. to 45 deg. and clear width shall be between 750mm to 1000mm . Please confirm.	Bid Specification Prevails. 35 deg. to 45 deg. From horizontal is acceptable for SG & Aux.
930	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.41.03	Staircases shall also be provided at the rear of the steam generator in the burner zone connecting burner platforms to enable operators to attend burner at other levels	To provide clear access around the furnace in burner zone separate staircase at rear side of furnace is not recommended . However, bidder will consider staircase and elevator landing at all firing floors for ease of operation inline with similar capacity executed super critical boilers. Please confirm.	Can be discussed DDE
931	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.43.01	One (1) no. passenger elevator having a capacity of 1088 kg. (Suitable for 16 persons) and one (1) number goods elevator having a capacity of 3000 kg for each steam generator.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required . Please confirm.	Passenger cum goods elevator as below: a) Two (2) nos., passenger cum goods elevators, suitable to carry minimum 3000 kg at a time; one for each boiler
932	VOLUME - II, LEAD TECHNICAL SPECIFICATION	SECTION - 2 ,		2.13.10 ELEVATORS	Two (2) nos., passenger cum good elevators, suitable to carry minimum 3000 kg at a time; one for each boiler.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required . Please confirm.	Bid Specification Prevails
933	VOLUME - II, LEAD TECHNICAL SPECIFICATION	SECTION - 2 ,		2.13.10 ELEVATORS	e) if passenger cum goods elevator is provided for that building, then separate passenger elevator is not required there.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required . Please confirm.	Bid Specification Prevails
934	VOLUME - III/TECHNICAL SPECIFICATION ELEVATORS	SECTION - 10 , PART-A		2.04.01	Passenger cum goods elevators shall be provided for the following area: i) Boiler - Two (2) nos., one for each boiler , suitable for min. 3000kgs.	Bidder understand that one no. of goods cum passenger elevator of 3000kg capacity is sufficient per boiler and separate passenger elevator is not required . Please confirm.	Bid Specification Prevails
935	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		2.37.03	Regenerative air heaters shall be supplied and designed to permit off-load washing. The system shall include all supply pipes, pumps dosing system, discharge pipes, dust separator complete with internals, discharge ducts and pumps (if required) from the dust separator. Dust separator may be carried out from concrete also, provided that the relevant cooling water connections exist	Bidder do not envisage any separate system for dust separation for RAPH washing water. The washed water will be drained through connecting ducts and hoppers and will be connected with drain trench. Further ash laden water will be transferred to CSSP through drain pumps. Please confirm.	Can be discussed DDE
936	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP,	SECTION - 1/PART - A		3.01.03	ix) Suitable screen shall be installed in each module, above the catalyst elements , to prevent large ash particles from reaching the catalyst surface. The screen shall be designed to withstand personnel walking on it.	Common screen plate will be provided only at the top of first catalyst layer . No screen plate will be considered for remaining catalyst layers as per bidder experience in similar capacity executed project. Personal walking during maintenance can be done at top of catalyst itself. Please confirm.	Noted.

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937	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		3.01.03	vii) Hoppers (if required) shall be provided to collect ash with valley angles not less than 60 degrees from the horizontal	Considering Layout feasibility, 60 deg. valley angle for all the hoppers may not be feasible. Vendor will consider min.60 deg. slope with min. 45 deg, valley angle for all hoppers as per experience of similar capacity executed project and based on OEM recommendation. Please confirm.	Reference clause mentioned is incorrect. Bidder to comply Specification requirement.
938	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		5.01.04	Each pyrite hopper shall be provided with vibrating feeder and metallic belt/chain flight conveyor carry mill reject from hopper to Bucket elevator for final storage at Silo.	As per Bidder experience in similar capacity super critical boilers, and based on OEM recommendation, vibrating feeders are not required . Hence, please include "If Applicable" for vibrating feeder.	Bidder to follow technical specification, however it can be discussed during detail engineering based on the layout requirement.
939	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		5.03.03	iv) Cross over shall be provided at every second discharge point suitably.	As suitable walkway has been considered on both sides of metallic conveyor, crossover for conveyor is not necessary . Please confirm.	Bid Specification Prevails
940	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		5.03.03	vi) Reliable and proven hydraulic/pneumatic auto take up arrangements , with facility of adjustment of tension.	Hydraulic/pneumatic/ mechanical (counter weight based) take-up arrangement shall be considered for adjustment of conveyor tension as per OEM design. Please confirm.	Noted
941	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		5.03.03	vii) 800 mm clear walkway on both sides of conveyor along with handrails shall be provided .	As the conveyor has been considered on ground level, handrails are not considered. Handrails will be provided only for the portion where separate walkway will be provided due to inclination of the conveyor at the terminal point with bucket elevator. Please confirm.	Handrail is not required only for conveyor running on ground level, however all inclined portion of conveyor shall be provided with 800 mm clear walkway on both sides of conveyor along with handrails shall be provided. Also, proper safety arrangement shall be envisaged all around the conveyor.
942	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		9.02.38	A clear walkway of 1200mm (min) shall be ensured between the mills / its foundation / mill reject conveyors and inner face of mill bay column. Maintenance space shall be provided on either side.	There is discrepancy in the mill reject conveyor maintenance space. Bidder understand that 800mm clear walkway shall be considered on both sides of MRHS conveyor as per VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRH/SECTION - 1/PART - A/ Clause no.5.03.03. Please confirm.	As per clause 5.03.03, vii) of Vol.-III, Part-A, Section-1, 800 mm clear walkway on both side of conveyor along with hand rail shall be provided for Mill reject conveyor.
943	VOLUME - III TECHNICAL SPECIFICATION STEAM GENERATOR & AUXILIARIES, ESP, DeNOx & MRHS	SECTION - 1/PART - A		5.03.05	i) The reject silo shall be fabricated out of minimum 12 mm thick steel plates with adequate stiffeners. The minimum valley angle of silo shall be 60deg.	Considering circular silo, min. slope of 60 deg. will be considered for hopper portion . Please confirm.	Noted for circular silo
944	VOLUME - III/ TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES	SECTION - 2/PART - A		17.09.00	For each unit, in the primary circuit a set of Demineralised cooling water (DMCW) pumps of 3 X 50% capacity shall discharge cooling water through 3 X 50% capacity plate type heat exchangers (PHE).	Bidder understand that either 3x50% or 2x100% shall be considered for DMCW P& PHE for SG facilities. Please confirm.	Bid Specification Prevails However, it can be discussed DDE
945	VOLUME - III/ TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES	SECTION - 2/PART - A		17.05.00	It is proposed that primary cooling circuit and secondary cooling water circuit shall have separate set of (2x100% or 3x50%) pumps –	Bidder understand that either 3x50% or 2x100% shall be considered for DMCW P& PHE for SG facilities. Please confirm.	Bid Specification Prevails
946	VOLUME - III/ TECHNICAL SPECIFICATION STEAM TURBINE & AUXILIARIES	SECTION - 2/PART - A		17.13.00	ECW overhead tank shall be located at Power House floor at suitable elevation. The tank elevation shall be at a height above the cooler located at highest position and to overcome system frictional head requirements	ECW overhead tank for SG facilities shall be located at SG floor at suitable elevation to overcome system frictional head requirements. Please confirm.	Bid Specification Prevails

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947	VOLUME- III/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D		7.01.02	Mill Bay 12.5 X 44	Mill bay dimension will be considered as per bidder's bunker design. However, bidder understand that the provided dimensions are minimum for the complete mill bay (WxL) which is considering CHP tripper conveyor (Not in bidder scope). Please confirm.	Bidder note that the provided dimension is minimum. Tender conditions prevail. However, it can be discussed DDE, if there is any space constraint				
948	VOLUME- III/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D		7.07.03	Mills are to be located on the ground floor. Mill foundations are to be designed with conventional block/frame type RCC foundation. In addition to Mill foundations provision has to be made in the Mill bay ground floor for trenches accommodating Mill reject system conveyors.	Bidder understand that trenches to be considered for chain conveyor only if required. However, bucket elevator will be located inside the pit as per OEM design. Please confirm.	Noted.				
949	VOLUME- III/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D		7.07.05	A steel stair case shall be provided for access to feeder floor from ground floor.	Bidder propose to consider approach to feeder floor through interconnection platform from boiler. Hence, separate staircase is not considered as per the practice in similar capacity project. Please confirm.	Bid Specification Prevails				
950	VOLUME- III/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D		7.07.10	In addition to the above, framing arrangement for structural steel platform at various levels around the bunker shall be provided with proper access ladder, for poking, striking and attending to air cannons.	Air cannons are not considered as per OEM design, Please confirm.	Noted				
951	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	f) Firing aisle platforms with enclosure with GI sheet covering	Requirement is not clear. Bidder is not considering any covering for firing floor. Please confirm.	Bidder shall note that respective clause is describing the platform requirement at burner locations and GI sheeting is applicable for boiler outer surfaces over lagging.				
952	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	g) The steam generator roof shall be provided with an approach ladder and all round hand railing.	Bidder do not envisage separate hand railing all around the roof as followed by all the bidders of super critical boiler. Please confirm. Suitable approach through ladder shall be provided to roof for the approach of silencers. Please confirm.	Bid Specification Prevails				
953	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	k) Structures for support of monorails of ID fans, FD preheaters, coal mills and ESP maintenance.	There is discrepancy in the fan handling arrangement requirement. Bidder will consider monorail with electric hoist for handling of PA,FD & ID fans and its motors. Please confirm.	Bid Specification Prevails				
954	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		9.02.38	FD, ID and PA fans handling arrangement complete with crane and handling facilities along with removal space shall be provided.	There is discrepancy in the fan handling arrangement requirement. Bidder will consider monorail with electric hoist for handling of PA,FD & ID fans and its motors. Please confirm.	Noted				
955	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		2.13.01	XX) Complete transition ductwork from steam generator economizer outlet flange to the reactor inlet and from reactor outlet to air heater inlet flange(s), including expansion joints, flow straightening devices, and supports. Bidder to provide single/ double stream configuration as per their standard and proven practice. In case of double stream each stream shall cater the requirement corresponding to 60% BMCR operation. Economizer bypass duct & bypass damper from economizer inlet to SCR reactor inlet shall be equipped to ensure appropriate gas temperature at SCR inlet at part load operation.	Bidder understand that there is no requirement for SCR Bypass system. Please confirm.	Bid Specification Prevails				
956	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		3.02.01	<table><tr><td>28.</td><td>Coal bunker emptying system</td><td>Outlet of chute</td><td>Suitable to directly unload from bunkers to trucks.</td></tr></table>	28.	Coal bunker emptying system	Outlet of chute	Suitable to directly unload from bunkers to trucks.	Bidder is considering one no. of temporary chute between bunker to feeder floor on each side (total 2 nos. per boiler) for diverting coal from bunker to permanent chute. One no. of permanent chute will be considered from feeder floor up to ground floor. Please confirm.	Bidder to refer VOLUME - III-SECTION - 1/PART - A, 2.28.03-(v) for this requirement.
28.	Coal bunker emptying system	Outlet of chute	Suitable to directly unload from bunkers to trucks.								

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957	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		3.03.01	ii) Balance of plant systems like a) Coal handling system up to coal bunker inlet b) Ash handling system, including Bottom ash and Fly ash evacuation and disposal system	coal handling inputs such as conveyor load data to be considered on tripper floor, minimum clear space requirement for tripper floor, location of TP inside the STG area (with coordinates) and ash handling inputs such as minimum hopper elevation, clear height requirement for ash handling shall be specified in the contract for considering the layout for preparation of competitive bid. Employer is requested to provide the input on not to exceed basis.	Bidder shall go ahead with his conventional layout and preliminary loading as per his own experience. However, the same interface data shall be shared to the Bidder during basic engineering stage. Bidder to also submit his preliminary layout / general arrangements along with bid.
958	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		9.02.38	v) Roof shall be provided above maintenance space.	Roof will be considered for bunker bay above the tripper floor. No separate roof has been envisaged for Mill maintenance space as the same is located outside the bunker bay. Please confirm.	Bid Specification Prevails Separate roof has been envisaged for Mill maintenance space considering the same is located outside the bunker bay. Can be discussed DDE
959	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		9.02.38	viii) In the SG area, facility of crane/monorail hoist etc. shall be provided along with provision of space for maintenance/ overhauling of equipment such as handling of coils of economizer, motors etc.	Underslung type motorized Crane has been considered only for handling of mill components. For handling of all the other facilities in SG area monorail with electric/manual hoist shall be considered as per equipment weight as mentioned in the contract, Please confirm.	Noted.
960	VOLUME - II/LEAD TECHNICAL SPECIFICATION	SECTION - 2		9.02.38	XV) DeNOx system layout shall be suitable for easy hook-up of SCR and ducting to the isolation dampers, in case if the SCR is taken as optional scope.	Contract requirement is not clear. Bidder understand that DeNOx system along with SCR and all the associated facilities to be supplied as a part of contract. Please confirm.	Noted
961	VOLUME-VI BID DRAWINGS	-		20231123 2x660MW Koradi U#11 & U#12 Project Plot Plan_RA	Plot plan facilities	Bidder observed that no space has been identified for Ammonia storage and handling. Minimum space of 75mx90m is required for the same as per PESO requirement and inline with the bidder experience in similar capacity executed projects	Plot Plan shared along with the Spec is preliminary and bid purpose. Bidder shall submit his preliminary Plot Plan covering various facilities.
962	VOLUME - III	SECTION - 1		2.28.05.iii.p	One (1) no. of Rota probe shall be provided for each steam generator for coal sampling as per ISO 9931. Further, four (4) nos. of Dirty Pitot tubes shall be provided for steam generator and shall be suitable for measurement of coal-air velocity in the coal pipes.	Bidder propose to use proven and reliable ASME PTC 4.2 Coal sampling system in place of system as per ISO 9931. Bidder have carried out sampling using ASTM PTC 4.2 Coal Sampling system in 11 units of 660 MW satisfactorily without any issues but ISO sampling systems were not functioning adequately in all of bidder's previous projects(4 units of 660 MW) in which ISO 9931 sampling were supplied. Moreover , there has been some discrepancy in the quantity of the coal sampling system. Hence, Bidder request customer to kindly accept the use of 1 No. of ASME PTC 4.2 Coal Sampling System.	Bid Specification Prevails
963	VOLUME - III	SECTION - 1		2.28.03 iii)	The chutes shall be of minimum 12 mm thick SS 410 material and shall be of fully welded construction	The chutes between outlet of bunker valve to inlet of feeder and also from coal feeder outlet to pulverizer inlet shall be of 12 mm thick. However the permanent chute and temporary chute shall be of 6 mm thickness with suitable liner at bend and suitable reinforcement. Please confirm our understanding.	Bid Specification Prevails
964	DRAWING			TURBINE CYCLE FLOW SCHEME (ETG061-BTG-ME-ST-PFD-001)	Feed control station shown D/s of HP Heaters	As per Bidder's proven & standard practice for all recent supercritical projects,Feed control station shall be provided upstream of HP Heaters with suitable provisions as per IBR and piping design pressure shall be governed by SG requirement. HP Heater tube side design pressure shall also be selected accordingly. This arrangement is also provided in recent 1x660 MW Bhusawal project of MAHAGENCO. Customer is requested to accept the same.	Noted

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965	DRAWING			TURBINE CYCLE FLOW SCHEME (ETG061-BTG-ME-ST-PFD-001)	Individual Recirculation line of each CEP is indicated	As per Bidder's standard & proven practice, common minimum recirculation line for GSC and CEP from CEP discharge header after GSC is provided. This arrangement is also provided in recent 1x660 MW Bhusawal project of MAHAGENCO. Customer is requested to accept the same.	Noted
966	DRAWING			TURBINE CYCLE FLOW SCHEME (ETG061-BTG-ME-ST-PFD-001)	HP heater-7 & 8 drain to Deaeratore with control stations	Alternate arrangment for emergency drain is provided to condenser only. Since the operation is expected for very short duration, connection to Deaerator is not envisage as per our standard engineering practices. This practice is followed in recent 1x660 MW Bhusawal project of MAHAGENCO. Customer is requested to accept the same.	Noted, as per OEM
967	DRAWING			TURBINE CYCLE FLOW SCHEME (ETG061-BTG-ME-ST-PFD-001)	Non return valves indicated in various extraction lines	Non return valves in various extraction lines shall be provided as per turbine manufacturer's recommendations and turbine integral schemes. Customer is requested to accept the same.	The arrangement and quantity of NRVs, shall be validated by the Bidder through submission of entarined enegy calculation DDE.
968	DRAWING			FLOW DIAGRAM FOR AUXILIARY STEAM SYSTEM(ETG061-BTG-ME-AS-PFD-001)	As per drawing separate HCPRDS valve and desuperheater are shown alongwith two separate Headers (High temperature and Low Temperature Headers) and spray from BFP discharge.	As per bidder's standard practice for all recent supercritical projects, combined type HCPRDS valve is provided along with single Header having HT parameters of 16kg/cm2 and temperature varying from 290 to 310 Deg C and desuperheater spray from CEP discharge. This arrangement is also provided in recent 1x660 MW Bhusawal project of MAHAGENCO. Customer is requested to accept the same.	Can be finalised DDE
969	Volume-V	Annexure-3		3.1	ID Fans	Hydraulic adjusting device (HAD/ Hydraulic servomotor) is not included in Mandatory Spares List of ID Fans, it is recommended to add the same in the Mandatory Spares List inline with FD & PA Fans as it is a critical component.	Noted. One (1) set Hydraulic adjusting device (HAD/ Hydraulic servomotor/ Hydraulic Cylinder) spare to be considered for each type and rating (ID, PA & FD).
970	Volume-V	Annexure-3		3.1.1.i	Fan rotor assembly (including impeller & shaft) :1 no.	Complete Fan rotor assembly excluding blades and HAD (Hydraulic adjusting device) shall be offered.	1 no. Complete Fan rotor assembly, including HUB, excluding blades and 'HAD/ Hydraulic servomotor/ Hydraulic Cylinder' shall be offered; since Blades (2 sets) and Hydraulic Device (1 set) is separately considered.
971	Volume-V	Annexure-3		3.1.1.v.e	Intermediate piece (if applicable) : 3 sets	Intermediate piece is not applicable. Instead of that, Adjusting lever assy shall be offered	Noted. Items if not applicable as per OEM, can be omitted.
972	Volume-V	Annexure-3		3.1.1.vi.b	Pressure regulator: 2 nos.	Pressure regulator is not applicable (as per OEM std. design). Pressure relief valve shall be offered.	Noted. Items if not applicable as per OEM, can be omitted. 1 set of Pressure Relief Valve spare to be considered for each type and rating.
973	Volume-V	Annexure-3		3.1.1.vi.c	Filters : 8 nos.	Filter elements (replaceable part in oil filter) shall be offered	Noted
974	Volume-V	Annexure-3		3.1.1.vi.e	Coolers :1 set	Cooler tube bundle shall be offered as per OEM std.	Bid Specification Prevails
975	Volume-V	Annexure-3		3.2.1	Fan rotor assembly (including impeller & shaft) : 1 no.	Complete Fan rotor assembly excluding blades and HAD shall be offered. Blades and HAD were already covered in sl no: 3.2.4 & 3.2.8	1 no. Complete Fan rotor assembly, including HUB, excluding blades and 'HAD/ Hydraulic servomotor/ Hydraulic Cylinder' shall be offered; since Blades (2 sets) and Hydraulic Device (1 set) is separately considered.
976	Volume-V	Annexure-3		3.2.5.v	Intermediate piece (if applicable) : 3 sets	Intermediate piece is not applicable. Instead of that, Adjusting lever assy shall be offered	Noted. Items if not applicable as per OEM, can be omitted.
977	Volume-V	Annexure-3		3.2.6.ii	Pressure regulator: 3 nos.	Pressure regulator is not applicable (as per OEM std. design). Pressure relief valve shall be offered.	Noted. Items if not applicable as per OEM, can be omitted. 1 set of Pressure Relief Valve spare to be considered for each type and rating.
978	Volume-V	Annexure-3		3.2.6.iii	Filters : 8 nos.	Filter elements (replaceable part in oil filter) shall be offered	Noted

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979	Volume-V	Annexure-3		3.2.6	Coolers :1 set	Cooler tube bundle shall be offered as per OEM std.	Bid Specification Prevails
980	Volume-V	Annexure-3		3.3.1	Fan rotor assembly (including impeller & shaft) : 1 no.	Complete Fan rotor assembly excluding blades and HAD shall be offered. Blades and HAD were already covered in sl no: 3.3.5 & 3.3.7.vi	1 no. Complete Fan rotor assembly, including HUB, excluding blades and 'HAD/ Hydraulic servomotor/ Hydraulic Cylinder' shall be offered; since Blades (2 sets) and Hydraulic Device (1 set) is separately considered.
981	Volume-V	Annexure-3		3.3.6.v	Intermediate piece (if applicable) : 2 sets	Intermediate piece is not applicable. Instead of that, Adjusting lever assy shall be offered	Noted. Items if not applicable as per OEM, can be omitted.
982	Volume-V	Annexure-3		3.3.7.ii	Pressure regulator: 3 set .	Pressure regulator is not applicable (as per OEM std. design). Pressure relief valve shall be offered. Customer to clarify the qty - 3 Set or 3 no's (3 no's are quoted in FD and ID Fans)	Noted. Items if not applicable as per OEM, can be omitted. 1 set of Pressure Relief Valve spare to be considered for each type and rating.
983	Volume-V	Annexure-3		3.3.7.iii	Filters : 8 set	Filter elements (replaceable part in oil filter) shall be offered as per OEM std. Customer to clarify the qty - 8 Set or 8 no's (8 no's are quoted in FD and ID Fans)	Noted
984	Volume-V	Annexure-3		3.3.7.v	Coolers :1 set	Cooler tube bundle shall be offered as per OEM std.	Bid Specification Prevails
985	Volume-V	Annexure-3		8.2	Bearings & seals : 2 sets	Bearings and Sealing collar shall be offered as per OEM std	Noted
986	Volume - V	Annexure - 3		9.1.10.	Speed Reducer Seals & Gaskets	Gaskets are not Applicable	Noted, however if applicable the same shall be provided
987	Volume - V	Annexure - 3		9.1.18	Actuators (Pneumatic/Hydraulic)	Actuators are not applicable	Noted, however if applicable the same shall be provided
988	Volume - V	Annexure - 3		9.1.16 & 9.1.17	9.1.16. Spares for cleaning device (i)Worm & worm wheel for gear reducer- 1 Set (ii) Coupling - 1 Set (iii) Bearing & seals for spec reducer - 1 Set (iv) Bearing for cleaning device - 2 Sets 9.1.17. Bushings for worm gear reducer 2 Set	These spares enquired are not applicable to LRNR Cleaning device. Hence the following spares will be offered against the specification requirement. a. Chain - 2 sets for LRNR b. Bearing – 2 sets for LRNR c. Glands- 2 sets for LRNR d. Gaskets - 2 sets for LRNR e. Bushing for travelling Carriage – 2 sets for LRNR	Noted, however if applicable the same shall be provided
989	Volume-V , Annexure-3	MANDATORY SPARES LIST		15.0 ELECTROSTATIC PRECIPITATOR {ESP}	15.3. EMITTING ELECTRODES 15.3.1. Helical wire type 5% of the installed quantity 15.3.2. Wire pipe in rigid frame 10% of the installed quantity 15.3.3. Mast type 2% of the installed quantity	Helical wire type emitting electrodes as per OEM design is considered under Cl. 15.3.1. Other type of emitting electrodes spares are not applicable.	Items if not applicable as per OEM, can be omitted.
990	Volume-V , Annexure-3	MANDATORY SPARES LIST		23.4	15.9. RAPPERS 15.9.1. For electric rappers 15.9.2. For tumbling rappers	Tumbling hamer type rapping mechanism is envisaged as per OEM desig under Cl. 15.9.2. So electric rapper spares are not applicable	Items if not applicable as per OEM, can be omitted.
991	Volume - V	Annexure-4 (List of Approved Vendors), pg 5/65		1.08, pg 5/65	RAPH - 1. L&T Howden Pvt Ltd.	With reference to the Provenness criteria mentioned in special terms and conditions of the contract, BHEL has already supplied Tri-sector type Air Pre-heaters to various customers and has a proven design. Hence Customer is requested to include BHEL in the list of Approved Vendors for RAPH.	Bid specification prevails Can be decided DDE, based on credentials
992	Volume-V	Annexure-4		1.09	List of approved vendors: ID/FD/PA Fans	BHEL Ranipet is the supplier of FD, ID, PA & Seal air Fans in all the Super-critical TPP projects executed by BHEL (including MAHAGENCO Bhusawal 1x660 MW EPC). MAHAGENCO is requested to include BHEL Ranipet name against approved vendors under FD, ID, PA & Seal air Fans	Bid specification prevails
993	Volume-V	Annexure-4		1.10	List of approved vendors: Seal Air Fans		Can be considered DDE based on credentials

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994	VOLUME-IV BID DRAWINGS	Drawing Title: SCHEME OF AIR AND FLUE GAS SYSTEM, Drawing No: ETG061-BTG-ME-SG-PFD-001	--	--	Louver damper symbol is shown at each PA Fan Outlet in this SCHEME OF AIR AND FLUE GAS SYSTEM, Drawing No: ETG061-BTG-ME-SG-PFD-001	As per DATA SHEET-A in Volume-III / Part-A / Section-1/ Clause No: 6.15.00 Dampers --> 6.15.06 i) (Page 74 & 75 of Doc no: ETG061-BTG-ME-SG-TS), Guillotine type damper to be provided at Outlet of each PA Fan. Whereas in this "SCHEME OF AIR AND FLUE GAS SYSTEM, Drawing No: ETG061-BTG-ME-SG-PFD-001", Louver Damper symbol is shown at PA Fan Outlet. The above 2 clauses are contradicting w.r.t. the type of damper to be provided at each PA Fan Outlet. Please inform whether Guillotine type damper (Gate) OR Louver type damper needs to be provided at each PA Fan Outlet. Generally, Guillotine damper (Gate) is preferred for Fan isolation purpose for larger size ducts in super-critical boilers.	Guillotine damper (Gate) shall be provided at for PA Fans
995						"Chemical Laboratory equipment", which is used for offline measurement of Air/Water samples in the plant, is not appearing in tender specification. Kindly confirm that the Chemical Laboratory Equipment is in scope of BTG contract. Also provide the list of items and quantity so that offer could be submitted.	Central Chemical Lab is not in the scope of BTG package, it is considered in BoP package.

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1	Volume I	Section 1		Schedule – 7, Unit Auxiliary power consumption, FGD System Page no. 177 of 412	Sump system – Absorber area sump pump & agitator, gypsum area sump pump & agitator, limestone area sump pump & agitator and auxiliary absorbent pump and agitator	Owner to note all the mentioned Sump system are intermediate system and not work regularly. Hence, Bidder request owner to kindly remove this item from FGD system Auxiliary power consumption list.	Noted
2	Volume I	Section 1		Schedule – 7, Unit Auxiliary power consumption, FGD System Page no. 177 of 412	- Gypsum dewatering system - Vacuum belt filter, vacuum pump, filtrate pump & agitator, waste water pump and agitator - Lime stone preparation system – gravimetric feeder, grinding mill, limestone slurry pump and agitator - Sump system – Absorber area sump pump & agitator, gypsum area sump pump & agitator, limestone area sump pump & agitator and auxiliary absorbent pump and agitator - All agitators - Lime handling system (0.3) - Gypsum handling System (1.0)	Owner to Note that Gypsum dewatering and limestone handling & slurry preparation system along with its Auxiliaries are common Auxiliary systems for both units. Hence, Bidder request owner to kindly move this items from Unit Auxiliary power consumption list to Station Auxiliary power consumption.	Will be decided during finalization of PG test procedure
3	II	1		--	Limestone Characteristics	The limestone analysis is not provided in the tender specifications. The customer is kindly requested to provide this information.	Lime Stone Analysis will be shared with bidders
4	II	1		3.05.00	Coal Analysis	Chloride & Fluoride content in Flue gas has got implication on Limestone consumption, Recirculation flow rate and waste water quantity. Bidder request owner to provide Cl and F Content in Coal.	Bidder to consider - HCL - 45 PPM (v) HF - 12 PPM (v)
5	VOLUME-II	Section-2 /LEAD TECHNICAL SPECIFICATION/ Sub Section No. 2.00.00 / BROAD SCOPE OF SUPPLY AND SERVICES (Page 14 of Doc no: ETG061-BTG-GEN-LTS)		Clause No: 2.13.01 --> xix) Dampers b)	xix) Dampers b) Electrically operated guillotine type gas tight isolators at inlet and outlet of ESP, inlet and outlet of each ID fan, inlet and outlet of each RAPH for local/remote operation. inlet and outlet of FGD & bypass;	As per technical specification Clause No: 3.22.29 GATES & DAMPER ---> i) (in Volume-III, Part-A, Section-4, Page 10 of Doc no: ETG061-BTG-ME-FGD-TS), Pneumatic Bi-plane / multi louver type dampers shall be provided at a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct. The above is contradicting with the referred Clause No: 2.13.01 --> xix) Dampers b) in Volume-II, Section-2 Lead Technical Specification- where guillotine type gas tight isolators are required at inlet and outlet of FGD & bypass. Bidder understands that Pneumatic Bi-plane / multi louver type dampers shall be provided at a) Hot gas inlet to Absorber, b) Cold gas outlet from Absorber and c) In the bypass duct, and Guillotine type damper is not applicable in these ducts. Please clarify and confirm bidder's understanding. Additionally, please note that in the FGD Bypass duct, process requirement calls for quick opening of Damper in case of emergency, which is not possible with guillotine damper (quick opening is possible only with Pneumatic Bi-plane / multi louver type damper).	FGD dampers shall be as per specification Clause No: 3.22.29, i), of Vol-III, Part-A, Section-4

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6	VOLUME-II	Section-2 /LEAD TECHNICAL SPECIFICATION/ Sub Section No. 4.00.00 / BASIC PLANT TECHNICAL AND DESIGN REQUIREMENTS (Page 63 of Doc no: ETG061-BTG-GEN-LTS)		Clause No: 4.36.16 FLUE GAS DE-SULPHURISATION (FGD) SYSTEM --> v)	v) The arrangement of flue gas system shall allow complete isolation of the absorber from gas side, with the unit in operation. For this purpose, Motorized Guillotine type gates shall be provided at gas inlet, gas outlet of the flue gas and in FGD bypass duct.	As per technical specification Clause No: 3.22.29 GATES & DAMPER ---> i) (in Volume-III, Part-A, Section-4, Page 10 of Doc no: ETG061-BTG-ME-FGD-TS), Pneumatic Bi-plane / multi louver type dampers shall be provided at a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct. The above is contradicting with the referred Clause No: 4.36.16 FLUE GAS DE-SULPHURISATION (FGD) SYSTEM --> v) - in Volume-II, Section-2 Lead Technical Specification- where Motorized Guillotine type gates shall be provided at gas inlet, gas outlet of the flue gas and in FGD bypass duct. Bidder understands that Pneumatic Bi-plane / multi louver type dampers shall be provided at a) Hot gas inlet to Absorber, b) Cold gas outlet from Absorber and c) In the bypass duct, and Guillotine type damper is not applicable in these ducts. Please clarify and confirm bidder's understanding. Additionally, please note that in the FGD Bypass duct, process requirement calls for quick opening of Damper in case of emergency, which is not possible with guillotine damper (quick opening is possible only with Pneumatic Bi-plane / multi louver type damper).	FGD dampers shall be as per specification Clause No: 3.22.29, i), of Vol-III, Part-A, Section-4
7	II	2		11.32.04.xxiv	Guarantees under Cat-III a. Absorber outlet gas temperature. b. Absorber outlet gas moisture percentage.	Please note that the hot gas will become saturated in the absorber and then be discharged into the chimney. Any change in the absorber outlet gas temperature will not affect the FGD performance. In the case of GGH, the outlet temperature is essential due to dry stack. However, for this project, the stack is wet, and it is not necessary to maintain the outlet temperature. Also, please note that as per standard practice, this parameter is not guaranteed in the FGD system. Additionally, please note that only the mist concentration at the FGD absorber outlet is guaranteed, rather than the moisture percentage. We kindly request the customer to review these guaranteed parameters and make an appropriate decision and issue an amendment accordingly.	Make-up water (moisture content in outlet gas) will depend on Absorber outlet gas temperature, hence Bidder to follow technical specification
8	Volume: I	Section: 1		Auxiliary Power Consumption (APC)	All unit auxiliaries required to be operated to continuously operate the plant at the rated load of 100% TMCR have to be considered. The auxiliaries to be considered shall include but not be limited to the following: a.) Gypsum dewatering system - agitator b.) Lime stone preparation system – agitator c.) Sump system – agitator d.) All agitators	Duty factor for agitators to be considered for Auxiliary Power Consumption is not specified in the tender specification. Bidder has considered duty factor of 0.5 for all types of agitator. Further, Auxiliary absorbent tank agitator is of intermittent operation (only when FGD is under maintenance), hence same shall not be considered under Auxiliary power consumption. Please confirm.	Following duty factor for agitators to be consider for auxiliary power consumption a) Absorber Agitator - 1 b) Limestone slurry tank Agitator - 1 c) Rest of the all agitator - 0.5 d) Auxiliary absorber tank agitator not to be consider under auxiliary power consumption
9	Volume - II	SECTION - 2		X) Auxiliary power consumption (APC)	◊ All agitators ◊ Lime handling system (0.3) ◊ Gypsum handling System (1.0)	We understand that for limetone and Gypsum handling system Auxiliary power consumption will be considering single stream of operation excluding Lighting, Elevators, Dust Extraction systems & related equipment such as centrifugal fan & compressor, Ventilation system, Exhaust fans, Dust suppression pumps (if applicable), Drinking water pumps (if applicable), Service Water Pumps (if applicable), Sump pumps, flap gates, air conditioning. Requesting confirmation regarding same	Single stream of operation including dust extraction & dust suppression (if applicable) system to be considered for Aux. power consumption. APC of other auxiliaries shall be as per respective clauses of the bid specification.

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10	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 2.00.00 / SYSTEM DESCRIPTION (Page 2 & 3 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 2.01.09	2.01.09 dampers at outlet to Absorber and in the bypass duct shall also be provided with 2x100 electrical heaters .	Seal air heaters (2x100 %) will have very high power consumption (about 450 to 500 KW for each heater). Already special anti-corrosive materials (C276 cladding of 1.6 mm thickness) are considered for Dampers at Outlet to Absorber and in the Bypass duct, to avoid acid dew point corrosion. Therefore, Electrical Heater is not necessary for these Dampers to heat the seal air. If Seal air electrical heaters are deleted, power consumption of about 450 to 500 KW for each heater can be saved. Therefore, bidder requests customer to delete the requirement of Seal Air Electrical Heaters for Dampers at Outlet to Absorber and in the Bypass duct, since already 1.6 mm thickness C276 cladding is considered for these Dampers (as per technical specification). It may also be noted that for FGD dampers supplied by the bidder for various State Electricity boards, the requirement of Seal air Electrical Heaters were not applicable (or) has been deleted during pre-bid stage.	Noted, seal air heater is not required for FGD outlet and bypass damper.
11	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 2.00.00 / SYSTEM DESCRIPTION (Page 2 & 3 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 2.01.09	2.01.09 The design of the damper shall ensure 99.95% leak tightness , on flow basis, without seal air. The damper shall be 100% leak tight with seal air fans under the above conditions.	As per technical specification clause no: 2.01.09 (in Volume-III / Part-A / Section-4 / Page 3 of Doc no: ETG061-BTG-ME-FGD-TS), "pneumatic bi-plane / multi louver dampers at hot gas inlet to Absorber, cold gas outlet from Absorber and bypass duct shall be provided". For Bi-plane / multi louver Dampers, it is not technically possible to achieve 99.95% leak tightness without seal air (Reason: Bi-plane / multi louver Dampers have Multiple blades due to which there are much more contact surfaces/ contact areas between multiple blades (when compared to single blade Guillotine damper)). Only 99.5 % leak tightness can be achieved for Bi-plane / multi louver Dampers, without seal air. With seal air, it will be 100%. This is also in-line with Clause No: 3.22.29 GATES & DAMPER --> vii) (in Volume-III / Part-A / Section-4 / Page 10 of Doc no: ETG061-BTG-ME-FGD-TS) where it is mentioned that "The dampers shall have a guaranteed gas tightness efficiency (on flow) of not less than 99.5 % without the use of seal air fans of the damper. For all projects of various Customers (All State Electricity Boards, NTPC, DVC, NLC etc) supplied by bidder till date, Biplane Damper's leak tightness efficiency is 99.5% without seal air. With seal air, leak tightness efficiency will be 100%. Please accept.	Bid Specification Prevails
12	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 3.00.00 / GENERAL TECHNICAL REQUIREMENTS (Page 10 of Doc no: ETG061-BTG-ME- FGD-TS)		Clause No: 3.22.29 GATES & DAMPER --> ii)	3.22.29 GATES & DAMPER ----> ii).... Damper at outlet from Absorber and in the by-pass duct shall also be provided with 2x100 electrical heaters .	Seal air heaters (2x100 %) will have very high power consumption (about 450 to 500 KW for each heater). Already special anti-corrosive materials (C276 cladding of 1.6 mm thickness) are considered for Dampers at Outlet to Absorber and in the Bypass duct, to avoid acid dew point corrosion. Therefore, Electrical Heater is not necessary for these Dampers to heat the seal air. If Seal air electrical heaters are deleted, power consumption of about 450 to 500 KW for each heater can be saved. Therefore, bidder requests customer to delete the requirement of Seal Air Electrical Heaters for Dampers at Outlet to Absorber and in the Bypass duct, since already 1.6 mm thickness C276 cladding is considered for these Dampers (as per technical specification). It may also be noted that for FGD dampers supplied by the bidder for various State Electricity boards, the requirement of Seal air Electrical Heaters were not applicable (or) has been deleted during pre-bid stage.	Noted, seal air heater is not required for FGD outlet and bypass damper.

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13	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 3.00.00 / GENERAL TECHNICAL REQUIREMENTS (Page 10 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 3.22.29 GATES & DAMPER --> iii)	3.22.29 GATES & DAMPER ---> iii) The blade and other components in the gas path, of the dampers shall be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm or better material.	C276 cladding of sheet of minimum thickness 1.6 mm or better material is applicable only for Dampers at Outlet of Absorber and in the FGD Bypass duct , located in the FGD treated flue gas path. For damper at hot gas inlet to Absorber (FGD Inlet) which is not exposed to corrosive treated flue gas, C276 cladding is not applicable. Please confirm. This is in-line with all FGD projects supplied by the bidder till date where damper at FGD Inlet is made of carbon steel without C276 cladding. Also, tender specification for all FGDs supplied by the bidder required special material cladding only for FGD Outlet & FGD Bypass locations (Special material cladding was not applicable for FGD Inlet).	Noted																		
14	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 3.00.00 / GENERAL TECHNICAL REQUIREMENTS (Page 12 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 3.22.29 GATES & DAMPER --> xxxiii)	3.22.29 GATES & DAMPER ---> xxxiii) The seal air system shall be provided with an electric heater to elevate and maintain the air temperature above the dew point temperature.	As per 3.22.29 GATES & DAMPER --> ii) , Seal air electric heater is applicable only for Damper at outlet from absorber (FGD Outlet Damper) and in the bypass duct (FGD Bypass Damper). Seal air heater is Not applicable for Damper at Inlet to Absorber (FGD Inlet Damper). Please confirm bidder's understanding.	Noted, seal air heater is not required for FGD intlet.																		
15	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 3.00.00 / GENERAL TECHNICAL REQUIREMENTS (Page 13 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 3.22.29 GATES & DAMPER --> Table shown after xxxiv)	3.22.29 GATES & DAMPER ---> Table shown after xxxiv) Sl. No: I.d of table: Operator type: Electric <table><tr><th>Sl.No</th><th>Particular</th><th>Details</th></tr><tr><td>I.</td><td>Sealing air system primary isolation damper</td><td></td></tr><tr><td>a.</td><td>Seats</td><td>Viton / Metal</td></tr><tr><td>b.</td><td>Gate</td><td>ASTM A36 or ASTM A588 or IS 2062</td></tr><tr><td>c.</td><td>Stem</td><td>ASTM A36 or ASTM A588 or IS 2062</td></tr><tr><td>d.</td><td>Operator type</td><td>Electric</td></tr></table>	Sl.No	Particular	Details	I.	Sealing air system primary isolation damper		a.	Seats	Viton / Metal	b.	Gate	ASTM A36 or ASTM A588 or IS 2062	c.	Stem	ASTM A36 or ASTM A588 or IS 2062	d.	Operator type	Electric	Please inform whether seal air primary isolation damper can be provided with pneumatic actuator instead of electric. It may be noted that for all projects supplied by the bidder, seal air primary isolation dampers (Seal Air KGVs) were <u>Pneumatically operated</u> , for the purpose of quick isolation of seal air system, from the damper. Please provide option for electric or pneumatic operation for seal air primary isolation damper.	Noted, pneumatic actuator can be accepted.
Sl.No	Particular	Details																							
I.	Sealing air system primary isolation damper																								
a.	Seats	Viton / Metal																							
b.	Gate	ASTM A36 or ASTM A588 or IS 2062																							
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d.	Operator type	Electric																							
16	VOLUME-III	Part-A/ Section-4 / TECHNICAL SPECIFICATION- MECHANICAL- FGD, LIME HANDLING & CHIMNEY/ Sub Section No. 3.00.00 / GENERAL TECHNICAL REQUIREMENTS (Page 13 of Doc no: ETG061-BTG-ME-FGD-TS)		Clause No: 3.22.29 GATES & DAMPER --> Table shown after xxxiv)	3.22.29 GATES & DAMPER ---> Table shown after xxxiv) Sl. No: II. Particular: Seal air system duct from damper frame to isolation damper Details: ASTM A588 or ASTM A36 or IS 2062 <table><tr><th>Sl. No</th><th>Particular</th><th>Details</th></tr><tr><td>II.</td><td>Sealing air system duct from damper frame to isolation damper</td><td>ASTM A588 or ASTM A36 or IS 2062</td></tr></table>	Sl. No	Particular	Details	II.	Sealing air system duct from damper frame to isolation damper	ASTM A588 or ASTM A36 or IS 2062	Bidder is considering Seal Air Pipe (instead of seal air duct) for FGD Dampers – This is the practice followed by the bidder for all projects (including MAHAGENCO projects like Bhusawal 1x660 MW) till date. As per Pipe Standard, IS 3589 is applicable (instead of IS 2062 for duct). Kindly note the above and please accept.	Noted, Seal Air Pipe can be accepted (instead of seal air duct) for FGD Dampers												
Sl. No	Particular	Details																							
II.	Sealing air system duct from damper frame to isolation damper	ASTM A588 or ASTM A36 or IS 2062																							
17	VOLUME - III	PART - A/SECTION - 4		3.31.03	Dumper unloading platform for tippling of Limestone from dumper, Rod gates, Rack & Pinion gates and Vibrating feeders, separate dedicated DE system for unloading facility	We understand there is no requirement of Truck tipplers as customer shall be bringing self tippling trucks. However we request you to kindly clarify what is the meant by "Dumper unloading platform", so accordingly same can be considered by bidder.	For Limestone unloading no TT required. LS shall be brought inside through self tipping dumper. Platform if any required shall be suitable for dumper movement. However, entire area shall be covered as per specification with remotely operated shutter gates																		

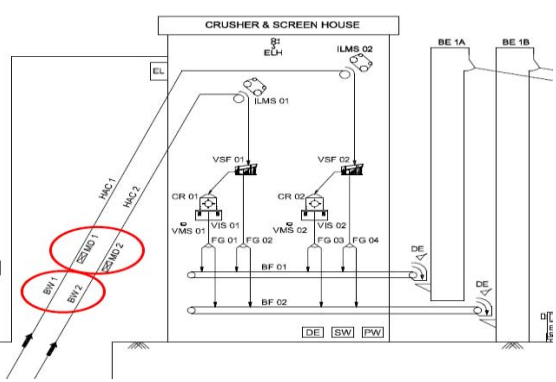
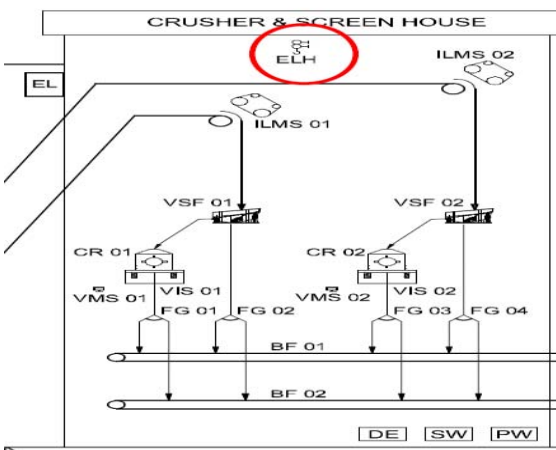
MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
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RFx No. 3000046202 (BTG Package)
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18	VOLUME - III	PART - A/SECTION - 4		3.31.03	Dumper unloading platform for tipping of Limestone from dumper, Rod gates, Rack & Pinion gates and Vibrating feeders, separate dedicated DE system for unloading facility	We understand DE systems to be provided as follows:- 1. (1 Working + 1 Standby) DE system for complete Truck unloading shed . 2. (1 Working + 1 Standby) DE system with suction point at Vibrating feeders LVF-1/2 & Feeding point to conveyors CB1A/1B Kindly confirm.	Unloading area shall have dedicated DE - (1W+1S) All other area, below hopper, feeder, high angle conv., vibrating screen, crusher, belt feeder, bucket elevator shall have separate DE (1W+1S)
19	VOLUME - III	PART - A/SECTION - 4		3.31.03	One no. separate electronic weigh bridge (60T) shall be provided, along with operator control room and equired accessories like computer set with printer and associated furniture like Table, Chair and file storage cabinet/almirah.	1.Kindly confirm if separate weigh bridge (One for limestone and one for gypsum) to be provided . 2. As other facilities also has also been asked like file storage cabinet/ almirah etc. in control room. May pl. specify if there is any requirement wrt size of the control room. 3. May pl. confirm if any toilet is to be provided near operator room	1. Bid Specification Prevails. One (01) no. weigh bridge shall be provided for both limestone and gypsum 2. Size of the control room can be finalised DDE 3. Yes, toilet to be provided.
20	VOLUME - III	PART - A/SECTION - 4		3.31.06	Limestone Conveying system shall consists of high angle belt conveyors, belt conveyors, belt feeders, reversible belt feeders, Belt weighers, Metal detectors, ILMS / CBMS, Tramp iron chutes (to discharge tramp iron to ground), Flap gates (for diverting and interconnection), interconnecting chutes, Dust extraction (DE) system for conveying system	Kindly Specify :- A) RATED CAPACITY B) DESIGN MARGIN c) GUARANTEED CAPACITY D) MOTOR MARGINS For following equipments:- 1. Belt Conveyors 2. High Angle/Vertical conveyors 3. Bucket Elevators 4. Limestone Vibrating Feeders 5. Vibrating Screen Feeders 6. Crushers	A) RATED CAPACITY=LS required in 24 hrs divided by 8 B) DESIGN MARGIN =10% c) GUARANTEED CAPACITY =110% of Rated capacity D) MOTOR MARGINS = 15% For equipments bidder to follow the flow scheme & specifications.
21	VOLUME - III	PART - A/SECTION - 4		3.31.10	The Bidder shall provide 2x100% capacity of conveying, crushing and grinding system. The capacity of each conveying, crushing and grinding system shall run for 8 hours/day to meet the daily requirement of the maximum limestone of the FGD plant for both the units. Bidder shall consider additional 10% margin on the capacity. However, both the conveying and grinding system shall be designed to run for 24 hours.	Kindly note that Conveyor capacity has been asked wrt 8 hr working to meet requirement of 24 Hr limestone consumption. However, all the other equipments in data sheet of equipments 6.02.00 Vibrating Feeder, 6.03.00 Crusher etc. has been asked to sized wrt 12 hr working to meet requirement of 24 Hr. Due to this the conveyor capacity will be higher than the equipment suggested for selection. Thus we request customer to re-check and amend this cl. 3.31.10 inline with Datasheets.	Conveying, crushing and storing of LS into silos and wet grinding shall work for 8 hours only. Bidder may consider higher capacity of conveying, crushing and storing into silos. However, Wet grinding shall work only for 8 hours and feed to wet grinding shall be based on 8 hours working to meet the 24 hours limestone slurry requirement of FGD i.e LS required required in 24 hours will be grind in 8 hours. However, conveying and grinding system shall be designed to run for 24 hrs as & when required.
22	VOLUME - III	PART - A/SECTION - 4		3.31.12	vi) Valley angle of hoppers shall be minimum 60 deg. The unloading hopper holding capacity shall be 60 MT.	We understand 60 MT is water filled capacity. Incasse, volume of hopper is to be calculated using the heap formation in hopper, customer to specify the angle of repose of limestone.	Holding capaity of unloading hopper shall be 60 Ton of limestone storage Bidder can consider angle of repose, as per standard; 34 to 38 degrees
23	VOLUME - III	PART - A/SECTION - 4		3.31.15 CRUSHER & CONVEYER BELT	Sufficient number of crushers and Screen/Feeders & belt conveying system, as per the proven practice of the bidder, shall be provided for limestone feeding system for continuous operation of the FGD system	1. We shall be considering inline with the flow diagram ETG061-BTG-ME-FGD-PFD-001, Rev 01. & Clause no. 3.31.07 "Lime stone crushing system shall consist of two nos. of Grizzly deck vibrating screens and two nos. of Crushers... " 2. Kindly specify the rated/design and gauranteed capacity of Crusher and screen.	1. Noted 2. Specified above

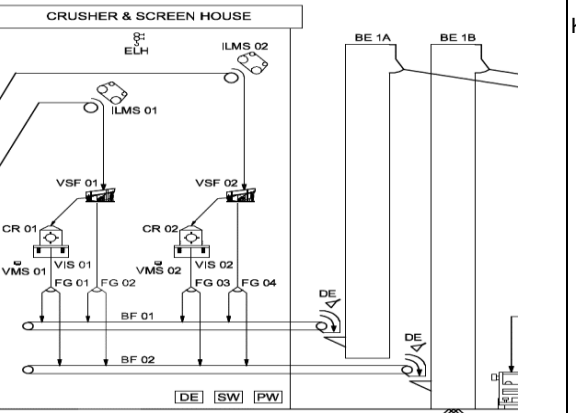
MAHARASHTRA STATE POWER GENERATION CO. LTD.
KORADI THERMAL POWER STATION
2X660 MW UNITS - 11 12 PROJECT
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24	VOLUME - III	PART - A/SECTION - 4		3.31.18 BELT WEIGHERS	Each belt scale shall also have rate flow indicator and totaliser mounted near the unit. Single roller Electronic, Load cell Strain gauge type – IP 66 capable of withstanding 200% load with tachogenerator for speed control. Weighing range 20 – 110%. Accuracy +0.5% on weighing range	Considering the low TPH of the conveyors Limestone and gypsum, accuracy of +0.5% won't be possible. We request customer to kindly amend accuracy to ±1%	Bid Specification Prevails
25	VOLUME - III	PART - A/SECTION - 4		3.35.02 GYPSUM STORAGE & GYPSUM STORAGE SHED:	The capacity of each Gypsum belt capacity shall be 110% of vacuum belt capacity.	We understand customer here refers to Design capacity of the Gypsum conveyor.	Bidder's understanding is correct
26	VOLUME - III	PART - A/SECTION - 4		3.35.02 GYPSUM STORAGE & GYPSUM STORAGE SHED:	-----	Kindly clarify if any Sump pumps to be considered for Gypsum shed	Wherever sump and sump pumps required shall be (1W+1S). Wherever service water used for cleaning, sump and sump pumps to be provided.
27	VOLUME - III	PART - A/SECTION - 4		3.35.02 GYPSUM STORAGE & GYPSUM STORAGE SHED:	-----	Pl. note that as per specifications neither Plain water dust suppression nor DE system in Gypsum handling regions is asked. May pl. confirm if there is any requirement of Plain Water dust suppression system in Gypsum storage shed.	DE and DS system is not applicable for Gypsum storage shed, however, ventilation system to be provided in gypsum storage shed
28	VOLUME - III	PART - A/SECTION - 4		3.35.02	GYPSUM STORAGE & GYPSUM STORAGE SHED: x) Maximum 7.0 Meter height of Gypsum stock pile shall be considered accordingly the dimensions of storage shed shall be designed by Bidder. xi) 40 degree repose angle of Gypsum to be consider for designing of Gypsum storage xii) Gypsum storage shed shall be designed for 5 days storage.	Kindly specify the Density of Gypsum to be considered for Volumetric calulation of Shed & Load Calculation.	Density of Gypsum shall be considered 900 kg/m3 for the purpose of volumetric calculations; and 1250 kg/m3 for the purpose of structural load, torque & drive calculations.
29	VOLUME - III	PART - A/SECTION - 4		3.35.03 - PAY LOADER/FRONT END LOADER :	Parking shed with maintenance space shall be provided for Pay loaders.	Kindly specify the size and details wrt parking shed & maintenace space required.	Bidder to consider size as per the Payloader data and OEM recommendation
30	IV) BID DRAWINGS	FLOW DIAGRAM FOR LIMESTONE HANDLNG		ETG061-BTG-ME-FGD-PFD-001, Rev 01		Pl. note that if High angle conveyor/ Vertical Conveyor is used then following items cannot be provided before the crusher house on HAC -1 & HAC-2 A. Metal detector B. Belt weigher Instead BW1/2 & MD1/2 can be provided only on BF-01 & BF 02 before bucket elevators. We request customer to kindly give their confirmation regarding the same	Noted.
31	IV) BID DRAWINGS	FLOW DIAGRAM FOR LIMESTONE HANDLNG		ETG061-BTG-ME-FGD-PFD-001, Rev 01		Kindly clarify what is ELH as same is not mentioned in legend of flow diagram.	ELH is electric hoist. Bidder to consider maintenance hoist for all equipment

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32	IV) BID DRAWINGS	FLOW DIAGRAM FOR LIMESTONE HANDLNG		ETG061-BTG-ME-FGD-PFD-001, Rev 01		Kindly confirm if underground pit can be considered for Bucket elevators.	Underground pit is not acceptable.												
33	VOLUME - III	PART - A/SECTION - 4		6.02.00 Vibrating Feeder	<table border="1"><tr><td>7.</td><td>% of inherent moisture</td><td>%</td><td>-----</td></tr><tr><td>8.</td><td>Hours of operation</td><td>Hours</td><td>24</td></tr></table>	7.	% of inherent moisture	%	-----	8.	Hours of operation	Hours	24	Kindly specify the maximum moisture content to be followed for designing equipments.	For Lime stone 5% moistute to be consider for equipment design				
7.	% of inherent moisture	%	-----																
8.	Hours of operation	Hours	24																
34	VOLUME - III	PART - A/SECTION - 4		6.03.00 Crusher	<table border="1"><tr><td>4.</td><td>Hard grove Index</td><td></td><td>-----</td></tr><tr><td>5.</td><td>Maximum moisture content</td><td>%</td><td>-----</td></tr></table>	4.	Hard grove Index		-----	5.	Maximum moisture content	%	-----	1. HGI & maximum moisture content in limestone to specified as same has effect on crusher finalization. 2. Further seive anaysis of limestone may pl. also be provided.	To be furnished to successful bidder				
4.	Hard grove Index		-----																
5.	Maximum moisture content	%	-----																
35	VOLUME - III	PART - A/SECTION - 4		6.08.00 Suspended Magnate	<table border="1"><tr><th colspan="4">6.08.00 Suspended Magnate</th></tr><tr><th>Sl. No.</th><th>Item</th><th>Unit</th><th>Description</th></tr><tr><td>1.</td><td>Quantity & Location</td><td></td><td>Two (02) Nos. over Vibrating discharge hopper Two (02) Nos. over limestone conveyor discharge</td></tr></table>	6.08.00 Suspended Magnate				Sl. No.	Item	Unit	Description	1.	Quantity & Location		Two (02) Nos. over Vibrating discharge hopper Two (02) Nos. over limestone conveyor discharge	Pl. note that suspended magnets are not envisaged as per Flow diagram ETG061-BTG-ME-FGD-PFD-001 Rev 01 as furnished by customer. Thus suspended magnets are not being considered as ILMS is already indicated in Crusher house. May pl. give your confirmation regarding same.	Noted
6.08.00 Suspended Magnate																			
Sl. No.	Item	Unit	Description																
1.	Quantity & Location		Two (02) Nos. over Vibrating discharge hopper Two (02) Nos. over limestone conveyor discharge																
36	VOLUME - III	PART - A/SECTION - 4		iv) Crusher	<table border="1"><tr><td>8.</td><td>Output size</td><td>mm</td><td>(-) 20</td></tr><tr><td>9.</td><td>Type of Drive</td><td></td><td>Through Gear box, V-belts, sheaves</td></tr></table>	8.	Output size	mm	(-) 20	9.	Type of Drive		Through Gear box, V-belts, sheaves	1. Kindly note that Gearbox won't be applicable in case bidder considers V Belt drive. 2. If Scoop coupling is applicable same shall be air colled type. Kindly confirm.	Noted				
8.	Output size	mm	(-) 20																
9.	Type of Drive		Through Gear box, V-belts, sheaves																
37	VOLUME - III	PART - A/SECTION - 4		iv) Crusher	-----	1. We understand Reversible Hammer mill crusher to be considered. 2. Kindly specify the motor margin to be considered for crusher.	1. Noted 2. Min. 15% margin												
38	VOLUME - III	PART - A/SECTION - 4		---	----	We understand as per specification No Lime Sampling Unit is envisaged.	No online lime sampling system is required,however off line lime sampling system shall be provided in lab. Sample collection system to be provided.												
39	VOLUME-IV BID DRAWINGS	Drawing Title: FLOW SCHEME OF ABSORBER SYSTEM, Drawing No: ETG061-BTG-ME-FGD-PFD-005		--	For FGD Inlet Damper's seal air system shown in the P&ID, Seal Air Electric Heaters (2 nos) are shown.	As per clause no: 3.22.29 GATES & DAMPER --> ii) (in Volume-III, Part-A, Section-4, Page 10 of Doc no: ETG061-BTG-ME-FGD-TS), Seal air electric heater is applicable only for Damper at outlet from absorber (FGD Outlet Damper) and in the bypass duct (FGD Bypass Damper) . Seal air heater is Not applicable for Damper at Inlet to Absorber (FGD Inlet Damper). Please confirm bidder's understanding.	Noted, heater is not required for FGD inlet dampers												

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40	VOLUME-V ANNEXURE	Annexure-2 / DATA SHEET – B (To be filled by Bidder) / Sub Section No. 2.00.00 / MECHANICAL (Page 43 of Doc no: ETG061-BTG-GEN-DS)		Clause No: 2.03.00 FGD, Lime handling & Chimney --> 2.0 Guillotine Gates/ Dampers (booster fan) inlet & out let, bypass duct	2.03.00 FGD, Lime handling & Chimney ---> 2.0 Guillotine Gates/ Dampers (booster fan) inlet & out let, bypass duct a) At Booster fan inlet b) At Booster fan outlet <table><tr><td>2.0</td><td>Guillotine Gates/ Dampers (booster fan) inlet & out let, bypass duct</td><td></td><td></td></tr><tr><td>2.01</td><td>Size</td><td>(m x m)</td><td></td></tr><tr><td>2.02</td><td>Quantity</td><td></td><td></td></tr><tr><td>a)</td><td>At Booster fan inlet</td><td>no</td><td></td></tr><tr><td>b)</td><td>At Booster fan outlet</td><td>no</td><td></td></tr><tr><td>c)</td><td>In FGD Bypass duct</td><td>no</td><td></td></tr></table>	2.0	Guillotine Gates/ Dampers (booster fan) inlet & out let, bypass duct			2.01	Size	(m x m)		2.02	Quantity			a)	At Booster fan inlet	no		b)	At Booster fan outlet	no		c)	In FGD Bypass duct	no		As per technical specification Clause No: 3.22.29 GATES & DAMPER ---> i) (in Volume-III, Part-A, Section-4, Page 10 of Doc no: ETG061-BTG-ME-FGD-TS), Pneumatic Bi-plane / multi louver type dampers shall be provided at a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct. Whereas in the referred DATASHEET-B, "Booster Fan Inlet" & "Booster Fan Outlet" are mentioned. Since Bidder is providing combined ID Fan, separate Booster Fan is not applicable for FGD. Therefore, Guillotine Gates for Booster Fan Inlet and Booster Fan Outlet are not applicable. Bidder will be providing Pneumatic Bi-plane / multi louver type dampers at a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct in-line with Clause No: 3.22.29 GATES & DAMPER ---> i) (in Volume-III, Part-A, Section-4, Page 10 of Doc no: ETG061-BTG-ME-FGD-TS). Please confirm.	Guillotine Gates for Booster Fan Inlet and Booster Fan Outlet are not applicable, if Booster fan is not required. FGD dampers shall be as per specification Clause No: 3.22.29, i), of Vol-III, Part-A, Section-4
2.0	Guillotine Gates/ Dampers (booster fan) inlet & out let, bypass duct																														
2.01	Size	(m x m)																													
2.02	Quantity																														
a)	At Booster fan inlet	no																													
b)	At Booster fan outlet	no																													
c)	In FGD Bypass duct	no																													
41	III	A		3.23.23	The absorber wet-dry interface shall be made of C-276 of minimum 6 mm thickness from ½ meter before emergency quenching spray to absorber.	As per standard practice, the Emergency Quenching system will be installed prior to the Wet Dry interface system. No lining is necessary for the Emergency Quenching area. However, lining will be applied in the Wet Dry interface area at the Absorber inlet as per standard practice.	Bid specification prevails.																								
42	III	A		3.26.01	The tank shall be sized to provide a minimum mean residence time of 12 hrs for the slurry to be oxidized to gypsum. For oxidation of calcium sulphite to gypsum.	Normally as per our DCFS BHEL FGD, the absorber will be designed minimum 8 hrs retention time based on the design point absorber slurry flow rate. DCFS FGD is proven in more than 100 installations.	Bid specification prevails.																								
43	III	A		3.26.02	Maximum slurry chloride level shall not exceed 20000 mg/L.	As per the tender specifications, it is mentioned that the maximum slurry chloride level shall not exceed 20,000 ppm. However, in the process water scheme, it is stated that the CW blowdown water shall be used for the FGD process. Customers/Consultants shall note that in CW blowdown water, the chloride level will be high, and it is not feasible to maintain a chloride level less than 20,000 ppm.	Bid specification prevails.																								
44	III	A		3.42.01	Cooling tower blowdown water will used as process water for the FGD system. Blowdown water from the CW pump discharge shall be taken to the process water tanks	The bidder requests the customer to note that the use of CW blowdown for FGD process makeup results in degradation of absorption and/or oxidation performance because CW blowdown inherently contains anticorrosion reagents, which will inhibit performance. Customer may kindly clarify.	Maximum chloride level in slurry shall be maintained considering CW blow down water																								
45	ETG061-BTG-ME-FGD-PFD-002_GYPSUM DEWATERING SYSTEM ETG061-BTG-ME-FGD-PFD-003_GYPSUM HANDLING SYSTEM				Waste Water neutralisation System	The tender specification does not include the Waste water neutralization scheme & waste waster terminal point. The customer may provide the same.	Bidder to submit the scheme DDE, inline with the specification requirements																								
46	III	A		3.23.10	The scope of modelling shall include flue gas path inside the absorber vessel including inlet and outlet duct.Homogeneity shall be ensured, if the deviation from average is less than (+)10%. Further, in the Absorber outlet hood no internals such as guide vanes and baffle plates shall be allowed.	CFD analysis is not required since DCFS FGD has been proven in more than 100 installations. The design of DCFS FGD will ensure homogeneous flue gas flow distribution in the flue gas ducts, inlet, and outlet hoods of the FGD. The customer's requirement, "deviation from average: less than +10%," is too strict and is not mandatory for stable operation based on our experiences with actual plants. The deviation shall be ranges from 15-20%, and BHEL has designed and delivered FGD plants with a deviation from the average of approximately 15%. Therefore, the customer's requirement for deviation from "+10%" shall be changed to "+15-20%" for ducting.	Bid specification prevails.																								
47	III	A		3.28.01	It should be possible to discharge the each absorber into the emergency drain tank within 2 hours.	In clause 3.28.01, it states that the slurry from the Absorber shall be discharged to the Auxiliary Absorbent Tank within 2.0 hours, while in clause 3.26.08, it indicates that it shall be done within 10.0 hours. These statements are contracdictory. Kindly clarify	Slurry from the Absorber shall be discharged to the Auxiliary Absorbent Tank within 2.0 hours as per clause 3.28.01, of Vol-III, Part-A, Section-4																								
48	III	A		3.26.08	It should be possible to discharge the absorber tank into the Auxiliary absorber tank within 10 hours																										

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
49	III	A		3.23.08	Sieve plates shall be installed at the vessel outlets to protect the circulation pumps and all other pump connected.	Suction screens will be installed within the Absorber for Recirculation slurry pumps to safeguard them. For other slurry pumps, a coarse screen will be placed on the suction side until the pump is commissioned. After commissioning, the screen will be taken out. This practice aligns with QFGDM and current commissioning procedures. Kindly accept.	Noted
50	III	A		3.23.27	In case of Spray Tower System, Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps and all other pumps connected in absorber.		
51	III	A		3.23.16	The absorber shall be self-supported from the bottom to suit site conditions. The absorber shall have adequate stiffening arrangement on the external side	We understand that this clause is applicable for circular absorber. Our BHEL DCFS absorber is in rectangular shape and supported by external supporting structure. Kindly accept.	Noted
52	III	A		3.25.03	The slurry recirculation pumps shall have motor driven knife gate valve at pump suction and discharge side.	Normally, in the recirculation pump area, if a pump stops, the gate should quickly close without any leaks in the slurry lines. However, with knife gate valves, there may be leakages after several operations due to component wear. In such instances, we propose the installation of pneumatic-operated butterfly valves, which are commonly used in FGD plants. Kindly accept.	Motor driven Knife gate valve or motor driven butterfly valve shall be provided for suction and discharge of all slurry pumps
53	III	A		3.40.04	Motorized actuators shall be provided for valves requiring frequent operation as indicated in the relevant scheme	The customer may please note that in the FGD system, manual, motor, and pneumatic actuators are being used. The nature of the selection of actuators will depend on the frequency of valve operation in the FGD system. Based on current and proven practice, the actuators will be selected, and the same will be finalized with the customer during the detailed engineering stage	1. Suction and discharge valves of all the pumps shall be motorized as per specification 2. All flushing valves shall be motorized / Pneumatic. 3. All drain valves required for flushing operation shall be motorized / Pneumatic. 4. The drain valve in Absorber tank and auxiliary absorber tank shall be motorized 5. Flushing water for the pumps shall be taken from process water as per technical specification
54	III	A / Sec 4		3.34.14	1 no. drain sump with 1x100% agitator and 2x100% sumps shall be provided in gypsum dewatering area.	It is understood that clause shall be "1 no. drain sump with 1x100% agitator and 2x100% sumps pumps shall be provided in gypsum dewatering area". There shall be only 1 no. sump in gypsim dewatering area. Please confirm.	Noted.
55	III	A / Sec 4		3.34.17 (II) & IV	The filter cloth shall be polyester or polypropylene as per the proven design of the supplier and shall be guaranteed for a minimum life of not less than 7000 hrs. & The sealing belt shall have minimum life of not less than 5000 hrs.	No belt filter manufacturer provides guarantee for operational life as it depends upon the usage conditions. The guaranteed life of 7000 hours is not being provided by the OEMs for belt filter/cloth. The OEMs have informed that the life of the cloth is around 1200-2000 hours. Please accept.	Bid Specification Prevails
56	III	A / Sec 4		3.34.20 (VI)	Replaceable internal ceramic liner shall be provided for hydro-cyclone apex.	No liners are being provided by some suppliers as material is Polyurethane/other similar material which does not require any liner.	Noted
57	VOLUME - III	PART – A/ SECTION - 4		3.32.03	LIMESTONE SLURRY PREPARATION / STORAGE TANK ii) The storage tanks shall be equipped with sufficient number of agitators, to avoid settling of limestone, as per the proven practice of the supplier.	Limestone slurry storage tank is provided with vertical agitator. Accordingly, one no. of vertical agitator is envisaged for lime stone slurry tank.	Noted
58	VOLUME - III	PART – A/ SECTION - 4		3.37.04	Agitators shall also be provided to avoid settling of solids in the sump.	Sumps are provided with vertical type agitator. Accordingly, one no. of vertical agitator is envisaged for each sump.	Noted
59	VOLUME - III	PART – A/ SECTION - 4		3.39.05	The material for the shaft and agitator blades of the Absorber Agitators and for Agitators in other tanks shall be in accordance with Alloy 926 or better.	Pl. note that the material of vertical agitators, shaft shall be Carbon Steel with rubber lining. Further, pl. also accept duplex stainless steel material for agitator blades. This is inline with the Bhusawal project. Pl. accept.	Material of shaft shall be Alloy 926 or better as per technical specification. For Agitator blades Bidder can consider Alloy 926 or super duplex or better
60	VOLUME - III	PART – A/ SECTION - 4		3.39.05	The material for the shaft and agitator blades of the Absorber Agitators and for Agitators in other tanks shall be in accordance with Alloy 926 or better.	For horizontal agitators, the material for shaft & agitator blade shall be Alloy 926/ Duplex stainless steel. This is inline with the Bhusawal project. Pl. accept.	Material of shaft shall be Alloy 926 or better as per technical specification. For Agitator blades Bidder can consider Alloy 926 or super duplex or better
61	VOLUME - III	PART – A/ SECTION - 4		3.39.06	Each agitator and its associated equipment shall be arranged in such a manner as to permit easy access for operation, maintenance and agitator removal without interrupting plant operation.	Agitator removal is not feasible without cutoff of that particular tank. Pl. confirm.	Bidder to follow technical specification

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62	VOLUME - III	PART – A/ SECTION - 4		3.39.09	Static and dynamic (as far as applicable) balancing of all agitators shall be carried out after assembly.	Static balancing shall be carried for all types of Agitators. While, dynamic balancing shall be carried for agitators having RPM > 150. This is inline with IS 9522. Pl. accept.	Bidder to follow technical specification
63	VOLUME - II	SECTION - 2		4.01.00	The complete plant shall be designed with adequate redundancy. As a rule 100% redundancy shall be followed for all critical/important equipment unless specified otherwise	Reduncancy is not applicable for Agitator package. The agitators shall be provided as per Volume-III, PART – A/ SECTION - 4 and accepted clarification/ deviation.	Noted
64	III	A/4		3.06.00, V,1	FGD design point: Boiler Load in MW (e): BMCR	Please specify the load (either BMCR or VWO) to be considered for design point of FGD.	Bidder shall consider BMCR load (with worst coal with respect to Sulphur %) at FGD inlet temperature of 150 deg.C.
65	III	A/4		3.06.00, V,4	Gas flow: To be worked out by Bidder when firing the specified worst coal at VWO load, considering 20% excess air at economizer outlet,15% Air heater in leakage & 2% duct and 1% ESP leakage as a minimum.		
66	VOLUME - III PART - D	CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	Page 151	18.08.05	18.08.05 The Bidder will provide testing equipment for conducting non-destructive tests for confirming the integrity of welding wherever necessary as directed by the Owner / consultant.	Bidder will perform NDT as per FQAP requirement, in case of additional NDT to be performed, same shall be subject to extra time and cost. Please confirm.	Bid Specification Prevails
	3/ Sec 7/ Part A	ETG106-EPC-ME-FGD-TS	68	4.08.11	In addition, the Bidder, at its expense, shall have the option of taking one radiograph per day per welder at a location selected by the Bidder.		
67	3/ Sec 7/ Part A	ETG106-EPC-ME-FGD-TS	67	4.08.02	4.08.02 Special attention shall be given to the AWS requirements with regard to manual shielded metal arc welding such that all vertical welds shall progress upward for all passes. Shielded metal arc welding (stick electrode) shall be used during erection of the flue.	SMAW / FCAW /GMAW will be used for erection of flue can as per existing industrial practice.	Noted.
68	VOLUME - II	SECTION - 2		11.32.04	xxiii) FGD System j) Gypsum Purity 1) The contractor shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and based on Cao content of 51% in limestone.	Bidder request owner to Provide the Complete Limestone analysis for Guarantee and design conditions for FGD System Design	Limestone analysis will be shared with bidders along with pre-bid replies
69	VOLUME - II	SECTION - 2		213.10	b) One (1) no., passenger cum goods elevator, suitable to carry minimum 1088 kg at a time; one for each building/structure in FGD area, if height of operating floor/platforms (where personnel /goods approach is required for O&M) is more than 10m from ground floor/FFL.	Since also our absorber in substantially shorter (< 20m), bidder is not proposing elevator for absorber tower if height less than 20m. Owner is requested to accept the same.	Bid Specification Prevails
70	VOLUME - II	SECTION - 2		20.14.03	iv) Noise level shall not exceed 85 dBA at 1.5 m from equipment surface, except for the following: a) Turbine, generator and pulveriser – 90dBA b) Safety valves & associated vent pipes, HP/LP bypass valve, soot blower or wall blowers, regulation drain valves – 115 dBA	Please note, Noise level for WBM shall be <90 dBA	Noted
71	VOLUME - III	PART - A / SECTION - 4		2.01.08	Clean gas from the absorber shall be taken to the wet Chimney through three stage mist eliminators.	The quantity of mist in flue gas in JBR technology is significantly lower as compared to Spray Tower Process as Flue gas does not come in contact with any spray to pick up mist. The outlet plenum acts as first stage of mist collection due to sudden expansion of treated gas in the outlet plenum. This reduces the mist loading to the mist eliminator downstream. Moreover, unlike vertically installed mist eliminators, in JBR mist eliminator is mounted on the horizontal duct which further reduces chance of carryover to a great extent due to the inherent droplet collection system. Hence, bidder proposes 2 stage ME.	Bid Specification Prevails
	VOLUME - III	PART - A / SECTION - 4		3.25.01	Three stage chevron type Mist Eliminators (ME) made of polysulfone or stainless steel or poly propylene shall be provided at the exit of the absorber.		

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72	VOLUME - III	PART - A / SECTION - 4		2.01.09	dampers at outlet to Absorber and in the bypass duct shall also be provided with 2x100 electrical heaters.	Since the MOC of the dampers at the Absorber outlet and By-pass duct are suitable for corrosion resistant, bidder is not envisaging any heaters in seal air for the same. Kindly confirm. Further if customer insists for heater at by-pass and Absorber outlet damper, bidder proposes Carbon steel (STEN-1) material for blades and frame with seal material of SS 316L instead of C276	Noted Heater in seal air for Absorber outlet and by-pass damper is not applicable																																				
	VOLUME - III	PART - A / SECTION - 4	3.22.29	ii) ... Damper at outlet from Absorber and in the by-pass duct shall also be provided with 2x100 electrical heaters. The dampers shall be designed for tight shut-off.																																							
				iii) The blade and other components in the gas path, of the dampers shall be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm or better material. The seals shall be made of Alloy C-276 or better material.																																							
73	VOLUME - III	PART - A / SECTION - 4		2.01.17	Recirculation arrangement shall be provided for all pumps.	Recirculation arrangement for pumps shall be provided with respect to process requirement as per bidder's standard practice.	Noted. Whereever the recirculation arrangement for pump required as per system / process requirements, the same shall be provided by Bidder during Detail Engineering stage																																				
74	VOLUME - III	PART - A / SECTION - 4		3.06.00	1. Boiler Load in MW (e): BMCR 2. Type of Coal: Worst coal 4. Gas flow (m3/sec):To be worked out by Bidder when firing the specified worst coal at VWO load, considering 20% excess air at economizer outlet,15% Air heater in leakage & 2% duct and 1% ESP leakage as a minimum.	There is discrepancy in the boiler load in FGD design condition for flue gas flow (m3/sec) in sl.no.4 and sl. No. 1 . Bidder assumes that the boiler load shall be BMCR for FGD design as per sl. No. 1. Please confirm.	Gas flow (m3/sec):To be worked out by Bidder when firing the specified worst coal at BMCR load, considering 20% excess air at economizer outlet,15% Air heater in leakage & 2% duct and 1% ESP leakage as a minimum.																																				
75	VOLUME - II	SECTION - 1		3.05.03	<table><tr><th>Sl. No.</th><th>Parameters</th><th>Design Coal</th><th>Worst Coal</th></tr><tr><td>1.</td><td>Inherent Moisture</td><td>9.86%</td><td>8%</td></tr><tr><td>2.</td><td>Total Moisture</td><td>15.77%</td><td>16%</td></tr><tr><td>3.</td><td>Volatile Matter (VM)</td><td>23.30%</td><td>21.66%</td></tr><tr><td>4.</td><td>Ash Content</td><td>39.91%</td><td>42.49%</td></tr><tr><td>5.</td><td>Gross Calorific Value ARB (GCV-ARB)</td><td>3229 Kcal/Kg</td><td>3012 Kcal/Kg</td></tr><tr><td>6.</td><td>Hard grove Index</td><td>88</td><td>-</td></tr><tr><td>7.</td><td>Size</td><td>0 to 100 mm</td><td>-</td></tr><tr><td>8.</td><td>Ash Fusion Temperature</td><td>>1400 deg C</td><td>-</td></tr></table>	Sl. No.	Parameters	Design Coal	Worst Coal	1.	Inherent Moisture	9.86%	8%	2.	Total Moisture	15.77%	16%	3.	Volatile Matter (VM)	23.30%	21.66%	4.	Ash Content	39.91%	42.49%	5.	Gross Calorific Value ARB (GCV-ARB)	3229 Kcal/Kg	3012 Kcal/Kg	6.	Hard grove Index	88	-	7.	Size	0 to 100 mm	-	8.	Ash Fusion Temperature	>1400 deg C	-	Owner requested that HCL and HF values be provided if they are required to be considered in flue gas for FGD design.	Bidder to consider - HCL - 45 PPM (v) HF - 12 (PPM (v)
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76	VOLUME - III	PART - A / SECTION - 4		3.06.00	1. Boiler Load in MW (e): TMCR 2. Type of Coal: Design/worst/best coal whichever gives maximum SO2 concentration	Bidder request owner to furnish the coal analysis of all coal types and provide one coal type for Guarantee case. If required different coals can be considered in design case. Owner to confirm the same.	Coal analysis will be shared with bidders, along with pre-bid replies																																				
77	VOLUME - III	PART - A / SECTION - 4		3.11.00	In case of a power failure all items of equipment (e.g. agitators in absorber and limestone slurry tanks, flue gas damper upstream of FGD) which may cause irreversible damage to the FGD System shall be connected to the emergency power supply system to be provided by the Bidder.	For JBR type, the agitator in the absorber is not needed to be connected to the emergency power supply Since the agitator blades will be located well above the slurry settling height and can work even after a long duration shut-down.	Bidder to follow technical specification, however this may be discussed during detail engineering																																				
78	VOLUME - III	PART - A / SECTION - 4		3.13.00	Motorized drain valve shall be provided for draining of absorber and auxiliary absorber tank.	Bidder request owner to include the option of Pneumatic operated valves as per bidder's proven practice.	Bid Specification Prevails																																				
79	VOLUME - III	PART - A / SECTION - 4		3.21.00	The entire flue gas system, flue gas ducts, absorber etc. shall be designed to meet the following conditions: Short temperature excursion temperature of inlet gas (for approx 30 minutes at a time): 300 °C	Bidder request owner to modify the values as "300 deg C for 15 minutes", as same is followed in all our ongoing projects (NTPC and other power utilities) and agreed by the customers. The temperature of 300 deg. C is applicable for ducts inlet to Absorber (up to Gas cooler) and bypass-duct only and not applicable for Absorber and ducts downstream of absorber as the temperature of flue gas shall never go above saturation temperature for JBR type absorber. Bidder request customer to accept the same.	Bid Specification Prevails																																				

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80	VOLUME - III	PART - A / SECTION - 4		3.21.00	Pressure at chimney inlet : 40 MMWC	The booster fans shall be considered for JBR. Hence, booster fan shall be sized as per the actual calculated head required to overcome the pressure drop in absorber & ducts and stack inlet pressure. Please confirm.	Booster fan shall be sized for actual calculated head required to overcome the pressure drop in absorber & ducts with minimum stack inlet pressure of 40 MMWC as per specification
81	VOLUME - III	PART - A / SECTION - 4		3.22.10	Ductwork for wet dry interface from ½ meter before quenching spray up to absorber Plates - ASTM B575 Alloy C-276 (UNS N10276) of minimum 6 mm thk. Shapes and expansion joint frames - Components Not Exposed to Flue Gas: ASTM A992 / A992M Components Exposed to Flue Gas: ASTM B575 Alloy C-276 (UNS N10276) Internal braces and test ports - ASTM B575 Alloy C-276 (UNS N10276), seamless	As per bidder's standard proven practice, gas cooling duct shall be of 10m. Out of 10m,wet-dry interface shall be of length ~3m from inlet of gas cooling duct made of 6mm solid C-276 . Remaining length of gas cooling duct shall be of carbon steel coated internally with FLRP and anti-abrasion coating.	1. For JBR technology Gas cooling duct from inlet of gas cooling duct (wet-dry interface of length ~3m) made of 6mm solid C-276 and remaining length of gas cooling duct shall be carbon steel with minimum 2mm thick C276 cladding. All other ducts and components shall be as per technical specification. 2. For DCF and spray tower absorber the dry - wet interface shall be as per technical specification
82	VOLUME - III	PART - A / SECTION - 4		3.22.10	Duct from absorber outlet to wet stack and Duct after by-pass damper /gate Plates (Cladding) - Cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 8 mm thick (minimum) mild steel base metal. Cladding shall be done to achieve the required quality as per ASTM B 898-11 Shapes and expansion joint frames - Components Not Exposed to Flue Gas: ASTM A992 / A992M Components Exposed to Flue Gas: ASTM B575 Alloy C-276 (UNS N10276) Internal braces and test ports - ASTM B575 Alloy C-276 (UNS N10276), seamless	As per bidder's standard proven practice, Duct from absorber outlet to wet stack and Duct after by-pass damper /gate and other components coming in contact with flue gas shall be made of 7 mm thick (minimum) mild steel base metal with 3mm thick Flake Glass Lining suitable for By-Pass condition. Bidder request owner to please confirm and accept the same.	Bid Specification Prevails
83	VOLUME - III	PART - A / SECTION - 4		3.22.12	The inlet duct shall be sloped towards the absorber. The inlet duct shall have minimum 10 degrees downward slope in the direction of absorber.	As per bidder's standard practice the inlet duct shall have minimum 5 to 6 degrees slope towards absorber. Please confirm and accept the same.	Bidder to follow technical specification, however this may be discussed during detail engineering
84	VOLUME - III	PART - A / SECTION - 4		3.22.29	i)...The arrangement of the flue gas system shall allow complete isolation of the absorber from the gas side, with the unit in operation. For this purpose Pneumatic Bi-plane / multi louvers type dampers shall be provided at - a) Hot gas inlet to Absorber b) Cold gas outlet from Absorber and c) In the bypass duct . ----- xxxiv) Motor operated Guillotine gate shall also be provided by the bidder at the outlet of each booster fan, in case Booster fan is provided by the bidder.	In the specification as per clause no. 3.22.29(xxxiv), in case booster fan is considered, it is mentioned to provide guillotine damper only at booster outlet. Bidder understands that at booster fan inlet Pneumatic Bi-plane / multi louvers type dampers are to be considered. Please confirm.	Motor operated Guillotine gate shall also be provided by the bidder at the inlet and outlet of each booster fan, in case Booster fan is provided by the bidder.
85	VOLUME - III	PART - A / SECTION - 4		3.22.29	xvi) ... Minimum thickness of major structural members shall be 10 mm.	As bidder's experience in on-going projects minimum thickness shall be around 7-8mm . Please confirm.	Bid Specification Prevails
86	VOLUME - III	PART - A / SECTION - 4		3.22.29	I. Sealing air system primary isolation damper d. Operator type: Electric	As per bidder's experience in on-going projects and also as per the contract P&ID, bidder shall consider pneumatic operated isolation damper.	Noted
87	VOLUME - III	PART - A / SECTION - 4		3.23.10	The above shall be proven by two phase Computational Fluid Dynamics simulations (liquid and gas). The scope of modelling shall include flue gas path inside the absorber vessel including inlet and outlet duct.	The CFD shall be carried out for the duct as asked for. For the absorber section ,unlike Spray tower, in the JBR technology the flue gas is passed through the Absorber slurry in the reaction tank and the technology don't envisage escaping of the flue gas untreated. Hence the CFD is not required for the JBR which may be mandatory for the spray technology. Scope of modelling shall only be limited to inlet/outlet duct. Owner is requested to confirm.	Bid Specification Prevails
88	VOLUME - III	PART - A / SECTION - 4		3.23.10	Homogeneity shall be ensured, if the deviation from average is less than (+)10%.	This requirement is too strict and cannot be met. Homogeneity shall be less than ±30%.	Bid Specification Prevails

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89	VOLUME - III	PART - A / SECTION - 4		3.23.19	The Bidder shall guarantee the operation of scrubber along with mist eliminators without fouling or plugging continuously for the period of 20,000 hours without cleaning which requires FGD shutdown. Access for possible inspections of the mist eliminator section shall be provided.	The QFGDM /OEM maintenance schedule to be strictly followed for continuous operation / to meet the required performance. Bidder request owner to confirm.	Bid Specification Prevails
90	VOLUME - III	PART - A / SECTION - 4		3.23.15	The raw gas inlet duct of the absorber shall be equipped with a flushing device of the side walls and the ground, which shall operate continuously as well as intermittently.	Please note that, in the offered JBR type absorber, the gas cooling mechanism which is provided at raw gas inlet duct of the absorber will be continuously operated. Hence, no separate flushing devise is required and envisaged.	Flushing of duct to prevent the accumulation of dried slurry solids/ dissolved slurry solids shall be provided
91	VOLUME - III	PART - A / SECTION - 4		3.23.21	The absorber vessel shall be made of minimum 7 mm thick carbon steel. For carbon steel absorber bidder to consider cladding of carbon steel plate with minimum 2 mm thickness Alloy C276/Alloy59.	As per the bidders' collaborator experience and proven practice, the absorber vessel shall be made of minimum 7 mm thick carbon steel with 2 mm thick flake glass lining. Please confirm.	Bid Specification Prevails
	-----	-----		-----	All metallic equipment that does not receive a lining or coating and that comes into contact with slurry or condensing flue gas shall be made of Alloy 59/ C276, if not otherwise specified. Furthermore all areas, which are highly stressed by slurry, dust, flue gas velocity etc. shall be made of or respectively lined with Alloy 59/ C276.		
92	VOLUME - III	PART - A / SECTION - 4		3.26.01	The absorber tank shall be made of minimum 7 mm thick carbon steel cladded with minimum 2mm thickness Alloy C276/Alloy59.		
93	VOLUME - III	PART - A / SECTION - 4		3.23.23	The other bridges (supports) shall be cladded with Alloy 59/ C276 as per bidder's proven design.	The other bridges shall be lined as per proven QFGDM's proven practice. Please confirm.	The other bridges (supports) shall be cladded with Alloy 59/ C276
94	VOLUME - III	PART - A / SECTION - 4		3.23.26	At the head of the absorber two manholes shall be provided to reduce the draught of the stack during outage.	Kindly note, bidder understands that this clause is applicable only for spray type absorber.	Bidder understanding is correct
95	VOLUME - III	PART - A / SECTION - 4		3.23.28	For the agitators a flushing system for start ups shall be provided.	For JBR, the impeller of absorber agitators are mounted above the slurry settling zone and can start without flushing system after a long shutdown as per collaborator proven design. Hence, requirement of separate flushing system for agitator is not envisaged.	Bidder to follow technical specification, however this may be discussed during detail engineering
96	VOLUME - III	PART - A / SECTION - 4		3.23.33	iv) The sparger and gas riser tubes shall be made of proven material which shall have aminimum life of 5 years. Minimum 10% redundancy shall be provided in the Sparger Tubes.	To achieve the desired performance as mentioned in the tender specification, the velocity profile in absorber is designed at guarantee point/design point. For achieving the desired bubbling effect in the absorber, suitable numbers of spargers are provided. Any additional spargers provided inside the absorber shall have an adverse effect on the velocity profile and hence on the performance of the absorber. In view of the above, Bidder requests 10% of the number of Sparger Tubes required for one JBR to be provided as warehouse spares for the project and no redundancy in the installed spargers is envisaged.	Bidder to follow technical specification. 10% redundancy shall be provided in sprager tubes as per specification to achieve the desire performance even after chocking of some sparger tubes.However this can be discussed during detail engineering
97	VOLUME - III	PART - A / SECTION - 4		3.25.07	The mist eliminator wash piping shall be constructed of rubber lined carbon steel or glass fiber reinforced plastics.	External piping for ME washing shall be Carbon steel, however, internal piping / header shall be 'PP/PVC/ FRP/CSRL. Please confirm.	Bid Specification Prevails
98	VOLUME - III	PART - A / SECTION - 4		3.25.19	The mist eliminator support beams shall be designed to act as maintenance walkways approximately 300 mm wide and shall allow for a minimum 500 Kg/m2 load.	This requirement is applicable for ME of Spray Tower Absorber, whereas in JBR type Absorber, the ME is located outside of Absorber in the Outlet duct. Hence this clause is not applicable for JBR type absorber. Please confirm.	This will be discussed during detail engineering and if maintenance walkway is required considering the maintenance / removal of mist eliminator the same shall be provided by bidder as per specification

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99	VOLUME - III	PART - A / SECTION - 4		3.25.21	The nozzles used in the wash system shall be full cone spray nozzles. Maximum mist eliminator wash nozzles angle shall be 90 degrees and they shall not use any moving parts to achieve the spray pattern. The overlap from adjacent wash nozzles shall provide a minimum of 150 percent coverage (on average) of the mist eliminators. The wash nozzles shall be located no more than 36 inches from the mist eliminator surface.	Kindly note that the internal arrangement and design of ME will be as per standard proven design of OEM.	Bid Specification Prevails
100	VOLUME - III	PART - A / SECTION - 4		3.26.03	The bidder shall offer and demonstrate mixing arrangement such that N-1 numbers of agitators are sufficient to avoid the slurry settlement in the absorber tank in case of one agitator under breakdown (where is N-total no. of working agitators).	Bidder understands that this clause is applicable only in case side entry (or horizontal) agitators are used.	Noted, however one no agitator as warehouse spare to be provided to meet specification requirement
101	VOLUME - III	PART - A / SECTION - 4		3.26.05	The absorber oxidation tank shall be provided with an over flow line complete with sealing pot, over flow and drain line. The absorber over flow shall be taken to a sump in the absorber region, from where the slurry shall be pumped back to the absorber by a sump pump.	This clause is applicable for Spray tower type absorber. In JBR type absorber, over flow line of the absorber oxidation tank is not necessary for the offered process as there is no possibility of foaming phenomena of the absorbent slurry and also, the absorbent tank is a sealed chamber.	Noted, however if required during detail engineering the same shall be provided as per specification
102	VOLUME - III	PART - A / SECTION - 4		3.27.02	Head: For bubbling type actual requirement considering choking/ blockage of minimum 10% of the oxidation nozzles / sprayers or minimum 3500 mmwc whichever is higher. Margin on Head: 10% margin on the higher value of above conditions.	The minimum head requirement should be as per actual calculation. Also requirement of additional 10% margin on minimum head is not required and 10% margin on frictional loss of actual head will be considered.	Bid Specification Prevails
103	VOLUME - III	PART - A / SECTION - 4		3.27.03	Oxidation nozzles / spargers shall have a minimum redundancy of 10% or as per the bidder's proven practice whichever is maximum.	For JBR type absorber, oxidation air system shall not be of sparger type. Oxidation air injected in the JBR through pipe without any nozzle. Hence minimum redundancy of 10% on oxidation air nozzles/ spargers is not applicable as per our technical collaborator proven design. Please accept and confirm.	Bidder to follow technical specification, however this may be discussed during detail engineering
104	VOLUME - III	PART - A / SECTION - 4		3.27.05	Bidder shall consider CS lines for oxidation air supply system up to air cooling spray. FRP/SS 316L from spray to absorber and inside absorber C-276 or better material.	As per the bidders' collaborator experience and proven practice, oxidation air supply lines inside absorber shall be of FRP with anti-abrasion coating on outside surface. Please confirm and agree the same.	Bid Specification Prevails
105	VOLUME - III	PART - A / SECTION - 4		3.28.01	The Bidder shall provide an auxiliary absorbent tank, for the unit, sized to contain the complete slurry of one absorber tank at its maximum level equipped with all necessary pumps, valves, piping and controls to transfer the tank's contents back to the absorber to refill the absorber sump	As per Bidder's understanding and previous experience, there will be a common auxiliary absorbent tank for both the units. Further, the slurry from auxiliary absorbent tank shall be transferred to oxidation tank integrated with absorber. Please confirm.	Bid Specification Prevails
106	VOLUME - III ----- VOLUME - III	PART - A / SECTION - 4 ----- PART - A / SECTION - 4		3.28.01 ----- 3.26.08	It should be possible to discharge the each absorber into the emergency drain tank within 2 hours. ----- It should be possible to discharge the absorber tank into the Auxiliary absorber tank within 10 hours, However Bidder has to provide margin as per their proven design for trouble free O&M. Draining of absorber using a pumping system shall be between maximum slurry level to pump trip level. The balance slurry will be drained to the drain sump, using absorber drain and then will be transferred to the auxiliary absorbent tank or absorber tank by drain pumps. Bidder may use Gypsum bleed pumps for transferring of slurry absorber tank to Auxiliary absorber tank or provide 2 X 100% separate pump as per the Bidder's proven practice.	There is discrepancy in the specification regarding the discharge of slurry from absorber to auxiliary absorbent tank. Bidder shall consider the specification as mentioned in clause no. 3.26.08. Please confirm.	Slurry from the Absorber shall be discharged to the Auxiliary Absorbent Tank within 2.0 hours as per clause 3.28.01
107	VOLUME - III	PART - A / SECTION - 4		3.28.02	The bidder shall provide 2 x100% pump to pump back the slurry from the sump back to the absorber in a maximum time of 8 hours.	Bidder understands that, 2 x100% pump to be provided to pump slurry back from auxiliary absorbent tank to absorber. Please confirm.	Bidder's understanding is correct

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108	VOLUME - III	PART - A / SECTION - 4		3.28.03	Agitation shall be provided to prevent settlement of slurry by side entry agitators with emergency flush start system.	As per bidder's standard practice top entry agitator shall be provided for agitation in auxiliary absorbent tank. Please confirm.	Noted
109	VOLUME - III	PART - A / SECTION - 4		3.29.01	Margin on Head - 20% Margin on Flow - 15%	The margin on Flow shall be 10% and on frictional head shall be 15% as per standard design practice. Bidder request owner to accept.	Bid Specification Prevails
110	VOLUME - III	PART - A / SECTION - 4		3.32.02	WET BALL MILL 2) Flow: 110% of limestone requirement of two (2) absorbers at Design point (for both units); based on 8 hrs operation of mill to meet 24 hrs lime stone requirement of both the units.	As per the process requirement, to maintain the water balance in the system ball mill shall be designed based on 22 to 24 hrs of operation considering 110% of limestone requirement at Design point to meet the 24hrs limestone requirement of the absorber. Please confirm. Bidder request owner to clarify the need for sizing the wet ball mill based on 8hrs operation of mill to meet 24 hrs limestone requirement of the absorber.	Bid Specification Prevails
111	VOLUME - III	PART - A / SECTION - 4		3.32.04	LIMESTONE SLURRY SUPPLY PUMPS 5. Margin on head Heads: 15% (minimum)	As per standard practice, 10% margin on Friction losses instead of 15% shall be considered.	Bid Specification Prevails
112	VOLUME - III	PART - A / SECTION - 4		3.33.03 ----- 3.33.04	FLUID COUPLINGS i) Fluid couplings shall be provided in all the drive, if the actual power requirement at motor output shaft is more than 30 KW. ii) The fluid coupling for LT motors shall be of traction type. Cooling water coils for traction type fluid coupling shall not be accepted. iii) Scoop tube type fluid coupling shall be provided for drive with HT motors. Suitable electrically operated actuators shall be provided for scoop tube operation from local as well as remote. ----- FLEXIBLE COUPLING i) For motor rating up to 30KW – Geared type flexible coupling. ii) For LT motor of above 30KW – Traction type fluid coupling. iii) For HT motor – Actuator operated scoop type fluid coupling.	Bidder request owner to kindly note that type of coupling shall be as per OEM's standard practice and recommendation.	Bid Specification Prevails
113	VOLUME - III	PART - A / SECTION - 4		3.34.09	The underflow of primary hydro-cyclone which contains the coarser gypsum particle shall be fed to 2 x100% capacity vacuum belt filter system. The overflow shall be collected in a secondary hydro-cyclone feed tank of adequate capacity (minimum 1 hr.) and then taken to 2x100% secondary hydro-cyclones by means of 2X100% secondary hydro cyclone feed pumps.	Bidder shall provide only primary hydro cyclone. No waste water hydro cyclone (secondary hydro cyclone) shall be provided since the Bidder's technical collaborator has proven experience and many installation without the requirement of secondary hydro cyclone . Please accept and confirm.	Bid Specification Prevails
114	VOLUME - III	PART - A / SECTION - 4		3.34.11	The filtrate from the each vacuum belt filter shall be collected in the vacuum receiver and further transferred to filtrate / reclaim tank by 1X100% vacuum receiver filter pumps. 1X100% vacuum pump shall be provided for each receiver.	2x100% pumps for transferring water from vacuum receiver tank to common filtrate Tank is not required / not envisaged by bidder, since water from vacuum receiver tank shall flow by gravity to Filtrate tank.	Noted, however if pump is required during detail engineering the same shall be provided as per technical specification
115	VOLUME - III	PART - A / SECTION - 4		3.34.17	The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design.	As the frame for vacuum belt filter shall never come in contact with gypsum slurry, hence shall be made of carbon steel painted with corrosion resistant paint. Bidder request owner to please agree and confirm the same.	Bid Specification Prevails
116	VOLUME - III	PART - A / SECTION - 4		3.34.17	v) Head and tail pulleys shall be made of mild steel with flake glass lining.	As per OEM's standard practice in all our ongoing projects, head and tail pulleys shall be made of mild steel with rubber lining	Bid Specification Prevails
117	VOLUME - III	PART - A / SECTION - 4		3.34.17	xviii) The Vacuum box shall have a lowering device for inspecting and servicing the vacuum box without disturbing belt.	As per OEM's standard practice in all our ongoing projects, lowering device for inspecting and servicing the vacuum box is not envisaged / considered.	Bid Specification Prevails

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118	VOLUME - III	PART - A / SECTION - 4		3.34.17	xx) A 1.2 m (min.) wide platform shall be provided around each belt filter for easy approach & maintenance.	The belt filter shall be provided with elevated platform of 2 mtr between two VBF common for both VBF and clear space is maintained around the VBF without elevated platform, since provision of platform all around will hinder the maintenance for all the parts (below VBF). owner is requested to confirm.	Common platform for both the VBF is acceptable, however requirement of platform all around the VBF and width of platform shall be as per specification. Can be reviewed /discussed during detail engineering
119	VOLUME - III	PART - A / SECTION - 4		3.34.18	The vacuum receiver and pump internals shall be suitably lined to protect against the corrosive environment. The material selected for vacuum pumps & vacuum receivers shall be proven for similar application.	As per OEM's recommendation, it is not suggested to do the lining on the pump internals as the liner may fail after operating for a certain period, which will impact the performance of the pump. As per OEM's experience and proven practice Carbon steel material is considered for casing, impeller and shaft. Addition to this, we would like to justify that there will be no corrosion since the sealing water is clarified water.	Bid Specification Prevails
120	VOLUME - III	PART - A / SECTION - 4		3.34.19	The pump shall be capable of pumping of filtrate water with solid concentration of not less than 10% & particle lumps of 6-7mm.	Filtrate pumps handling slurry will have a slurry concentration much less than 10%. Also the filtrate pumps handling slurry will never have a particle size of 6-7 mm. Hence this clause is not applicable. Please clarify the requirement.	Noted for slurry concentration only, Pump shall be designed to handled the particle size of 6-7 mm as per specification
121	VOLUME - III	PART - A / SECTION - 4		3.34.20	ii) The secondary hydro cyclone feed tank shall be sized to provide a minimum storage of One (1) hrs. of primary hydro-cyclone overflow with all the units operating at design Point and no outflow from the tank. iii) 2x100% horizontal centrifugal pumps shall be provided to feed the secondary hydro cyclones. Each pump shall be sized to empty the full storage capacity of the tank in 45 mins.	Bidder request owner to clarify the requirement to increase the pump size for 45 mins, whereas the storage tank is sized for one hour. However, Secondary hydro-cyclone feed pump shall be sized as per the flow requirement to secondary hydro-cyclone.	Pump shall be designed to pump the hydro cyclone tank content in one hours with 10% margin in flow
122	VOLUME - III	PART - A / SECTION - 4		3.34.20	The waste water collection tank shall be of Steel construction with rubber lining.	Bidder request owner to include the option of Steel construction with Vinyl ester based flake glass lining on internal surface for waster water tank.	Noted, Bidder can consider Vinyl ester based flake glass lining on internal surface for waster water tank.
123	VOLUME - III	PART - A / SECTION - 4		3.34.20	c) Bucket conveyors shall be provided by the bidder to feed lime to each of the lime storage silos from ground level. The Bucket conveyors shall be sized to completely feed each lime silo within 2hrs.	As the slacked lime quantity required for lime dosing is very less, hence bucket conveyors are not required. Hence, for handling of this small quantity of lime, a chain pulley arrangement shall be provided. Please confirm.	Bid Specification Prevails
124	VOLUME - III	PART - A / SECTION - 4		3.36.04	All the slurry pumps shall be provided with motorized suction and discharge valves. In addition, flushing water lines with motorized valves shall be provided for each pump for automatic flushing of the pump after each shut down.	Bidder shall consider pneumatic valves at suction and discharge of slurry pumps as per bidder's standard practice and as shown in the owner's P&IDs. (14 ETG061-BTG-ME-FGD-PFD-005_ABSORBER SYSTEM,13 ETG061-BTG-ME-FGD-PFD-004_LIME PREPARATION & STORAGE SYSTEM,12 ETG061-BTG-ME-FGD-PFD-003_GYPSUM HANDLING SYSTEM,11 ETG061-BTG-ME-FGD-PFD-002_GYPSUM DEWATERING SYSTEM)	1. Suction and discharge valves of all the pumps shall be motorized as per specification 2. All flushing valves shall be motorized / Pneumatic. 3. All drain valves required for flushing operation shall be motorized / Pneumatic. 4. The drain valve in Absorber tank and auxiliary absorber tank shall be motorized 5. Flushing water for the pumps shall be taken from process water as per technical specification
125	VOLUME - III	PART - A / SECTION - 4		3.38.04	Interior surface of the tanks shall lined with replaceable chlorobutyl/bromobutyl rubber lining of minimum 5 mm thickness and the outside surface shall be coated with paint as approved by the Owner.	Kindly note as per our standard practice interior of tanks shall be lined / coated as below: ●Limestone Slurry Storage Tank, Waste Water Tank, Primary Hydrocyclone Feed Tank, Auxiliary Absorbent Tank shall be CS+Replaceable chlorobutyl/bromobutyl rubber lining of 4 mm thick. ●Filtrate Water Tank, Secondary Hydrocyclone Feed Tank, Waste Water Tank, Additional Waste Water Tank shall be CS + Vinyl ester based flake glass lining of 3 mm thick or CS+Replaceable chlorobutyl/bromobutyl rubber lining of 4 mm thick. ●Absorber Area Sump, Limestone Area Sump, Dewatering Area Sump, Auxiliary absorbent area sump shall be Concrete+resin mortar Lining of 5 mm thick. ●Process water tank and clarified water tank shall be epoxy coated. This is inline with all ongoing major projects including NTPC. Please confirm.	Rubber lining thickness of the tank shall be minimum 5 mm as per specification, however bidder may consider minimum 3 mm glass flake lining of the tank and sumps

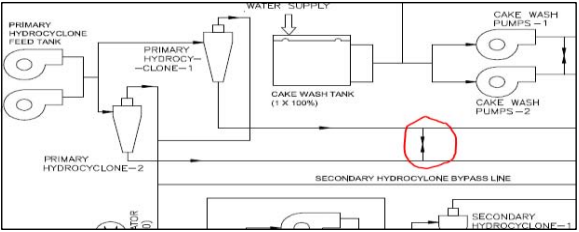
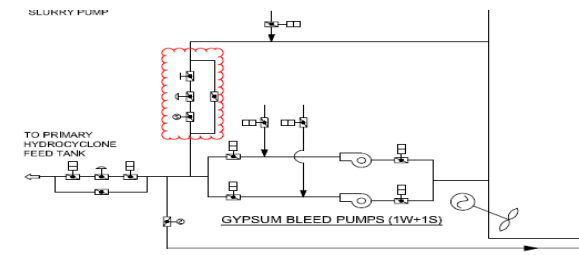
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126	VOLUME - III	PART - A / SECTION - 4		3.39.05	The material for the shaft and agitator blades of the Absorber Agitators and for Agitators in other tanks shall be in accordance with Alloy 926 or better.	As per bidder's collaborator's proven experience, For agitators in all the tanks (except for Absorber), agitator blades & shaft shall be made with carbon steel rubber lined and for absorber only the impeller and the shaft in contact with the slurry shall be of alloy 926, rest of the shaft not in contact with slurry shall be of CSRL. Please accept and confirm.	Bid Specification Prevails
127	VOLUME - III	PART - A / SECTION - 4		3.39.07	To prevent mechanical blocking load start-up after standstill of pumps, piping and agitators for slurries shall be applied with C-hose connection.	In the offered technology the impeller of absorber agitators are mounted above the slurry settling zone, thus starts without flushing system even after a long shutdown as per collaborator proven design successfully operating worldwide. Hence, requirement of C-hose is not envisaged.	Bidder to follow technical specification, however this may be discussed during detail engineering
128	VOLUME - III	PART - A / SECTION - 4		3.39.09	Static and dynamic (as far as applicable) balancing of all agitators shall be carried out after assembly.	Since all the agitators are vertically mounted & rotating at low rpm, the static & dynamic balancing after assembly are not envisaged. Kindly confirm.	Bid Specification Prevails
129	VOLUME - III	PART - A / SECTION - 4		3.40.02	The bidder may provide a recirculation line with motorized isolation valve for the above purpose.	As per bidder's standard practice and also as shown in contract P&ID, bidder shall consider pneumatic valve in the recirculation lines.	1. Suction and discharge valves of all the pumps shall be motorized 2. All flushing valves shall be motorized / Pneumatic. 3. All drain valves required for flushing operation shall be motorized / Pneumatic. 4. Recirculation valve shall be motorized / Pneumatic. 4. The drain valve in Absorber tank and auxiliary absorber tank shall be motorized
130	VOLUME - III	PART - A / SECTION - 4		3.40.03	All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. The Bidder can provide slurry pipes of size up to 400 Nb made up of abrasion resistant FRP material as per ASTM 2310 and testing as per ASTM B2583 (silicon carbide coating on slurry exposed surface) Outer surface of the pipes should be fire retardant.	For JBR, Bidder proposes FRP pipes for all the slurry pipes as per bidder's practice and experience.	Bid Specification Prevails
131	VOLUME - III	PART - A / SECTION - 4		3.40.04	Motorized actuators shall be provided for valves requiring frequent operation as indicated in the relevant scheme.	Bidder request owner to include the option of pneumatic operated valves for all motor operated valves .	1. Suction and discharge valves of all the pumps shall be motorized 2. All flushing valves shall be motorized / Pneumatic. 3. All drain valves required for flushing operation shall be motorized / Pneumatic. 4. Recirculation valve shall be motorized / Pneumatic. 4. The drain valve in Absorber tank and auxiliary absorber tank shall be motorized
132	VOLUME - III	PART - A / SECTION - 4		3.42.04	Each water storage tank shall be designed to store 2 Hrs (min.) water requirement of the FGD system.	Bidder considers 15 minutes storage capacity for process water tank as per industry practice. Please confirm.	Bid Specification Prevails
133	VOLUME - III	PART - A / SECTION - 4		3.42.07	2x100% Mist Eliminator Wash Water Pump for each unit connected to each of the Process water Storage tanks along with all necessary piping, valves, control & instrumentation shall be provided by the Bidder. Each pump shall cater to maximum mist washing requirement of one unit. The capacity of the pumps shall be such that the total capacity of working pumps is sufficient to meet the maximum wash water requirements of mist eliminators of the absorber. A further 10% margin shall be provided over the above capacity for all the above pumps.	ME wash water pumps are not applicable as per QFGDM standard design. The water required for ME wash shall be supplied by process water pump itself. Hence Bidder does not envisage separate ME wash water pumps.	Can be accepted for JBR technology only

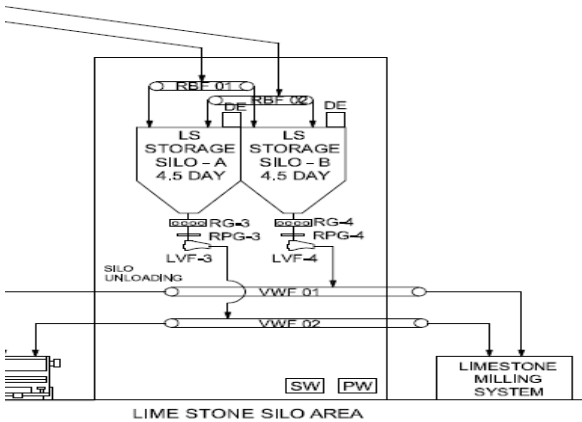
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134	-	-		ETG061-BTG-ME-FGD-PFD-002		Kindly note, there shall not be any interconnection between primary hydro-cyclone underflow lines to vacuum belt filters. As both VBF trains are completely different and interconnection may lead to operational issues.	Bid Specification Prevails
135	-	-		ETG061-BTG-ME-FGD-PFD-005		Kindly note, control valve station in gypsum bleed pump recirculation line is not required in our JBR technology, hence not considered.	Can be discussed during detail engineering
136	VOLUME - III	PART - A / SECTION - 4		3.12.00	In case of shutdown and outage periods, draining and flushing of limestone slurry and gypsum slurry pipe work, tanks and all other items being in contact with limestone slurry or gypsum slurry shall be possible without restriction and without necessity of extensive or unusual preparation and activity. Draining and flushing which are required even during short time outages or an emergency shutdown shall be started automatically and by remote control from the Control Room.	As per bidder's standard practice, automatic flushing and draining shall be provided only at gypsum and limestone slurry pump outlet and other critical areas. Other required areas shall be provided with manual flushing and draining arrangement.	Bid Specification Prevails
137	VOLUME - III	PART - A / SECTION - 4 ----- PART - A / SECTION - 4		3.23.08 ----- 3.28.06	Sieve plates shall be installed at the vessel outlets to protect the circulation pumps and all other pump connected. ----- Coarse-screen(s) of suitable material at suction-side of the pumps shall be provided.	Permanent Sieve plates are not envisaged as the temporary strainers being provided for pumps to use during commissioning and other areas permanent strainers shall be provided based on the system requirement.	Bidder to follow technical specification, however this may be discussed during detail engineering
138	Vol. - III, Part-A, Section-6	SECTION - 6		Annexure-I	The pipe joints will be screwed coupling type for sizes up to 50 NB and above 50 NB the same will Slipon flange and butt weld joint.	Galvanised Pipes joints are screwed socket up to 100mm NB size.	Noted
139	Vol. - III, Part-A, Section-6	SECTION - 6		Annexure-I	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB, Material of Pipe is Stainless Steel ERW as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10. Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB, Material of Pipe : Stainless steel as per ASTM A-312 Gr. 304. Size-up to 150 mm NB as per schedule 10S, ANSI B-36.10.	Material of Pipe for Service and Instrument air is Carbon Steel as per IS-1239 Heavy Grade for sizes up to 150 mm NB and IS-3589 for sizes above 150 mm NB with minimum pipe thickness of 6 mm. The pipes shall be galvanized as per IS-4736	Bid Specification Prevails
140	Vol. - III, Part-A, Section-6	SECTION - 6		Annexure-I	Demineralised Water, Service and Instrument Air Piping less than and equal to 50 mm NB, Material of Pipe is Stainless Steel ERW as per ASTM A-312 Gr. 304. Size- as per schedule 40 ANSI B36.10. Demineralised Water, Service and Instrument air piping for sizes equal to greater than 65 mm NB, Material of Pipe : Stainless steel as per ASTM A-312 Gr. 304. Size-up to 150 mm NB as per schedule 10S, ANSI B-36.10.	Material of Pipe for Demineralised Water is Carbon Steel (ERW/Seamless) IS-1239 Heavy Grade up to 150 mm NB and IS-3589 for sizes above 150 mm with minimum pipe thickness of 6 mm.	Bid Specification Prevails

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141	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.06, Page no 23	Limestone Conveying system shall consists of high angle belt conveyors, belt conveyors, belt feeders, reversible belt feeders, Belt weighers, Metal detectors, ILMS / CBMS, Tramp iron chutes (to discharge tramp iron to ground), Flap gates (for diverting and interconnection), interconnecting chutes, Dust extraction (DE) system for conveying system	Since, there is a limited available space for FGD area, if high angle conveyor is provided, belt weigher, metal detector will not be possible to place in high angle conveyor. Bidder requested owner to confirm the system requirement to be considered.	Bidder may place Blet weigher and metal detector in belt feeder below crusher discharge or alternatively bidder may provide additional Belt feeder with BW, MD in Belt Feeder above silo RBF.
142	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.01 , Page no 22	The bidder shall consider totally covered unloading facilities for unloading of limestone from Dumper.	Since, self tipping trucks will discharge/unload the Limestone to the underground hopper, there will be a frequent movement of trucks and dumpers/pay loaders in shed. Hence, for easy & conjunction free operation, bidder proposed to provide open type shed with covered roof truss inline with the ongoing NTPC/DVC/WBPDCL projects.	Bid Specification Prevails
143	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.12, Page no 23	ii) Unloading area including dumper tipping area shall be fully covered.		
144	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.04 , Page no 22	Shed shall be provided with local as well as remotely operated shutters entry gates.		
145	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.11 , Page no 33	All inclined or vertical conveyors or bucket elevators shall be provided with cam roller type hold back integral with the gear box in addition to thruster brakes to prevent reverse rotation of conveyor in the event of power failure under all weather conditions. The rating of the holdbacks shall be 1.5 times the full load torque of the drive and shall be provided in the intermediate shaft of the gear box. Hold backs shall be provided on the non drive end of drive / head pulley shaft. Hold backs of ratchet and pawl type are not acceptable.	- Applicability of brakes will be as per the approved coasting time calculation for all conveyors including inclined conveyors. - Bidder understand to provide gearbox with holdback in drive component for all inclined or vertical conveyors.	Noted
146	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.07 , Page no 23	Lime stone crushing system shall consist of two nos. of Grizzly deck vibrating screens and two nos. of Crushers, interconnecting chutes and DE system in Crusher house. The vibrating screen shall impart elliptical motion to the deck and exciter or drive shall be above deck.	Bidder understood to provide vibrating screen/Grizzly feeder with Cardon shaft/eccentric shaft/V-belt drive/Unbalance motor arrangement.	Noted
147	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.24, Page no 33	ii) Each silos shall be interconnected for feeding limestone to any of silo.	Bidder understand "...interconnected for feeding..." as to provide two individual belt conveying system, which can feed storage silo individually as shown in the flow diagram. Please confirm bidder's understanding.	Two nos. of reversible belt feeders (1W+1S) shall be provided and each belt feeder shall discharge lime stone to either of silo as per Bid drawing
148	ETG061-BTG-ME-FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM	---		FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM 		
149	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.12, Page no 23	ii) Unloading area including dumper tipping area shall be fully covered.	Bidder understand that there will be only self tipping dumpers for unloading the limestone material to the hopper and no separate truck tippler is required.	Noted

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
150	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.06, Page no 23	Limestone Conveying system shall consists of high angle belt conveyors, belt conveyors, belt feeders, reversible belt feeders, Belt weighers, Metal detectors, ILMS / CBMS, Tramp iron chutes (to discharge tramp iron to ground), Flap gates (for diverting and interconnection), interconnecting chutes, Dust extraction (DE) system for conveying system	Bidder understood that side walkway requirement is not applicable in case of high angle conveyor. Please confirm.	Bidder to provide walkway or suitable access platforms at various location, from maintenace point of view or the HAC can be housed inside with floors at various levels for maintenance
151	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.12, Page no 24	xi) Limestone conveyor gallery walkway shall be provided with minimum 1200mm clear central walkway and 1000 mm clear side walkway.		
152	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.12 , Page no 33	GROUND HOPPERS, UNLOADING FACILITIES AND CHUTES i) The ground hoppers of RCC lined with 10mm thk. TISCRAL/C45 plate shall be provided and any other part of hopper shall be made with MS plate with 4mm thick SS-304 lining.	Bidder understand to provide RCC underground hopper lined with 10 mm thk. Tiscral/C45. Rest chute will be as per chute specification. Clause specified as "...and any other part of hopper shall be made with MS plate with 4mm thick SS-304 lining.... " is not clear. There is no other area where liner is required. Please clarify, any applicable for this 4 mm lining is to be considered.	RCC hopper with liners -OK Below Hopper there shall be steel members to accommodate Rod gate/RP gate - some portion to connect with skirt. These all area shall be lined
153	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.03, Page no 22	Dumper unloading platform for tippling of Limestone from dumper , Rod gates, Rack & Pinion gates and Vibrating feeders, separate dedicated DE system for unloading facility	Please provide truck/dumper details used for limestone & gypsum handling system, like model no, overall dimension, gross weight details. Etc for design consideration.	To be provided to successful bidder during detail engineering
154	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.35.02, Page no 38	v) The gypsum conveyor at the head end shall also have dust tight telescopic chute to discharge gypsum directly to open truck.		
155	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.22, Page no 28	iii) The skirt plates shall be fitted with modular segmented and replaceable rubber skirting pads having facility of adjusting the pressure on the belt conveyor and shall have provision of on line removal for the purpose of easy maintenance.	Bidder understand the clause "...provision of on line removal for the purpose of easy maintenance." as to provide modular rubber skirt sealings having facility of manual adjustment only, there is no any online provision of removal of skit sealing.	Modular rubber removal and replacement locally in running condtion if required.
156	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.15, Page no 25	vii) Idlers a) Carrying idlers shall be provided with three equal rolls with troughing angle of 35 deg. and 2 deg. forward tilt	Considering the limestone & gypsum conveying capacity, bidder requested owner to allow selection of belt width and troughing angle as per bidders design, restricting maximum troughing angle of 35 deg.	Bidder may design as per requirement. However flat belt is not acceptable.
157	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.15, Page no 25	vii) Idlers a) Carrying idlers shall be provided with three equal rolls with troughing angle of 35 deg. and 2 deg. forward tilt	For reversible belt conveyor idler tilting is not applicable. Please confirm.	Noted
158	VOLUME - III, PART – A, SECTION - 7	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.15,viii) Belt Cleaners a) External Belt Cleaner, Page no 37	1) Counter Weight scraper type cleaner with modular segmented and replaceable polyurethane scrapers blades complete with main cleaner, precleaner along with accessories and necessary fines chutes shall be furnished for all belt conveyors, tripper head pulley and belt feeders at discharge pulleys.	In most cases, cleaners that use counterweights required more space for the installation, particularly at the drive end and inside the discharge chute area. Alternatively, the bidder proposed the sprung type external scraper, which is commonly used in all current NTPC and DVC projects.	Noted
159	VOLUME - III, PART – A, SECTION - 7	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.35.03, Page no 39	ii) Parking shed with maintenance space shall be provided for Pay loaders.	Bidder has considered open shed for parking considering maintenance space for 1 no. pay loader with pit arrangement for inspection on the bottom side of the payloader and other payloader in parked position. Since this is payloader shed, there shall not be any Hoist/ crane arrangement. Please confirm.	Hoist / Crane shall also be considered
160	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.33.02, Page no 32	v) Service factor will be taken 1.25 for conveyor drive gearboxes and for gear boxes in other application service factor will be taken 1.2	Bidder understood to consider service factor on consumed power. Bidder requested owner to confirm.	Service factor shall be consider on Drive Motor rating
161	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.33.02, Page no 32	vi) Flexible Couplings vii) The design of the coupling shall be such that it can take shock and misalignment without sacrificing its efficiency. Flexible couplings shall be geared type.	Generally, Pin-type flexible coupling is used to transmit the torque between the drive shaft and the driven shaft, this type of coupling is mostly used to couple electric motors and gearbox in all ongoing NTPC & DVC projects. Bidder propose to provide pin bush coupling as a high speed coupling up to 30KW.	Bid Specification Prevails

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162	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.33.04, Page no 32	3.33.04 FLEXIBLE COUPLING i) For motor rating up to 30KW – Geared type flexible coupling.	Geared coupling shall be provided as a slow speed coupling to connect gearbox output shaft with pulley. Owner requested to confirm.	
163	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.43.09, Page no 44	3.43.09 Bidder shall provide electric hoists and trolleys for all items requiring maintenance and weighing 1000 kg or more. All auxiliary structures, monorails, runway beams for all lifting tackles, hoists etc., are included in Bidder's scope of supply. Access ladders with suitable platform shall also be provided for approach to all motorized hoists/trolleys mounted on their runway beams for the maintenance of hoists/trolleys. Items weighing more than 50 kg and required to be replaced for maintenance shall be provided with manual hoists/trolleys with runway beams/supporting structure etc.	Since, it is not possible to provide electric hoist at gravity take up area. Bidder considered the manual hoist with adequate capacity to handle the take up pulley and counterweights in line with on going NTPC/DVC specification. The bend pulley of conveyor will be handled with the help of chain pulley blocks with required capacity of hook located at gallery. Owner to confirm the bidder consideration.	Manual hoist shall be provided for take-up and counter weight for each location. For bend pulley hook along with permanent chain pulley block shall be provided for each location
164	VOLUME - II, SECTION - 2	LEAD TECHNICAL SPECIFICATION		2.13.09, Page no 35	Electric hoist has to be provided to handle all plant equipment (which is not covered by any crane) and which is One (1) ton and above OR if the height to which any equipment is to be handled is 10m and above .	Bidder proposed, Hoists with more than 2.0 tons lifting capacity or more than 10.0 M lift are to be provided as an electric hoist and below that manual hoists/chain pulley blocks are to be considered. Which is also a general specification for other NTPC and DVC projects. Bidder requested owner to confirm bidder's proposal.	Bid Specification Prevails
165	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.13, Page no 24	iv) The isolating gates shall be fabricated from 10 mm thick SS 304 plate. The material for rack & pinion wheel shall be cast steel and shaft shall be EN -8.	Both clauses are contradictory, Based on our earlier projects reference, We are consider as following. R&P gate slide plate MOC - MS - 10 mm thk +6 Thk SS 304. Body - MS fabricated. Please confirm.	Noted
166	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.01.00, Page no 79	9. Materials of construction a) Slide gate 12mm thick MS plate as per IS: 2062		
167	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.10, Page no 23	The Bidder shall provide 2x100% capacity of conveying, crushing and grinding system. The capacity of each conveying, crushing and grinding system shall run for 8 hours/day to meet the daily requirement of the maximum limestone of the FGD plant for both the units. Bidder shall consider additional 10% margin on the capacity. However, both the conveying and grinding system shall be designed to run for 24 hours.	With both the clauses bidder understand the way of calculating the conveyor capacity as following in two possible options. Limestone requirement as per mass balance = A (TPH). Capacity of storage silo (B) = 4.5 x A x 24 (Tonne) Option-1 As per clause no 3.31.10, "The capacity of each conveying, crushing and grinding system shall run for 8 hours/day to meet the daily requirement of the maximum limestone of the FGD plant for both the units." In this case Limestone conveyor capacity = A x 24 / 8 (TPH).	Conveying, crushing and storing of LS into silos and wet grinding shall work for 8 hours only. Bidder may consider higher capacity of conveying, crushing and storing into silos. However, Wet grinding shall work only for 8 hours and feed to wet grinding shall be based on 8 hours working to meet the 24 hours limestone slurry requirement of FGD i.e LS required required in 24 hours will be grind in 8 hours Others on margin as per specification
168	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.08 , Page no 23	Limestone Storage system shall consist of two nos. of limestone storage silos, Rod gates, Rack & pinion Gates, Vibrating feeders, belt feeders, weigh feeders, interconnecting belt feeders, interconnecting chutes and DE system. Limestone storage silos shall be design to store limestone of at least 4.5 days (each silos) requirement of the plant.	Option-2 Alternatively, bidder also understood that the conveyor capacity is not linked with the capacity of storage silo, as if the storage silo needs to filled up in 8 hours then the overall capacity of conveyor will be changed as per following. In this case Limestone conveyor capacity = A x 4.5x24 / 8 (TPH).	
169	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.10, Page no 23	The Bidder shall provide 2x100% capacity of conveying, crushing and grinding system. The capacity of each conveying, crushing and grinding system shall run for 8 hours/day to meet the daily requirement of the maximum limestone of the FGD plant for both the units. Bidder shall consider additional 10% margin on the capacity. However, both the conveying and grinding system shall be designed to run for 24 hours.		
170	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.02.00, Page no 80	2.Feeding capacity - TPH - To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement for both the unit at maximum demand		

Conveying, crushing and storing of LS into

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171	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.03.00, Page no 81	6.03.00 Crusher Capacity - TPH To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement at maximum demand	With both the clauses, bidder understand that capacity of Limestone conveying system and it's all associated equipments above storage silo shall be defined considering 8 hours/day running operation as per the clause 3.31.10. After storage silo, vibrating feeder capacity shall be similar to ball mill capacity.	Conveying, screening and storing of LS into silos and wet grinding shall work for 8 hours only. Bidder may consider higher capacity of conveying, crushing and storing into silos. However, Wet grinding shall work only for 8 hours and feed to wet grinding shall be based on 8 hours working to meet the 24 hours limestone slurry requirement of FGD i.e LS required required in 24 hours will be grind in 8 hours Others on margin as per specification
172	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.04.00, Page no 81	6.05.00 Bucket Elevator for Limestone Flow rate - TPH To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement at maximum demand		
173	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.06.00, Page no 86	6.06.00 Belt Weigher Capacity (flow) - TPH To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement at maximum demand		
174	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.07.00, Page no 86	6.07.00 Metal Detector Flow rate - TPH To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement at maximum demand		
175	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.08.00, Page no 87	6.08.00 Suspended Magnate Flow rate - TPH To be worked out by Bidder considering 12 hours of operation to meet the limestone requirement at maximum demand		
176	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.14, Page no 24	iv) The trough of the feeders shall be of tray type construction and shall be made out of minimum 8 mm thick MS plate (IS 2062-1992). Liner 6mm SS-304 shall be provided inside the trough bottom along its length and sidewall for entire cross section. Liners shall be fitted with counter sunk head bolt.	Both the clauses are contradictory, bidder requested owner to confirm MOC consideration for Vibrating feeder tray and liner.	Vibrating tray MS Liners 6 mm SS - all side (bottom and side)
177	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.02.00, Page no 80	12. Trough/tray material SS (below limestone discharge hopper MS (below limestone silo) 13. Tray liner SS (below limestone discharge hopper Sailhard/C45 (below limestone silo)		
178	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.02.00, Page no 80	15. Local feed rate controller to be provided - Yes	Bidder understood that vibrating feeder is to be provided with VFD arrangement. Please confirm bidder's understanding.	Noted
179	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.03.00, Page no 81	6.03.00 Crusher 9. Type of Drive Through Gear box, V-belts, sheaves	As per the standard practice, V-belt drive is provided in hammer crusher for all ongoing NTPC/DVC projects and gearbox is not applicable. Bidder is considering the same arrangement for this project also, where gearbox is not applicable.	Noted
180	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.03.00, Page no 81	6.03.00 Crusher c) Liner plate SS-409	In all ongoing projects Mn steel Housing liner is provided for hammer crusher for Limestone application. Bidder requested owner to allow to select MOC of crusher as per OEM recommendation.	Noted
181	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.03.00, Page no 82	Belt shall be of Nylon-Nylon. The cover shall be Fire resistant grade type (BS 490 Part-I grade N17 rubber). Fire resistant property shall conform to Canadian Bureau of Mines Report No. FRL –269.	There is a discrepancy in the said clause for consideration of belt grade. Based on our earlier experience in FGD Project, Bidder shall consider belt confirming as per IS 1891 , Confirming FR properties of as per ISO-340 & CAN/CSA/M-422-M87 Grade-C. Please confirm specification of belt to be considered.	Bid Specification Prevails

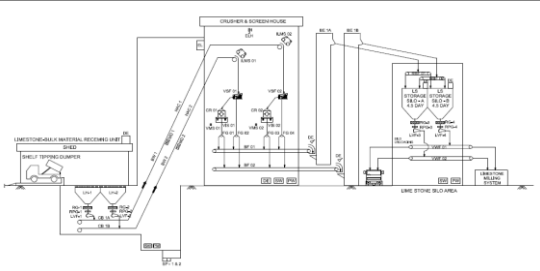
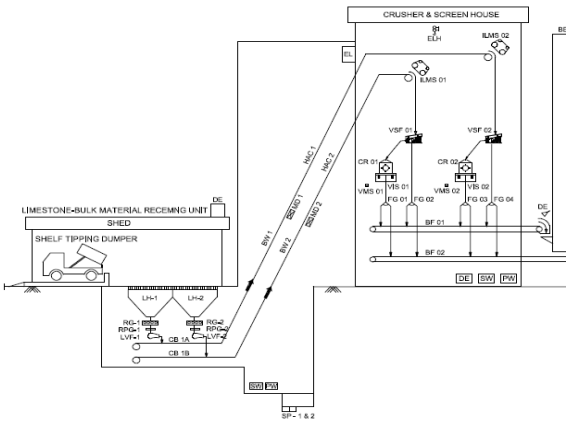
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182	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.05.00, Page no 82	<table><tr><td colspan="4">6.05.00 Lime Stone Conveyor</td></tr><tr><td>Sl. No.</td><td>Item</td><td>Unit</td><td>Description</td></tr><tr><td>1.</td><td>Belt width</td><td></td><td>As required</td></tr><tr><td>2.</td><td>Belt specification</td><td></td><td>Belt shall be of Nylon-Nylon. The cover shall be Fire resistant grade type (BS 490 Part-I grade N17 rubber). Fire resistant property shall conform to Canadian Bureau of Mines Report No. FRL-269.</td></tr><tr><td>3.</td><td>Minimum thickness of cover</td><td></td><td>Top – 5 mm Bottom – 2 mm</td></tr><tr><td>4.</td><td>Minimum no. plies</td><td></td><td>4</td></tr><tr><td>5.</td><td>Ratio of working tension to allowable tension</td><td></td><td>80 %(maximum)</td></tr><tr><td>6.</td><td>Conveyor Belt Rating</td><td></td><td>As required</td></tr></table>	6.05.00 Lime Stone Conveyor				Sl. No.	Item	Unit	Description	1.	Belt width		As required	2.	Belt specification		Belt shall be of Nylon-Nylon. The cover shall be Fire resistant grade type (BS 490 Part-I grade N17 rubber). Fire resistant property shall conform to Canadian Bureau of Mines Report No. FRL-269.	3.	Minimum thickness of cover		Top – 5 mm Bottom – 2 mm	4.	Minimum no. plies		4	5.	Ratio of working tension to allowable tension		80 %(maximum)	6.	Conveyor Belt Rating		As required	In case of high angle conveyor, this belt specification will not be applicable. Bidder requested owner to allow to select the belt specifications as per OEM recommendation.	Noted
6.05.00 Lime Stone Conveyor																																							
Sl. No.	Item	Unit	Description																																				
1.	Belt width		As required																																				
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183	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.05.00, Page no 84	9. Idlers v) Non- Magnetic Idler Idler below suspended magnet shall be non-magnetic including its frame and supports - stringer	Normally the magnetic zone of suspended magnet remains up to the belt only. However to avoid any magnetic field disturbance, as per OEM recommendation only idler tubes are provided as non magnetic. Further to that, all the technological structures remains of MS constructed only. The same is followed for all ongoing NTPC/DVC projects also. Bidder requested owner to accept the same.	Bid Specification Prevails																																
184	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.12, Page no 28	viii) Mother plate of all chutes shall be 10 thick MS and lined with 6 mm SS-409 liners (CSK bolted).	Both the clauses are contradictory, bidder requested owner to confirm MOC to be considered for chute liner plate.	Mother plate of all chutes shall be 10 thick MS Liner material SAILHARD / TISCRAL / SS 409																																
185	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		6.05.00, Page no 89	6.05.00 Lime Stone Conveyor 12. Chute x) Thickness of parent material mm 10 xi) Liner material SAILHARD / TISCRAL / SS 409 xii) Liner thickness mm 6																																		
186	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.22, Page no 28	iv) The skirt plates shall be made of 10 mm thk. MS and lined with 6mm thk. SS-409 material.	Both the clauses are contradictory, bidder requested owner to confirm liner to be considered or not for skirt side plate.	No contradiction Skirt plate with 10 mm plate and lined with 6 mm SS																																
187	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		11, Page no 84	11. Skirt Boards iv) Side plate Min. 10 thk																																		
188	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.15, Page no 24	3.31.15 CRUSHER & CONVEYER BELT i) The bidder also considers the crushers and Screen/feeder for proper sizing of the limestone as per requirement of the limestone grinding mill.																																		
189	ETG061-BTG-ME-FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM	---		FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM 			As per clause 3.31.15 (i) "...crushers and Screen/feeder for proper...." and as per other clause and flow diagram, bidder understood to consider vibrating screen/vibrating grizzly feeder before crusher instead of vibrating feeder. Owner requested to confirm bidder's understanding.																															

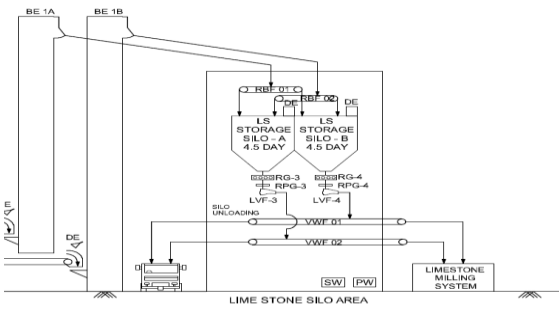
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190	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.15, Page no 25	v) Screen/Grizzly Feeder a) For segregation of limestone lump as per requirement of Grinding Mill/Feeding of Limestone to Crusher. The Screen/Grizzly Feeder shall be floor mounted isolated by springs. b) Bidder to provide discharge of screen out limestone (undersize) from screen and crushed out limestone to discharge on either of belt feeder to respective bucket elevators		
191	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING & CHIMNEY		3.31.15, Page no 25	3.31.15 CRUSHER & CONVEYER BELT iii) Interconnection between two limestone conveying streams shall be provided		
192	ETG061-BTG-ME- FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM		---	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM 	Bidder understood, Interconnection requirement as following inline with the flow diagram. 1. Limestone from LH-1 to LC-1 & from LH-2 to LC-2. 2. Limestone from LC-1 to CR-1 and from CR-1 to BF-1 & 2. Similarly. from LC-2 to CR-2 and from CR-2 to BF-1 & 2. 3. Limestone from BE-1 to RBF-1 and from RBF-1 to Silo -A & Silo B. Similarly, Limestone from BE-2 to RBF-2 and from RBF-2 to Silo -A & Silo B. Owner to confirm bidder understanding.	Bid Specification Prevails
193	ETG061-BTG-ME- FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM		---	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM 	All clauses are contradictory. In flow diagram only one no of ILMS is shown to consider for CB-1AB and as per Clause 6.08.00 2 nos of suspended magnet to be considered at vibrating discharge hopper and 2 nos over limestone conveyor. Since, Vibrating feeder is discharging material to post conveyor there will be no any applicability of suspended magnet. Bidder understood to consider ILMS at discharge position of limestone conveyor only. Also bidder requested to provide an updated flow diagram mentioning all such requirement of equipments like metal detector, ILMS, Belt weigher, suspended magnet which is to be considered along with qty bifurcation for both Gypsum and Limestone handling system.	ILMS at discharge position of HAC
194	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.08.00, Page no 87	6.08.00 Suspended Magnate 1. Quantity & Location Two (02) Nos. over Vibrating discharge hopper Two (02) Nos. over limestone conveyor discharge		

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
195	ETG061-BTG-ME-FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM		---	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM 	Reversible conveyor is required in case if preceding conveyor is feeding perpendicular to silo from crusher house but in case of parallel feeding arrangement from preceding conveyor to silo, separate unidirectional conveyor is to be provided with plough feeder arrangement. Since, there is a limited available space, bidder understood that flow diagram is meant to show only limestone flow path and does not indicate comprehensive scope, the nos of TPs shown is indicative and bidder may optimize the layout meeting the function and technical requirement inline with the available space and layout requirement.	Bidder to submit his scheme and layout, along with bid, for review.
196	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.20, Page no 28	3.31.20 IN-LINE MAGNETIC SEPARATORS / CBMS i) Inline Magnetic Separators or CBMS shall be provided for continuous and automatic extraction and discharge of tramp iron pieces from the conveying limestone. ii) The sets shall be complete in all respects with drives, magnets, inline belts, hoppers, chutes, tramp-iron chutes and all electrical ancillaries like control panels etc.	Both clauses are contradictory. Bidder requested owner to clarify the requirement is for ILMS or CBMS or SM along with qty and location.	ILMS at discharge position of HAC
197	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.08.00, Page no 87	6.08.00 Suspended Magnate 1. Quantity & Location Two (02) Nos. over Vibrating discharge hopper) Two (02) Nos. over limestone conveyor discharge		
198	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.08.00, Page no 92	6.08.00 Suspended Magnate 10. Operating height above conveyor belt mm - 500	Since the capacity of limestone handling conveyors is on the lower side, 500 mm operating height is on higher side. Bidder requested owner to allow to consider the operating height between 350 to 400 mm inline with the OEM recommendation for all applicable ILMS/CBMS and suspended magnet.	Noted
199	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.16, Page no 26	3.31.16 BUCKET ELEVATOR i) The Bucket Elevator shall be designed to convey at maximum filling of 60% for continuous duty of twenty-four hour service.	Both the clauses are contradictory, bidder considered filling factor as 75% inline with IS 12941, Which is generally accepted in all ongoing NTPC & DVC projects. Bidder requested owner to confirm.	75% filling factor to be considered as per clause 6.04.00
200	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.04.00, Page no 82	6.04.00 Bucket Elevator for Limestone 13. Bucket filling factor % Maximum 75%		
201	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.04.00, Page no 85	6.04.00 Bucket Elevator for Limestone. 14. Bucket elevator conveyor speed - M/s Maximum 0.6	Casing thickness and other bucket elevator design parameters/MOC shall be inline with IS 7167, IS 12941,IS 7054 and other relevant Design standards of bucket elevator. As per all ongoing NTPC & DVC projects casings thickness is ~ 4mm. Bidder requested owner to allow to decide bucket elevator MOC and design parameters as per OEM recommendation and as per relevant design standard.	Tender terms prevails
202	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.16, Page no 26	iv) Casing shall be steel as per IS:2062. Head section shall be 10mm thick and all other section shall be 8 mm thick. Mother plate of chute shall be 10 thick MS and lined with 6 mm SS-409 liners (CSK bolted).		
203	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		6.04.00, Page no 82	14. Bucket elevator conveyor speed M/s Maximum 0.6	Bucket elevator design shall be inline with IS 7167, IS 12941,IS 7054 and other relevant Design standards of bucket elevator. As per all ongoing NTPC & DVC projects bucket elevator speed remains up to 1.5 m/s. Bidder requested owner to allow to decide bucket elevator design parameters as per OEM recommendation and as per relevant design standard.	Bid Specification Prevails

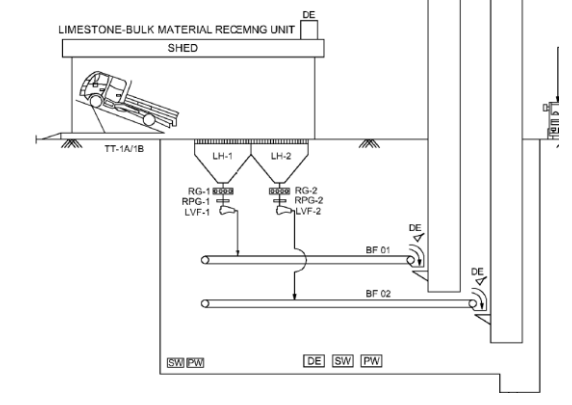
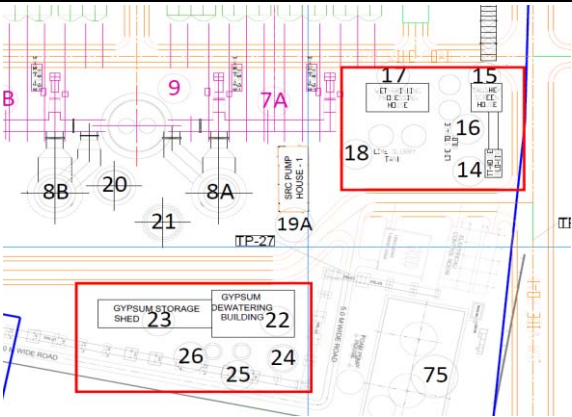
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204	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.24, Page no 29	x) Each silo shall be provided with facilities for unloading the limestone through feeder to a truck at ground level, along with all necessary extendable covered chutes and diversion chutes.	Bidder would like to clarify that silo evacuation is required during emergency / shutdown condition. During emergency / shutdown, feeder mounted below silo is also shutdown. Hence unloading facility of silo shall be provided at bottom of silo with fixed type chute arrangement to a truck at ground level. Further to that, since this evacuation is required during emergency/shutdown condition, hence it is preferred to provide fixed type of chute instead of extendable chute. The same is provided for all ongoing NTPC/DCV projects. Bidder requested owner to please confirm.	Bidder to submit his scheme and layout, along with bid, for review.
205	VOLUME - II, SECTION - 2	LEAD TECHNICAL SPECIFICATION		3.34.20, Page no 37	xv) Waste water neutralisation System c) Bucket conveyors shall be provided by the bidder to feed lime to each of the lime storage silos from ground level. The Bucket conveyors shall be sized to completely feed each lime silo within 2hrs. Adequate storage and feeding system required for feeding the lime to the Bucket conveyors is also in the Bidder's scope. d) Bidder shall provide 2x 100% Lime Storage Silos for feeding lime to the Lime Neutralisation tanks. The lime storage silo shall be of minimum 24 hr capacity equivalent to the requirements of FGD system of 2 X 660 MW at design point and shall be complete with supporting steel structure, platforms, power operated outlet gates, level switches, air relief devices, etc.. For dust free operation each silo should be provided with a covering arrangement and a self cleaning bag filter system of suitable capacity containing blower, automatic/on-load cleaning system, etc.	Bidder would like to clarify that requirement of lime for a day is around ~1- 2 kg. Hence Lime from bags will be stored in silos manually. There is no requirement of bucket elevator for such a small capacity system. Bidder requests Owner to relook into the requirement.	Bid Specification Prevails
206	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.43.15, Page no 45	Minimum Headroom (free height) under all floors, ducts, walkways and stairs shall be 2.50 M.	As per general practice and as per ongoing NTPC/DVC projects, Minimum Headroom (free height) under all floors, ducts, walkways and stairs shall be 2.10 M.	Noted
207	VOLUME - II, SECTION - 2	LEAD TECHNICAL SPECIFICATION		9.02.19, Page no 132	Sufficient clear headroom of minimum 2.1 m shall be provided in all plant area.	Accordingly bidder requested to proceed as per clause no 9.02.19.	
208	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.31.12, Page no 24	xi) Limestone conveyor gallery walkway shall be provided with minimum 1200mm clear central walkway and 1000 mm clear side walkway.	As per general practice, Minimum 800mm side walkway and 1000mm central walkway is provided in all ongoing DVC & NTPC projects. Bidder request owner to confirm.	Bid Specification Prevails
209	VOLUME - II, SECTION - 2	LEAD TECHNICAL SPECIFICATION		11.30.11, Page no 189	x) Auxiliary Power Consumption(APC) FGD system Lime handling system – (0.3) Gypsum handling System – (1) Other unit auxiliaries (Bidder to list all other continuously/intermittently running equipment)	Bidder understood for Limestone and Gypsum handling system Aux power consumption, only continuous running single streams are considered inline with other ongoing NTPC/DVC projects, excluding all auxiliary systems like Lighting, Hoists, sampling unit, Sump Pumps, Elevators, DE, Ventilation, SW System, Potable water system. Etc. Bidder requested owner to confirm.	Will be finalised during finalisation of PG test procedure
210	VOLUME - II, SECTION - 2	LEAD TECHNICAL SPECIFICATION		9.2.35, Page no 133	All equipment shall be installed above ground. Below ground installation will not be allowed, but if a below ground installation is unavoidable, then proper maintenance space and dewatering arrangement has to be provided. Collection of oil and dirt in that area has to be avoided and it should be easy to clean such a place.	Since, allotted space for FGD area is on very much limited and it is difficult to accommodate both the Limestone and Gypsum handling system. Due to available limited space for FGD area and for the easy of maintenance and operation, instead of providing under ground hopper arrangement, bidder alternatively proposed to provide truck tippler arrangement placed at ground level. From Truck tippler, Limestone will be discharged to BRU tail pulley located partially below ground and will feed the Limestone directly to the storage	

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211	ETG061-BTG-ME-FGD-PFD-001	FLOW DIAGRAM FOR LIMESTONE HANDLING SYSTEM		---		silo through conveyor.	The flow diagram indicated by bidder is not matching with the tender drawing. Noted, however BRU shall discharge limestone to high angle conveyor for further transportation to crusher house. BRU and tipping truck shall be totally enclosed with dedicated DE (1W+1S) system as per specification.						
212	ETG061-COM-GEN-PP-001	Plot plan		---									
213	VOLUME - III, PART-A, SECTION-10	TECHNICAL SPECIFICATION OF ELEVATORS		8.01.00, Page no 6	<table><tr><th>Sr. No.</th><th>Item</th><th>Requirement</th></tr><tr><td></td><td></td><td>Passenger Elevator Passenger cum Goods Elevator</td></tr></table>	Sr. No.	Item	Requirement			Passenger Elevator Passenger cum Goods Elevator	Bidder proposed to provide ventilation fans at car inline with ongoing NTPC/DCV projects. Please confirm.	Bid Specification Prevails
Sr. No.	Item	Requirement											
		Passenger Elevator Passenger cum Goods Elevator											
214	VOLUME - III, PART-A, SECTION-10	TECHNICAL SPECIFICATION OF ELEVATORS		2.03.00, Page no 2	iii) ESP & FGD control building - Three nos.; one (1) no. for ESP control building of each unit and one for FGD control building ; suitable to carry for eight (8) persons at a time. 2.03.02 Other passenger elevator, suitable to carry eight (8) persons at a time, as required; i.e. one (1) for each building, which has more than Ground plus two (2) floors or if floors are above 10m height (above ground floor level / FFL). If a passenger cum goods elevator is provided for that building, then separate passenger elevator is not required there.	FGD control buildings are generally single/double floor buildings. Hance, bidder considered to provide Elevators for the building as per clause no 2.03.02, if height of floors are above 10m height (above ground floor level / FFL).	Bid Specification Prevails						
215	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.35.02, Page no 38	The capacity of each Gypsum belt capacity shall be 110% of vacuum belt capacity.	We understand as following. Rated capacity of Gypsum conveyor = 100% of of vacuum belt capacity. Design capacity of Gypsum conveyor = 110% of of vacuum belt capacity. Please confirm.	noted						
216	VOLUME - III, PART – A, SECTION - 4	TECHNICAL SPECIFICATION FGD, LIME HANDLING SYSTEM & CHIMNEY		3.35.02, Page no 39	Maximum 7.0 Meter height of Gypsum stock pile shall be considered accordingly the dimensions of storage shed shall be designed by Bidder.	Due to limited space availability, bidder proposed to allow stockpile height up to 9M	This shall be discussed during detail engineering						
217	---	---		---	General Query	Bidder would like to combine different buildings as per space availability complying with operational & functional requirements of the FGD system. Please confirm	Can be discussed DDE						
218	---	---		---	General Query	Bidder requested to provide sieve analysis for the incoming material.	Will be provided to successful bidder						
219	---	---		---	General Query	Bidder requests Owner to provide repose angle for limestone for designing of the system.	Will be provided to successful bidder						
220	---	---		---	General Query	Bidder requests Owner to provide bulk density of Gypsum material.	Will be provided to successful bidder						

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221	---	---		---	General Query	Bidder request Owner to provide moisture content of Incoming limestone.	Will be provided to successful bidder For equipment design 5% moisture to be considered
222	---	---		---	General Query	Bidder would like to decide MOC of various equipments covered under limestone & gypsum handling system as per OEM recommendation for FGD application. Bidder request Owner to give us flexibility for selecting MOC same as our executed project for NTPC/ NLC/ DVC.	This is a general statement, hence not acceptable. Bidder to follow tender specification, however bidder may specify for clarification of MOC of particular equipment from MAHAGENCO
223	---	---		---	General Query	Please furnish limestone flow analysis report for silo design. Else Owner is requested to provide following material characteristics & source of limestone for flow analysis: 1) Cohesive strength 2) Wall Friction 3) Compressibility 4) Permeability 5) Segregation Tendency	Bidder to study and submit report based on the material analysis during detail engineering
224	---	---		---	General Query	Please furnish Minimum belt width & minimum/maximum belt speed for limestone & gypsum handling system.	Bidder to decide based on general engineering practice and applicable standard
225	---	---		---	General Query	For screw take up , we have considered take up travel 1.5 % C/C of belt length as per IS; 4776 .Please confirm	Noted
226	---	---		---	General Query	There are two conveyor stream (1W+1S) out of which only one stream will be in operation. Bidder understand that all the design requirement of Mechanical, Electrical, civil and structural system shall be as per one stream conveyor system. Bidder requests owner to confirm.	System shall be designed to operate both the stream parallel at a time
227	---	---		---	General Query	We have considered three side retaining wall for gypsum shed & one side kept open for truck bay.	Bid Specification Prevails
228	---	---		---	General Query	NIT is silent about requirement of deck plate and seal plate. Bidder considered 3 mm deck plate at loading zone skirt area and seal plate at road crossing area only.	Noted
229	---	---		---	General Query	No any truck and dumpers are considered in our scope.	Noted
230	---	---		---	General Query	Please furnish motor margin & service factor for gear box selection.	1. +15% margin shall be consider for Motor. 2. SF for GB shall be as technical specification on motor name plate rating
231	Vol-III	Part-A/Section-4		3.31.23, ii	2 x 100% DE units shall be provided at each area.	Bidder understand that DE system shall be One Working & One Stand by. Capacity of each Bag filter with fan shall be designed considering one stream in operation. However, if both the streams are in operation, both bag filter & fan shall be working simultaneously. Please confirm Bidder understanding is correct.	Noted
232	Vol-III	Part-A/Section-4		3.31.23, iv	Followings are the minimum areas where Dust Extraction system will be provided: a) Unloading Area b) Discharge from hoppers, discharge from conveying equipment and receiving point of conveying equipment, c) Silos and silos discharges	Dust Extraction system will be provided following areas. 1). One number DE system (1W+1S) at Unloading Area to cover unloading Area, discharge from hoppers and receiving point of conveying equipment. 2). One number DE system (1W+1S) at Crusher House Area to cover discharge from conveying equipment (Vibrating screen feeder), Belt feeder receipts & discharge and Bucket elevator receipts. 3). One number DE system (1W+1S) at limestone silo to cover Belt feeder receipts & discharge, Silos and silos discharges. Please confirm.	Noted
233	Vol-III	Part-A/Section-4		3.31.23, iii	Arrangement of compressed air system for purging the bags and operation of dampers of DE units shall be also considered	Compressed air required for DE system shall be obtained from owner terminal point. Please confirm	Bid Specification Prevails

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234	Vol-III	Part-A/Section-4		3.31.12, xiii	2 X 100% sump pump shall be provided for under ground installation below 1.5 meter level.	Bidder understand that pump common discharge line shall be terminated up to nearest surface drain. Please confirm	Noted
235	---	---		---	General Query	Please provide the size of sump pit in under ground area.	Sump pit size Sq. 2m wide x 2 m depth
236	---	---		---	General Query	As NIT is silent, We have not consider any ventilation system in under ground unloading area. Please confirm.	Ventilation for underground installation to be provided
237	---	---		---	General Query	As NIT is silent, We have not consider any dust suppression system in gypsum storage shed. Please confirm.	Noted
238	Volume II	Section 2		3.02.01 Page no. 58 of 242	Battery Limits/Terminal Points 25. FGD area effluents (waste Water) - HCSD System (Pump House) / Ash Dyke	Bidder shall terminate the FGD area effluent to single point. i.e. at HCSD System (Pump house). Further disposal to Ash dyke is in owners scope. Please confirm.	Waste water shall be terminated to HCSD pump house and ash slurry sump. Further disposal is excluded from Bidder's scope of work
239	Vol.-IV) BID DRAWINGS	FLOW DIAGRAM FOR LIMESTONE HANDLNG		ETG061-BTG-ME-FGD-PFD-001, Rev 01		We understand Truck Tipplers are not Applicable for this project as self tipping trucks will be arranged by customer. Requesting confirmation wrt same.	Noted.
240	Volume - V	Annexure 1 Plot Plan				As Allocated space is less for Limestone handling. We request customer to allow for use of additional space for limestone handling till railway lines as marked in green. Requesting your confirmation wrt same.	Based on the tender flow scheme, Space considered for Lime handling and gypsum handling in the tender Plot Plan, is reasonable as per our understanding. AutoCAD layout will be shared with bidders to check feasibility.
241	Volume - V	Annexure 1 Plot Plan				As Allocated space is less for Gypsum handling & shed. We request customer to allow for use of additional space for limestone handling as marked in orange. Requesting your confirmation wrt same.	Based on the tender flow scheme, Space considered for Lime handling and gypsum handling in the tender Plot Plan, is reasonable as per our understanding. AutoCAD layout will be shared with bidders to check feasibility.
242	Volume - V	Annexure 1 Plot Plan					

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Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
244	Volume - V	KRD1112 Volume - V Annexure 1 Plot Plan		Plot Plan		Space in which Limestone handling is indicated in Tender plot plan seems less. We request customer to provide Autocad copy of plot plan with demarcated/allocated space for limestone gypsum handling regions so that feasibility of scheme as per flow diagram ETG061-BTG-ME-FGD-PFD-001 Rev 01 can be checked	Based on the tender flow scheme, Space considered for Lime handling and gypsum handling in the tender Plot Plan, is reasonable as per our understanding. AutoCAD layout will be shared with bidders to check feasibility.
245	Volume-V	Annexure-3		-	Following minimum Mechanical, Electrical & C&I spares shall be provided for each Unit of 660MW i.e. Unit No 11 & Unit No 12	Bidder understands that mandatory spares list provided is common for 2 units & there is no requirement of duplicating the spares for each unit. Bidder understands that each unit mentioned is a typo error. Please confirm.	Listed Mandatory spares are the minimum requirement for each unit.
246	V	Annex. 3		1.24	Spares for Hydrocyclone: i) Hydrocyclones 1 Set & ii)Feed Vessel iv)Complete vessel assembly xi)Vortex finder & apex inserts	Please review the items mentioned in spares list. Hydrocyclone is assembly of feed,underflow & overflow chambers/ vessels, apex and valves only. Hence spares quantity of hydrocyclone is double in the list . Please confirm the list	Bid Specification Prevails

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PRE-BID CLARIFICATIONS - LAYOUT



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1	Vol. I	2C	Pg. No. 339	2. 0	The contractor shall, in connection with the works, provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the engineer or by any competent statutory or other authority for the protection of the works or for the safety and convenience of the public or others.	Watch and ward arrangement shall be taken care for the scope of supplies and storage made by BTG contractor only .The arrangement for a strong security set up to insulate complete project contours and plant boundaries shall be Owner's responsibility . It is understood Owner will provide security at plant boundaries and all open entry points of th plant areas. Kindly confirm.	Bid Specification Prevails
2	Vol. II	2 -Lead technical specification	51	2.14.21	Watch and Ward for security and safety of bidders offices,including that of sub -contractors and all material for the plant till completion and Hand over.		
3	Vol. I	2B	312	12.1	The Contractor shall have total responsibility for all equipment and works at Site till taking over by the owner. The Contractor shall make suitable security arrangements, employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the contractor shall enter & leave the project site only with the written permission of the Engineer in the prescribed manner		
4	Volume II	Section - 2		2.13.13, page 48 xxii),	Civil : y) Pipe and cable racks / pedestals / trenches (Pipe & cable racks shall also be suitably designed to accommodate BoP package / system pipes & cables trays, wherever required).	Owner is requested to provide the preliminary details of pipe and cable trays to be considered on BTG's scope of pipe rack / pedestals to keep all Bidder's at par.	To be finalised DDE
5	Vol. II	2 -Lead technical specification	51	2.14.16	Although the owner will try to demolish the above ground structure, any left out minor structures shall be removed by bidder for site preparation.	Owner is requested to provided levelled and graded land for the proposed BTG plant.	Bid Specification Prevails
6	Volume - II	Section-2		Table 3.02.03 Page 57	CW - Channels - 15 m away from cooling towers	Bidder request Owner to restrict Civil works for BTG scope within the battery limit of Main Plant facilities. Therefore, it is requested to exclude CW Channel from the BTG scope of work & limit the scope of work up to CW Fore bay.	Bid Specification Prevails
7	Volume - II	Section-2		Table 3.02.03 Page 57	Sewage - Sewage collection sump at STP area	Bidder request Owner to restrict Civil works for BTG scope within the battery limit of Main Plant facilities. Therefore, Bidder shall consider terminal point of sewage network similar to the terminal point specified for Road in tender drawing no. ETG061-COM-GEN-PP-001	Bid Specification Prevails
8	Volume II	Section - 2		9.01.02, page 128	vii) The area for construction/erection facilities like lay-down, pre-assembly, offices and stores is to be managed by the bidder within the overall area available and allocated within plant boundary....	Owner is requested to indicate the area (approx. 100 acres) for laydown / construction/erection facilities in the Plot Plan.	Bidder to refer clause 9.01.02, vii, of Vol-II, Section-2. Available area within the plant area, will be marked in the Plot Plan & shared with bidders.

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9	Volume II	Section - 2		9.02.03, page 131	i) Unit pitch : Shall be minimum 130 m for 3 cylinder steam turbines and 140 m for 4 cylinder steam turbine.	Bidder shall consider Boiler pitch as per their equipment layout. Kindly confirm.	Bid specification prevails
10	Volume II	Section - 2		9.02.39, page 136	Steam Turbine and Generator Hall/Power House Building (PHB) : ii) Generator stator shall be lifted using the strand jack method or portable crane.	Bidder understand that bidder will bring strand jack for stator lifting and will be taken back after completion of erection. Strand jack shall not be handed over to Owner. Please confirm Bidder's understanding.	Noted
11	Volume II	Section - 2		9.02.21, page 132	Space for pipe racks and pipe pedestals shall be considered while planning the layout	Owner is requested to provide the space to be considered for Owner's scope of pipe rack / pedestals (i.e. Bottom Ash etc.) within BTG scope area.	To be finalised DDE
12	Volume II	Section - 2		9.02.39, page 136 4.37.21 (v), Page 69	vii) TDBFPs shall be preferably placed at the operating floor, with VIS system.	As per bidder's proven design and layout, TDBFP's are kept at BC bay at zero meter elevation. Further the foundation of TDBFP will be rigid without VIS as per Bidder's proven practice. Please confirm.	Bid specification prevails
13	Volume II	Section - 2		9.02.39, page 136	x) Facility shall be provided for handling of condenser water box to enable maintenance and withdrawal of condenser tubes...	Condenser water boxes are provided with hinges to facilitate opening and closing during maintenance and withdrawal of condenser tubes. Further, rolling shutters on A row side shall be provided to facilitate condenser tube removal.	Noted
14	Volume II	Section - 2		9.02.43, page 141	ix) A walkway of 800mm width (minimum) with hand rails and toe guards shall be provided all along length of the trestle for maintenance of cables and pipes .	Bidder will provide 800 mm wide walkway with handrails and toe guards on trestle for cables / cable trays . Bidder do not envisage any separate walkways for pipes in BTG Bidder's scope. Please confirm.	Bid specification prevails
15	Volume III Volume IV	Part D Bid drawings		7.01.02 Drg. no. ETG061-BTG-ME-ST-GA-001, Rev. 0	 However, the building sizes shall in no case be less than what is furnished in the table. 1. Power House Building : 45 m x 265 m a) TG building Layout drawing : (Ground floor) TG building size : 48 m x 268.5 m b) Note : 3 Suitable changes in the layout to be incorporated by the Bidder's based on the selection of single or Double pressure LP turbine. c) TG building Layout drawing : (Cross Section) Number floors and Elevations	(1) Owner to note that there is a discrepancy in TG building / Power House building sizes. Bidder understands that 45 m x 265 m shall be followed. Please confirm. (2) Further, please note that equipment disposition inside power house shall be based upon Bidder's proven layout. Please confirm.	1) Bidder note that the provided sizes are minimum requirement. However it can be discussed DDE. Bidder shall establish that there is sufficient clear space around the equipment for easy maintenance and movement. 2) Will be discussed and decided DDE.

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2X660 MW UNITS - 11 12 PROJECT
RFx No. 3000046202 (BTG Package)
PRE-BID CLARIFICATIONS - LAYOUT



Sr. No.	Volume	Part/Section No.	Page	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
16	Volume - V	Annexure 1 Plot Plan				As Allocated space is less for Limestone handling. We request customer to allow for use of additional space for limestone handling till railway lines as marked in green. Requesting your confirmation wrt same.	Based on the tender flow scheme, Space considered for Lime handling and gypsum handling in the tender Plot Plan, is reasonable as per our understanding. AutoCAD layout will be shared with bidders to check feasibility.
17	Volume - V	Annexure 1 Plot Plan					

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19	Plot Plan	-		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A	Notes : 3. Existing 210MW Unit#6 is in service and existing utilities catering to this unit should not be disturbed. 3.1 Cooling towers 3.2. Cooling tower lift pump (CTLP) house 3.3. Water treatment plant 3.4. Ash slurry (Booster) pump house, etc.	Bidder request Owner to indicate all the existing facilities (above ground and underground) in Plot Plan with coordinates.	AutoCAD layout will be shared with Bidders.
20	Plot Plan	-		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A	Notes : 8. Coordinates of existing facilities should be reconfirmed by bidder.	Coordinates of existing underground facilities are not indicated in the Plot Plan, request Owner to indicate the same in the drawing.	Bid specification prevails
21	Plot Plan	-		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A	Gas Cylinder storage area (item no. 70)	Owner is requested to locate the Gas Cylinder storage area / shed in the Plot Plan.	It will be finalised DDE
22	Plot Plan	-		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A	Terminal point	Owner is requested to provide preliminary coordinates / location of Terminal points in the Plot Plan / Tie-In point list for keeping all Bidders at par.	AutoCAD layout will be shared with Bidders.
23	Plot Plan Volume II	- Section - 2		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A 9.02.44, page 142	Pipe rack x) The interconnection pipe work between plant utilities and power block equipment shall be routed through pipe racks/sleepers	Owner is requested to clarify the scope of pipe rack with coordinates for BTG bidder. Also demarcate the scope of pipe rack for different bidders (BOP etc.) to keep all Bidders at par	All major pipe/cableracks of respective packages (BTG & BoP) will be in respective bidder's scope. However, some of the pipes and cables from BoP/BTG area may have to be routed on other package pipe/cable rack. Bidders will have to consider some margin for the same. Details will be finalised DDE.
24	Plot Plan	-		Plot Plan, Drg. no. ETG061-COM-GEN-PP-001, Rev. A	FGL of Various area	Owner to provide extent of area grading layout applicable for BTG Bidder to keep all Bidders at par.	Topography report is provided. FGL for various areas in proposed plant is mentioned in Plot Plan. Also the area grading is in the Bidder's scope.

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25	Volume-IV	-	-		Plot plan	Bidder would like to inform Owner that the space provided in the tender plot plan is not sufficient to accommodate BTG facilities as per specification. As per Bidder's assessment additional space of approx. 250 m x 200 m towards south direction as shown in Annexure-1 will be required to accommodate proposed BTG facilities. In view of the above, the below mentioned points to be considered by Owner: a)Existing pipe rack comprising fuel oil pipelines and other adjoining facilities (road, drains etc) will have to be rerouted to make way for the proposed 2x660 MW BTG facilities. b) Relocation of adjoining BOP buildings such as AHP Compressor house & AHP control building (item no. 13) and Ash water tank & pump house etc. which are part of proposed BOP scope. Owner to kindly provide acceptance.	Rerouting/Relocation of existing facilities if required, shall be in the scope of bidder.
26	General	General		General	General	On reviewing the Customer PLOT PLAN, it is observed that area allocated for BTG & FGD facilities is not sufficient. Bidder requires additional area near item no. 64 of customer PLOT PLAN to accommodate FGD facilities. Kindly confirm.	Bidder to note that we have to manage the proposed facility within the available area. Bidder to find ways to optimise the layout. However, if bidder is not able to manage the plant within the available area, then any relocation of existing facilities, for eg. Existing Fuel Oil Pipe Rack of 3x660MW plant, will be bidder's scope.
27	General	General		General	General	Customer is requested to furnish AutoCAD copy of existing 3x660MW koradi power plant.	AutoCAD layout will be shared with bidders
28	General	ETG061-COM-GEN-PP-001			PLOT PLAN	During site visit, Bidder has observed that mill rejects are lying within the proposed BTG area. Bidder understands that the same shall be removed by Owner before handover of site to EPC Contractor. Please confirm.	Noted

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Sr. No.	Volume	Part/Section No.	Clause No.	Bid Specification Stipulation	Bidder's query/Stipulation	Owner's Clarification
1	II	SECTION: 1	3.11.02	Chimney of adequate height (150 m) along with ESP, FGD & SCR is considered to contain ground level concentration of SPM, SOx, NOx etc. within acceptable limits prescribed by MOEF.	There is mismatch in specification regarding height of RCC Chimney (Wet Stack). Customer to confirm height of Chimney to be considered (140 m or 150 m)	Chimney height shall be maximum 140 m including top of lightning arrestor
2	II	SECTION: 2	2.13.13 xxii) m)	Twin flue RCC Chimney (Wet stack) of 140 m height		
3	II	SECTION: 2	9.02.38 xii)	Twin flue RCC (Wet stack) Chimney 140m high shall be located beyond ESP.		
4	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	3.02.03 (3)	15 m away from cooling towers	This is the BTG Package and cooling tower is not a part of this package. Hence, battery limit for CW Channel shall be kept at 10 m away from CW Forebay. Kindly confirm.	Bid Specifications Prevails.
5	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.13.13, page 45	iv) Site development works: Site clearance, site grading, roads, drainage and cross drainage works, including temporary roads/drains, if required.	Please furnish grading plan drawing with boundary co-ordinates in Auto Cad format for estimation of cutting and filling quantity. FGL of proposed plant area shall be marked in the drawing.	Demarcated area grading plan showing the boundaries, FGL, plant levels and terminal points for BTG is attached. Please refer topography survey report. CAD format drg is also attached. However, if any building / structure / facilities coming in outside of demarcated area, the area grading shall be considered 10m away from the edge of the building/facilities.
6	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	2.05.02, page 8	Site grading of the area as identified in the Property Plan.		
7	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	3.02.03, Sl no 4, Page 57	Sewage pipeline up to collection sump at STP area is in bidder's scope.	Please provide the location of Sewage collection sump/STP.	Please refer plot plan.
8	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.13.13 (v), Page 45	 cutting of existing roads and making good, drainage, roads, rail track, fencing	Please provide the drawings or mark the road, etc. in plot plan whose dismantling and repair is required for this package scope of works.	Bidder to visit the site and collect necessary data.
9	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.13.13 (vi), Page 45	Dismantling of buried/semi-buried structures, if any, encountered within the plant limits.	Please furnish the details/drawings of existing buried/semi-buried structures, whose dismantling area required.	Since the proposed plant location is in the existing plant area, Bidder to visit the site and collect necessary data.
10	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	9.01.03, Page 129	Drain shall be provided on one side of patrolling road.	Patrolling road not in bidders scope, hence drains for patrolling road also will not be in bidders scope. Kindly confirm.	Noted.
11	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	9.02.15, Page 132	Adequate number of permanent stores and open paved yard shall be provided.....	As per Clause 2.13.13, permanent store and open paved yard is not in bidders scope. Kindly confirm.	Noted.
12	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	9.02.44, xiii), Page 142	Fabrication yard and laydown area shall also be developed as green belt.		

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13	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.02.13, Page 67	The development of green belt is not in bidder scope.	Green belt is not in bidder scope. Kindly confirm.	Noted.
14	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	2.04.03, Page 8	Drainage study	As per Cl 3.02.03 (2) Section 2/Lead specification, drains within the BTG area are only in bidders scope. Hence drainage study shall not be in bidders scope. Kindly confirm.	Required study shall be done by the bidder, for the design of efficient drainage system, in the BTG area.
15	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.13.13, page 46	iii) Site related investigations: Topographical survey and detailed Geo Investigations. Area drainage study to be done if required.....		
16	VOLUME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.14.37, page 52	vi) Rain water harvesting shall be completed.	1. Rain water scheme for BTG scope is only in bidders scope. Kindly confirm. 2. Ground water recharge (refer clause 37.01.00) is required as per specification, hence there shall not be any roof water collection pond. Kindly confirm. 3. Please provide the detailed specification, scheme and requirement of water storage pond/capacity for the rain water harvesting, if required.	Providing rain water harvesting system, for individual buildings (BTG package), along with sump, is in bidder's scope.
17	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.02.09, Page 66	Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope		
18	Volume II - Section 2		20.14.00	Noise Control Design and layout of building to minimize transmission of noise...	Bidder understands this clause is applicable only for mechanical equipment, not applicable for civil buildings. Kindly Confirm.	Designing building and structures to minimize transmission of noise is applicable to Civil structures also.
19	Volume II - Section 2		9.01.03 (vii)	Top of road shall be 0.20m above from ground level.	Bidder understand that top of road value is a typo error. Owner to kindly check and confirm.	Top of road shall be 0.20m above from ground level.
20	IV	D (PAGE-41)	7.24.05	Limestone unloading shed: It shall be an underground RCC framed and RCC walled water retaining structure and steel structure on over ground from RCC pedestal at height of 0.5m and having side and roof cladding with galvalume sheet.M.S grizzly is provided on RCC hopper top as per required size of lime stone and sump with sump pump is considered for dewatering of the pit. RCC stair case, machine hatch, monorail shall be considered for access to the pit with the prohibition of pent house.	Kindly furnish the thickness of galvalum sheet to be adopted.	Please refer clause no. 24.06.01 iii for thickness of sheets.

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21	IV	D (PAGE-41)	7.24.05	Limestone unloading shed: It shall be an underground RCC framed and RCC walled water retaining structure and steel structure on over ground from RCC pedestal at height of 0.5m and having side and roof cladding with galvalume sheet.M.S grizzly is provided on RCC hopper top as per required size of lime stone and sump with sump pump is considered for dewatering of the pit. RCC stair case, machine hatch, monorail shall be considered for access to the pit with the prohibition of pent house.	Kindly furnish the crack width to be adopted in water retaining structure.	Crack width for concrete works for water retaining structure shall not be exceed 0.2mm.
22	IV	D (PAGE-41)	7.24.05	Limestone unloading shed: It shall be an underground RCC framed and RCC walled water retaining structure and steel structure on over ground from RCC pedestal at height of 0.5m and having side and roof cladding with galvalume sheet.M.S grizzly is provided on RCC hopper top as per required size of lime stone and sump with sump pump is considered for dewatering of the pit. RCC stair case, machine hatch, monorail shall be considered for access to the pit with the prohibition of pent house.	We understand that on the inner face of hopper, 50mm thick of guniting has to be provided for liner.	Hopper shall be provided with liner plate over 50mm thick guniting.
23	IV	D (PAGE-41)	7.24.05	Limestone unloading shed: It shall be an underground RCC framed and RCC walled water retaining structure and steel structure on over ground from RCC pedestal at height of 0.5m and having side and roof cladding with galvalume sheet.M.S grizzly is provided on RCC hopper top as per required size of lime stone and sump with sump pump is considered for dewatering of the pit. RCC stair case, machine hatch, monorail shall be considered for access to the pit with the prohibition of pent house.	Kindly furnish the grizzly details which is to be provided above hopper.	Grizzly opening shall be with 250mm x 250mm opening. Minimum thickness of plate shall be 25 mm, & it shall be suitable for hammering and breaking bigger lumps
24	IV	D (PAGE-41)	7.24.06	Limestone storage silo: Silo of required capacity made of structural steel as specified in mechanical portion along with roof covering overhead structural shed and access platforms/walkways shall be provided as per soil investigation.	Kindly furnish the shell thickness to be adopted for Lime stone silo.	The storage silos and hopper cones shall be fabricated of minimum 10 mm thick carbon steel with a SS lining of grade SS304 of minimum 4 mm thickness in the complete cones to ensure reliable discharge of material.
25	IV	D (PAGE-41)	7.24.07	Lime stone Crusher house	Kindly furnish the thickness of side cladding to be adopted for crusher house	Please refer clause no. 24.06.01 iii for thickness of sheets.
26	IV	D (PAGE-41)	7.24.07	Lime stone Crusher house-Crushers shall be supported on RCC deck slab which in turn will rest on vibration isolation system consisting of springs & dampers.	We understand that s RCC deck shall be isolated from the floor. However, the vibration isolation system consisting of springs and dampers shall be rest on main building framework .Kindly confirm.	Bidder's understanding is correct.
27	IV	D (PAGE-130)	18.01.01(ii)	Structural steel work	We understand that site fabrication of steel structure is allowed.Kindly confirm	Bidder's understanding is correct.
28	IV	D (PAGE-130)	18.01.01(ii)	Structural steel work	We understand that hollow section (Min. 4mm thick)can also be provided along with rolled section for structural steel work.Kindly confirm.	Please refer Vol-III, Part-D, of the specification, however, in addition to this, bidder to consider corrosion allowance

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29	IV	D (PAGE-41)	7.24.02	Buildings for FGD System: FGD System may comprise of various buildings	Kindly furnish the construction details of gypsum shed.	RCC framed structure with RCC/brick masonry wall (up to Tripper floor) and structural steel shed with permanently colour coated profiled sheet roof and side cladding (above Tripper floor). Roof shall be provided with troughed profile permanently colour coated sheet with slope.
30						
31	Volume-I	Part-D	7.05.02	PA/ FD/ ID Fan and Mill foundations shall be RCC block foundation directly resting on virgin soil/ pile below Ground level.	It is clarified that the offered FD,ID and PA Fans are Constant Speed Axial Fan with Blade pitch control and foundation shall be RCC Block Foundation without Vibration isolation system. This is in line with BHEL Supplies for MAHAGENCO Bhusawal 1X660 MW EPC Package.	Noted
32	Volume-I	Part-D	9.01.01	Machine foundations for TG, ID/FD/PA fans, BFP and Misc. pumps and equip-ment foundations will also be supported on RCC foundations.		
33	Volume-I	Part-D	9.06.02 ix)	In case of variable speed machines such as ID fan, one or more natural frequencies of the foundation may coincide with the operating frequency of the machine. If it is not possible to satisfy the codal frequency or amplitude criteria VIS with springs and viscous dampers shall be provided..... The vibration isolation system shall consist of helical spring units and viscous dampers supporting the RCC inertia block which support the machine. The spring units shall conform to DIN 2089 and DIN 2096.		
34	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	1.16.01 v), page 5	A preliminary Geo-technical Investigation has been carried out by the Owner and report of the same is attached in Annexure – 5, Volume-V. However this report along with the recommendation given there shall be considered by the Bidder for reference only.	It is observed that only bore logs are provided. Please furnish following additional details: 1. Existing ground level (EGL) of all bore holes. 2. Depth of ground water table in each bore hole 3. Laboratory test results of soil and rock samples of all bore holes. 4. Chemical analysis results of sub soil and water samples. 5. Electrical resistivity test results.	1. For EGL, please refer Topography survey report. 2, 3, 4 and 5. The provided Geo-technical report is for reference/bidding purpose only. If any further details required, the Bidder can do the same for his Own cost.
35	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	2.05.02, Page 8	Site grading of the area as identified in the Property Plan.	1. Please provide/mark in plot plan the extent of grading required to be done by the bidder. 2. Provide the graded level required for chimney, FGD area . 3. Please furnish required graded level for all facilities within BTG package. 4. Bidder understand that micro grading within BTG area is only in bidders scope. Kindly confirm.	Please refer Plot plan and topography survey report for all the details of FGL, NGL, terminal point, etc.

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36	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	3.02.11, Page 10	 sewers, sewage pump house, sewage treatment plant	Sewage pump house, sewage treatment plant are not in bidders scope. Kindly Confirm.	STP is not in bidder's scope. Sewage transfer pumps, if required to send sewage collected in bidder's area/buildings, to STP will be in bidder's scope.
37	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	4.02.02,iii), page 13	Bore holes shall be located to cover the entire area. All bore holes shall be sunk up to a depth of 60.0 m or 5 m continuous into hard rock whichever is earlier.	Please specify the hard rock properties in terms of Core recovery and RQD for deciding termination depth of bore holes.	As per relevant IS codes
38	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.02.02, page 16	Site grading Fills shall normally be made up of Cohesive Non Swelling material capable of being compacted up to 95% Modified Proctor density. In case earth has to be borrowed from outside the plant boundary, the same shall be arranged by the bidder himself.	Please allow use of excavated soil of proposed plant area in place of CNS material in filling during site grading as the same is suitable for filling purpose and is having similar properties like CNS material.	Excavated soil shall be tested in the laboratory. If it is suitable for backfilling, Bidder can use the same.
39	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	15.04.03, page 93	Site Levelling Filling shall be done in horizontal layers not exceeding 300 MM compacted thickness or as directed by the Engineer subjected to compaction test 95% M.D.D.	Please allow 95% standard Proctor density in place of Modified Proctor density.	Compaction of soil shall be 95% of M.D.D.
40	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.03.02, Page 16	Peripheral/patrolling roads inside boundary wall shall be 4 m wide Water bound macadam base (WBM) without bituminous topping	Peripheral/patrolling roads are not in bidder scope. Kindly confirm	Noted
41	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.03.01, Page 16	All roads in the power plant area of BTG island and main access road from gate.....	Main access road from gate is not in bidders scope. Roads within the BTG area only in bidders scope. Kindly confirm.	Main access road from gate shown in plot plan at IDCT is not in bidders scope. However Roads as shown in the plot plan and approach to the various BTG auxiliaries thereof is in bidders scope.
42	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.04.07, Page 17	The storm water drainage for the contaminated area such as coal stack pile etc., shall be designed separately and the discharge shall be led separately for treatment and disposal.	As per Cl 3.02.03 (2) Section 2/Lead specification, drains within the BTG area are only in bidders scope. Hence Clause 6.04.07 shall not be applicable for this package and drainage for Coal stack pile not in the scope of BTG package. Pls. confirm.	Noted

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43	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.04.08, Page 17	Any existing nalla which is coming in the plant area shall be suitably diverted and connected to a permanent water course.	1. Please furnish the longitudinal and cross-sectional details of the existing nalla including discharge. 2. Please mark the existing and diverted route of nalla on plot plan.	Bidder shall visit the site and collect the necessary data.
44	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.04.01, Page 17	The drainage scheme shall be based on the detailed area drainage study being carried out by the Bidder.	Drains within BTG area are only in bidders scope, hence area drainage study is not in bidder scope. Kindly confirm.	Required catchment study should be conducted by the bidder, for the design of efficient drainage system, in the BTG area.
45	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.04.03, Page 17	Main drains shall be designed as a network covering total plant area and shall ultimately be disposed in the manner defined in the drainage studies.	As per CI 3.02.03 (2) Section 2/Lead specification, drains within the BTG area are only in bidders scope. Kindly confirm.	Noted
46	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.05.02, Page 17	Provision shall also be made for collection and disposal of solid waste.	1. Collection and disposal of solid waste is not in bidder scope. Kindly confirm. 2. Kindly provide the details of provision requirement.	Collection and transfer of effluent & sewage, up to common collection sump of ETP/STP (of BoP Package), will be bidder's scope.
47	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.02.02, Page 20	Over the TG Bay roof, monitor shall be provided with Exhaust system mounted on the side wall of the monitor.	Kindly clarify the followings : 1. What is monitor? 2. Is this civil structure or equipment? Kindly provide GA details.	TG bay roof Monitor is not envisaged
48	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.03.16, Page 23	ACP cladding shall be provided for walls inside and outside of PCR.	Please elaborate PCR. Also clarify where ACP cladding is to be provided.	PCR - Plant control room. Also called as Central control room (CCR). ACP cladding shall be provided for walls inside and outside of the control room.
49	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.04.01 Page 23	The TG foundation shall comprise of RCC top deck supported on steel helical springs & viscous dampers (called herein as the Vibration Isolation System)	It is requested to give the option for providing TG foundation without VIS.	TG foundation shall be rigid

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50	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.04.02 Page 23	TDBFP&MDBFP foundations shall consist of RCC top deck supported on steel helical springs & viscous dampers	Requirement of VIS for BFP foundations shall be decided by bidder. Please confirm.	Bidder note that if the BFP foundations are resting over the building structure, the VIS shall be provided. If the foundation is resting at ground floor, it shall be rigid foundation.
51	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	2.02.00, Page 7	Bidder's scope shall also include excavation in soil and rock (if any, with/without blasting as per the site conditions), dewatering, dressing to required profile, sheet piling or shoring/strutting, backfilling with CNS soil with compaction as per IS code wherever required around completed structures and plinth filling, piling (if required), plinth protection, import soil from borrow pits, disposal of surplus earth and rock as directed by Engineer,	The referred clauses are contradictory. Bidder understand that excavated soil/rock/dismantled material from proposed plant area shall be used for filling/backfilling purposes. Kindly confirm.	Bid Specifications prevails. Bidder note that if the excavated materials are suitable for backfilling, it can be used. If it is not suitable for backfilling, it should be disposed off.
52	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	6.02.02, Page 16	Fills shall normally be made up of Cohesive Non Swelling material capable of being compacted up to 95% Modified Proctor density.		
53	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	15.06.01, Page 97	The excavated soils will be disposed off in any or all the following manners: i) By using it for backfilling straightway.		
54	VOLU ME - II	SECTION - 2/LEAD TECHNICAL SPECIFICATION	2.13.13, page 45	v) Excavation in soil and rock (if any, with or without blasting as per the site conditions), dewatering, dressing to required profile, sheet piling or shoring/strutting, backfilling with CNS (Cohesive Non swelling soil) and compaction as per IS code		
55	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	15.04.05, page 94	BACKFILLING i) Select surplus soils from excavated materials shall be used as backfill. Fill material shall be free from lumps, salts, sulphates, organic or other foreign material. All fill material will be subject to Engineer's approval. The bidder shall remove fill material rejected by Engineer from the site at no extra cost to the Owner.		
56	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	15.04.05, page 94	(iii) All back filling shall be carried out with approved material in layers not exceeding 200mm, watered and compacted with mechanical compaction equipment. However, the.....	Bidder proposes that all backfilling shall be carried out with approved material in layers not exceeding 300mm compacted thickness and each layer shall be compacted so as to achieve atleast 90% Standard Proctor Density as per IS 2720 Part 7 in case of cohesive soil and 75% relative density in case of 405 sionless soil. Please confirm.	Bid Specification Prevails

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57	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.07.02, Page 25	Complete hopper (sloped portions) shall be provided with lining of at least 5mm thick SS 304M grade material.		
58	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.18.02, Page 72	Coal Storage Bunkers shall be provided with 3.15 mm thick stainless steel lining conforming to ASI 409M, IS1570.	1. Referred clauses are contradictory, please clarify about the SS lining material for coal bunkers . 2. Only hopper portion (sloped portion) shall be provided with SS Liner. Kindly confirm.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick , SS 304M grade material shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
59	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	18.04.09, Page 144	The hopper portion of the coal bunkers shall be lined with stainless steel plates of 3 mm thickness. The stainless steel shall be of AISI-316 quality.		
60	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	Cl 7.14.00, Page 29	Cooling water pump house (CWPH) - Forebay	Pressure relief valves (PRV) shall be provided to prevent uplift of the forebay. Please confirm.	Bid Specification Prevails
61	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	Cl 7.14.00, Page 29	Cooling water pump house (CWPH) - Channel	Pressure relief valves (PRV) shall be provided to prevent uplift of the channel. Please confirm.	Bid Specification Prevails
62	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.04, Page 36	ACP cladding shall be provided for inside partitions and front side elevation works.	Service building, wall finishing schedule for internal and external as per Clause No .7.20.08, ii) (a) shall be followed. Kindly confirm.	7.20.04 clause prevails. For other areas clause 7.20.08 ii a prevails.
63	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.07, Page 36	Shaded car parking facility shall be provided as per requirement of the owner.	Please furnish number of two wheelers and cars.	Bidder shall consider for parking of 20 cars and 50 two wheeler parking.

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64	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.08 (viii), Page 38	Numbers of store building required shall be decided during detail engineering.	Store building is not in bidder scope. Please confirm.	Major store building is not in bidders scope. However, Store rooms/space for stores as and where required in service building/ other buildings is in bidders scope.
65	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.23.07, Page 40	The foundation of the Pipe/Cable Trestle shall be constructed at a distance of 4.0M from centre line of the plant building	The extent of foundation for Pipe/Cable Trestle shall be decided by bidder during detailed engineering after ensuring suitable clearance from nearby foundations. Pls. confirm.	Noted.
66	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.14.09, Page 30	The pump house structure shall be of R.C.C frame.	Cl 7.14.09, Cl 7.19.02, Cl 7.21.02 are in contradiction to Clause No. 10.01.03. Kindly clarify which clause to be followed for Cooling Water PH, Fuel Oil Pump House and Fire water Pump House.	RCC pedestals, structural steel super structure with Galvalume sheet roofing is envisaged for all the pump houses except Fuel oil pump house. Fuel oil PH shall be RCC framed structure. Also, CWPB roof shall be RCC slab.
67	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.19.02, Page 33	This building shall be a single storied framed superstructure with RCC columns, structural steel roof truss (with rafter and tie level plan bracings), purlins and roof slab. The roof slab shall comprise minimum 40 mm thick (above the crest of metal deck sheet) RCC slab supported on profiled metal deck sheet.		
68	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.21.02, Page 39	The fire water Pump House shall be single storied and single bay RCC superstructure provision for a structural steel monorail.		
69	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.03, Page 58	However, pump houses shall have structural steel super structure with Galvalume sheet roofing.		
70	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.23.03, Page 40	A walkway of minimum width 600mm shall be provided along the Cable Trays supporting floor of the gallery.	Bidder proposes to consider 600mm wide walkway for cable	Walkway of minimum 800mm width shall be provided along the cable / pipe

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71	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.03.07, Page 61	All trestles shall be provided with continuous walkway of minimum 750mm width with handrails and toe-guards all along the length of the trestle	gallery. Please confirm.	galleries.
72	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.03.09, Page 61	The storm water drainage shall cater to storm water runoff resulting from one hour rainfall intensity, with a return period of 100 years.		
73	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	1.13.01 v), page 4	Rain fall a) Annual average rainfall : 1112.7mm b) Maximum rainfall in 24 hours : 315mm/day	Please furnish design rainfall intensity in mm/hr for design of BTG area drainage.	Minimum rainfall intensity for design shall be consider 75mm/hr.
74	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	8.03.00, Page 44	2 Power House Building (iii) Other Areas in Turbine Hall -25 kN/Sq.m plus hung loads	Imposed load of 10 kN/Sq.m plus hung loads shall be considered. Please confirm.	Bid Specification Prevails
75	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	8.03.00, Page 45	3 Mill Building (b) Feeder Floor - 25 kN/Sq.m + hung loads + 0.5 kN/sq.m (dust load)	10 kN/Sq.m + hung loads kN/sq.m (dust load) shall be considered. Please confirm.	3 Mill Building (b) Feeder Floor - 15 kN/Sq.m + hung loads + 0.5 kN/sq.m (dust load)
76	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.02, Page 58	The main plant building, Control Room building, de- aerator supporting structures and Bunker building shall have structural steel framed super structure, with metal cladding on exterior face.	Clause 7.02.04 for TG Bay, Clause 7.03.04 for Control room, Electrical bay & heater bay, and Clause 7.0712 for mill and bunker bay shall be followed. Kindly confirm.	The clause no. 10.01.02 is design concept/design criteria for the building.
77	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.21, page 59	Water proofing treatment shall be provided for liquid retaining/ carrying structures and basement type structures	Plasticiser/ super-plasticiser cum water proofing compound shall be added in concrete as per specification. No separate water treatment is required. Kindly confirm.	The clause no. 10.01.02 is design concept/design criteria for the building. Separate details for waterproofing of underground structures is provided.

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78	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.03.05, Page 61	All roads shall be of flexible pavements except as otherwise specified.	Flexible pavement roads are not specified in the specification for BTG package. Kindly confirm.	All roads in the BTG package shall be rigid pavement.
79	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.17.05, Page 72	Cement sand mortar 1:6 for one brick thick wall and 1:4 for half brick thick wall shall be used.	Referred clauses are contradictory, please clarify about the cement sand mortar for one brick thick wall (outer as well as internal).	All internal walls shall be with one brick thick in cement mortar (1:6). However, internal partition walls for office area and toilets shall be with half brick masonry thick with cement mortar (1:4).
80	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	21.01.02, Page 158	All internal walls shall be with one brick thick in cement mortar (1:4). However, internal partition walls for office area and toilets shall be with half brick masonry thick with cement mortar (1:4).		
81	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	Cl 11.22.05, Page 76	TEMPERATURE CONTROL OF CONCRETE i) The temperature of fresh concrete shall not exceed 23°C + 2°C when placed. ii) For maintaining the temperature of 25°C in the machine foundations, crushed ice shall be used in mixing water.	Temperature control of concrete is required only for TG foundation (deck). Kindly confirm.	Noted.
82	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.24.02, Page 77	No pressure relieving devices shall be permitted in underground structures.	Pressure relief valves (PRV) shall be permitted to prevent uplift of the cooling water channel and forebay. Please confirm.	Bid Specification Prevails
83	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	14.00.00, Page 91	The Bidder shall carry out the work as per the drawings issued to him and/or Bidder's drawings which are approved by the Engineer and/or the Engineer's instructions.	Micro-grading of area within the BTG Package is only in Bidders scope. Kindly confirm.	Bid Specification Prevails
84	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	38.01.03, Page 231	The scope of work shall also include the patrol road around the plant area and parallel to boundary wall. The patrol road will be 4m wide	Patrol roads are not in bidder scope. Kindly confirm.	Noted.

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85	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	37.02.00, Page 231	This shall include ground water recharging with clean water collected from roof of buildings like Administration Building and collection of clean rain water from other areas in a pond.	1. Ground water recharge (refer clause 37.01.00) is envisaged as per specification, hence there shall not be any roof water collection pond. Kindly confirm. 2. Scope of rain water harvesting is applicable for BTG package only. Kindly confirm.	Providing rain water harvesting system, for individual buildings (BTG package), along with sump, is in bidder's scope.
86	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	38.02.00, Page 232	Roads – Bitumen Roads [Part – A]	1. Kindly clarify what is Part-A and Part-B w.r.to Roads. 2. Kindly clarify is their any bitumen road in scope of BTG Package . Bidder understand that Bitumen roads are not in bidders scope. Only internal roads within BTG package area are in bidders scope. Kindly confirm.	1. It is the detailed specification for Bituminous road and concrete road. 2. All roads in the BTG area shall be rigid pavements. BTG roads with in the terminal points marked in the Plot plan is in the scope of Bidder.
87	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.14.01, Page 170	The elastomeric membrane for the raft		It should be used for all underground like tunnel/basement floor or water retaining structures.
88	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.15.00, Page 172	Bituminous or Tar Coating on External Surface		It should be used for all concrete surfaces of structures/foundations which are contact with soil or ground water.
89	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.16.00, Page 173	Protective Coating on Inside Surface		It should be used for internal surface of concrete walls for all underground or water retaining structures.
90	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.17.00, Page 173	Bitumen Felt: Application for Tanking		It should be used for base of below MS tanks.
91	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.18.00, Page 173	Polyethylene Films: Application in Walls or base of Structures	1. Bidder proposes to follow Clause No 10.01.05, page 58 for below ground RCC structures in contact with soil. Kindly confirm. 2. Above ground RCC superstructure, RCC substructure which is not in contact with soil, inside surface of RCC tanks and walls - Surface treatment/coating is not required. Kindly confirm.	Not applicable.

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92	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.19.01, Page 174	Protective Coating on Concrete Surface ON FOUNDATION	Not applicable.
93	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.05, Page 58	The concrete surface wherever contacts with soil or ground water shall be provided Bitumen painting/Bitumen felt for all areas/structures shall provide if required as per soil condition.	
94	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.02.07, Page 21	elastomeric membrane type waterproofing system as per specifications.....	Bid Specification Prevails
95	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.03.12, Page 23	Elastomeric membrane type Waterproofing system as per specifications shall be provided over the roof.	
96	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.10.04, Page 27	Roof shall be given Heavy duty water proofing with Bitumen felt.	
97	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.14.10, Page 30	Review for providing elastomeric compound as per roof treatment done in other major plant building.	
98	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.14.11, Page 30	To protect water proofing courses, a screed layer of concrete grade M20 using 10 mm downgraded aggregate, of average thickness 40 mm shall be provided.	

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99	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.02.00, Page 165	MATERIALS High solids content Polyurethane based cold liquid applied coatings shall be as per ASTM C836-89	There is contradiction in roof water proofing requirement in different clauses of the specification. Bidder proposes to follow 23.04.00 for roof water proofing system. Kindly confirm.	Clause no. 23.04.00 shall be followed for roof water proofing.
100	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.04.03, Page 166	roof water proofing treatment using high solid content liquid applied elastomeric water proofing membrane with separate wearing course as per ASTM - C-836 & 898.....		
101	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.05.00, Page 167	Expanded Polystyrene Blocks		
102	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.05.04, Page 167	Either of above items can be adopted subject to approval of engineer.		
103	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.07.00, Page 167	Water proofing by epoxy resin based application		
104	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.09.00, Page 168	Waterproofing with app modified bituminous membrane.		
105	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.10.00, Page 168	Surface finish		

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106	IV-PART D	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	31.03.06, Page 204	Underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending upon the functional requirements. This under deck insulation shall consist of Glass insulation with 0.05 mm thick aluminium foil & 0.6 mm x 25mm mesh wire netting and shall be fixed to the ceiling with 2 mm wire ties.	1) Bidder understands that underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending upon the functional requirements of HVAC. Please confirm. 2) Areas such as cable vault etc. which are coming below the air conditioning area shall not be provided with under deck insulation (below floor) due to practical constraints. Please confirm.	Noted
107	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	32.01.06, Page 205	Vitrified ceramic tiles of size 400mm x 400mm or 600mm x 600mm (Mat or Mirror Polished) and of specified thickness from reputed manufacturer shall be used.	Please provide the thickness of the floor tile.	Minimum thickness required for Vitrified tiles is 12mm.
108	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 81	Colour coated Metal cladding on A-row & Gable end.	Bidder understand that only external cladding is required on A Row and Gable end. Kindly confirm.	Noted.
109	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 81	ACP cladding works	Scope not clear, please clarify	ACP cladding will provide over the wall surface.
110	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 82	Aluminium composite panel cladding on walls and columns upto false ceiling level	1. ACP pannel in SWAS room/UPS battery charger room is not required. Kindly confirm. 2. Please furnish painting schdeule.	Bid Specification Prevails
111	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 82	Aluminium Composite panel cladding for columns and walls	1. ACP pannel in Conference room, senior executive room, Computer Room, Office room and staff room is not required. Kindly confirm. 2. Please furnish painting schdeule.	Bid Specification Prevails
112	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01 Page 82	Digitally glazed ceramic wall tiles up to False Ceiling Height	Please confirm which clause (i.e. 12.02.01 page 82 or 32.01.02 page 204) is to be followed.	Both the clauses are different.

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113	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	32.01.02, Page 204	Sunken RCC slab shall be provided in false flooring area and all toilet areas so as to keep the finished floor level of these areas 12 mm below as that of the surrounding area. For toilet area, sunken slabs shall be made water tight by suitable water proofing treatment.		Bid Specification Prevails
114	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 83	INTERIOR FINISH SCHEDULE 2)Service building a) Entrance Lobbies and Lift areas/ Foyer /Exhibition space. b) Conference room, senior executive room. Page-84 INTERIOR FINISH SCHEDULE 4)ESP Control building c) Control room area	ACP cladding on internal wall is not required. Kindly confirm. 1. ACP pannel in Entrance Lobbies and Lift areas/ Foyer /Exhibition space, Conference room, senior executive room, ESP Control room, control room ares is not required. Kindly confirm. 2. Please furnish internal painting schdeule for above mentioned area.	Bid Specification Prevails
115	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 82/83	INTERIOR FINISH SCHEDULE Service building Conference room, senior executive room - 11 mm thk. Laminated wooden flooring INTERIOR FINISH SCHEDULE, STG Building k) Conference room, senior executive room, Computer Room, Office room and staff room - Matt finished Vitrified ceramic tiles.	1) Bidder proposes vitrified tiles instead of wooden flooring as this type of flooring is not advisable in dusty environment. Please confirm.	Bid Specification Prevails
116	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.02, Page 87	Toilet & pantry doors shall be wooden panel door. EXTERIOR FINISH SCHEDULE 5. Doors f) Toilet / Pantry area Brief technical specifications of different items to be used for the area as follows:	Bidder proposes to provide wooden panel door with steel frame in toilets and pantry. Kindly confirm.	Bid Specification Prevails
117	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.08 Page 38	iv) DOORS		
118	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.02, Page 87	EXTERIOR FINISH SCHEDULE 6. Windows d) Toilet / Pantry area	Bidder suggest to use Aluminium framed glazed windows in toilet and pantry. Kindly confirm.	Noted
119	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.08 Page 37	i-c) For staircase and Corridors: Steps – risers & tread, stair skirting, corridor floor should be combination of Aranga white marble and Abu green marble.	504 Clause 7.20.08 and 12.02.01 for flooring in RCC stairs are	20mm thick Granite flooring

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120	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, Page 83	Service building d) RCC Stair case - 20mm thick Granite flooring.	contradictory. Kindly clarify which is to be followed.	20mm thick Granite flooring
121	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.02.10/ 11.02.00	For Control Rooms, CER, UPS Charger Room area in MPH/turbine building. Dry wall construction technology shall be incorporated. Control room shall be designed as designer control room with ACP Cladded wall panelling for housing LVS.	Clause 7.02.04 for TG Bay, Clause 7.03.04 for Control room, Electrical bay & heater bay shall be followed. Kindly confirm.	Bid Specification Prevails
122	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.10.02, Page 69	ii) Rain water down comers shall be of uPVC Pipe conforming to IS 4985:2021.	There is contradiction in specification for rain water downtake pipe material. Bidder proposes to follow uPVC Pipe for rain water downtake pipe. Kindly confirm.	Noted. Rain water down comers shall be of uPVC Pipe conforming to IS 4985:2021
123	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	35.03.01, Page 222	Rainwater down comers shall be standard Cast Iron Pipes. In case where specifically desired, M.S. pipes may also be used. M.S. pipes shall be painted.....		
124	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.08, Page 58	Welding shall be used for fabrication and erection. Site connections shall generally be with welding/bolts.	Bidder proposes that primer coat shall be applied at shop, Intermediate coat and final coat shall be applied at site after erection for welded construction of structural steel works. Kindly confirm.	Noted
125	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	13.03.00, Page 88	Painting of Steel Surfaces (Other Than Those Embedded In Concrete)		
126	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.02, Page 45	Exposed Metal Work		

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127	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	24.04.01, Page 175	Permanent Colour Coated Aluminium Cladding System		
128	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	24.06.01 iii), Page 175	Troughed galvanized M.S. sheets having 0.6 mm minimum base metal thickness (bare material) with minimum rate of galvanization of 275 gms./sq.m. as per IS-277 of minimum yield strength of 250MPa	The referred clauses are in contradiction for side cladding/roof sheeting requirement in the specification. Bidder proposes to follow clause 12.02.02 for side cladding/roof sheeting. Kindly confirm.	Bid specification prevails
129	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	24.06.02 iv), Page 176	Sheeting material shall be preformed and precoated profile sheeting of thickness 0.60 mm or as recommended by manufacturer to resist the climate of the jobsite for Top skin (Weather side) and Bottom skin or inner side slightly ribbed type and minimum 0.5 mm thick or as recommended by manufacturer of similar pre coated panel.....		
130	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	24.07.00, Page 176	Double skin insulated metal cladding		
131	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	24.06.02 v), Page 175	Insulating core shall vary from 25 mm to 100 mm thick according to the climatic requirement of the site and shall be either polystyrene block or rock wool slab made to profile of the sheet.	Bidder proposes 50 mm thick insulation sandwiched between two sheets. Kindly confirm.	Bid Specification Prevails
132	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.01.06, Page 45	External surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet over insulation.	In case of borosilicate glass block lining system is envisaged on inner surface of flue can, there shall be no requirement of insulation on outer surface of flue can. External surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet without insulation. Kindly confirm.	Noted.
133	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.01.12, Page 46	For Borosilicate lining, the top flue liner above the roof slab shall be made of C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 8 mm thickness with Borosilicate Glass Block Lining of minimum 38 mm thickness.	In case of borosilicate lining, for flue can projecting above the roof slab, bidder proposes to provide 8 mm thick (minimum) mild steel flue internally lined with borosilicate and external surface wrapped with 2 mm thick Titanium/C276 sheet. The same is as per latest specifications of most of the customers including NTPC and also inline with engineering done for various projects chimneys by bidder. This is to avoid joint between two type of materials for flue can. Kindly confirm.	Noted.

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134	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.01.14, Page 46	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 8 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining. The minimum length of the capping inside the chimney shall be atleast equal to 1/4th diameter of flue liner.	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 2 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining. The minimum length of the capping inside the chimney shall be atleast equal to 150mm. Kindly confirm.	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 3 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining. The minimum length of the capping inside the chimney shall be 150mm and the thickness shall be 2mm of Titanium / C-276 sheet.
135	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.03, Page 49	Internal and external platforms shall be provided not more than 45 m intervals and shall satisfy the requirements of high intensity aviation obstruction lights as per IS 4998 / I.C.A.O. regulations, aviation lights are provided at three levels at 1 / 3, 2 / 3 and at top of Wind Shield.	External platform nowadays are obsolete due to high maintenance cost and delay in construction. Bidder proposes to remove the requirement of external platform. Aviation Warning lights (AWL) shall be fixed to openings in the chimney shell. The same is inline with detailed engineering done by bidder for various projects as a proven practice. Kindly confirm.	Noted.
136	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.13, Page 49	CHIMENY OPENING iii) Bidder shall consider not more than 45° as maximum angle subtended by single opening at the centre of the shell as per clause 7.0 of IS 4998:2015. iv) The maximum width of opening shall be limited to an angle of not more than 30 degree subtended at center of concrete shell.	Opening criteria mentioned in these clauses are contradictory. Bidder proposes to follow the opening criteria as per IS4998:2015 including its amendment. Kindly confirm.	Noted.
137	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.14 i) Page 50	The floor supporting beams shall take support on shell by making a pocket in the shell and elastomeric bearings shall be provided below the supporting beams.	Steel bearing plates shall be provided for supporting beams in shell pockets. The same is inline with detailed engineering done by bidder for various projects. Kindly confirm.	Noted.
138	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.17 vii) Page 51	Minimum factor of safety against 1.5 using unfactored loads	Values of Partial Safety Factor for Loads shall be aprovided as per IS 4998:2015 table-1. Kindly confirm.	Noted.
139	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.18 ii) Page 52	If the liner is supported by the shell, the shell shall be thickened for the liner support framing beam pockets, unless otherwise approved by the Owner.	Liner supporting beams shall be supported in recess provided in chimney shell. Thickening of shell may not be required. The same is inline with detailed engineering done by bidder for various projects. Kindly confirm.	Noted.
140	VOLU ME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.02.19 ii) Page 54	Use a response spectrum modal analysis with the design response spectrum for horizontal ground motion calculated by the general procedure in IS 4998 appropriate for the seismic conditions. A fixed base "stick" model, which couples the shell and liner behavior, shall be used. The liner stay rod system shall be included in such a manner as to produce a conservative design of the shell and liner. A sufficient number of modes shall be considered such that the stresses would not change by more than 10 percent if additional modes were included.	Chimney shall be designed fulfilling all the requirements of IS 4998:2015 (latest). Kindly confirm.	Noted.

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141	VOLUME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.03.00 Page 55	Painting i) The Chimney painting as per ICAO guidelines. External portion of the wind shield shall be coated with alternate bands of colours red and white to meet the aviation safety requirements. The minishell and the top few metres of the internal surface of the windshield shall be painted for acid and heat protection with bituminous paint.	Minishell shall be wrapped with titanium/C276 sheet. Please provide complete specification (type, DFT etc) for chimney RCC shell external surface and internal surface painting as the same is ambiguous.	Refer Addendum on Chimney Painting
142	VOLUME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.05.06 Page 59	The top flue liner above the roof slab shall be made of solid C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 10 mm thickness.	In case of borosilicate lining, for top flue liner above the roof slab, bidder proposes to provide 8 mm thick (minimum) mild steel flue internally lined with borosilicate and external surface wrapped with 2 mm thick Titanium/C276 sheet. The same is as per latest specifications of most of the customers including NTPC and also inline with engineering done for various projects chimneys by bidder. This is to avoid joint between two type of materials for flue can. Kindly confirm.	Noted.
143	VOLUME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.05.10 Page 60	ALLOY CHIMNEY HOOD:	Chimney hood were required in case of brick flue chimney, to seal the gap between brick lining and RCC shell. For subject steel flue chimney, the same is not required. Kindly confirm.	Bidder note that it is coming at Chimney roof level for connection between Flue can and Roof slab.
144	VOLUME - III	PART - A/SECTION - 4/FGD, Lime Handling & Chimney	4.06.01 iii) Page 63	Compressive strength of at least 1.38 Mpa as per ASTM C.165	Minimum compressive strength of 1.1 Mpa as per ASTM C165 is proposed by the bidder. The same is inline with other projects done by bidder. Kindly confirm.	Noted.
145	VOLUME - PART - D		8.17.01 ii) Page 51	R.C.C CHIMNEY a) Reference shall be made to IS: 4998 Part I (1992) – “criteria for design of Reinforced concrete chimneys – Part I, assessment of loads” for loading details. For wind loading IS: 875 and for seismic loading IS: 1893 shall be referred to. b) Wind load magnification on the Chimney induced by adjacent tall structures such as Cooling Towers/Boiler structures shall be included in model study conducted in wind tunnel, and necessary modification shall be made in the wind loading for design. c) Detailed design requirements in respect of the chimney have been described elsewhere in the specifications (Refer FGD Section Vol.-III, Part-A, Section-4).	Chimney shall be designed fulfilling all the requirements of IS 4998:2015 (latest). Kindly confirm.	Bid Specification prevail. However, the code IS 4998: 2015 instead of IS 4998: 1992 shall be followed
146	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.02.07, Page 21	Roof rain water pipe shall be of uPVC conforming to IS 4985:2021		

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147	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.07.14, Page 26	Rain water down take pipes shall be of uPVC pipe conforming to IS 4985:2021.	The referred specification clauses are contradictory. Please clarify the type of rain water down take pipes to be used.	Roof rain water pipe shall be of uPVC.
148	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.10.04, Page 27	Adequate number of rain water down take pipe shall be provided using uPVC pipe conforming to IS 4985:2021.		
149	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.14.11, Page 30	Rain water down comers shall be of uPVC pipes conforming to IS 4985:2021.		
150	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.10.02 ii), page 69	Rain water down comers shall be of uPVC Pipe conforming to IS 4985:2021.		
151	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	23.04.05, Page 166	For all Buildings are envisaged uPVC pipes shall be provided to drain off rain water from the roof.		
152	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	35.03.01, Page 222	Rainwater down comers shall be standard Cast Iron Pipes.		
153	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.24.14 ii), Page 42	interlocking concrete blocks of minimum M35 grade and minimum 80 mm thickness.....	The referred clauses are contradictory. Pls. clarify the grade of concrete and thickness of interlocking concrete blocks.	Clause no. 7.24.14 ii) shall be followed for interlocking concrete blocks.

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154	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	32.01.08, Page 205	Inter locking concrete blocks used for paving shall be of minimum M-30 grade of concrete, and of thickness 60 mm,.....		
155	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.24.14, Page 42	All facility/buildings shall be provided with 1000 mm wide plinth protection all around with garland drain. It consists of 100 mm thick P.C.C. M-20 grade.....	The referred clauses are contradictory. Pls. clarify the grade of concrete for plinth protection.	Clause no. 7.24.14 shall be followed for Plinth protection.
156	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.36.01, Page 80	All buildings will be provided with a width of 1000mm with plain cement concrete of M15 grade paving.....		
157	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.17.05, Page 72	Cement sand mortar 1:6 for one brick thick wall and 1:4 for half brick thick wall shall be used.	Referred clauses are contradictory, please clarify the following: 1. Proportion of cement mortar for external wall. 2. Proportion of cement mortar for internal wall one brick thick. 3. Proportion of cement mortar for internal wall half brick thick.	Cement sand mortar 1:6 for one brick thick wall and 1:4 for half brick thick wall shall be used.
158	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	21.01.02, Page 158	All internal walls shall be with one brick thick in cement mortar (1:4). However, internal partition walls for office area and toilets shall be with half brick masonry thick with cement mortar (1:4)		
159	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	21.02.06, Page 159	Mortar for brick masonry shall consist of cement and sand and shall be prepared as per IS:2250. Mix shall be in the proportion of 1:4.		
160	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	22.01.01, Page 162	Outer face (i.e. rough side) of all brick walls shall have 18 mm thick and inner face (i.e. smooth side) of all walls shall have 12 mm thick cement sand plaster 1:6.	Referred clauses are contradictory, please clarify the proportion	The proportions of the cement mortar for plastering shall be 1:4 (one part of

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161	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	22.02.01, Page 163	The proportions of the cement mortar for plastering shall be 1:4 (one part of cement to four parts of sand).	of the cement mortar for plastering.	for plastering shall be 1:4 (one part of cement to four parts of sand).
162	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.18.03 i), Page 72	Dry film thickness of each primer coat shall be 50 microns.	C1 11.18.03 i) & 13.03.00 are contradictory w.r. to requirement of primer coat DFT. Please clarify DFT for each primer coat.	Clause no 13.03.00 shall be followed for primer coat DFT.
163	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.18.04 ii), Page 72	Two coat of primer shall be provided.		
164	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	13.03.00, Page 88	All steel surfaces shall be provided with two component moisture curing zinc (ethyl) silicate primer coat (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% $\pm 2\%$) of minimum 70 micron DFT to be applied over blast cleaned surface.....		
165	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.08 i) b), Page 37	For Entry cum reception lounge, VIP lounge, Main meeting/ conference room: Suitable and approved combination shed of marble slab and strips shall be used.	1. Please clarify thickness of marble slab for flooring, wall, staircase tread/riser. 2. Please provide details of strip?	For marble, 20mm thick shall be provided. For staircase and corridors, 20mm thick granite shall be provided. Strips for design/border shall be same as that of floor material.
166	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	7.20.08 i) c), Page 37	For staircase and Corridors: Steps – risers & tread, stair skirting, corridor floor should be combination of Aranga white marble and Abu green marble.		
167	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 1), Page 81	STG building d) General circulation area like lift entrance area, office area and laboratory - 25mm thick Granite flooring.		

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168	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 1), Page 81	STG building e) Operating floor - 25mm thick Granite flooring.	Bidder proposes to provide 18-20 mm thk. Granite flooring. Please confirm.	Bid Specification prevails.
169	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 1), Page 82	STG building n) RCC Stair case - 20mm thick Granite flooring.		
170	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 1), Page 82	STG building l) Record room - ceramic tiles		
171	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 2), Page 83	Service building f) Pantry/ Kitchen - ceramic tiles	Bidder proposes to provide vitrified ceramic tiles in place of ceramic tiles for the referred clauses. Please confirm.	Noted.
172	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 1), Page 82	STG building m) Toilet area- Ceramic (anti-skid) tiles		
173	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.02.01, 2), Page 83	Service building e) Toilet - Ceramic (anti-skid) tiles	Bidder proposes to provide vitrified ceramic (anti-skid) tiles in place of ceramic(anti-skid) tiles for the referred clauses. Please confirm.	Noted.
174	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.02.01, Page 66	All the Architectural design works shall be carried out by professionally qualified architects having adequate experience (minimum five years) in the design and detailing of architectural work of power plant buildings. Bidder may have inhouse Architects with the required experience for the above or engage Architect Consultant having similar experience.	Referred clauses are contradictory, please confirm the following: Bidder proposes to follow Clause No. 11.02.01, page 66 for architectural design and detailing aspects of all the buildings. All the Architectural design works shall be carried out by in-house	Noted. However Bidder to submit

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175	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	12.01.04, Page 81	Architectural design and detailing aspects of all the buildings shall be rendered through professional services of an Architect. Statutory requirements may be required to be met with, wherever essential. The Architect Consultant shall be of National/International repute having experience in similar kind of works. The consultant shall evolve the design philosophy based on Owner/Engineer's guidelines and shall present it in the form of presentation drawings, Perspective views, 3-D Models and detail drawings.	Architects having adequate experience (more than five years) in the design and detailing of architectural work of power plant buildings. Also, in-house Architects shall evolve the design philosophy based on Owner/Engineer's guidelines and shall present it in the form of presentation drawings, Perspective views, 3-D Models and detail drawings. Kindly confirm.	atleast three number of design options for owner's approval DDE. In-house Architect having minimum 10 yrs experience is accepted.
176	III	PART - D	10.01.07	Design detailing and fabrication of steel structures shall be done as per provisions of IS: 800 with updated version.	Design boiler structures will be as per IS 800 latest using working stress method.	Noted
177	III	Part-D	(Page 88) 13.02.00	Painting of steel surfaces embedded in concrete Steel surfaces embedded in Concrete, the surface shall be prepared by Manual Cleaning and provided with Pri-mer Coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron Dry Film Thickness (DFT).	<i>No painting is required for embedded surfaces, as paint will hinder adhesion.</i> <i>Temporary rust preventive fluid can be applied to protect these surfaces until erection.</i>	Noted
178	Volum e III - Part D Civil		5.04.02	Face of the buildings and facilities are located in such a way so as to have an offset of minimum 15 to 20m with respect to centre line of road	The minimum requirement given is stringent considering the available space. Building offset shall be finalised based on available space in plot during detail design. Owner to please confirm.	Face of building and facility should be maintained at a distance of minimum 3 mtr with respect to edge of right of way
179	Volum e III - Part D Civil		7.03.08	All partitions wall for Control room area shall be of aluminium glazed partition up to roof level, on either side of air lock	Bidder understands glazed partition to be provided till False ceiling level. Owner to please confirm.	Bid Specifications prevails and glazed partition to be provided till False ceiling level.
180	Volum e III - Part D Civil		7.03.09	Battery room shall be provided with PVC doors in PVC framing.	Bidder recommends to provide steel door for battery room as per standard practice. Owner to please confirm.	2 Hr fire rating MS Steel fire proof door in MS frame shall be provided.
181	Volum e III - Part D Civil		7.03.11	Under deck insulation shall be provided on the ceiling, on the walls and beams above false ceiling	Bidder understands that under deck insulation shall be provided as per functional requirement for Air conditioned rooms. Owner to please confirm.	Bid Specifications prevails.
182	Volum e III - Part D Civil		7.03.12	Roof shall be given a fall of about 300 mm for proper drainage.	Specification requirement is not clear. Owner to elaborate the requirement.	Roof shall be given a projection of 300 mm from outer face of wall for proper drainage.
183	Volum e III - Part D Civil		7.20.08.i.a	Total thickness of the flooring shall be 40 mm thick including the thickness of the tiles, under bed	Total flooring thickness for service building shall be 75 mm considering cable raceway under flooring for working cubicles. Owner to please confirm	Total thickness of 40 mm mentioned in bid is minimum. As per functional requirement thickness may increase.
184	Volum e III - Part D Civil		7.20.08.iii	It shall be of aluminium linear acoustic false ceiling with glass wool insulation on top having approved colour with stove enamel finish,	For AC area under deck insulation is provided as per HVAC requirement. Bidder understand additional insulation above false ceiling is not envisaged. Owner to please confirm.	Noted

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185	Volume III - Part D Civil		7.20.08.v	GLAZED PANELS The glazed panels shall be made of aluminium sections having same finish that of aluminium doors with double-glazed insulating glass panels. This partition height shall be from top of floor finish to the bottom of the false ceiling and maximum available width. Insulating glass shall consist of 2 nos. 6 mm thick clear float glass separated by an air gap of 12mm thick, hermetically sealed, moisture resistant and of approved manufacturer.	Bidder understand that the clause is for internal partitions, not the external glazing. Generally internal partition does not require Double glazed glass. Generally double glazed is used to segregate between AC and Non AC area, but here the Service building is centrally AC, hence this may not be required. Owner to check and confirm.	Noted. However, for main entrance double glazed partition shall be provided.
186	Volume III - Part D Civil		11.02.11 7.03.04	For Control Rooms, CER, UPS Charger Room area in MPH/turbine build. dry wall construction technology shall be incorporated. Control room shall be designed as designer control room with ACP Cladded wall panelling for housing LVS. Cladding shall be of brick walls	There is a discrepancy in 2 clauses for cladding for control room. Owner is requested to check and clarify.	There is no discrepancy. The building shall be cladded with Brick wall (as per clause no. 7.03.04). In addition to Brick wall, the inside control room shall be cladded / decorated with ACP panels (as per clause no. 11.02.11).
187	Volume III - Part D Civil		11.02.10	For Control Rooms, CER, UPS Charger Room area in MPH/turbine build. dry wall construction technology shall be incorporated. Control room shall be designed as designer control room with ACP Cladded wall panelling for housing LVS	Owner to please clarify the type of DRY WALL to be used if not brick.	Bidder note that the drywall means no Brick wall. It means Aluminium partition, ACP partition, etc.
188	Volume III - Part D Civil		11.02.12	All control room shall be provided with air lock lobby having double glass door	Bidder understand this shall be considered only for MPH main Control room.	Noted
189	Volume III - Part D Civil		11.03.01	All roofs shall be provided with access thorough a staircase/cage ladder	Bidder understands that wherever equipment handling is required, staircase shall be provided. Otherwise ladder or cage ladder to be provided.	Noted.
190	Volume III - Part D Civil		11.05.03	All stairs normally shall have not more than 15 risers in one flight.	As per NBC only 12 risers in one flight is allowed. Owner to confirm on providing 15 risers in one flight.	Noted and maximum 12 risers in one flight may be provided
191	Volume III - Part D Civil		12.01.04	The consultant shall evolve the design philosophy based on Owner/Engineer's guidelines and shall present it in the form of presentation drawings, Perspective views, 3-D Models and detail drawing	Bidder understands and request to provide 3D Perspective view of important buildings like Service building and MPH only. Rest other buildings shall not be submitted with 3D perspective views. Owner to confirm.	Noted
192	Volume III - Part D Civil		12.02.00	FINISH SCHEDULE- Aluminium False ceiling	Bidder understands that Aluminium False ceiling here means Lineal pattern as mentioned in clause 31.00.00 on page 203 of Volume III- Part D civil and not a Grid type aluminium panel ceiling. Owner to please confirm	Bidder's understanding is correct.

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193	Volum e III - Part D Civil		21.01.01	All walls shall be non-load bearing infill panel walls. For initial height up to 3 metres from ground floor one brick thick masonry wall shall be provided wherever Aluminium cladding is specified.	As per this clause wherever ACP (aluminium cladding) is coming, external wall shall be of 3mt high and rest area shall be ACP. As per finishing schedule Service building is to be provided with ACP on external face. Owner to please check and clarify the clause to be followed.	Bidder note that this clause is only specification of Brick work. For initial height up to 3 metres from ground floor one brick thick masonry wall shall be provided wherever Aluminium cladding is specified. It is for Steel building wherever sheet cladding will come. The ACP cladding on external face for Service building shall be as per tender requirements.
194	Volum e III - Part D Civil		22.01.02	Plaster of Paris (Gypsum Anhydrous) shall be used for plaster of paris punning over cement plastered surfaces for inside wall of all buildings. The finish surface shall be smooth and shall be of 2 mm nominal thickness	POP Punning shall be provided only for important areas and buildings like Service building and control rooms only. Rest of the areas shall be cement base putty over plaster before painting. Owner to please confirm	Noted.
195	Volum e III - Part D Civil		27.03.09	All inaccessible (where regular maintenance is not feasible) ventilators and windows shall be provided with 6mm thick Multiwall Polycarbonate plain or tinted sheet for preventing solar radiations.	Bidder recommends to provide 4mm thick ground glass or 6 mm thick wired glass for inaccessible windows instead of Polycarbonate sheet for better durability in weather effect. Owner to please reconsider.	6mm thick wired glass shall be provided instead of multiwall polycarbonate plain or tinted sheet.
196	Volum e III - Part D Civil		32.03.03	The total thickness of glazed tile finish including the bedding mortar shall be 20mm in flooring/dado/skirting. The minimum thickness of bedding mortar shall be 12mm for flooring and 10mm for dado/skirting work	As per clause 32.00.01 nominal total flooring thickness is 50 mm, but here it is mentioned 20 mm. Bidder understands it shall be 50 mm for all buildings Owner to please confirm.	Minimum total thickness of glazed tile in dado/skirting is 20mm. Thickness of flooring shall be 50mm.
197	Volum e III - Part D Civil		32.04.02.ii.a	The total thickness including the underbed shall be minimum 40 mm for floors 30 mm for walls unless otherwise specified	As per clause 32.00.01 nominal total flooring thickness is 50 mm, but in this clause it is mentioned 40 mm. Bidder understands it shall be 50 mm for all flooring. Owner to please confirm.	
198	Volum e III - Part D Civil		35.03.01 11.11.02	Rainwater down comers shall be standard Cast Iron Pipes. In case where specifically desired, M.S. pipes may also be used. M.S. pipes shall be painted outside with two coats of anticorrosive paints under a coat of primer. Rain water down comers shall be of uPVC Pipe conforming to IS 4985:2021	There is a discrepancy in 2 clauses for Rain water down comer. Bidder understands that uPVC pipes as Rain water down comers shall be considered. Owner is requested confirm.	uPVC Pipe conforming to IS 4985:2021 shall be used for rain water down-comers.
199	Volum e III - Part D Civil		10.03.09 36.00.00	These values shall be based on the recommendations of the Meteorological Department. The maximum velocity for pipe drains and open drains shall be limited to max. 1m/sec. The maximum velocity for pipe drains and open drains shall be limited to 2.4m/sec and 1.8 m/sec. respectively	There is a discrepancy in 2 clauses for Maximum Velocity in drain. Owner is requested to check and clarify.	Clause no. 36.01.00 shall be followed.

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200	Volum e III - Part D Civil		36.03.00 6.03.03	The drain shall be minimum 300mm wide at the base. Drains shall be designed during detailed engineering; however minimum clear width of the drain shall be 450mm.	There is a discrepancy in 2 clauses for Drain Width. Owner is requested to check and clarify.	Minimum width of drain shall be 450 mm.
201	Volum e III - Part D Civil		36.05.00 10.06.03	Similarly all artery drains and the drains along the periphery of building shall also have perforated precast RCC covers of minimum 50 mm thickness with provision of openable galvanized steel grating covers at about 4.0 m intervals. Drains outside building (Garland drains) will have perforated pre-cast RCC covers of minimum 75mm thickness	There is a discrepancy in 2 clauses for Precast RC Cover. Owner is requested to check and clarify.	Perforated precast RCC covers of minimum 75 mm thickness with provision of openable galvanized steel grating covers at about 4.0 m intervals shall be provided.
202	Volum e III - Part D Civil		10.03.09	The storm water drainage shall cater to storm water runoff resulting from one hour rainfall intensity, with a return period of 100 years. These values shall be based on the recommendations of the Meteorological Department.	Owner to specify the rainfall intensity for storm water drain design.	Bidder shall collect the data from Meteorological department
203	Volum e III - Part D Civil		10.06.03	Runoff coefficient shall be taken as per IS 8835-1978.	Kindly note that IS 8835 is only for rural area and agriculture land. Coefficient for plant area, paving etc. are not provided in code. Hence owner is requested to specify the runoff coefficient for plant.	Run-off coefficient 1) Paved area - 1 2) Unpaved area - 0.6
204	Volum e III - Part D Civil		6.03.01 10.03.05 38.01.01	All roads in the power plant area of BTG island and main access road from gate shall be rigid pavement with RCC and all other roads shall be Bitumen top flexible pavement designed and constructed as per relevant IRC codes. All roads shall be of flexible pavements except as otherwise specified. Design of flexible pavement shall be carried out as IRC-37. The minimum requirements as specified in IRC-37 w.r.t. surfacing base and sub base shall be followed. All main plant roads (Part-B) will be in concrete rigid pavement with minimum 300 thick PQC as per IRC except patrolling roads.	a) There is a discrepancy in all 3 clauses for type of road. Owner is requested to specify whether road shall be flexible (Bitumen) or Concrete (RCC or PQC). Also, if Concrete road, then whether the concrete road will be with reinforcement (i.e. RCC Road) or without reinforcement (i.e. PQC road). Owner is requested to check and clarify. b) Also in case of PQC road, Owner is requested to allow bidder to design the PQC thickness of rigid pavement of road as per IRC. 300 mm thickness is too high which is generally not required as per design.	All main plant roads will be in concrete rigid pavement with minimum 300 thick PQC as per IRC.
205	Volum e III - Part D Civil		6.04.08	Any existing nalla which is coming in the plant area shall be suitably diverted and connected to a permanent water course.	Bidder do not envisage any nalla diversion within the BTG battery limit. However in case the same is included in BTG package then Owner is requested to provide layout and terminal point of existing Nalla to be diverted.	Bidder visit the site and collect the necessary data.
206	Volum e III - Part D Civil		6.05.01	For plant area sanitary sewage disposal, Effluent from the each building complex shall be connected to a common combined sewage treatment plant.	Bidder understand that Sewage treatment plant is existing or in others scope. For BTG package, Bidder needs to connect the pipe at terminal point. If this understanding is correct, Owner to provide terminal point location in the plot plan.	Sewage pipe line upto collection sump at STP is in bidder scope. Location of STP is marked in the plot plan.

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207	Volum e III - Part D Civil		7.04.01	The TG foundation shall comprise of RCC top deck supported on steel helical springs & viscous dampers (called herein as the Vibration Isolation System – VIS) and shall be located in the Turbine bay of Main Power House. The springs-cum-viscous dampers shall be placed on a group of RCC/ Structural Steel columns.	Owner is requested to also allow bidder to design STG without spring & dampers/VIS, as per OEM recommendation.	TG foundation shall be Rigid.
208	Volum e III - Part D Civil		7.04.03	In case the MDBFP/TDBFP foundation is approved by owner & consultant to be located at ground floor of Main Power House, then these shall be designed as block foundations directly resting on soil / pile.	Bidder proposed to keep MDBFP and TDBFP on ground floor of Main Power House Building. Owner is requested to confirm the same to proceed with layout.	If BFP foundations rest over the floor beams, VIS shall be provided. If the BFP foundation rest on ground or on lower floors where rigid foundation can be used, the VIS may not be required & all stipulations given in the code shall be followed..
209	Volum e III - Part D Civil		7.19.02 10.01.03	This building shall be a single storied framed superstructure with RCC columns, structural steel roof truss (with rafter and tie level plan bracings), purlins and roof slab. However, pump houses shall have structural steel super structure with Galvalume sheet roofing.	As per Cl 10.01.03 all pump house shall be Steel superstructure. However Fuel Oil pump house has been specified with RCC superstructure with Steel. Owner is requested to check and clarify the requirement.	RCC pedestals, structural steel Columns and truss is envisaged for all the pump houses except Fuel oil pump house. Fuel oil PH shall be RCC framed structure.CWPH shall have RCC roof.
210	Volum e III - Part D Civil		9.03.02	The permissible differential settlement between two adjacent footings (in a framed configuration) shall not be more than 6mm.	Owner is requested to allow bidder to design the foundation as per codal requirement of differential settlement.	Bid Specifications prevails. However, bidder want to go as per codal requirement then bidder has to give detailed calculation of settlement, DDE
211	Volum e III - Part D Civil		10.01.20	All RCC liquid retaining/ conveying structure (except water storage tanks) shall be designed in accordance with IS: 3370 by the working stress method.	As per Latest IS 3370- 2021, Only Limit state method is available for liquid retaining structure design. Therefore Bidder shall follow the same. Owner to confirm.	All RCC liquid retaining/ conveying structure shall be designed in accordance with IS: 3370 by the working stress method. However, the water storage tanks shall be designed as per IS 3370-2021. It should be satisfied with crack width.
212	Volum e III - Part D Civil		10.03.04	However, if such minor equipment is to be supported on building structure, floors, etc., suitable vibration isolation shall be provided by means of springs, neoprene pads, etc.	Where Minor equipment supported on floor, if mass of concrete is 3 times of mass of equipment, No vibration isolation required. Owner to confirm.	Bid Specifications prevails, Further requirement of isolation/dynamic analysis can be decided during detail engineering.
213	Volum e III - Part D Civil		10.03.03	Minimum Reinforcement in base raft in either direction shall be as follows: i) At bottom face - 0.2% of gross cross-sectional area	Owner to note that as per IS 2974 Part 3 ,0.12 % can be provided . Kindly confirm.	Minimum 0.12 % each on either direction can be provided.
214	Volum e III - Part D Civil		10.03.02	Transient analysis shall be carried out for the short circuit condition with an appropriate force function.	For Short circuit condition, loading and analysis will be carried out as per machine manufacturer requirement. Owner to confirm.	Noted

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215	Volume III Part D Civil		3.02.00 1.18.02 / 11.02.13	General plant layout drawing with coordinates of roads, buildings and facilities, piping / cable trenches, pipe and cable racks, provision of landscaping and green belt development, diversion roads and drains, equipment lay down areas etc The development of green belt is not in bidder scope. However, bidder has to plan the facilities leaving the space for green belt as indicated in "General Layout Plan". In addition to that lay-down areas and other vacant land of the plant will be used by owner for the development of green belt.	Bidder understand that, Landscaping and Green belt development will be done by Owner. Please confirm.	Development of landscaping in the BTG area for all the facility buildings as per specification shall be in Bidder's scope. However, Green belt development is not in Bidder's scope. Bidder has to plan the facilities leaving the space for green belt as per Mahagenco's requirement in the Layout Plan.
216	Volume III - Part D Civil		37.00.00	RAIN WATER HARVESTING	Bidder Understand that overall Rain water harvesting scheme development scope shall be with owner considering Split Packages. Any rain water collection from building in Bidder's scope shall be done by Bidder. Kindly Confirm.	Providing Rain water harvesting system to individual buildings with sump, is in bidder's scope.
217	III V	Part D Annexure - 8	13.03.00 Annexure - 8	Painting of Steel Surfaces (Other Than Those Embedded In Concrete) Painting specification All auxiliary steel structural steel components (Outdoor)	a) The referred clause mentions two types of painting category based on classification of environment "C3 - medium" and "C5-very high". Bidder understands that "C3-medium" painting scheme shall be followed for this project. Please confirm. b)Also, Bidder understands that the referred "Annexure-8 - Painting specification" is applicable for technological structures and equipment. For Building structures such as Turbine Building, Pipe rack, Coal Handling Plant structures, other structural buildings etc. clause no. 13.03.00 shall be applicable. Please confirm Bidder's understanding.	Pl. refer cl. No. 4.08.00 page no 4 of bid specification, Vol-V, Annexure-8- "Painting system for the plant shall be selected for medium corrosivity category, i.e. C3 and medium durability category, i.e. 7-15 yrs, as per ISO 12944. However, a minimum requirement of the specification has to be met." Pl. refer cl. No. 4.09.00 page no 4 of bid specification, Vol-V, Annexure-8- "System specific requirement of painting may be mentioned in other part/section of the specification. If there is any contradiction between this section and the other, the better painting scheme should be implemented."
218	Volume III - Part D Civil		5.04.05	Available Area for laydown, preassembly and batching plant have been earmarked on the General Layout Plan.	Laydown and preassembly area is not marked in the tender Plot Plan. Bidder request Owner to issue revised Plot Plan and earmark approx 100 acres of land for laydown and preassembly area.	Bidder to refer clause 9.01.02, vii, of Vol-II, Section-2. Available area within the plant area, is shown in the Plot Plan & shared with bidders. The planning for those areas shall be done by the bidder according to the sites requirement.
219	Volume III - Part D Civil		2.05.04	Tentative quantity of concrete/below ground structures and items to be dismantled is 5000m3.	Bidder requests Owner to furnish GPR survey report or drawing of underground facilities within the proposed BTG area.	Bidder to note that the proposed BTG plant is coming in the existing cooling tower area. The provided quantity is tentative. However Bidder can visit the site and collect if additional data is required. Nothing will be paid extra on this account.

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220	Volum e III - Part D Civil		2.05.01	Site clearance including diversion of existing services if any.	Owner to list out the facilities & earmark on the GLP which are fouling with the proposed BTG area and therefore requires rerouting. Also Owner to confirm that rerouting of such facilities shall be executed by Owner. For example - existing fuel oil lines, raw water pipeline, MCC Building of IDCT etc.	Bidder to visit the site and collect the necessary data. Tender terms and conditions prevail.
221	Volum e III - Part D Civil		2.05.04	MAHAGENCO has dismantled the superstructure of all structures including cooling towers etc.	Bidder understands that the debris arising out of dismantling of superstructure (which is Owner' scope) shall be cleared before handover of site to EPC Contractor. Please confirm.	Noted
222	Volum e III - Part D Civil		1.17.04	Site preparation including excavation and demolition of all underground structures, removal of all unwanted debris and transportation, procurement and transportation of suitable backfill material, backfilling, compaction, levelling, grading etc., is in bidder's scope.	As dismantling of substructure is included in EPC scope, Bidder requests Owner to specify the location wherein the debris and scrap material (substructure concrete, rebar etc.) shall be disposed.	Owner will provide the land for disposal of unused materials within 6 km from the plant boundary
223		ETG061-COM-GEN-PP-001		PLOT PLAN	During site visit, Bidder has observed that mill rejects are lying within the proposed BTG area. Bidder understands that the same shall be removed by Owner before handover of site to EPC Contractor. Please confirm.	Noted
224	Part A/ Section 5 Part D		4.11.09 7.15.08 7.14.15	600 NB size manholes, with 150 NB size vent valve shall be provided at 125 to 150m interval. Lifting lugs shall be provided to handle manholes. Manholes of minimum 1000mm clear opening shall be provided in each CW duct at a spacing of 200M (approx.) to facilitate maintenance / dewatering of CW ducts. At least one manhole shall be provided at the deepest point for both intake & discharge duct. Manholes shall be provided along the length of pipe at about 150 m centres and near locations of bend in each pipe.	Owner to clarify the manhole size required. Bidder proposes as a good industrial practice the size of 750 NB at spacing of 200 mtr. Owner to check and confirm.	Noted, however spacing can be finalized DDE.
225	Part A/ Section 5 Part D		4.04.16 7.14.01	Then pumps and equipment shall be designed for the tertiary treated sewage water as specified. Filtered / Clarified water shall be used for circulating water system	Owner is requested to confirm the water quality of the CW system. Bidder understand water quality is clarified water.	Filtered tertiary treated sewage water will be used for CW/ACW system.
226	Part D		7.14.04	Dimension of the pump sumps shall be so selected as to prevent dead water areas, reverse currents, flow separation and eddies. Recommendations of British Hydromechanics Research Association (BHRA) and Hydraulic Institute Standards shall be followed	Bidder will follow HIS recommendation for the CW sump design. Owner is requested to accept the same.	Noted
227	Part D		10.05.01 7.14.16	ii) Earth pressure with surcharge of 2.5 t / m2 and ground water table up to FGL outside and no water inside. iii) The conduit shall be designed for surcharge of 2t/m2.	We understand for CW conduit, the surcharge pressure to be considered is 2 t/m2. Owner is requested to confirm. 519	Noted

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228	Volume III, Part-D, Lead Technical Specification Civil, Structural and architectural			The bidder shall provide for a temporary workshop and garage to attend to routine maintenance and repair of the construction equipments as well as his fleet of vehicles used for construction activities.	Since, Workshop building is excluded from bidder scope, Bidder understand that all workshop equipment shall also not in bidder scope. Owner is requested to confirm bidder's understanding.	Bidder note that the specification clearly mentioned that "...the <u>temporary</u> workshop and garage to attend to routine maintenance and repair of the construction equipments as well as his fleet of vehicles used for construction activities". Bid specification prevail.
229	Volume-III	PART-D	11.35.01	Roof water tank of adequate capacity depending on the number of users and minimum 8 hours requirement shall be provided for each building and pump house. Separate tanks shall be provided for potable water and service water.	Tank capacity will be decided based on the number of users and requirement of national building code (NBC). Also, Bidder will provide the water requirement and pressure for both potable and service water at given terminal point during engineering. Kindly confirm	Noted. However, minimum capacities mentioned in the specification should be considered. Noted
230	VOLUME - III PART - D 3/ Sec 7/ Part A	CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS ETG106-EPC-ME-FGD-TS	18.08.05 4.08.11	18.08.05 The Bidder will provide testing equipment for conducting non-destructive tests for confirming the integrity of welding wherever necessary as directed by the Owner / consultant. In addition, the Bidder, at its expense, shall have the option of taking one radiograph per day per welder at a location selected by the Bidder.	Bidder will perform NDT as per FQAP requirement, in case of additional NDT to be performed, same shall be subject to extra time and cost. Please confirm.	Bid Specification Prevails
231	VOLUME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	10.01.21	Design Concepts Water proofing treatment shall be provided for liquid retaining/ carrying structures and basement type structures (requiring dry working condition). Dense and durable concrete with water cement ratio not more than 0.45 shall be used. Plasticiser/ super-plasticiser cum water proofing compound shall be added to the concrete. All the onstruction/expansion joints shall be properly treated with Copper strip water bar and/or chemical injection grouting after leak proof test as per IS:3370 standards.	Bidder would like to request for consideration as below; All expansion and construction joints of water retaining structures in RCC shall be made water tight using PVC Water stops. In case of any leakage found during leak test pressure grouting shall be done with fixing grouting nozzles and suitable materials.	Bid Specification Prevails
232	VOLUME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.09.01	Expansion /Construction Joints 11.09.01 Expansion and construction joints shall be provided wherever required. All expansion and construction joints of water retaining structures in RCC shall be made water tight using Copper strip water bars and Grouting nozzles for pressure grouting shall be provided. The minimum thickness of Copper strip water bars shall be 2 mm and minimum width 250 mm.	Bidder would like to request for consideration as below; All expansion and construction joints of water retaining structures in RCC shall be made water tight using PVC Water stops. In case of any leakage found during leak test pressure grouting shall be done with fixing grouting nozzles and suitable materials.	Bid Specification Prevails

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233	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.17.04	M-sand shall be used for construction of brick works and river/natural sand shall be used for plastering and finishing works.	Bidder would like to consider M-sand/river/natural sand for construction of brick masonry, plastering and finishing works. This is acceptable as per IS codes.	Bid Specification Prevails
234	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.22.03	11.22.03 NOMINAL COVER TO REINFORCEMENT The nominal cover to the reinforcement considering severe exposure as per IS 456: 2000 for all the structures, unless otherwise specified, shall be as follows:	As severe exposure condition is specified for nominal cover to reinforcement, Bidder understands the same is also applicable for mix design. Please confirm.	Noted
235	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	11.22.08	ULTRASONIC TESTING i) Ultrasonic pulse velocity test shall be carried out for Top Deck of TG to ascertain the homogeneity and integrity of concrete. ii) Testing shall be done as per IS: 1331 (Part-1). The defects shall be rectified by using cement / epoxy grout etc.	ULTRASONIC TESTING UPV testing shall be conducted as per IS: 13311 (Part-1). Defects shall be rectified using suitable materials as per rectification methodology. Please confirm.	Noted
236	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	17.23.02	CEMENT iii) No cement from a particular consignment/batch will be used on the works unless satisfactory 3 (three) days and 7 (seven) days test results for compressive strength are known.	Bidder would like to clarify that, cement will be received in bags or in bulkers along with manufacturing test certificate from source. Requisite sample testing will be done at site laboratory. However, cement bags will be kept at store whereas bulkers will be directly unloaded in cement silos. Same could not be kept hold until 7days. Therefore, bidder would like to request to kindly allow the cement usage after meeting requirement of consistency and setting time as per relevant standards.	Noted. However Bidder shall take responsibility for rectification works if the cement compressive strength fails in test result.
237	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	21.02.01	Bricks used in the works shall conform to the requirements laid down in IS:13757. Flyash bricks shall be used. The class of the bricks shall be as specified. The nominal size of the traditional bricks is 230mm x 110mm x 70mm with tolerance upto +3 mm in each dimension, one brick and half brick walls shall be considered as 230mm and 115mm respectively.	Bidder understand that use of fly ash bricks as per IS: 13757 or IS: 12894 is depend upon availability of fly ash bricks. However, in case fly ash bricks are not available in the vicinity area, burnt clay bricks meeting requirement of compressive strength 75kg/cm2 as per IS: 1077 shall be allowed for use. Owner is requested to confirm acceptance.	Noted
238	VOLU ME - III	PART - D TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	38.03.03	CEMENT CONCRETE (PLAIN AND REINFORCED) (c) Concrete : 1) Mix: The following concrete mixes shall be used for concrete roads. 2) Grade M15 with minimum cement content of 325 kg/cum shall be used for DLC layer below PQC and minimum grade of M35 with minimum cement content of 360 kg/cum shall be used for PQC.	Bidder would like to consider the minimum cement content shall be as per Concrete mix design as per IS 456 and IRC specifications	Bid Specification Prevails
239	Vol-III	Part-D	8.17.01	ii) R.C.C CHIMNEY Reference shall be made to IS: 4998 Part I (1992)....	The bidder understands that IS 4998 (Latest) is updated to limit state method. Therefore, chimney shell shall be designed as per IS 4998 : 2015. Kindly confirm.	Noted
240	Vol-III	Part-D	7.11.02	The height of Chimney/ stack height shall be 140m.	521 There is a ambiguity in the clauses. The bidder request owner to confirm Minimum Height to be provided for the Twin Flue RCC chimney	The top of Chimney for Flue can projection over the roof slab including the lightening arrester top shall be
241	Vol-II	Section-1	3.11.02	Chimney of adequate height(150m) along with ESP,FGD & SCR is considered....	Page 33	

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242	Vol-III	Part-A / Section - 4	4.01.07	Bidder shall consider the stack height is 140m.	provided for the Twin Flue RCC Chimney.	140m only.
243	Vol-III	Part-A / Section - 4	4.01.12	For Borosilicate lining, the top flue liner above the roof slab shall be made of C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 8 mm thickness with Borosilicate Glass Block Lining of minimum 38 mm thickness.	For Borosilicate lining, bidder proposes to provide 8mm thick (minimum) mild steel flue with Borosilicate Glass Block Lining for the top flue liner above the roof slab. This is proposed to avoid creation of welding joint between two different materials. It is not feasible to weld MS liner with solid titanium due to non-availability of suitable electrode for welding. Kindly confirm.	For flue can projecting above the roof slab, provide 8 mm thick (minimum) mild steel flue internally lined with borosilicate minimum 38mm thick and external surface wrapped with 2 mm thick Titanium/C276 sheet.
244	Vol-III	Part-A / Section - 4	4.01.14	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 8 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining	The bidder would like to propose 2 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining.	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 3 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining. The minimum length of the capping inside the chimney shall be 150mm and the thickness shall be 2mm of Titanium / C-276 sheet.
245	Vol-III	Part-A / Section - 4	4.01.19	However, minimum inside diameter of flue liner shall not be less than 8000 mm.	Bidder request owner allow to consider minimum inside diameter as per process requirement.	Bid Specification Prevails
246	Vol-III	Part-A / Section - 4	4.02.03	Internal and external platforms shall be provided not more than 45 m intervals and shall satisfy the requirements of high intensity aviation obstruction lights as per IS 4998 / I.C.A.O. regulations, aviation lights are provided at three levels at 1 / 3, 2 / 3 and at top of Wind Shield.	External platforms are obsolete these days. Moreover, DARA circulars are superseded by DGCA/ICAO guidelines. Also, external platforms have schedule and safety concerns. Therefore, bidder request Owner to remove this clause.	Noted.
247	Vol-III	Part-A / Section - 4	4.02.13	Bidder shall consider not more than 45° as maximum angle subtended by single opening at the centre of the shell as per clause 7.0 of IS 4998:2015.	There is a ambiguity in the clauses. Bidder request Owner to consider opening requirements as per clause 7 of IS 4998 : 2015(AMENDMENT NO. 1 ,JULY 2022) as following:	The single opening at the centre of the shell shall be as per clause 7.0 of IS 4998: 2015 and latest amendment.
248	Vol-III	Part-A / Section - 4	4.02.13	The maximum width of opening shall be limited to an angle of not more than 30 degree subtended at center of concrete shell.	The one-half opening angle of any opening shall not exceed 30° (Total = 2* 30 = 60 degrees). Therefore bidder would like to consider 60 degrees opening angle in place of 45 degrees. Please confirm. .	
249	Vol-III	Part-A / Section - 4	4.02.17	Concrete reinforcing steel Fe 550	Bidder would like to consider Fe500 for concrete reinforcing steel in line with ongoing FGD projects by NTPC/DVC.	Noted.
250	Vol-III	Part-A / Section - 4	4.02.17	Minimum factor of safety against - 1.5 using unfactored loads	The bidder understands that chimney shell shall be design as per IS 4998 : 2015 (Design of Reinforced Concrete Chimneys - Criteria, 3rd revision) with Limit State method of design. Similarly, loads and load combinations shall be taken as Table 1 of IS 4998 : 2015. Please confirm.	Noted
251	Vol-III	Part-A / Section - 4	4.02.18	The design shall be in accordance with IS 4998 for the following design conditions:	The bidder understands that wind shield shall be designed as per IS 4998 : 2015 using limit state method of design. Kindly confirm.	Noted
252	Vol-III	Part-A / Section - 4	4.02.18	Design basis concrete 28 day compressive strength for shell and other superstructure - f c ' = 35 Mpa	522 Bidder would like to propose Fc' = 30 Mpa for the Shell & other superstructure in line with ongoing FGD projects by NTPC/DVC	Minimum grade of concrete for RCC shell shall be M30.

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253	Vol-III	Part-A / Section - 4	4.05.06	The top flue liner above the roof slab shall be made of solid C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 10 mm thickness	There is a ambiguity in the clauses.	
254	Vol-III	Part-A / Section - 4	4.01.12	For Titanium/C-276 lining, the top flue liner above the roof slab shall be made of solid C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 10 mm thickness . For Borosilicate lining, the top flue liner above the roof slab shall be made of C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 8 mm thickness with Borosilicate Glass Block Lining of minimum 38 mm thickness.	For Borosilicate lining, bidder proposes to provide 8mm thick (minimum) mild steel flue with Borosilicate Glass Block Lining for the top flue liner above the roof slab . This is proposed to avoid creation of welding joint between two different materials. It is not feasible to weld MS liner with solid titanium due to non-availability of suitable electrode for welding. Kindly confirm.	Clause no. 4.01.12 - For Borosilicate lining, flue can projecting above the roof slab, provide 8 mm thick (minimum) mild steel flue internally lined with borosilicate minimum 38mm thick and external surface wrapped with 2 mm thick Titanium/C276 sheet.
255	Vol-III	Part-A / Section - 4	4.05.10	The hood shall slope toward the outside of the concrete shell. The hood shall be fabricated from Alloy C276 or C2000 material in sections arranged for attachment to the liner.	The bidder would like to propose 2 mm thick Titanium hood in line with ongoing FGD projects by NTPC/DVC	Noted
256	Vol-III	Part-A / Section - 4	4.05.15	The drain line shall be of 150 mm diameter solid Alloy C276 or C2000 material.	Bidder request Owner to allow use of Alloy C276 or SS316L material as Material for condensate collection drains / pipes for flue can/ outlet ducts.	Bid Specification Prevails
257	Vol-III	Part-A / Section - 4	4.06.05	The lining system shall, through documented testing, have been proven resistant to thermal shock, for a minimum of 1000 cycles, where each cycle results in the lining surface temperature to rise from ambient temperature to 180 °C, and back to ambient temperature.	Bidder request Owner to specify the ASTM Test Standard, which shall be followed to perform this study.	Five days cyclic test as per Manufacturer's recommendation shall be carried out.
258	Vol-III	Part-A / Section - 4	3.22.10	Ductwork for wet dry interface from ½ meter before quenching spray up to absorber	The extent to wet-dry interface shall be as per the recommendations from QFGDM. This extent has been similar to installation at NTPC projects. Kindly confirm.	Bid Specification Prevails
259	Vol-III	Part - D	7.24.04	Limestone Grinding System building/Ball Mill building: This shall be steel framed building with R. C. C. roof and floor. For steel building roof /floors shall comprise of RCC slab over profiled metal deck sheets (to be used as permanent shuttering only over structural beams). Cladding shall be of single skin metal sheeting or brickwork/concrete block work with plastering on both sides.	Bidder request to MSPGCL/STEAG to allow Bidder to have a flexibility to consider framing structure i.e. RCC or Structural steel based on construction schedule / layout etc. However, the floor and roof slabs shall be RCC.Kindly confirm.	Bid Specification Prevails
260	Vol-III	Part - D	7.24.09	Gypsum Dewatering Building: This shall be steel framed building with R. C. C. roof and floor. For steel building roof /floors shall comprise of RCC slab over profiled metal deck sheets (to be used as permanent shuttering only over structural beams). Cladding shall be of single skin metal sheeting or brickwork/concrete block work with plastering on both sides.	Bidder request to MSPGCL/STEAG to allow Bidder to have a flexibility to consider framing structure i.e. RCC or Structural steel based on construction schedule / layout etc. However, the floor and roof slabs shall be RCC. Kindly confirm.	Bid Specification Prevails

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261	Vol-III	Part - D	7.10.00	ESP Control Room	Bidder has considered a combined building for ESP and FGD control room building (unit wise). Owner is requested to confirm	Noted
262	Vol-II	Section-2	2.13.13	XXII) L - ESP & FGD Control / Switchgear Rooms		
263	Vol-III	Part - D	1.16.01	A preliminary Geo-technical Investigation has been carried out by the Owner and report of the same is attached in Annexure – 5, Volume-V.	Bidder requests to provide ground level in borelogs provided in geotechnical investigation report.	Bidder can check the tentative level of ground level from the topography survey report . Bidder shall visit the site and collect the necessary data.
264	Vol-III	Part - D	1.17.01	Owner has carried out the topography survey work and the drawing is attached in Annexure– 6, Volume-V.	As can be seen in Google earth, a conveyor is crossing from the CHP area. The same has not been marked in the surveyed drawing. Bidder requests to provide the details of same in survey drawing to check the interface with proposed CHP structures.	Bidder shall visit the site and collect the necessary data.
265	Vol-III	Part - D	1.17.02	The proposed plant will be established mainly at the land retrieved by demolishing the existing structures of retired units of 4X120MW units. The power block/main plant area of the proposed plant has to be constructed after demolishing the auxiliary structures like cooling towers.	Bidder requests to provide the foundation drawings of the retired units of 4x210 MW units, which are already demolished and / or which needs to be demolished.	Bidder shall visit the site and collect the necessary data.
266	Vol-III	Part - D	4.02.02 ii)	Following field tests shall be conducted: a) Bore holes b) Static Plate load tests c) Cyclic Plate load test d) Field Permeability tests e) Field Density tests f) Vane Shear tests g) Static Cone Penetration tests h) Electric resistivity tests. i) Pressure meter test j) Block vibration test	Following field tests shall be conducted: a) Bore holes b) Cyclic Plate load test c) Field Permeability tests d) Field Density tests e) Static Cone Penetration tests f) Electric resistivity tests. g) Block vibration test	Bid Specification Prevails
267	Vol-III	Part - D	4.02.02 iii)	Bore holes shall be located to cover the entire area. All bore holes shall be sunk up to a depth of 60.0 m or 5 m continuous into hard rock whichever is earlier.	Bore holes shall be located to cover the entire area. Bore holes for major structures shall be sunk up to a depth of 40.0 m or 5 m continuous into rock with Core Recovery more than 20 %, whichever is earlier and for other structures the bore holes shall be sunk up to a depth of 30.0 m or 5 m continuous into rock with Core Recovery more than 20%, whichever is earlier.	Noted.
268	Vol-III	Part - D	4.02.02 vii) k)	k) Triaxial Compressive Strength Tests: 1) Unconsolidated Undrained Test 2) Consolidated Undrained Test 3) Consolidated Drained Test	k) Triaxial Compressive Strength Tests: 1) Unconsolidated Undrained Test	Bid Specification Prevails

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269	Vol-III	Part - D	9.07.01 vi)	Number of initial load tests to be performed for each diameter and rated capacity of pile shall be as under: Number of initial load tests to be performed for each Vertical Lateral Uplift Minimum of 2 Nos. in each mode as per provision of IS:2911 This is because, 2 nos. of tests are sufficient for one type of pile (i.e. dia, length and capacity) as per IS:2911, if the number of piles of specific type are less than 1000. The same has been considered for ongoing projects with NTPC. Kindly confirm.	Bid Specification Prevails
270	Vol-III	Part - D	9.07.01 ix) & x)	ix) Vertical- 1.0 % of the total number of piles provided. x) Lateral -1.0 % of the total number of piles provided. Bidder would like to consider above mentioned frequency for routine load test as per IS:2911. Kindly confirm.	Bid Specification Prevails
271	Vol-III	Part - D	7.24.01	The civil works for FGD system shall comprise of civil, structural and architectural works below and above ground level of Ball mill building, Ball mill foundations, FGD control room building, slurry re-circulating pumps & oxidation blowers building, tank foundations, absorber tower foundation, MCC building, gypsum dewatering building, transformer foundation, equipment foundations, storage shed for Gypsum, lime storage silo, Truck tippler with shed Building description for gypsum storage shed is not mentioned, Bidder requests to consider the following building configuration of gypsum storage shed. RCC framed structure with RCC/brick masonry wall (up to Tripper floor) and structural steel shed with permanently colour coated profiled steel sheet roof and side cladding (above Tripper floor). Roof shall be provided with troughed profile permanently colour coated sheet with slope. Kindly confirm.	Noted
272	VOLU ME - III	PART D	3.02.09	Design calculations and drawings for foundations/ substructure and superstructure of all buildings including pump houses and other structures. As per Bidder practice, Mill Building is an integral part of Boiler Structure. Boiler Structure along with Back End Duct supporting structure comes under Technological category & Proprietary in nature. Hence Design calculations & Drawings will not be part of submission.	Noted. However, if the Mill building is not integral part of Boiler structure, all the design calculations and drawing shall be submitted for approval.'
273	VOLU ME - III	PART D	3.02.22	Shop drawings / fabrications of all structural steel works (only for reference) and design calculations for important joint connections. As per Bidder practice, Mill Building is an integral part of Boiler Structure. Boiler Structure along with Back End Duct supporting structure comes under Technological category & Proprietary in nature. Hence Shop drawings / fabrications of all structural steel works and design calculations for important joint connections will not be part of submission.	Noted. However, if the Mill building is not integral part of Boiler structure, all the drawings shall be submitted.'
274	VOLU ME - III	PART D	3.02.27	Soft copies of all design calculation and drawings shall be submitted for records after approval of the OWNER. As per Bidder practice, Mill Building is an integral part of Boiler Structure. Boiler Structure along with Back End Duct supporting structure comes under Technological category & Proprietary in nature. Soft copies of all design calculation and drawings will not be submitted.	Noted. However, if the Mill building is not integral part of Boiler structure, all the design calculations and drawing shall be submitted for approval.'
275	VOLU ME - III	PART D	3.02.29	Wherever possible mechanical bolts shall be cast in situ with sleeve for future minor rectification instead of providing pockets this will avoid cutting of main reinforcement for provision of pockets. As per Bidder practice, For Boiler Structure, Anchor Bolts are cast in situ along with Anchor Frames. Sleeve pipes will not be provided for Anchor Bolts. Seeking deviation for this clause.	Noted.

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276	VOLU ME - III	PART D	7.07.02	Complete hopper (sloped portions) shall be provided with lining of at least 5mm thick SS 304M grade material.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
277	VOLU ME - III	PART D	11.18.02	ii) Coal Storage Bunkers shall be provided with 3.15 mm thick stainless steel lining conforming to ASI 409M, IS1570.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
278	VOLU ME - III	PART D	18.04.09	i) The hopper portion of the coal bunkers shall be lined with stainless steel plates of 3 mm thickness.	As per Bidder practice & Ongoing Projects / Proposals, For Coal Silo Hopper, Lining material of 4mm thick SS 304 plate will be provide. Seeking deviation for this clause.	Fuel storage bunkers with supporting structure complete with emptying chute, poking holes. SS lining of 3mm thick SS 304 plate shall be provided in bottom conical portion plus 3m in cylindrical portion as per specification of Volume-III, Part-A, Section-1, Clause no. 2.29.02.
279	VOLU ME - III	PART D	18.04.09	ii) Such plug welding shall be done by drilling 21.5 mm dia. holes at 300 mm centre to centre both ways.	As per Bidder practice, plug welding shall be done by drilling 20mm dia holes. Seeking deviation for this clause.	Noted
280	VOLU ME - III	PART D	7.08.02	Elevator shaft shall be constructed with colour coated insulated metal cladding system supported on structural steel work.	As per Bidder practice & as per clause 7.06.02 of Volume III Part D Page 25, Cladding for Elevator Shaft (Elevator Enclosure) shall be by single skin troughed profile permanently colour coated sheet. Seeking deviation for this clause.	Bid Specification Prevails
281	VOLU ME - III	PART D	8.03.00	Imposed Loads: 3. Mill Building: b) Feeder Floor - 25 kN/Sq.m + hung loads + 0.5 kN/sq.m (dust load)	As per Bidder practice & Ongoing Projects / Proposals, Imposed load for Mill Building Feeder floor shall be 5kN/Sq.m (including Dust Load) + Actual equipment loads. Seeking deviation for this clause.	3 Mill Building (b) Feeder Floor - 15 kN/Sq.m + hung loads + 0.5 kN/sq.m (dust load)
282	VOLU ME - III	PART D	8.03.00	Imposed Loads: 3. Mill Building: c) Tripper Floor - 15 kN/Sq.m + hung loads + 0.5 kN/sq.m (dust load)	As per Bidder practice & Ongoing Projects / Proposals, Imposed load for Mill Building Tripper Floor shall be 5kN/Sq.m (including Dust Load) + Actual equipment loads. Seeking deviation for this clause.	Bid Specification Prevails
283	VOLU ME - III	PART D	11.19.01	Handrails and Gratings and Other Requirements: In such a case spacing shall be constructed with kick plates at bottom. It shall consist of 100 mm wide 8mm thick steel plate.	As per Bidder practice & Ongoing Projects / Proposals, Toe guard (Kick Plate) thickness shall be 6mm. Seeking deviation for this clause.	Noted

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284	VOLUME - III	PART D	11.19.02	Steel grating shall be Black Bitumen Painted to match with specifications. Pressure locked grating.	As per Bidder practice, as per clause 7.07.15 of Volume III Part D Page 26 and as per clause 13.05.01 of Volume III Part D Page 90, Grating shall be galvanised. Also Grating shall be of 32mm thick Electroforged type. Seeking deviation for this clause.	Noted.
285	VOLUME - III	PART D	13.01.03	Minimum thickness of metal for any structural steel elements shall be not less than 6 mm where steel is fully accessible for cleaning and repainting and where it is feasible to follow design criteria given in ISO: 12944 part 3.	Minimum thickness of structural steel shall be 4.5mm for the web of ISMB & ISMC sections. Seeking deviation for this clause.	Bid Specification Prevails
286	VOLUME-III/TECHNICAL SPECIFICATION ON CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D	7.05.02	PA/ FD/ ID Fan and Mill foundations shall be RCC block foundation directly resting on virgin soil/ pile below Ground level.	Bidder observed difference in requirement of foundation type for ID fan Bidder propose block type RCC foundation for ID fans considering existing practice in similar capacity executed project. Please confirm.	Bid Specification Prevails; it is self explanatory
287	VOLUME-III, TECHNICAL SPECIFICATION ON CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART-D	11.05.01 STEEL STAIRS	All steel staircases shall normally have minimum clear width (back to back of stringer) of 1000 mm and inclination with horizontal shall not be more than 35 deg. However, in case of space restriction, minimum clear width up to 750 mm and slope up to 450 may be provided	Bidder understand that staircase angle shall be provided between 35 deg. to 45 deg. and clear width shall be between 750mm to 1000mm. Please confirm.	All steel staircases except SG & Aux. shall normally have minimum clear width (back to back of stringer) of 1000 mm and inclination with horizontal shall not be more than 35 deg. However, in case of space restriction, minimum clear width up to 750 mm and slope up to 45 degrees may be provided
288	VOLUME-III/TECHNICAL SPECIFICATION ON CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS	PART - D	6.03.03	Drains shall be designed during detailed engineering. Minimum clear width of the drain shall be 450mm.	Drain width shall be as per layout feasibility. However, minimum 300mm shall be considered. Please confirm. 527	Bid Specification Prevails

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289	VOLU ME- III/TE CHNIC AL SPECI FICATI ON CIVIL, STRUC TURAL AND ARCHI TECTU RAL WORK S	PART - D	7.01.02	Mill Bay 12.5 X 44	Mill bay dimension will be considered as per bidder's bunker design . However, bidder understand that the provided dimensions are minimum for the complete mill bay (WxL) which is considering CHP tripper conveyor (Not in bidder scope) . Please confirm.	Bidder note that the provided dimension is minimum. Tender conditions prevail.
290	VOLU ME- III/TE CHNIC AL SPECI FICATI ON CIVIL, STRUC TURAL AND ARCHI TECTU RAL WORK S	PART - D	7.07.03	Mills are to be located on the ground floor. Mill foundations are to be designed with conventional block/frame type RCC foundation. In addition to Mill foundations provision has to be made in the Mill bay ground floor for trenches accommodating Mill reject system conveyors.	Bidder understand that trenches to be considered for chain conveyor only if required . However, bucket elevator will be located inside the pit as per OEM design. Please confirm.	Noted.
291	VOLU ME- III/TE CHNIC AL SPECI FICATI ON CIVIL, STRUC TURAL AND ARCHI TECTU RAL WORK S	PART - D	7.07.05	A steel stair case shall be provided for access to feeder floor from ground floor.	Bidder propose to consider approach to feeder floor through interconnection platform from boiler . Hence, separate staircase is not considered as per the practice in similar capacity project. Please confirm.	Bid Specification Prevails

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292	VOLU ME- III/TE CHNIC AL SPECI FICATI ON CIVIL, STRUC TURAL AND ARCHI TECTU RAL WORK S	PART - D	7.07.10	In addition to the above, framing arrangement for structural steel platform at various levels around the bunker shall be provided with proper access ladder, for poking, striking and attending to air cannons.	Air cannons are not considered as per OEM design , Please confirm.	Noted
293	VOLU ME- III/TE CHNIC AL SPECI FICATI ON CIVIL, STRUC TURAL AND ARCHI TECTU RAL WORK S	PART - D	7.08.02	Lift pit shall be of RCC construction. Ground floor entry shall be kept about 500 mm above general graded / paved level with a ramp for approach.	Ramp of 200mm from paving level will be sufficient for elevator entry for ease of material movement. Please confirm.	Bid Specification Prevails
294	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		General	As per site visit, it is observed that CW channels are located in the existing pond (water body) area. Bidder understand that MAHAGENCO will be providing levelled ground upto FGL clear of vegetation, bushes, builldings,trees, structures, debris, sheds etc. for entire scope in this package. Please confirm.	Minimum disturbance of the water body should be done for construction of Channel. Channel through the water body should be constructed on Pillars. However, any area leveling/grading/clearing etc required, shall be bidder's scope.
295	VOLU ME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		General	As per site visit, it is observed that debris, vegetation, bushes, trees, buildings, boundary wall, storage shed, piping, other misc buildings and RCC structures, tanks etc. are existing in BTG area. Bidder understand that MAHAGENCO will be providing levelled ground upto FGL clear of vegetation, bushes, builldings,trees, structures, debris, sheds etc. for entire scope in this package.Please confirm.	Bid Specification Prevails

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296	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		General	As per site visit, it is observed that mill reject stone heaves are present in the BTG area. Please confirm that the same will be removed by MAHAGENCO and levelled ground upto FGL shall be provided to bidder. Please confirm.	Mill reject materials which are lying in the proposed BTG area will be removed by owner.
297	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		General	At some places water pounding is observed in the BTG area. Please confirm that the levelled ground upto FGL shall be provided to bidder for entire area in the scope of this package.	Bid Specification Prevails
298	VOLUME - III	Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS		General	As per site visit, it is observed that some area of BTG is filled with water. Please confirm that the levelled ground upto FGL shall be provided to bidder for entire area in this scope.	Bid Specification Prevails
299				General	Please furnish the Highest Flood Level of the for the proposed plant.	Refer Vol-II, Section-2, Clause 3.01.00, "The high flood level of nearest Kolar river at a distance 2 km. from plant area, is 292.5 m above M.S.L." however bidder shall confirm from concerned department.
300				General	Please mark the co-ordinate and Finished graded level for terminal points of roads, drains, sewage in plot plan.	Please refer plot plan.
301				General	In case of ambiguity between 'VOLUME - II/SECTION - 2/LEAD TECHNICAL SPECIFICATION' and 'VOLUME - III/Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS', please clarify which of the two will take precedence.	For scope of work, VOLUME - II/SECTION - 2/LEAD TECHNICAL SPECIFICATION will follow. All other technical specification VOLUME - III/Part-D/TECHNICAL SPECIFICATION CIVIL, STRUCTURAL AND ARCHITECTURAL WORKS will follow.